DSP-Quattro 6

User's Manual

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Written by Stefano Daino

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Introduction

Welcome to the DSP-Quattro User's Guide. DSP-Quattro is the direct result of a very long experience developing Digital Audio applications for the MacOS, starting with D-SoundPRO, the powerful audio editor developed since 1994 for Apple Macintosh™ computers, a highly innovative product which uses even the latest technology of the new millennium. DSP-Quattro inserts the new dimension of real-time into the world of audio editors, turning your computer into a real time workstation for music production, plug-in hosting and audio editing for writing files ready for mastering. All of the above through the smoothest interface you have ever seen. DSP-Quattro is designed for the most professional users, however, thanks to the simple and intuitive interface, DSP-Quattro turns out to be the ideal product for whoever has no experience in the field and would like to enter in the world of digital audio.

This User's Guide will show you all there is to know about DSP-Quattro.

What is DSP-Quattro?

DSP-Quattro is an extremely powerful Audio Editor / AudioCD Mastering Application / BatchProcessor with extended real-time and off-line support of AU Effect and Virtual Instrument plug-ins for the Apple MacOS.

- DSP-Quattro is a real time audio editor.

DSP-Quattro is the right software for all people who want to record, create or edit their audio work with the computer. With DSP-Quattro you can record audio sources, edit existing audio files, and even create new files ready for mastering. All these using various existing formats, thanks to the import function, such as WAVE, AIFF, SDII, mp3, m4a, DDP, etc.

You will then be able to edit the new file starting with the basic Cut, Copy&Paste commands, to the most advanced algorithms, as the Time Stretching, Frequency and Pitch Shifting, Linear Phase Sample Rate Converter (SRC), and Digital Real Time Effects, like reverbs, stereo enhancers, graphic and parametric EQs, Analog Filter Simulators, and so on. And it is all built-in!

But not only that: DSP-Quattro is open to the standard third parties plug-ins as well. DSP-Quattro Editor allows you to use any plug-in exactly as any other internal edit function, offering also a real time preview of the result before to apply it.

And, if you will not like the result, you have not to worry: DSP-Quattro internal engine keeps track of all edits and you can Undo/Redo your operations without any limitation.

- DSP-Quattro is the perfect tool for Audio CDROM mastering.

DSP-Quattro integrates CD burning that conforms to the Redbook standards for playback in any CD player. DSP-Quattro comes also with a fully programmable AudioCD Layout, offering all the features needed to build your audio CDROM by using your favourites songs or even selections of audio files. Several non-destructive cross-fade types can be programmed to make the transitions between your audio tracks even smoother, without audio clicks or abrupt changes. And, as very unique feature, DSP-Quattro allows you to setup a serial chain of effects (to choose from the internal list or from the effect plug-ins installed on your system), to play and master you

AudioCD giving a tremendous additional power to your master. Even more, each track of the AudioCD may have its own chain of real time non-destructive effects, different from track to track to best suite all your needs!

CD-Texts, EAN/UPC, ISRC, PQ sub-codes are supported as well. You can even import/export the AudioCD layout according the DDP 2 standard.

- DSP-Quattro is an Instrument and Effect plug-in Host:

DSP-Quattro can also be used as a great real time synthesiser and multi-effects to be played by an experienced musician or by someone who simply wants to learn how to play an instrument.

Thanks to its specific connection with audio plug-ins and MIDI, DSP-Quattro is able to play a real time standard Instrument plug-in by using a MIDI controller and/or a external sequencer, while listening to an audio file and recording everything on a new file!

Even more, you can add in real time the effect plug-ins that better suites your needs. DSP-Quattro can even be used to better the sound quality of your voice or of your instruments as with a professional multi-effect, thanks to its real time management of the input/output connections of both internal standard and/or external analog/digital interfaces.

All of the above without any additional hardware or using all the features of those eventually connected to your computer.

- DSP-Quattro is a tool for software and hardware samplers:

For all those among you that have already experienced music and both hardware and software samplers, DSP-Quattro is the perfect editing tool. In fact, DSP-Quattro offers not only a way of processing in floating point precision to satisfy even the more professional user, it offers also all the graphical tools for the sample-based editing of your audio files. You will be able to set loop points through a special loop editor window, and apply any internal or plug-in effect directly to your samples!

DSP-Quattro guarantees the direct compatibility of audio files such as AIFF and WAVE, including the loop points information.

- DSP-Quattro is a BatchProcessor:

If you need to apply the same edits and processing functions to a bunch of audio files, the BatchProcessor of DSP-Quattro is the perfect tool for you. You can use it to set a serial chain of user-configurable processing functions to apply to as many audio file as you need, by pressing one button only.

And, last but not least, you can use it to change the audio format of even hundreds of audio files in just one step.

About Third Parties AudioUnit Plug-Ins formats

DSP-Quattro is capable to support Instruments and Effects plug-ins. Instruments can be used to play music in real time and to generate new audio files. Effects can be used as real time modifiers or as offline edit function with real time previewing. More about this will come later on this manual.

DSP-Quattro supports Instruments and Effects plug-ins in Audio Unit (AU) 64 bits format.

What do I need to use DSP-Quattro?

DSP-Quattro works on any Apple Macintosh with an Intel microprocessors running MacOS 10.14 (Mojave) or higher.

The minimum requirements are: a CPU Intel Core 2 Duo, 1 GB of free RAM, and around 50 MB of free space on your HD.

The audio and graphic engines of DSP-Quattro run at 64 bits and are multithread. If present, DSP-Quattro will use the CPU multicores.

Please consider also that the performances of DSP-Quattro are heavily dependent by the number of plug-ins and effects that are used at the same time.

If you have older systems, previous versions of DSP-Quattro which runs on previous versions of MacOS X - even on MacOS 9.2 - are still available upon request (but not supported anymore). Please contact the support@dsp-quattro.com to know the requirements to run it.

Mac standard audio interface can be used with DSP-Quattro by CoreAudio, which is built-in in the MacOS.

DSP-Quattro fully supports CoreMIDI, which is built-in into MacOS.

DSP-Quattro supports also all the external hardware audio interfaces if compatible with MacOS.

What do I need to know to use DSP-Quattro?

This User's Guide assumes that you know how to operate the Macintosh and are familiar with the basic Macintosh terminology such as point, click, drag & the MacOS file system and desktop. If you aren't familiar with these terms, you should refer to the Macintosh User's Guide to learn the basic operations of using the Macintosh. Optionally, this User's Guide assumes that you know what technologies like AudioUnit, CoreAudio, and, if you are interested to play software AU Instruments, what CoreMIDI and MIDI are.

Support:

DSP-Quattro official home page is:

www.dsp-quattro.com

Here you can find additional information on our product, you will be able to register your copy and, by being a registered user, you will be able to use a list of additional services in the user area.

At any time write us by e-mail at support@dsp-quattro.com to have the answer to your technical questions or for more information regarding the use of DSP-Quattro.

Installing DSP-Quattro

After downloading the DSP-Quattro archive from the web, your browser should decompress the zip archive and MacOS should automatically mount a disc titled DSP-Quattro.

If it does not happen, look into the Download folder on your HD for the DSP-Quattro zip archive, double-click on it to decompress it. Then, double click on the decompressed dmg file. Mac OS mounts a DSP-Quattro Hard Disk. Open it.

To complete the operation, drag the DSP-Quattro application icon into the Application folder.

Please read very carefully any additional documentation which is on the mounted DSP-Quattro disc, like About&FAQ and DSP-Quattro License.

Then, navigate to the Application folder on your HD, look for the DSP-Quattro application icon.

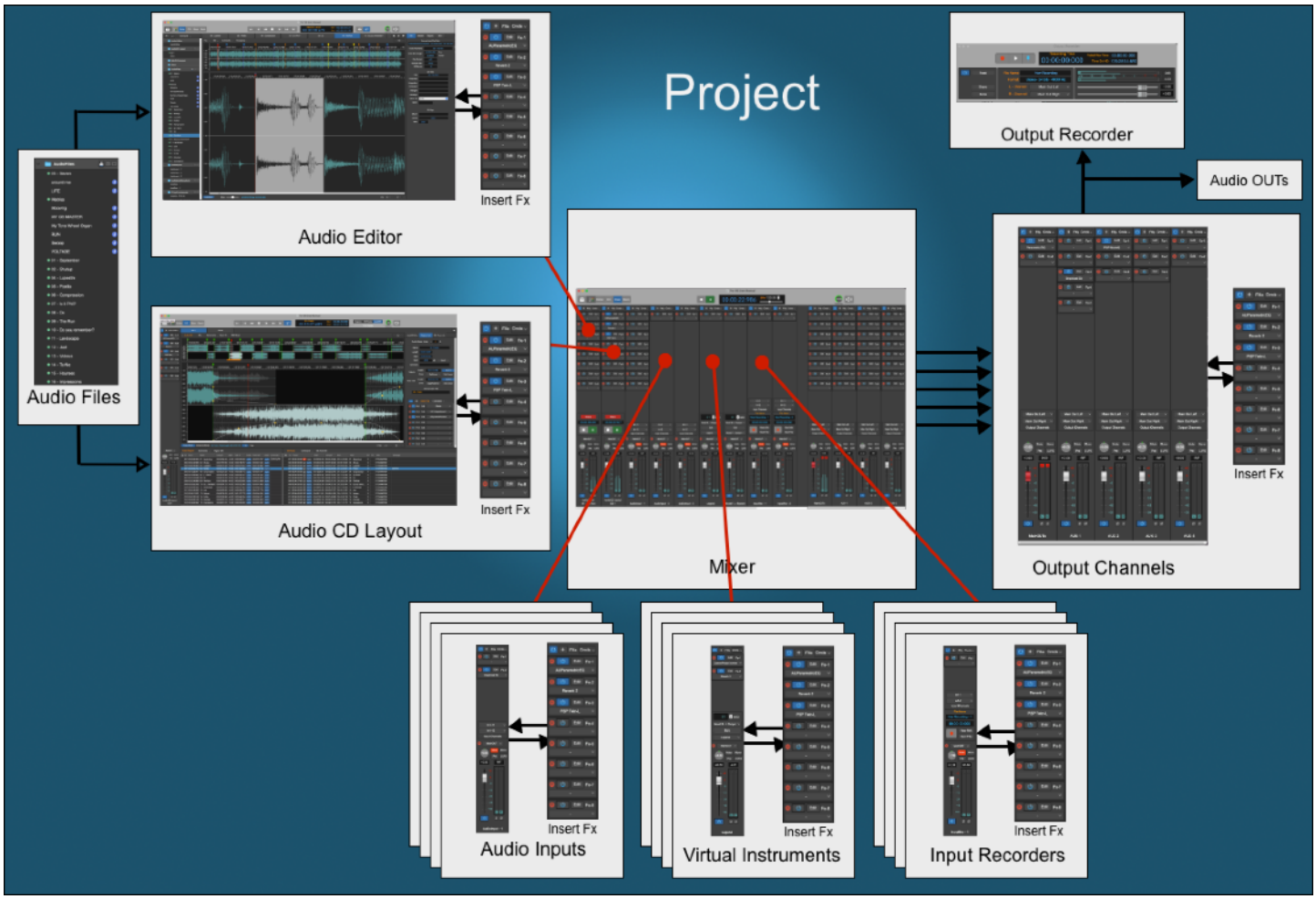
Running and Registering DSP-Quattro

Double click on DSP-Quattro application icon to run it. Then, please refer to the DSP-Quattro INSTALLATION GUIDE which is in the DSP-Quattro disk image and into the user area to know how to register your full version of DSP-Quattro.

That's it. Enjoy DSP-Quattro!

The Basics of DSP-Quattro

To make the most of DSP-Quattro, it is important to understand how it works.



The Project:

The project is the document used by DSP-Quattro. The project is a container including all the objects you need to accomplish your work. You start using DSP-Quattro creating a new project or opening an existing project, and you must decide if you want to save or discard the edits you did on your project when you quit DSP-Quattro.

When you wish to edit your audio files, or you wish to build an AudioCD, you import the audio files into the project. DSP-Quattro will make a copy of each audio file into the project bundle. Then, DSP-Quattro does not touch anymore your source audio files, it works on their internal copies: when you save the edits on your audio files using the Audio File Editor, DSP-Quattro updates the internal audio files, not the source audio files. To re-use the edited audio files outside DSP-Quattro, it is necessary to export them back to MacOS file system, eventually replacing your source files if this is what you want to do. Of course, DSP-Quattro offers several options to replace the source audio files on the MacOS file system with the versions which you have modified.

If you need, you can add to the Project also Audio Inputs and Input Recorders modules as well, you can also load and configure your Audio Unit Virtual Instruments, load your plug-ins on insert to your audio sources or on output channels. When you quit, you will save the Project if you wish to keep the current edit session.

The Audio Generators:

DSP-Quattro is based on Audio Generators. By Audio Generator we mean any source of sound. Examples of Audio Generators are any kind of audio file player, audio input, and virtual instrument plug-ins. In the real world, in a recording studio, a recorder, a synthesiser, a piano, a microphone, a musician playing his instrument would all be considered Audio Generators.

In DSP-Quattro it is possible to open or create as many Audio Generators as you want. These Audio Generators can then be played one at a time, all together or not even be played at all! A generator can be loaded or released dynamically, regardless of the other generators.

Effects and MasterOut Recorder:

The sounds created by Audio Generators go into a mixer that has one Master Out + four Aux channel strips, each one playing in stereo. It is possible to load on insert to each channel strip a series of real time effects that can be chosen among the internal effects of DSP-Quattro or among the third-party AU effect plug-ins installed on MacOS.

What you listen on output of the stereo channels can be even recorded as a new file using an Audio Output Recorder, and/or can be addressed to your audio devices, such as your Mac audio output or to an external audio device connected to the Mac.

The next chapters will deal with how to use different Audio Generators, how to configure an effects chain, and with all the other functions of DSP-Quattro.

The Audio File Editor:

A special kind of Audio Generator is the Audio File Editor. It is not only capable of playing an audio file, but it allows you to edit the file by a several different editing functions.

If you are already used a digital audio editor, the Audio File Editor of DSP-Quattro will look just like what you may have already used. But please do not stop at the use of DSP-Quattro as a simple audio editor, although it has all the possibilities to do so. DSP-Quattro introduces a new dimension of audio editing, and the time you will spend to understand how it works will be spent very well.

The AudioCD Layout:

Another very important component of DSP-Quattro is the AudioCD Layout. The AudioCD Layout is able to play a sequence - often called also playlist - of audio files or only portions of audio files. Each of these is called ‘Audio Regions’. It is also possible to set cross-fades between an Audio Region and the next one, to avoid abrupt changes of the output audio stream, making smooth transitions between them. You can also place markers to set the CD-Track starts and preGaps - or pauses - of your audio CD-ROM.

The AudioCD Layout output can be rendered to disc as a new audio file, can be used – in real time - as audio generator itself, or can be used to create an

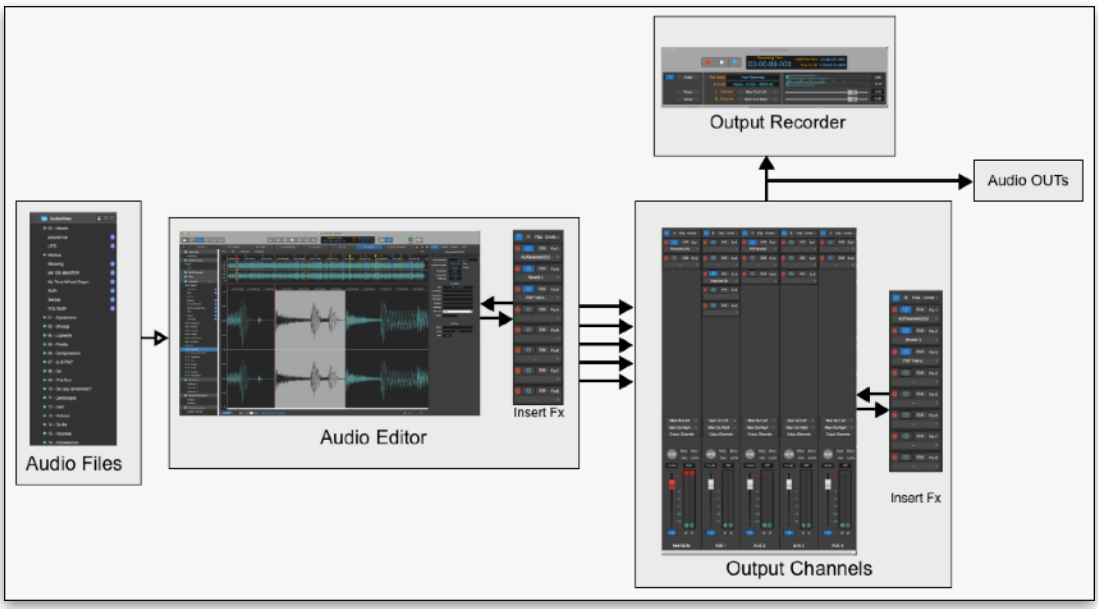
image of an audio CD-ROM using a standard format, the “DDP”. Moreover, DSP-Quattro is able to burn audio CD-ROMs by itself, if you have an internal or external CD writer device connected to your Mac.

Following are basic examples of what can be done with DSP-Quattro. And they could be even many more…

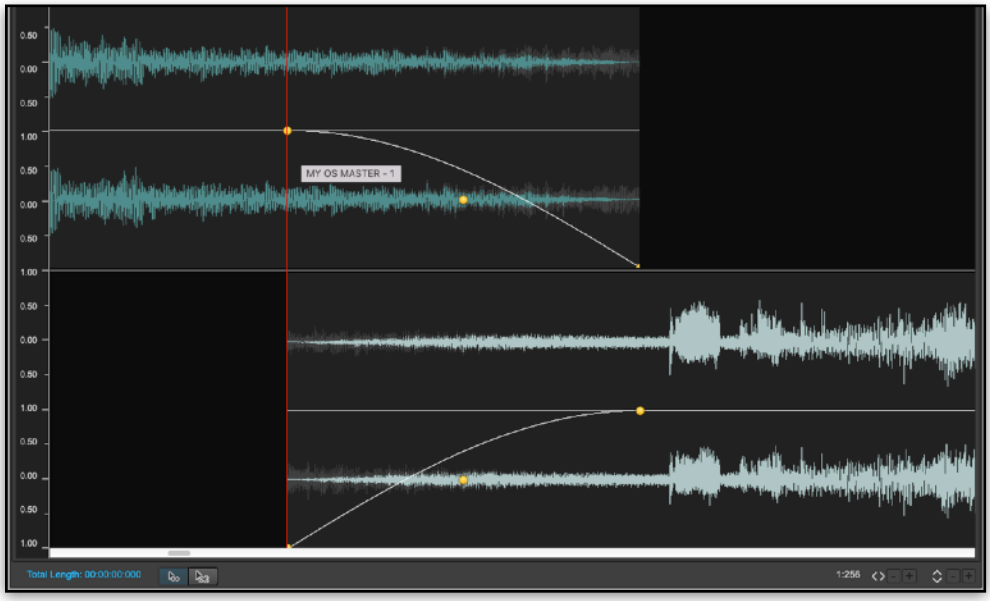
NOTE: Everything shown in these examples is dynamic and therefore can be fully customized by the user. Nothing stops you from adding or closing any of the elements, and to create a mix of the different configurations shown in the examples.

Using DSP-Quattro as Audio File Editor

You can choose to open/save audio files in all the most used formats, like AIFF, WAVE files (8, 16, 24, 32 or 32-Floats bits/sample), mp3, m4a,… or joining L&R channels from dual mono files if needed, and you can even import/export from/to RAW binary files. Again you can open different files at the same time and copy&paste data to one another audio file using the audio clipboard of DSP-Quattro.



DSP-Quattro offers a range of editing possibilities. Not only the basic Cut, Copy and Paste editing commands, but also highly professional commands such as High Quality Time Stretching and Frequency Shifting algorithms, an amazing De-clicker for audio restoration, reverbs, stereo enhancers, graphical and parametrical EQs, Analog Filter Simulators. Moreover, DSP-Quattro has been developed to host standard Audio Unit effect plug-ins, which can be used as edit function as well.



DSP-Quattro includes a very special Cut Editor as well. Using it, you can very easily remove portions, paste different audio materials on your audio file just looking to it and dragging waveforms back and forth in the time line to set crossfades between the regions, before and after the cut, avoiding abrupt changes or clicks on the resulting audio stream.

And don't forget that the editing is not destructive, because DSP-Quattro offers an infinite number of Undo/Redo levels. Last but not least, all the editing algorithms work with the precision of 64 bits floating point arithmetic when needed, to guarantee the best dynamic and professional results.

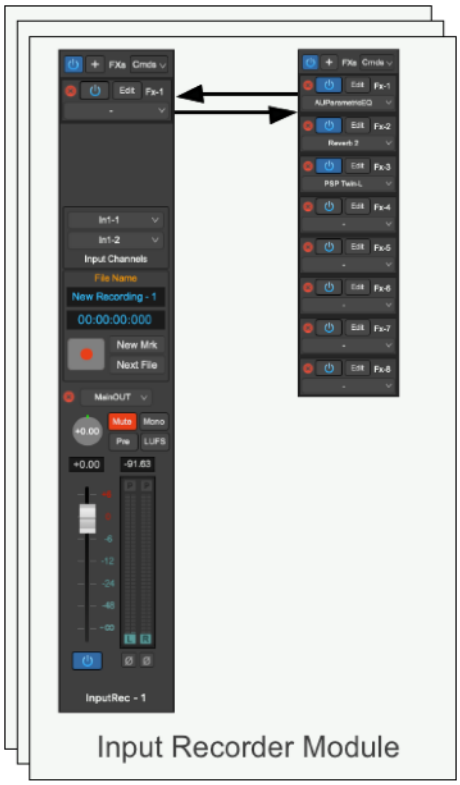
A series of real time effects can be added, both as insert on the audio file under editing and as global to the master out or to one of the auxiliary outputs.

Each effect can be chosen among the internal effects of DSP-Quattro and/or between the Audio Unit effect plug-ins installed in your system. There is also a very special internal 'plug-in' to address output/inputs of the Mac (or of the external audio device connected to your mac), so you can route your audio signals to/from an external analog/digital audio hardware.

The insert chain of effects can then even be used as an off-line editing algorithm to "render" it into a new audio file.

Not only this. Using the built-in Output Recorder of DSP-Quattro, which his able to make a new recording of what you are listening to the output of DSP-Quattro. Using it, any real time modification done on an audio file which is playing - such as pitch changes, time stretching, using jog shuttle in Audio Scrub mode, etc. - can be recorded into a new audio file.

Using DSP-Quattro as Digital Audio Recorder



The easiest way to make a new recording is to open an Input Recorder. This object is able to create a new audio file, choose a pair of stereo audio inputs (or only one input, if you prefer) and then record everything exactly as with a traditional recorder.

You can open how many Input Recorders you wish at the same time. This could be very useful when you have audio interfaces with multiple audio inputs. All them will be synchronised with the transport control of the Mixer Transport bar.

Each Input Recorder may have its own effect chains on insert.

DSP-Quattro offers also another possibility to make a new recording: the Output Recorder. It works almost as the Input Recorder, but it dumps to file everything that DSP-Quattro sends to the audio outputs.

Because it takes its inputs after the mixer, in the case in which you use multiple Input Recorders, ending a multiple recording sessions you will get one new file for each Input Recorder, plus one file with the mixed audio.

And, last but not least, you can configure different insert Fx for each recording, and for the mixed recording on output, of course.

And, of course, while listening to one input DSP-Quattro can play any other audio file and record everything mixed by using the Output Recorder...

Using DSP-Quattro for audio CD-ROM Mastering

DSP-Quattro allows you to do new recordings, get your audio files, edit

them, improve the audio quality of your product, build your AudioCD layout, and even burn and audio CD-ROM which is compliant with the Redbook standard, extended to include CD-Text, EAN/UPC CD-ROM Disc code, CD-Track ISRC and PQ sub-codes. You can import/export the AudioCD layout according to the DDP 2 standard as well.

Creating your first audio CD-ROM:

In just a few steps you will have your AudioCD ready for the distribution:

Step 1: *Record your audio files or import your audio files into the DSP-Quattro Project.*

Use DSP-Quattro as Digital Audio Recorder, as described above, to do your new recordings. DSP-Quattro will add the new recordings to the list of the imported audio files, ready for being used for editing or for building a new AudioCD Layout.

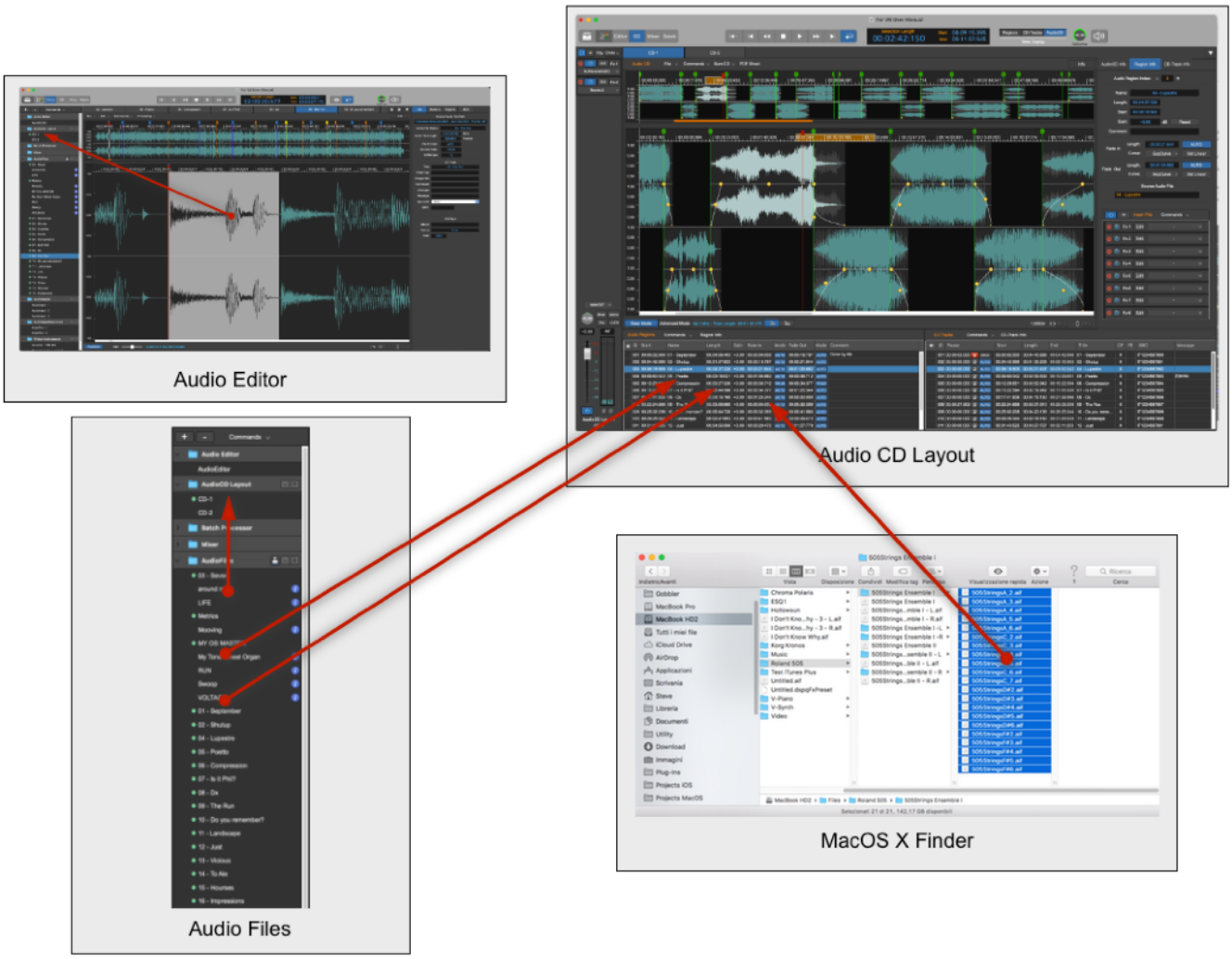
Step 2: *Edit your audio files and improve the audio quality.*

Use the Audio File Editor of DSP-Quattro to edit your audio files and to apply its internal effects or your favorite Audio Unit plug-in to clean or to improve their dynamics, modify their frequency spectrums, add reverbs and enhance the stereo image, and more.

Step 3: *Build the AudioCD layout.*

Use the audio files, or simply their selections/regions to build the sequence you want to burn on your AudioCD. By mouse dragging each region on the AudioCD row on the table on the left of the Project main window, DSP-Quattro will automatically add a new AudioRegion on the AudioCDLayout. The, step to the AudioCD to set the cross-fades between Audio Regions to avoid clicks and for the smoothest transitions between them just dragging each AudioRegion waveforms back and forth on the time line. You can also use DSP-Quattro for setting realtime non-destructive serial chains of effects differently for each track, or on the AudioCD Layout output if you want to apply the same effects to all the Audio Regions. You can choose the effects

among the real-time effects internal to DSP-Quattro or Audio Unit effect plug-ins installed on your configuration.



Step 4: *Save your work, burn and AudioCD or export as DDP*.

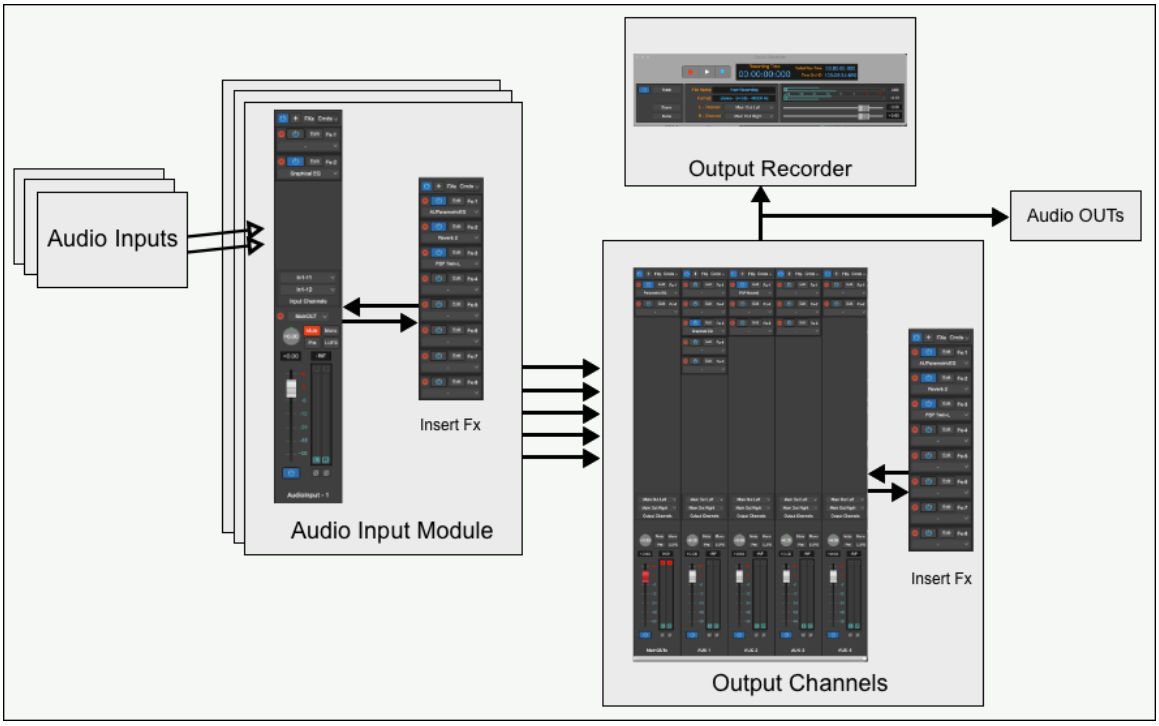
As soon as your AudioCD layout suites all your needs, save your Project. Then, you can export the AudioCD Layout as and audio file using the very best audio audio format (DSP-Quattro allows you to save even with 32 float sample bit precision), export each CDTrack as single audio file, choosing the audio file format you prefer, including the iTunes Plus AAC, the format used to upload the audio file to iTunes Music Store.

DSP-Quattro allows you also to burn an audio CD-ROM directly using your Mac, without the need of additional software. The resulting audio CD-ROM will be compliant with the Redbook standard, to guarantee the perfect compatibility with all the audio CDROM players available on the market.

If you need to distribute your AudioCD as a master Audio CD-ROM image, export it as DDP. DSP-Quattro will then create a folder including all the files needed, including CD-Texts, EAN-UPC, ISRC and PQ codes.

Using DSP-Quattro as Real-Time Digital Multi-Effects Unit

The chain of effects in the Master Out can be easily changed to use DSP-Quattro as a Real Time Digital Multi-Effects Unit. All you need to do is to open an Audio Input, set a couple of input, load the chosen effects in the Master Out, and choose the output.



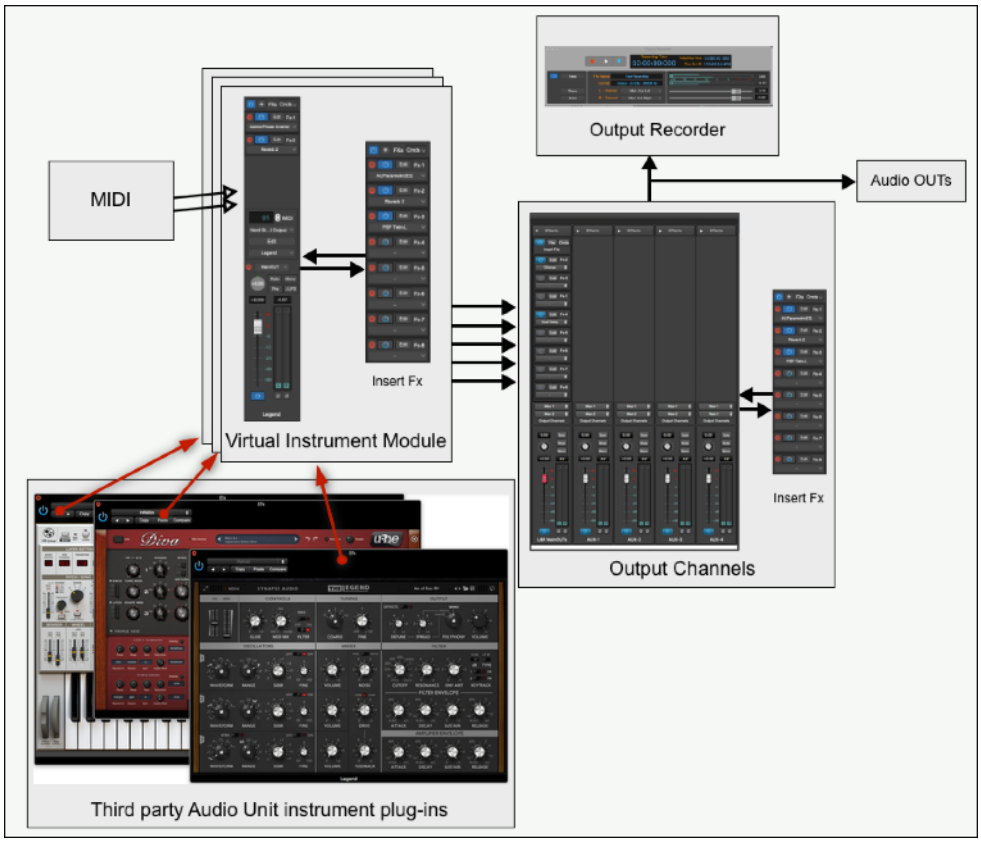
Your Mac, without any other hardware or software, is now a Digital Multi-Effects Unit.

And since DSP-Quattro let you choose the input and output on your audio board, this use allows you to turn the built-in real time effects or your Audio Unit Effect plug-ins into a professional stand alone processing units for your recording studio.

This possibility can be extended, because each Audio Input may have its own insert effect chain. It allows you to set-up a fully customisable parallel real time multi effect unit, without limitations except the CPU power…

Even more, an external hardware effect unit can very easily be integrated into the effect chain of DSP-Quattro, simply using its special internal module to address hardware Input/Output devices of your mac.
In this way, the audio stream will be routed to a pair of L&R outputs and taken again from a pair of L&R inputs, and external hardware will be seen exactly as an internal plug-in.

Using DSP-Quattro as Software Synthesizer



As with what has been said before, you can open a Audio Unit Instrument plug-in, set it to use it with a MIDI port and a MIDI channel, and play it in real time listening to it through the output. You can even process it with the chain of effects loaded in an Insert Effects chain (independent for each open Instrument) or in the Master Out Effects chain, recording everything while playing, if that's what you want!
You can play a Virtual Instrument plug-in in real time by using an external MIDI control, or by using a sequencer. It is always possible to open several different virtual Instrument plug-ins at the same time (even the same plug-in more than once), and mix this configuration with the others. This allows you to record what is played while listening to an audio file, or while singing into a microphone connected to the Mac, or while you are playing a Virtual Instruments and your friend is playing a guitar connected to an Audio Input Module and using different effects on insert…

All of the above are possible simply opening, creating or closing Audio Generators, and without worries about setting new systems or make audio connections. All connections are automatically handled by DSP-Quattro.

All you need to do is open a new object to use it. And when you don't need it anymore, simply close it again.

What's next…

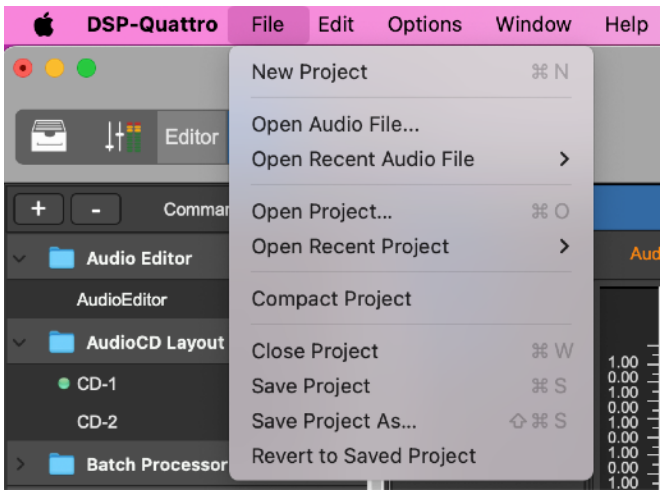
The next chapters deal with the different parts of DSP-Quattro, how they work and how to use them. They describe the Audio Editor, the AudioCDLayout, the Mixer, the different audio generator modules, all graphic interfaces, software and hardware compatibility and so on. Also a complete list of menu commands and the instructions about how to use them are included.

The Project

As already introduced, the Project is the document used by DSP-Quattro. The Project is a container which includes all the objects you need to accomplish your work.

You start using DSP-Quattro creating a new Project or opening an existing Project, and you must decide if you want to save or discard the edits you did on your Project when you quit DSP-Quattro - or you close the existing Project, of course.

The commands to create a new Project, to load an existing or to save the current Project are on the top menu bar of the application, under the File menu:



where:

- **New Project (or ⌘N)**: to create a new empty Project Document. DSP-Quattro shows a new empty Project Document window at full size on the main display.

- **Open Project… (or ⌘O)**: to open an existing Project Document. DSP-Quattro shows a file browser asking to locate the Project Document to open.

- **Open Recent Projects:** it shows a sub menu with the list of the most recent Project Documents which DSP-Quattro opened, if they are still available.

- **Compact Project**: a Project Document contains also several additional files, like graphic overviews, which are not strictly necessary when DSP-Quattro needs to open again the same Project - in case, it will rebuild these files when necessary. These files exist to speed-up loading times. It is convenient to use this command to delete these additional files to free HD space before to archive the Project.

- **Close Project (or ⌘W)**: to close the current Project Document. DSP-Quattro first asks to save or discard changes, if any.

- **Save Project (or ⌘S)**: to save the current Project Document replacing the source Project Document on MacOS file system.

- **Save Project As…**: to save the current Project Document with a different name and, optionally, into different location. The application shows a file browser asking for the file name and the place where to save the current Project Document.

- **Revert to Saved Project…**: to reload the last saved Project Document. It is similar to an immediate undo up to the last time in which the current Project Document was saved. **NOTE:** calling this command, DSP-Quattro will clear the Undo/Redo history. In other words, you will loose all your edits done after saving the last Project Document.

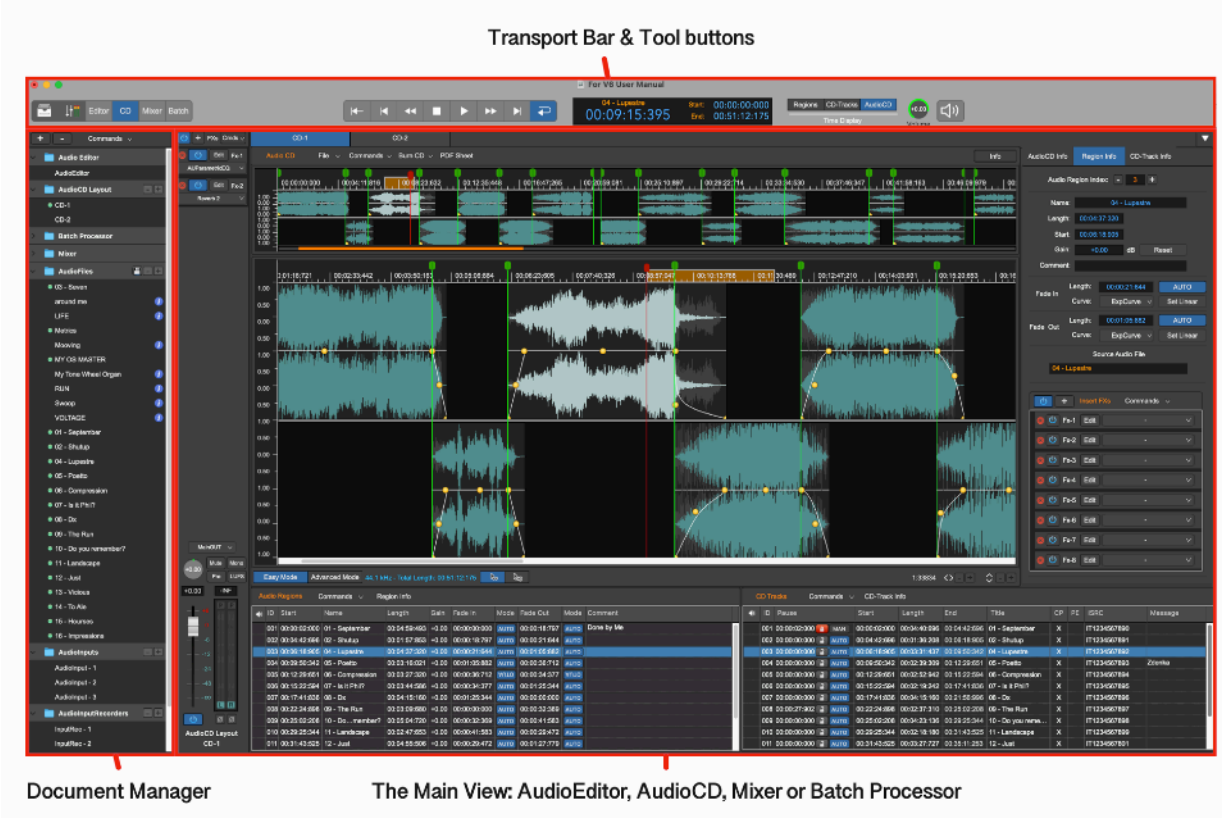
On this menu there is also a command

- **Open Audio File…**: to open an audio file into a new Project if there is not already an open Project, or on the current Project if there is already an open Project. The application shows a file browser to select one or more audio file to add on the Document Manger of the Project (more about this later in this manual).

- **Open Recent Audio File:** it shows a sub menu with the list of the most recent Audio Files which DSP-Quattro opened, if they are still available.

NOTE: it is not possible to have more than one Project open at the same time. For this, calling the command to open an existing Project when there is already an open Project, DSP-Quattro will first close the current Project, asking if you wish to save the changes if needed.

The Project Document Window



The Project interface uses one main window. Even if DSP-Quattro also uses some additional accessory floating windows like the Loop tool or custom plug-in GUIs, most of the work is done on the main Project Document Window.
The components of the Project Document Window are the following:

- **The Document Manager**: the Document Manager shows a list of the audio generators which are open in DSP-Quattro. They can be audio files, audio inputs, input recorders, virtual instruments.

- **The Main View - the Audio Editor, the AudioCD Layout, the Mixer or the BatchProcessor:** it is the main view of the Project Document window.

- **The Transport Bar & Tool Buttons:** this view consists of the buttons to control the playback, the display to show information about current marker, audio Regions, CD-Track or playback cursor position and of the tool buttons to switch the main view on the bottom part of the worksheet.

More about these components in the following chapters of this manual.

NOTE: it is possible to show, hide, resize each one of the above components of the Project Document window. It is possible to resize their sub views as well. Just click and drag with the mouse the border of the view to resize it.

Each component has its own menu commands

The application top menu bar contains only the commands for the Project management and for the options which are shared among different Projects, like the audio settings.

It does not mean that DSP-Quattro has not all the commands to do audio editing and audio mastering of the previous versions, of course.

Menu commands are on the interface of the project component where you can apply them. It means, as an example, that the commands to make an editing on an audio file are on top of the AudioEditor view, the commands to burn an audio CD-ROM using the AudioCD Layout is on top of the AudioCD view, and so on.

In the next chapters each project component will be deeply described, together with all the related menu commands.

The Project Document is a bundle

When you wish to edit an audio file, or you wish to build an AudioCD, you load the audio files into the Project.

When you load an audio file on the Project, before to edit it or to add it to the AudioCD Layout, DSP-Quattro automatically makes a copy of the source audio file which is located on MacOS file system and save it into the Project Document bundle.

After this, the application does not touch anymore the source audio file, it starts to work on the internal copy of it: when you save the edits on your audio files using the Audio Editor, DSP-Quattro updates the internal audio files, not the source audio files.

So, to re-use the edited audio files outside DSP-Quattro, it is necessary to export them back to MacOS finder, replacing the source files or making additional copies of them. This can be accomplished by a menu command or by Drag&Drop the file from the Document manager table of the Project to the MacOS file system.

It is important to know that any further change of the source audio file on the MacOS file system does not reflect automatically to the copy which the application is using in the current Project. However there are commands to refresh the copy used by the application to be update to the last version of the source audio file.

You can also add to the Project other objects as Audio Inputs and Input Recorders modules, you can allocate and configure your Virtual Instruments, load your plug-ins on insert to your audio sources or on output channels.

Closing the current Project Document or quitting the application, it is necessary to save the Project in order to avoid to discard the job done.

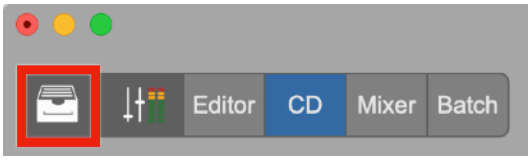
NOTE: please consider that to be able to fully restore again the current Project Document, the application also needs that all the AU plug-ins used are available at loading time. It means that, loading again the same Project Document, these AU plug-ins must be installed on MacOS. It is also valid loading the same Project Document on a different mac. Also in this case, the Project Document has all the necessary audio files safe into its bundle, but at the same time it is necessary the same AU plug-ins used by the Project are installed also on the Mac where you wish to restore the Project.

Of course, DSP-Quattro takes care to restore the current presets for each plug-in used into the Project by itself.

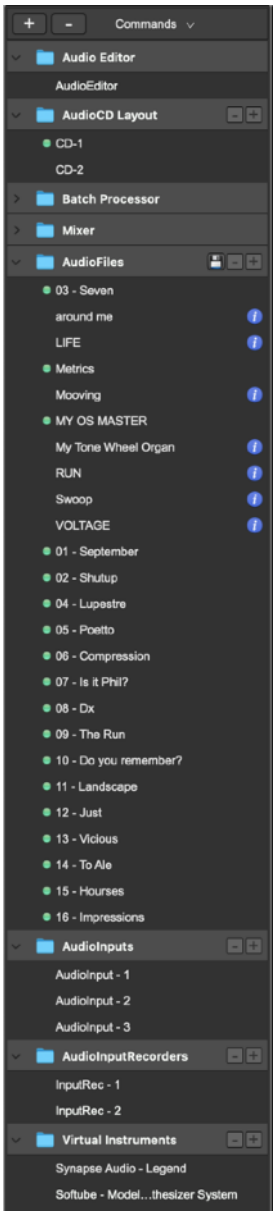
The Document Manager

On the left part of the worksheet, there is the Document Manager panel.

By default, when the application opens a new Project window, the Document Manager panel is visible. Use the leftmost button on the top of the Editor window to show/hide the Document Manager panel:



or, to show/hide it, you can also drag the right border of the Document Manager panel view.



The Document Manager shows a list of the audio generators which are open in DSP-Quattro at a certain moment. The different types of generators are divided into the following categories:

- **Audio Editor, AudioCD Layout, BatchProcessor and Mixer**: on each Project, there are always one AudioFile Editor and one or more AudioCD Layout(s), one BatchProcessor and one Mixer. You can drag the audio files on one of these rows to load them on the corresponding object.

- **Audio Files**: this the list of the audio files used by the Project. DSP-Quattro imports into the Project bundle the audio files used by the Audio Editor and/or the AudioCD Layout. If the audio file has been already imported into the Project Document bundle, a green dot on the left of the audio file name is visible. Instead, if an audio file on the Document Manager table has not already been imported into the Project Document bundle, there is a blue Info button on the right of the audio file name. Placing the mouse pointer on it, the application shows the file path of the source audio file. Clicking on it, the application reveals the position on the MacOS finder of that audio file.

- **Audio Inputs**: these are the objects to get mono/stereo audio inputs from the audio device, route the audio into the mixer and then to the output channel strips of DSP-Quattro.

- **AudioInput Recorders**: same as audio inputs, these objects are also be able to record new audio files.

- **Virtual Instruments**: Audio Unit Virtual Instruments, each with its own MIDI settings.

NOTE: if an audio file has not been imported into the Project Document bundle, the Project is keeping only a reference to the source file, without copying it into the Document bundle. It means that, in the future, loading the same Project, if that source audio file is no longer present on the disk, it won't be possible to import that audio file into Project Document bundle. If this is the case, the Document Manager will show that audio file name in red.

NOTE: it is possible to re-order the list of the audio files, dragging an item up or down on the table.

Document Manager Commands

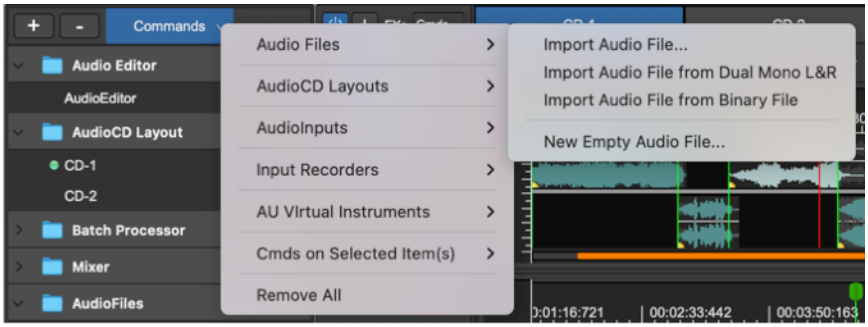
In the upper part of the Document Manager panel there two + and - buttons, one to Add one or more audio files to the Project and on the Document Manager table, the other one to Remove the current selected elements from the table.

Clicking on the **Commands button** on the top of the Document Manager table, a popup menu opens :

Here you can find several commands, grouped according to their category:

Audio Files: are the commands that concern the audio files:

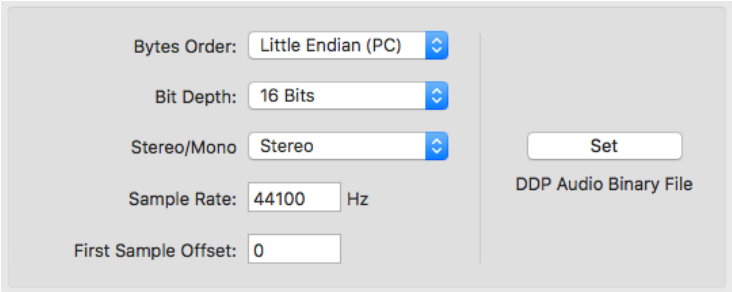
- **Import Audio File…**: to load an audio file from the MacOS file system. DSP-Quattro will show a file browser, allowing you to select an audio file to add to the Document Manager table. DSP-Quattro won't import it into the Project bundle, it will keep only a reference to the source file. DSP-Quattro will import it into the Project bundle only if you will load the audio



file on the AudioFile Editor or on the AudioCD Layout (more about this later on this manual).

- **Import Audio File from Dual Mono L&R…**: to load a stereo audio file using two mono audio files, one for the left channel, one for the right channel (dual mono). DSP-Quattro will show a file browser asking to choose two audio files, then will add a reference to a dual mono audio file to the audio file list. As above, DSP-Quattro won't import them into the Project bundle, it will keep only a reference to the two source files.

- **Import Audio File from Binary File…:** to load a mono/stereo audio file from a raw binary audio file. DSP-Quattro will show an additional dialog to set the parameters which it needs to play correctly the samples from the binary file:



where:

Bytes Order: can be LittleEndian (as used mostly on Windows and Intel based Macs) or BigEndian (as used mostly by other Macs)

Bit Depth: 8, 16, 24, 32 or 32 floats - the bit depth of each sample on the binary file.

Stereo/Mono: set the number of interleaved audio channels.

Sample Rate: set the sample rate used to play the audio file

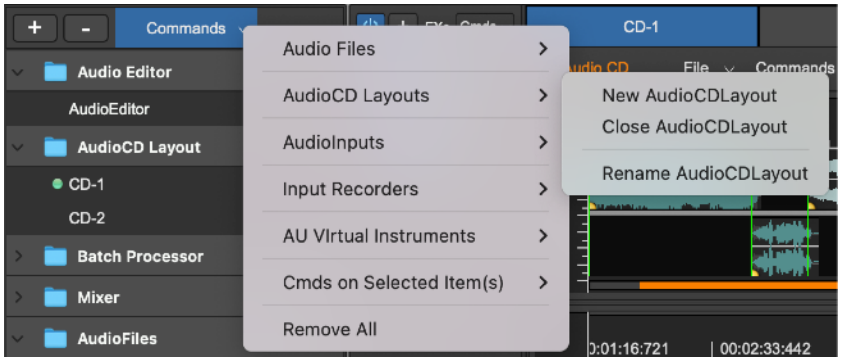
First Sample Offset: set an offset to start reading samples from the binary audio file. Set this value if the binary audio file has a header in front of the audio sample which DSP-Quattro must skip looking for samples.

On the right of this panel, there is a button to **Set** the current values to the values used by the DDP standard. Use these settings if you are importing the binary audio file generated exporting as DDP (Btw you should use the "import DDP" function of the AudioCD Layout to do it).

- **New Empty Audio File…**: DSP-Quattro shows a dialog to set a new File Name and the parameters to fill the header of the new audio file, as

Bit Depth, SampleRate, number of audio channels (Mono or Stereo), and then create a new audio file adding it to the Audio File list.

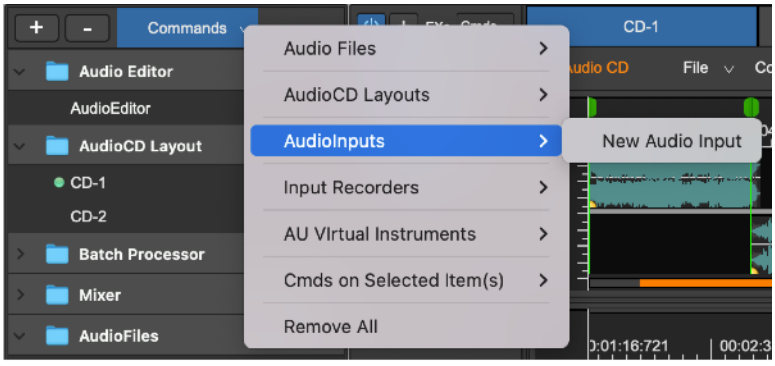
AudioCD Layouts: are the commands that concern the audioCD Layouts:



- **New AudioCD Layout**: to add a new AudioCD Layout to the Project. DSP-Quattro will switch to the AudioCD panel showing the new empty AudioCD Layout.
- **Close AudioCD Layout**: to close the current AudioCDLayout, removing it from the Project. DSP-Quattro warns you about the fact that this operation cannot be undone, asking you to confirm the operation.
- **Rename AudioCD Layout**: to rename the current AudioCD Layout.

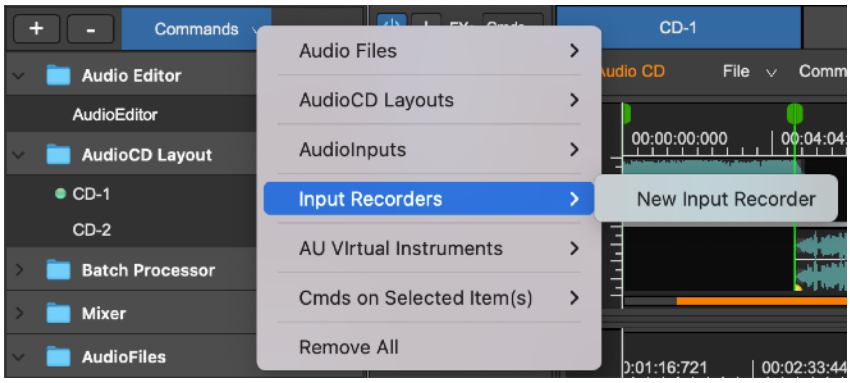
AudioInputs: are the commands that concern the Audio Inputs:

- **New Audio Input**: to add a new Audio Input module to the Project. DSP-Quattro switches to the Mixer panel showing the new Audio Input channel strip. By default, DSP-Quattro mutes the output of the added Audio Input module to avoid unwanted audio feedbacks on output.



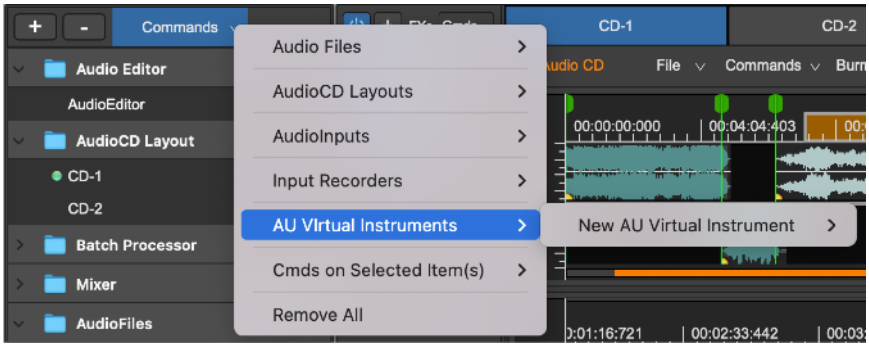
Input Recorders: are the commands that concern the Audio Input Recorders:

- **New Audio Input Recorder**: to add a new Audio Input Recorder module to the Project. DSP-Quattro will switch to the Mixer panel showing the new Audio Input Recorder channel strip. By default, DSP-Quattro will



mute the output of the added Audio Input Recorder module to avoid unwanted audio feedbacks on output.

AU Virtual Instruments: are the commands that concern the Audio Unit Virtual Instruments plug-ins:



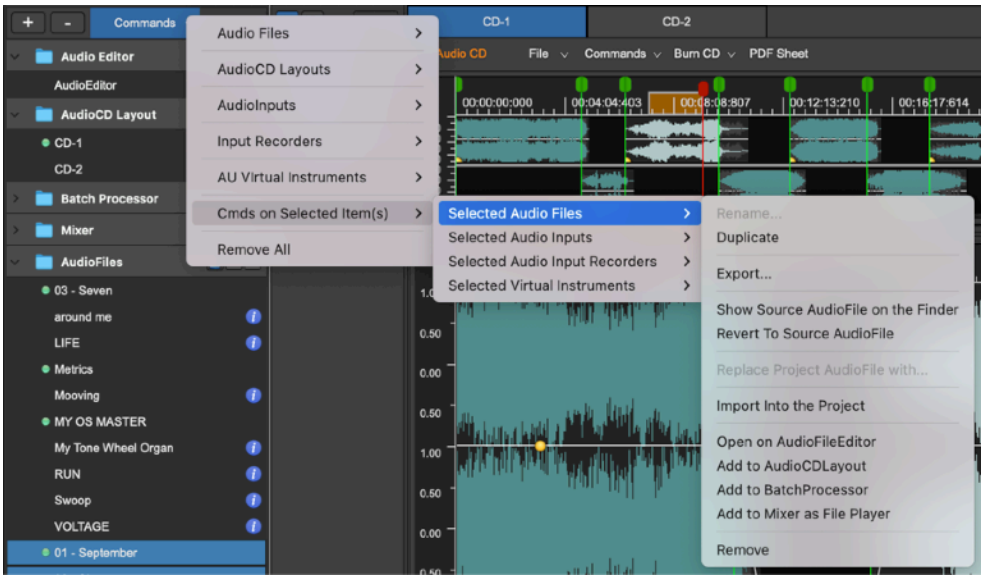
- **New AU Virtual Instrument**: DSP-Quattro shows the list of all 64 bits Audio Unit Virtual Instruments installed on your system as returned by MacOS. This list is ordered by Company producing the third party AU plug-in. If there are not AU Virtual Instruments installed on your system, you see listed only the Apple Virtual Instruments which are built-in on MacOS.

To remove (delete) one or more elements from the Document Manager, first select the element(s) to remove, then click on the - **Remove button** on the top of the Document Manager table. DSP-Quattro will show you a warning and, if you click on OK, will remove the selected elements, cancelling the reference to the source audio files if it has not been imported or trashing the imported audio files if already copied into the Project bundle.

Cmds on Selected Item(s): are the commands that applies only to items which are currently selected on the Document Manager table, divided by category:

Cmds on Selected Audio Files:

- **Rename**: to rename the selected audio file. This command is available only if there is only one audio file item selected on the table.



- **Duplicate**: To duplicate the selected audio file item(s).

- **Export**: to export to the MacOS File System the selected audio file item(s). DSP-Quattro shows a file browser asking first where to export the audio file(s), then shows a panel for technical details about the audio file format of exported audio file(s). See later on this manual for the detailed explanation of the options available on this panel.

- **Show Source AudioFile on the Finder:** to ask to the application to reveals the position on the MacOS finder of that audio file. This command is not available if there are several items selected on the table or if the source audio file is not present anymore in the original position on MacOS file system.

- **Revert To the Source Audio File:** use this command to discard any changes made after the last command for saving. The application reloads the last saved version of the selected audio file. This command is not available if there are several items selected on the table or if the source audio file is not present anymore in the original position on MacOS file system.

- **Replace Project AudioFile with…:** use this command to replace any instance of a certain audio file with a new one. Use this command if you did some edits on the source audio file and you want to apply these edits on the audio file which has been imported into the Project. If the audio file to replace is already loaded on an AudioCD Layout, this operation is NOT possible if the replacing audio file is shorter or if it has a different sample rate value than the file to be replaced. In this case, DSP-Quattro will show you a message about that. Moreover, this command is not available if there are several items selected on the table.

- **Import into the Project:** after selecting it, use this command to import an audio file into the Project that has not already been imported.

- **Open on Audio File Editor:** to load the selected items on the Audio File editor.

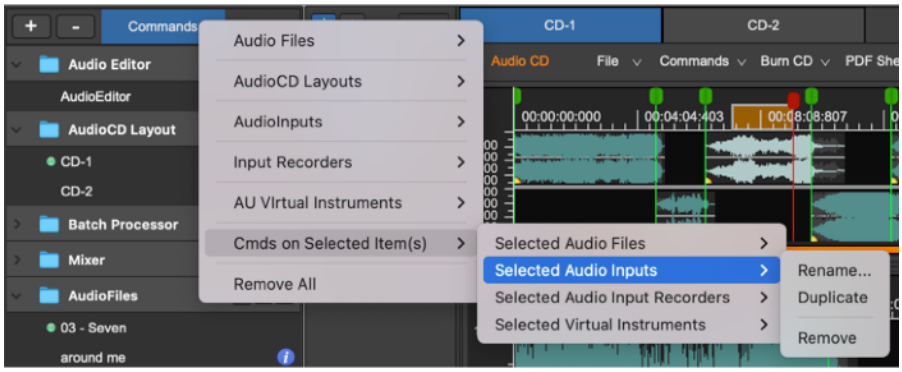
- **Add to AudioCDLayout:** to load the selected items on the AudioCDLayout. The application appends these audio files new Audio

Regions at the bottom of the Audio Regions table and creates a CD-Track for each of them.

- **Add to BatchProcessor:** to load the selected items on the Batch Processor.
- **Add to Mixer as File Player:** to load the selected items on the Mixer allocating an Audio File Player for each of them. More about File Players later in this user manual.
- **Remove:** to remove the selected items from the Project Document. The application asks to confirm, because this operation cannot be undone.

Cmds on Selected Audio Inputs:

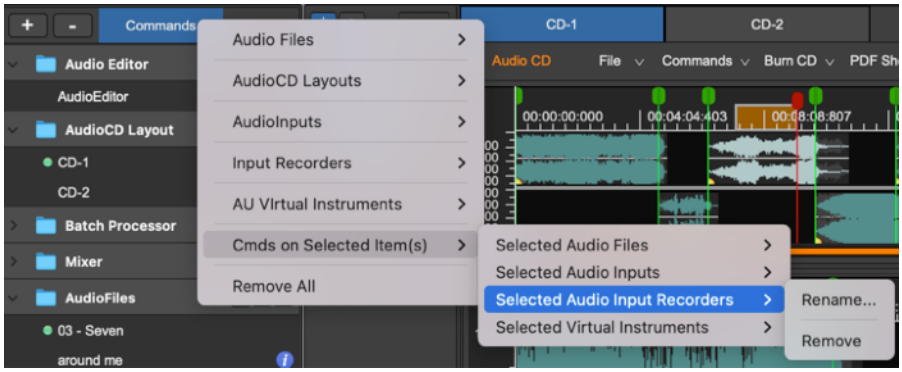
- **Rename**: to rename the selected audio input. This command is available only if there is only one audio input item selected on the table.



- **Duplicate**: To duplicate the selected audio input item(s).
- **Remove:** to remove the selected items from the Project Document. The application asks to confirm, because this operation cannot be undone.

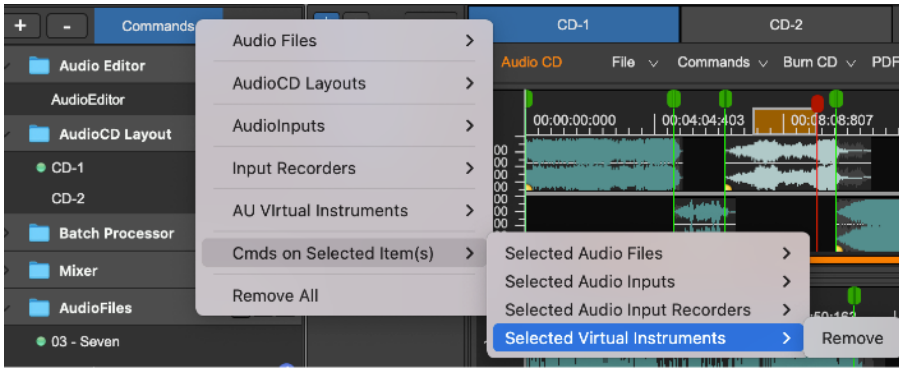
Cmds on Selected Audio Input Recorders:

- **Rename**: to rename the selected audio input recorders. This command is available only if there is only one audio input recorder item selected on the table.



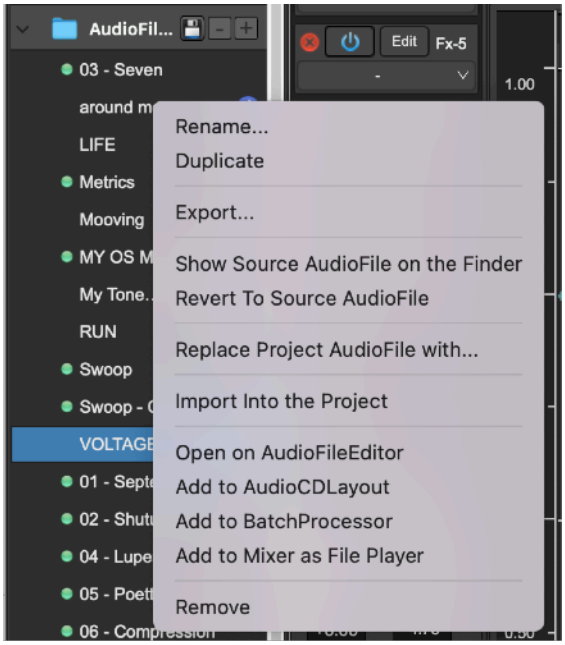
- **Remove:** to remove the selected items from the Project Document. The application asks to confirm, because this operation cannot be undone.

Cmds on Selected Virtual Instruments:



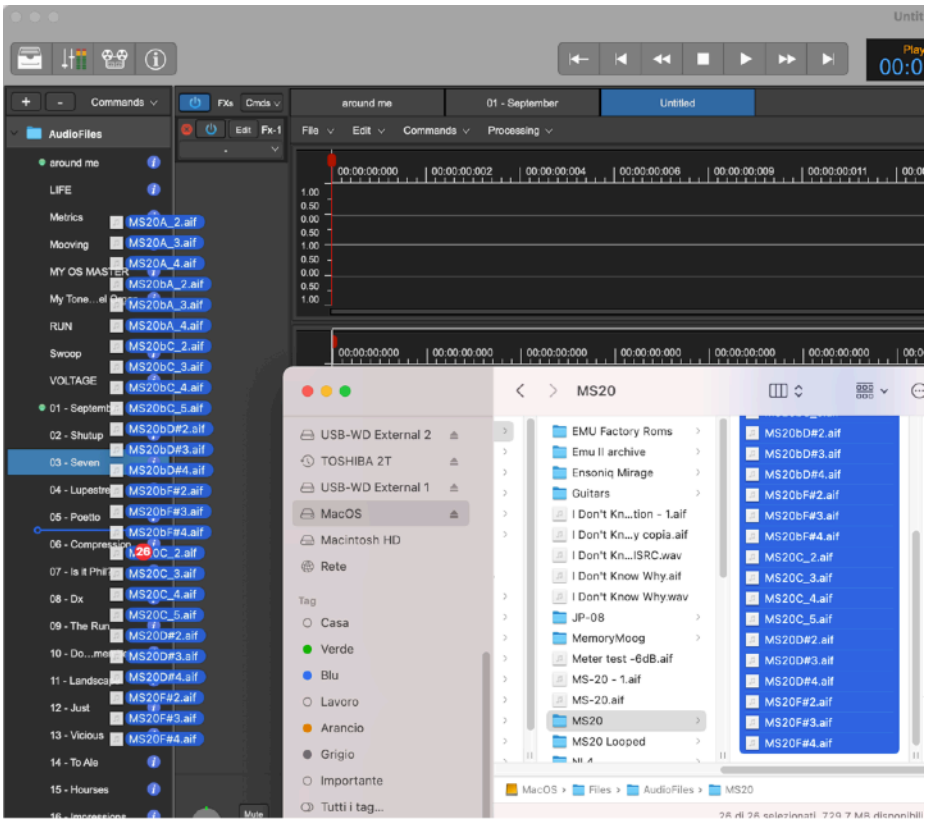
- **Remove:** to remove the selected items from the Project Document. The application asks to confirm, because this operation cannot be undone.
- **Remove All**: this command removes all the items which are on the file table, empty it. In case, before to remove the item(s), DSP-Quattro asks to save or discard the changes, if any.

NOTE: *most of these commands are also available clicking on a item on the table with the right mouse button or while keeping the control key pressed*, In this case, DSP-Quattro opens a popup menu with the commands according to the type of the item. As an example, this the popup menu which appears right-clicking on an audio file item:



Using Drag&Drop to Import/Export audio files

DSP-Quattro allows for the drag&drop of the audio files between the Document Manager Panel or the Audio Editor, AudioCD, BatchProcessor and Mixer and the MacOS file system:



A - Dragging one or more audio files from the desktop or from a folder on the window of the Document Manager will load the file audio in the current Project but will NOT import it into the Project. The result is the same as using the command **Import Audio File.** If you wish then to open it on the Audio Editor, AudioCD, BatchProcessor or Mixer, drag its row on the Document Manager table on the corresponding object on the same table. If you double click on its audio file name on the Document Manager table, DSP-Quattro loads it on the Audio File Editor.

B - Dragging one or more audio files from the Document Manager table to the desktop or to a folder, DSP-Quattro will export these audio files. If a file having the same name already exists (if, for example, you drag the file to the same folder of the source file), DSP-Quattro creates a new file having the same name of the source file with an increasing number added to the end of the destination file name.

Once opened an audio file in an Audio File Editor view,

A - Dragging one or more audio files from the desktop or from a folder on the Audio Editor view, DSP-Quattro imports the audio file into the current Project AND will opens the audio file in a new Audio File Editor Tab.

B - On the Audio Editor view, clicking on a waveform selection without moving the mouse, after around 2 seconds the mouse pointer will change to an hand. It is therefore possible to drag the selection from the Audio Editor to the desktop or to a folder. In this case, DSP-Quattro exports the selection in

a new audio file with the same name of source file. If it already exists (if, for example, you drag the file to the source folder), DSP-Quattro creates a new file having the same name of the source file with an increasing number added to the end of the destination file name.

C - Moreover, dragging the selection over the Document Manager table instead of the MacOS file system, DSP-Quattro exports the selection into a new file and imports it into the Project automatically. You can use this shortcut to create new files trimming the portions of the audio you want to export.

NOTE: it is even possible to drag the selection of only one channel of a stereo file to export only that channel (or a part of it).

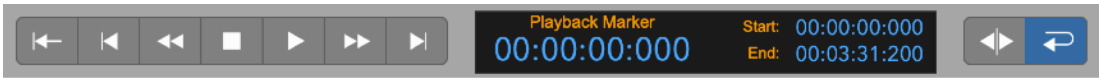
D – The above points B) and C) work also if the is not a selected waveform on the AudioEditor waveform view. In this case, DSP-Quattro will export the audio file from the beginning up to the end. This feature is very useful as shortcut to the Audio Editor command 'Export Audio File As…', because it saves a copy of the current audio file as it is in that moment.

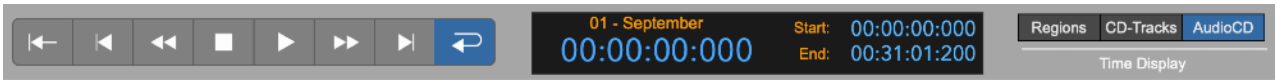
You are highly recommended to spend some minutes to make some practice with the extended Drag&Drop support in DSP-Quattro for exporting files with an incredible speed. It is an irreplaceable tool which will allow you to incredibly speed up your edits.

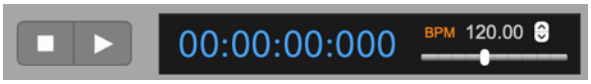
The Transport Controls

The transport controls are in the upper part of the Project window. This section consists of the transport bar and the counter displaying the position of the current marker or playback cursor as well as loop and playback points.

The controls and the Display on the Transport Bar change depending on which object, between the AudioFile Editor, AudioCD, BatchProcessor or Mixer, has been selected for the main view.







Above are the Transport Bars and Displays in the case of the Audio File Editor, AudioCD and Mixer, respectively.

The Transport Bar:

On the left part of the control section, there is the transport bar, which consists of the buttons to control the playback.

NOTE*:* Also the keyboard controls the playback:

- **Space Bar:** toggles Play/Stop. If it stops, the playback cursor returns to the position where the playback started.
- **Return Key:** to pause the playback. The playback cursor remains on the last playing position.
- **#0, #1. #2… keys on the Numeric Keypad:** pressing the key 0 on the numeric will move the playback cursor at start. In the case of the AudioCDL Layout, Pressing key 1 moves the playback cursor to the first CD-Track start, pressing key 2 moves it to the second CD-Track, and so on. In the case of the Audio File Editor, pressing key 1 moves the playback cursor to the position of the first generic marker (if any), key 2 to the second one, and so on.

	To play forward at normal speed
	First click: to stop Second click: to move the playback cursor to the beginning of the file.
	To play forward and reverse at double speed.
	To move the playback cursor to the next or previous marker or - if any - to the beginning or end of the current selection or - if any - of the file.
	To toggle On/Off the Cycle Mode. If the Cycle Mode is On, the playback cursor, reaching the end of the portion to play, jumps at start continuing to play. If Off, it stops at end.
	To toggle On/Off the Audio Scrub Mode (slow motion mode). When slow motion is ON, the playback speed - on both directions – is controlled by the speed control, the slider which is positioned at the bottom of the waveform view.
	To toggle On/Off the preroll. If the preroll is ON, pressing the play button, DSP-Quattro starts to play 2 secs in advance respect the current playback position.

If the AudioFile Editor has been deleted as main view, at the bottom of the waveform view, there is the speed control, a slider which controls the playback speed:

When DSP-Quattro plays at normal speed, moving the speed control to the right causes the increase of the playback speed - as well as the pitch. Moving it to the left causes the decrease if the playback speed as well as of the pitch. Releasing the mouse, the speed control returns to center.

Keep the **cmd key** pressed while dragging the speed control to lock it at the last position when realising the mouse.

If the Audio Scrub button on the transport bar is ON, DSP-Quattro plays in slow motion. In this case the speed control works as jog-shuttle. If the Knob is in the center, the playback is on stop (playback speed = 0). Moving the speed control to the right, DSP-Quattro will play in slow motion, forward. Moving it to the left DSP-Quattro will play in slow motion, backward.

Using the ribbon controller, DSP-Quattro plays the audio file at a different pitch and speed. Raising the pitch implies a faster speed and shorter time duration, and vice versa.

If needed, It is also possible to change the pitch without modifying also the speed - and time length - just using the Pitch Shifting processing function on the Processing menu. This processing function will be explained later in this manual.

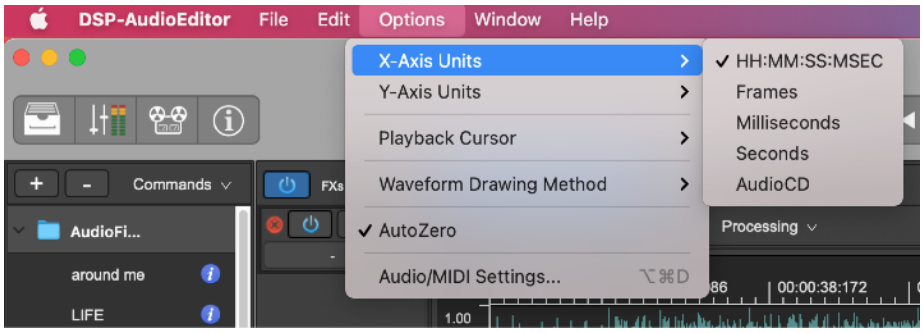
The Counter Display

At the center there is the Counter Display, which shows the position of the playback cursor or of the current marker.

As for the controls, also the Displays changes depending on which object, between the AudioFile Editor, AudioCD, BatchProcessor or Mixer, has been selected for the main view.

Generally speaking, in its main part, the Counter Display shows the current position of the playback cursor. In the two smaller sections on the right, there are the positions where DSP-DSP-Quattro currently cycles playing the file or, in the case of the AudioCD, there are the start and end position of the current CD-Track or Audio Region (more about this later in this manual).

Clicking on any marker on the waveform view, the information on the Counter Display - name and position – will change accordingly. If the main view is the Audio File Editor, clicking and dragging the mouse on the waveform view and making a waveform selection, the display shows the length of the new selection on the main part, while the counters on the right show the selection start and end.



The default time unit is hours:minutes:seconds:milliseconds (HH:MM:SS:MSEC). Possible choices are Frames, Seconds, Milliseconds or AudioCD (CDDA).

Use the menu command

Options->X-Axis Unit->…

which is on the application menu bar to change the current x-axis unit.

On DSP-Quattro Preferences, it is possible to enter the default value for X-Axis units used by DSP-Quattro opening new Projects.

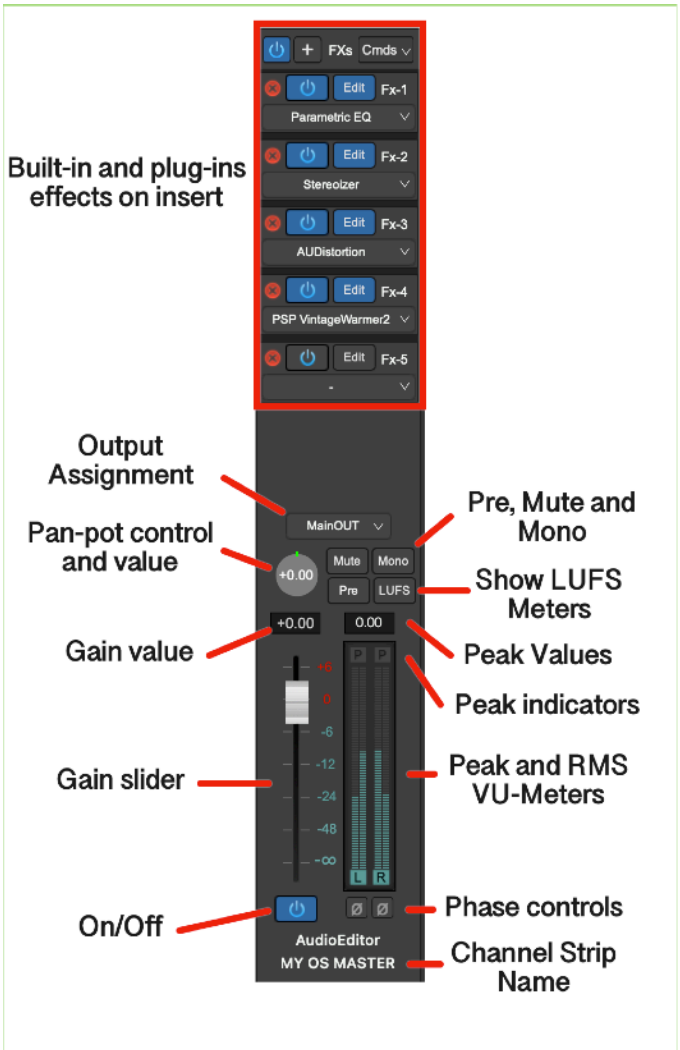
The Channel Strip

The Channel Strip is a common element to the different elements part of the Project. Using the channel strip, it is possible to set the gain, the pan-pot and the other parameters and features - as a serial chain of real-time effects - used by DSP-Quattro to play an audio file under editing, the AudioCD, to process an audio input as well as the audio input during a new recording.

There is a Channel Strip on the left part of the Audio File Editor waveform view as well as on the left part of the AudioCD waveform view. On Mixer view, there is a Channel Strip for each loaded element.

On the Audio File Editor, each audio file under editing has its own Channel Strip having different settings.

There are five Output Channel Strips as well: the L&R MainOUT and four Aux channel strips. These are the Output Channel Strips and they are available on the Mixer Main view. They allow the complete control of how DSP-Quattro will play on output - but they are not rendered to file exporting the AudioCD. They are very useful when using DSP-Quattro in a real time scenario.



The Gain sliders, Peak and RMS VU-Meters and other controls

On the lower part of the channel strip there are the Gain sliders and VU Meters.

Using the Gain Sliders and VU Meters on the channel strip is very intuitive:

Using the Gain Sliders:

- **Click&Drag**: clicking and dragging the Gain Slider knob will change the gain of the channel according to the dB scale.

- **CTRL + click**: to jump to the default +0dB value.

Using the numerical control above the Gain Slider:

- **Click**: a small dialog will prompt you to enter a new numerical value, expressed in dB (float number).

Peak and RMS Meters:

On the right of the Gain slider there are the Peak and RMS Meters. They show the peak and RMS levels of the left and right signals on Channel Strip output. The peak meters are innermost respect the RMS meters.

Peak meters show the max level of the audio signal, computed with the precision of the sample. They have a release time such that when the signal decreases, they follow smoothly. As soon as the signal increases, they immediately update the displayed value.

RMS meters show the power of the audio signal. An audio signal can have very high peak levels (even up to the distortion) but very low RMS values. In this case, they sound poor and weak. A good mastering engineer is able to rise the RMS level without causing the distortion. Usually, multi-band compressors plug-ins can help a lot to reach a good balanced result.

In the upper part of the Vu-Meters there is a number that shows the peak value in dB. This number remains fixed to the highest reached value for 3 seconds. Then, it will return to show the current maximum value. In Preferences, it is possible to set a flag to keep this value fixed to the maximum. In this case, to reset it, click on it.

Also there is a red peak level indicator that flashes if the signal reaches or exceeds 0dB. Be careful not to let these indicators flash too often because, even if DSP-Quattro, just like analog devices, uses a special clipping algorithm any abuse of the output levels will cause the saturation and distortion in the audio output signal.

The Panpot Rotary Control:

On top of the Gain slider there is a rotary control, the pan-pot, to set the balance between the L&R channels. Possible values are in the range [-1.0..1.0], where -1.0 means that the only the L channel will play, 0 means that the L&R output signals are equally balanced, and +1.0 that only the R channel will play.

It is also possible to click on the numerical value into the rotary control to enter the exact pan-pot value.

ON/OFF button:

It turns On/Off the audio on output from the channel strip.

Pre button:

Turning in button ON, V-Meters computes the signal level as it is BEFORE the gain stage (i.e. Slider). Otherwise, if OFF, V-Meters shows signal level as it is after the processing by the gain stage.

Mute button:

Use this button to mute/un-mute that channel strip.

Mono button:

Use this button to mix the L&R channels into a single mono channel, which will play on both L&R channels on the channel strip output. This is very useful to verify the mono compatibility of the output audio signal.

L&R Phase Invert button:

At the bottom of each VU-Meter there is a button with a Ø sign. Tuning ON this button will invert the phase of that audio channel. Use this button to check if there is a frequency cancellation when inverting the phase of one channel. These buttons are very useful when used in combination of the Mono button.

LUFS button:

Use this button to show/hide the Extended VU-Meters floating window including LUFS Meters and statistics. More about LUFS Meters later in this manual.

The built-in Effect and Plug-in Fx slots

On the upper part of the channel strip are the effects on insert to the Channel Strip output.

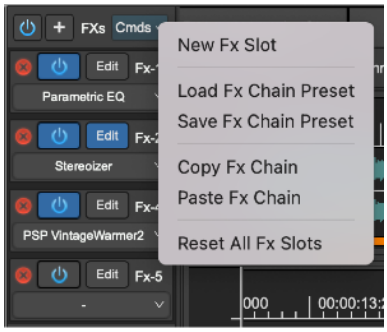
These effects process the output of the Channel Strip.

In the case of the Audio File Editor, these effects process the audio stream for the audio file under editing. Each audio file under editing has its own channel strip and its own effects on insert. See the chapter about the Audio File Editor to know how to render these effects to a new file, if needed.

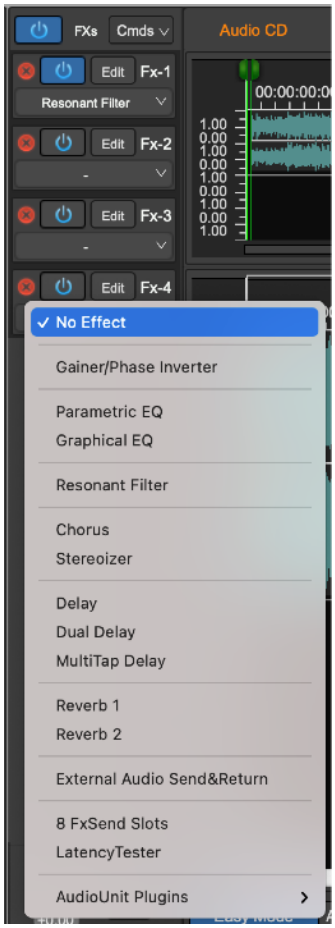
In the case of the AudioCD, these effects process the audio stream on output of the AudioCD. This serial chain of FX will be rendered to file burning or exporting the AudioCDLayout, ie DSP-AudioCDBuilder will process the audio regions thru these effects when burning an audio CD-ROM or exporting a DDP image. Btw, when necessary, it is also possible to load different effects for each audio region. To know more about the FX on insert to each audio region, please see the chapter about the AudioCD Layout later in this manual.

The first row on top includes a button to turn On/Off the processing of the serial chain. Clicking on the ***Cmds*** button, a popup menu appears including the commands to:

- **New Fx Slot:** to allocate a new Fx slot, appending it to the chain of effects. There is not a limit on the number of slots which can be allocated. The + button on the left of the cmd button does the same.



- **Load Fx Chain Preset:** to load from file a Fx chain previously saved using the Save Fx Chain Preset command below.
- **Save Fx Chain Preset:** to save on file the current Fx chain, including the number of Fx slots, which effect is allocated on which Fx slot, their current patch. The application shows a file browser for choosing where to save the preset on HD.
- **Copy Fx Chain:** to copy the Fx chain on the special Fx clipboard of the application. Then, it is possible to paste this Fx clipboard on another Fx chain using the command below.
- **Paste Fx Chain:** to paste the Fx chain previously copied into the special Fx clipboard of the application.
- **Reset All Fx Slots:** to empty all Fx slots on the Fx chain.



The Fx slot

By default, the application creates one FX slot.
Each Fx slot has a red cross button to remove it from the Fx chain, a button to turn it On/Off, bypassing it.

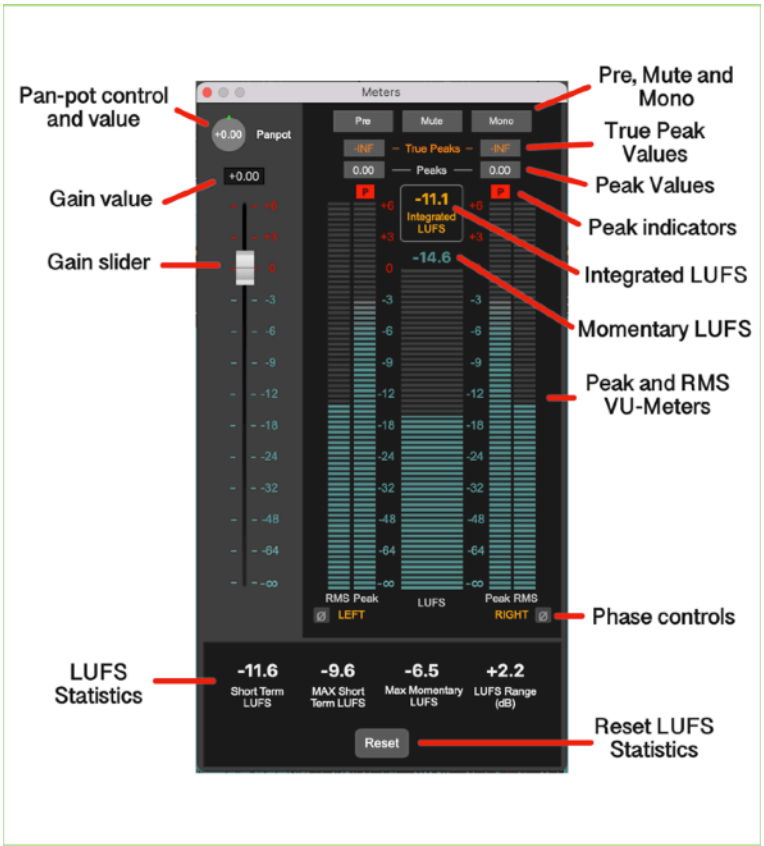
Click on the Edit button to show the custom plug-in GUI on a new floating window. Click on the same button to hide this floating window.

It is possible to load effects to choose among the high quality internal effects of the application, or among the built-in in MacOS Audio Unit effect plug-ins by Apple which are available for free, or among the commercial Audio Unit effects plug-in by third-parties manufacturers which are installed on MacOS.

Please refer to the relevant chapter for the description of the different built-in internal effects and about how to use them.

The Extended VU-Meters floating window with LUFS Meters and statistics

Click on the LUFS button on the Channel Strip to show/hide the LUFS floating window including also the LUFS Meters and LUFS statistics.



Several elements on this floating window, like the Gain Slider, Gain Values, Pan-pot, Peak and RMS Vu-Meters, etc…, are the exact copies of the Channel Strip elements. However, the GUI elements are bigger for a more comfortable display.

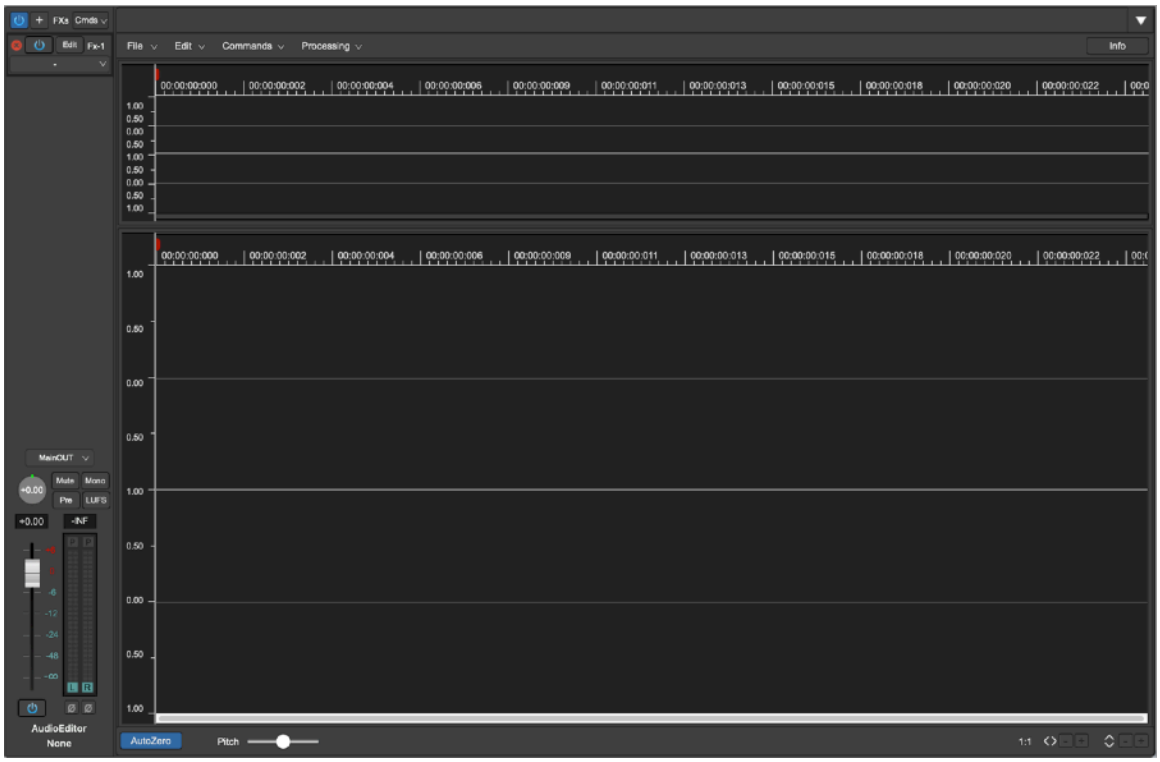
Also ***Integrated and Momentary LUFS*** *values* and LUFS statics (*Short Term, Max Short Term, Max Momentary LUFS and LUFS Range*) are displayed, as well as the ***TRUE PEAK Values*** for the left and right channels.

Use the Reset button to reset the values for LUFS statistics.

The Audio Editor

Use the Editor Button on the topmost left part on a Project window to switch the main central view to the AudioFile Editor of DSP-Quattro:

If you have not already loaded an audio file into the AudioEditor, DSP-Quattro shows an empty AudioFile Editor view.



To edit an audio file you need to load it first into the Project. This can be done by a two steps procedure, or by using a single command of DSP-Quattro, it will do both steps one after the other automatically.

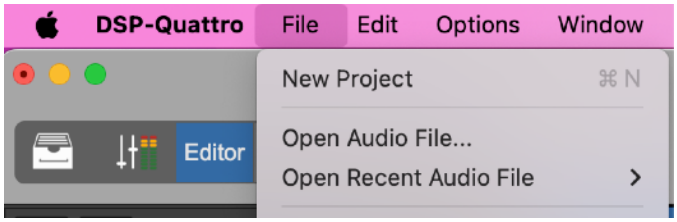
1 - Two Step procedure:

first load an audio file into the Project Document Manager, then open it into the AudioEditor doing one of the following actions:

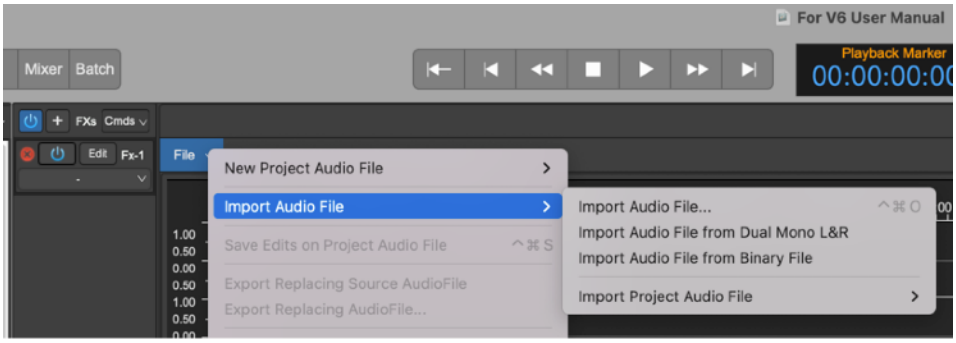
- double-click on the audio file name on the FileList table
- drag the audio file name on the FileList table on the AudioEditor row on the same table.

2 - SingleStep procedure:

- use the menu command **File->OpenAudioFile…** on the Application menu bar:

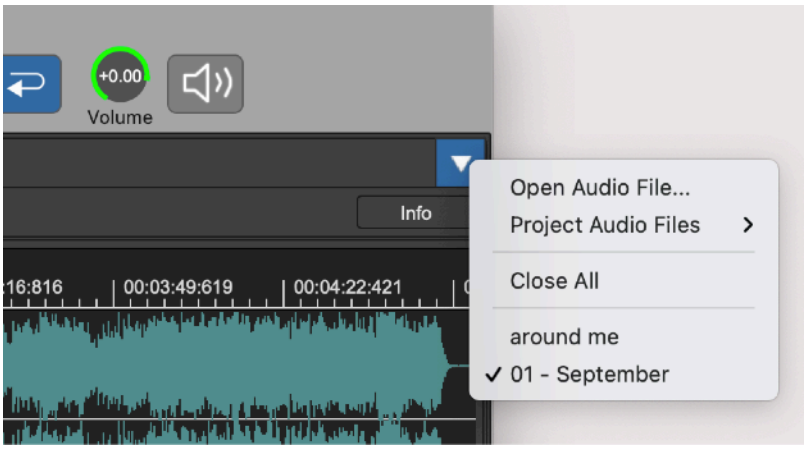


- use the command on the popup menu control **File->Import Audio File** on the top of the AudioEditor main view:



NOTE: on this sub-menu there is also a command to open an audio file composed of two mono files. DSP-Quattro will use them as L&R channels of a stereo audio file (Dual Mono L&R). There is another command to import a RAW Binary audio file. Please refer to the chapter about the Document Manager commands for a detailed explanation of these commands to Import.

- use the command OpenAudioFile… on the down arrow popup menu control on the top right of the Audio Editor waveform view:

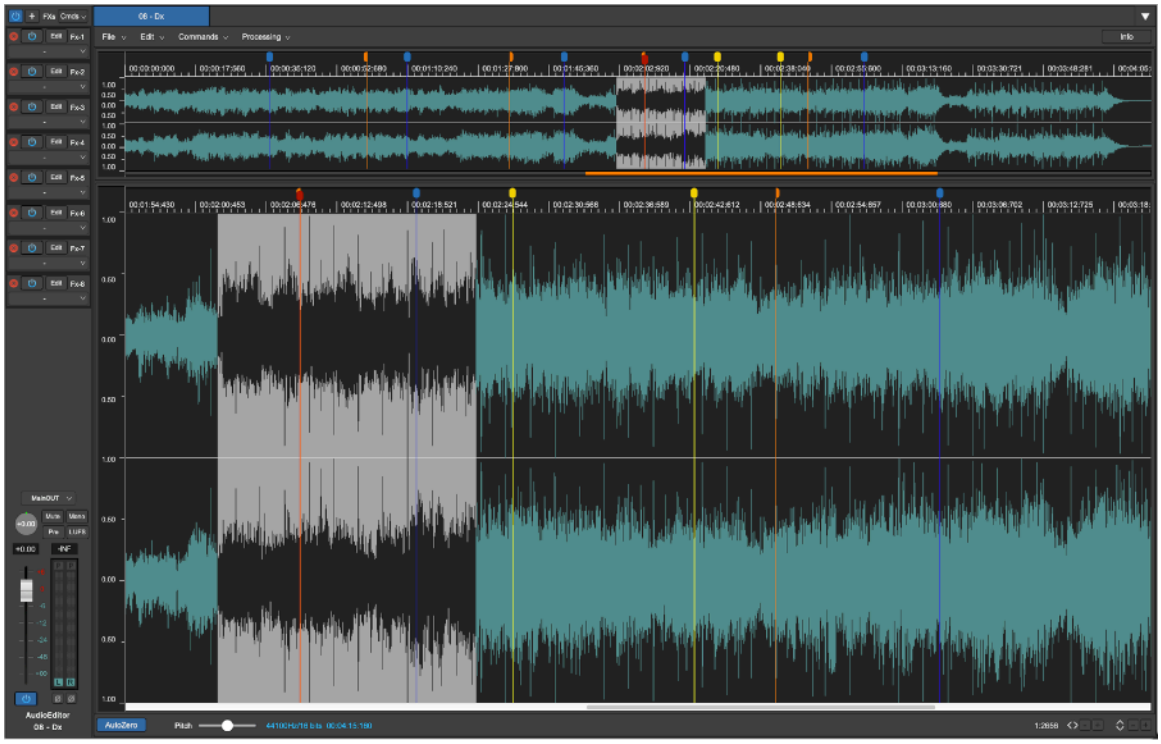


DSP-Quattro opens a file browser. Select the audio files you wish to edit.

NOTE: You can select multiple files by ⇧+Clicking or ⌘+Clicking on the file names.

Once opened the Audio Editor view will look something like this:

This window interface features these main areas:

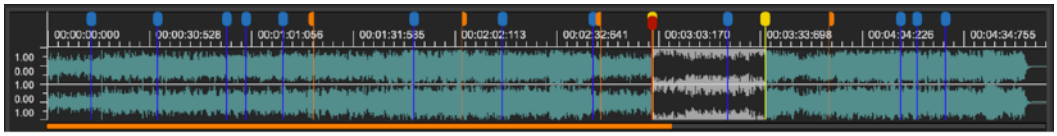


- **The waveform overview**: in the upper part of the Audio File Editor there is an overview of the audio file under editing. During all editing operations the overview will show you the waveform of the whole audio file, from start to end. The overview zooms in or out automatically if the file changes its length doing changes.

- **The Audio File Editor waveform view area**: in the middle part of the audio file editor there is also the waveform view which, differently from the overview, allows to zoom-in or zoom-out on any region of the audio file. When the waveform zooms, the underneath scroll bar can be used to scroll the view along the x-axis, back and forth in time. The audio file editor waveform area is the main part for the edits. It is possible to set the level of zoom very easily by using the mouse wheel, by using the commands in the menu, by the keyboard, or clicking on the zoom buttons located in the lower right angle of the waveform view area.

- **The Audio File Editor channel strip:** in the left part of the Audio File waveform view, there is a channel strip, with the gain sliders and Vu-Meters section. More about the channel strip in another chapter in this manual.

The Waveform Overview



The waveform overview is in the uppermost section of the Audio Editor view:

This view is a waveform view without the zoom in/out control.

It is possible to use the waveform overview to make new waveform selection, move the markers or the playback cursor, and set the zoom level for the main waveform view area below.

At the top of the waveform there is the Time Ruler. DSP-Quattro uses the same X-Axis unit used for the Counter Display control. As described into the corresponding chapter, to set the X-Axis unit for the time ruler, use the application menu command

Options->X-Axis Units…

Possible choices are

- HH:MM:SS:MSEC (hours:minutes:seconds:milliseconds)
- Frames
- Seconds
- Milliseconds
- AudioCD (CDDA)

On the right side there is the Level Ruler, that shows the level of the signal accordingly to the Y-Axis unit. To set the Y-Axis unit, use the menu command

Options->Y-Axis Unit…

Possible choices are

- Floats, normalized into the range [-1.0..1.0[
- dB (decibel).

Below the waveform display, there is a special **Zoom Controller**, that can be used to set the zoom level of the main waveform view area. This control highlights in orange the region that the main waveform view area displays. By clicking on it and then dragging the mouse, DSP-Quattro sets the zoom level of the main waveform view scrolling it accordingly.

Using the Zoom Controller

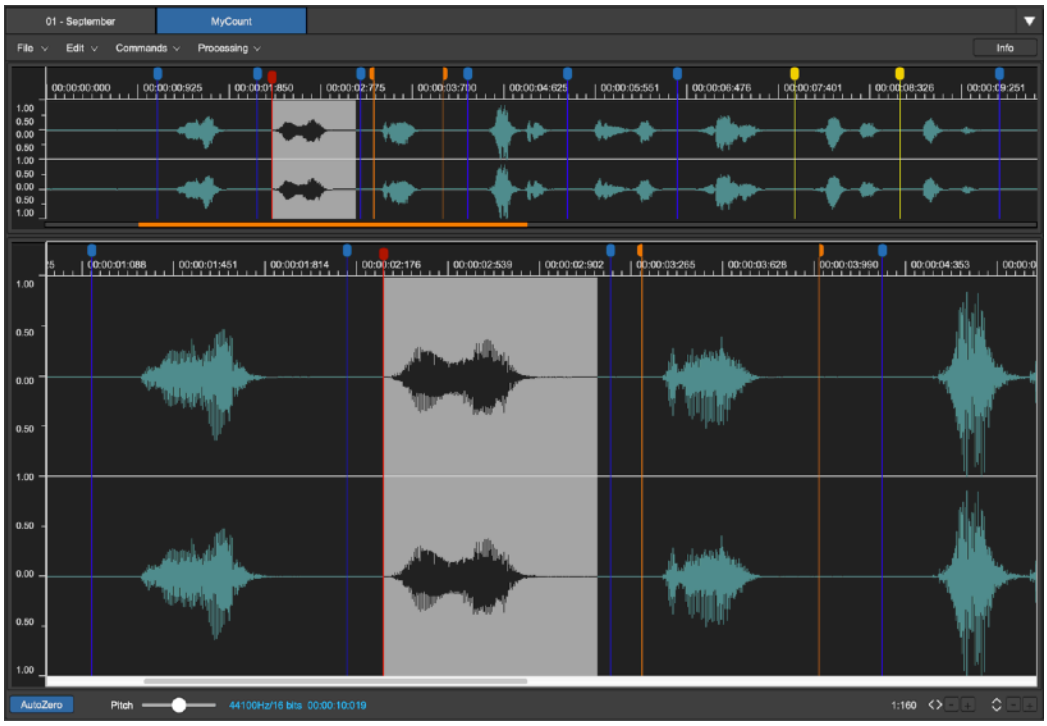
It is easy to use the zoom controller:

- **hover** the mouse over the zoom controller, the mouse pointer changes to a magnifying glass.

- **clicking on it and dragging** the mouse, the control draws an orange region. Then, releasing the mouse button, the main waveform view scrolls to the position corresponding to the orange rect start, zooming up to the position corresponding to the orange rect end.

- ⌥ **+ mouse click and dragging**, scrolls the main waveform view to the region pointed by the mouse, without modifying the zoom level.

The Audio File Editor Main Waveform view



As we have seen for the overview, the main Audio File Editor Waveform view area shows the waveform of the current audio file.

This view however is able to zoom in any part of the waveform, up to one samples per pixel and even more. Both x and y axes have an independent zoom levels. The vertical axis can be zoomed-in without limits, it is even possible to see the quantization noise in the audio file.

To zoom in/out:

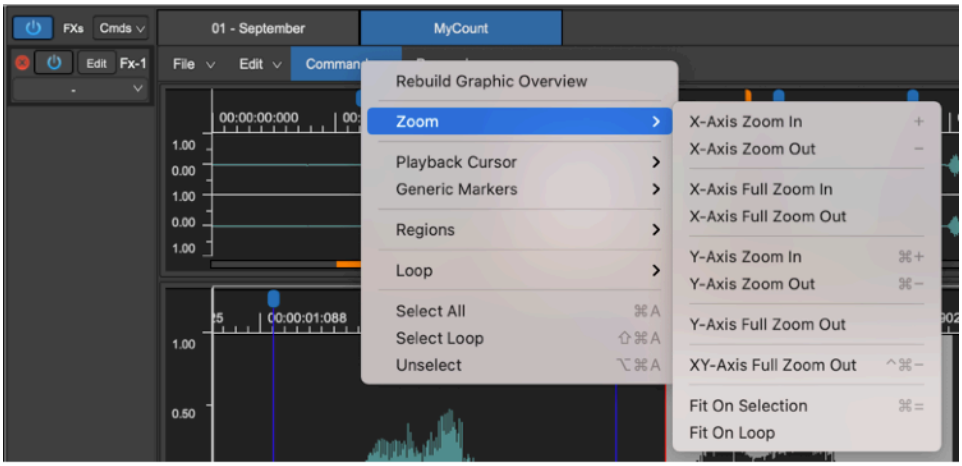
- **Use the mouse wheel**: it sets the horizontal X-Axis zoom-in/out ratio. The same can be done moving vertically 2 fingers on the Apple Trackpad, if any. Use ⌘ **+ mouse wheel** to set the vertical Y-Axis zoom-in/out ratio.

- **Use the +/- buttons**: use the +/- at the bottom right of the waveform view to zoom in/out horizontally on the X-Axis or vertically on the Y-Axis.

- **Use the menu commands**: clicking on the Commands button which is on top of the waveform overview, a popup menu appears, and it possible to use one of commands on the Zoom sub menu:

    - **X-Axis/Y-Axis Zoom In/Out** will increase or decrease the zoom in/out ratio by a factor 2 (it will magnify the waveform by a factor x2 or will zoom-out by a factor x0.5)

- **Full Zoom In/Out:** it is a shortcut to the maximum/minimum possible level.



Both functions are available for the X-Axis X (horizontal), Y-Axis (vertical) or in pair (XY-Axis Full Zoom Out).

There are also some functions to fit the zoomed area to a special region of waveform:

- **Fit On Selection**: to zoom in/out on the current selection. This command is not available if there is not a selection.

- **Fit On Loop**: to zoom in/out on the loop region. This command is not available if the loop is turned OFF.

- **Using the Keyboard shortcuts**: you can use the keyboard as shortcut to the above menu commands.

After zooming the waveform, the scroll bar a the bottom of the main waveform view lets you to scroll the view to another position.

Do not forget to use the Zoom Controller on the upper waveform overview view for immediate zoom in/outs!

NOTE: you can scroll the view also by clicking and dragging the Time Ruler. The effect is the same as using the scroll bar, but often it is smoother and very much more precise.

If it is playing, the Audio Editor waveform view area will scroll following the playback cursor.

In the left area at the bottom of the main waveform view, you can see information such as the sample rate, bit depth and total length of the audio file under editing.

The button AutoZero lets you to toggle On/Off the AutoZero options when placing markers and selection start/end (more about this later in this chapter).

The Info button opens the side panel on the right of the main waveform view, described here below.

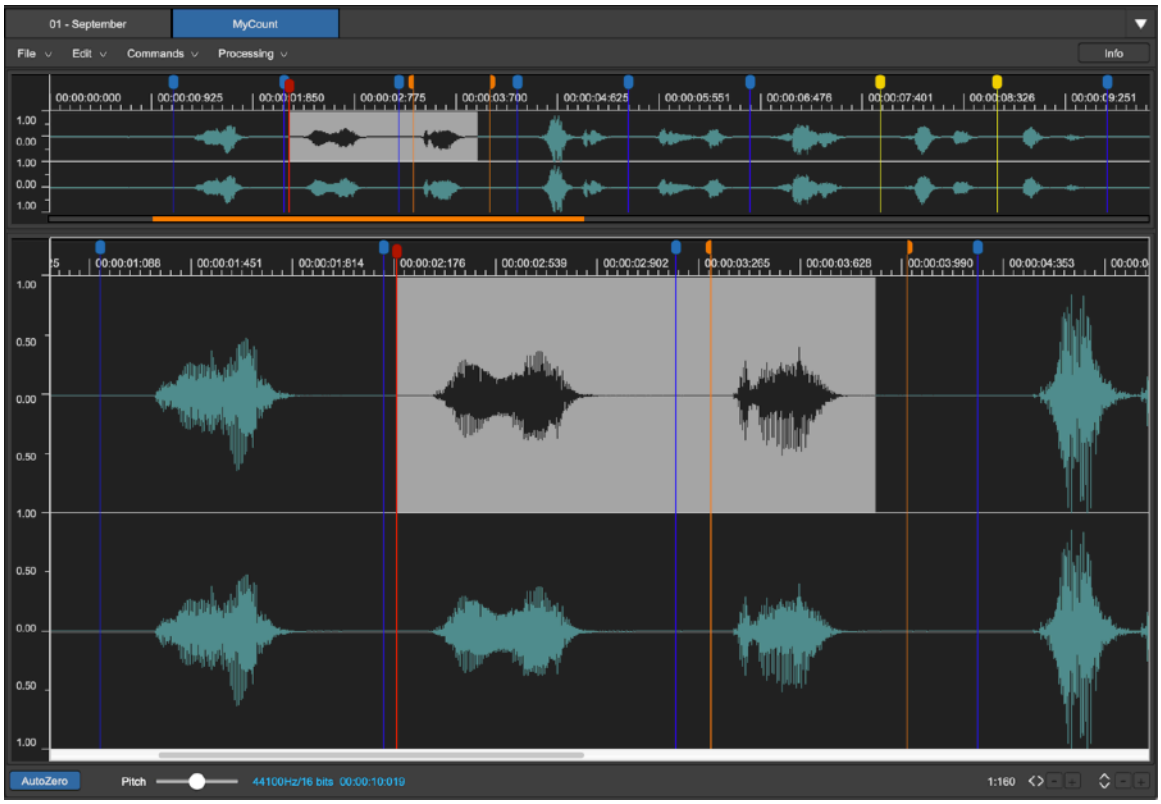
Making a waveform selection

A “selection” is a region of the audio file which we wish to edit. Most of DSP-Quattro editing functions work on the selection, if any. Otherwise, they works on the whole audio file.

There are several ways to do a selection: clicking and dragging the mouse, using menu commands or using keyboard key commands.

It is possible to make a selection on the main waveform view area or on the waveform overview. Since both views refer to the same file, a selection done on a waveform view will be visible also on the other waveform view as well. Doing a selection on the main waveform view area, dragging the mouse pointer outside the right or left borders, the view will scroll. The scrolling speed will increase/decrease accordingly to the distance outside the border.

NOTE: If the is already a selection, ⇧**+click** will extend the selection up to the mouse pointer. If there isn’t already a selection, ⇧**+click** creates a new selection between the playback cursor and the mouse pointer.



NOTE: you can also independently select the left or right channel of a stereo audio file. To select only the right channel, click and drag on the topmost part of the waveform of the right channel. To select only the left channel only, click and drag the lower part of the waveform of the left channel. In the case of a selection of only the left or right channel, if applicable, the edit function will process only that channel.

Clicking and dragging the mouse, doing a selection, the Counter Display will show in real time the selection length, start and end points.

NOTE: double-click with the mouse to select the portion of waveform between the two nearest markers. If there are none, all the waveform is selected. A triple mouse click always selects all the waveform.

Clicking on the Commands button which is on top of the waveform overview, It is possible to use the following commands to do selections:

Select All (or ⌘A):

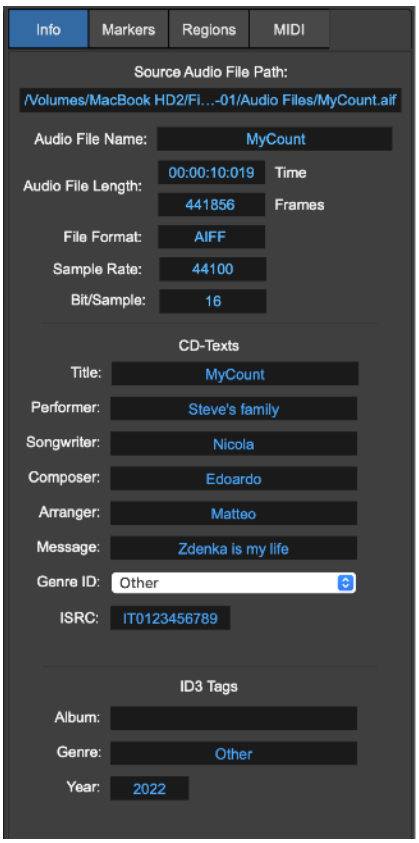
To create or extend the current selection to all the waveform.

Select Loop (or ⇧⌘A)

available only if loop is On, to select the region between start and end loop points.

The audio file Info side panel

Clicking on the Info button which is at the top left of the waveform overview view (or on the rightmost button among the buttons located at the top left of the worksheet, marker with an Info symbol), a side panel will open on the right of the waveform view itself. This side panel has some tab buttons. Clicking on each of them, the view below switches among the Info, Markers, Regions and MIDI views.



The same button used to open the side panel will close it if pressed again.

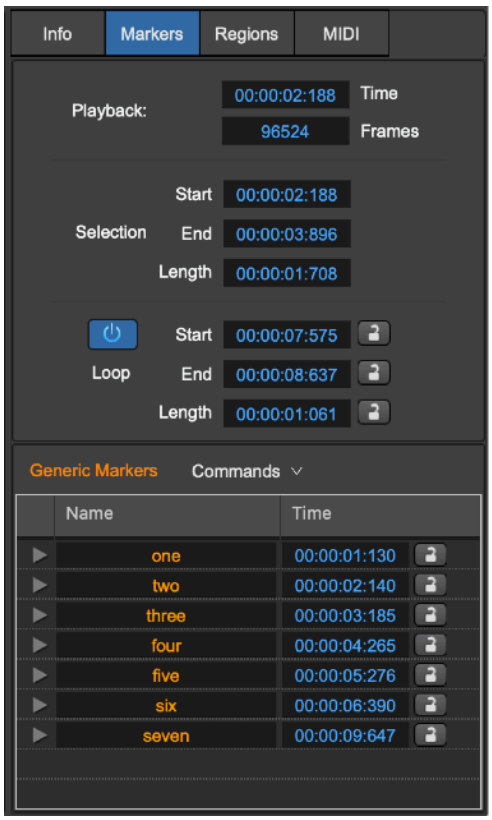
The Info panel is divided into two main parts:

- On top there are read-only info: source audio file path, audio file name, the length expressed in hh:mm:sec:msec and frames units, the audio file format, sample rate and bit depth.
- The lower part shows user editable settings: CD-Texts and ID3 Tags. Click on the editable field to enter the new value, then hit return (or click outside the popup view used to enter the new text) to confirm.

NOTE: please consider that exporting the audio file, not all audio file formats support the CD-Texts and ID3 Tags information.

Working with Markers

Two other tabs on top of the side panel switch to the Markers or Regions views.



There are several types of markers:

- **The Playback Cursor (the RED marker)** - always positioned at the current playback position.
- **Generic Markers (BLUE markers)** - a generic marker is identified by a location and a name.

- **Region markers (ORANGE start and end markers)** - a region is a portion of the audio file which is identified by two markers, one at region start, one at region end, and by a region name.
- **Loop markers (YELLOW start and end markers)** - A Loop is a portion of the audio file to cycle when playing it. It is identified by two markers, one at loop start, one at loop end.

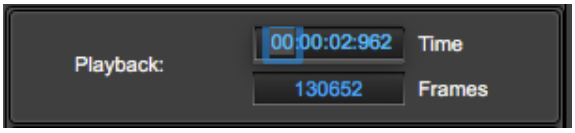
NOTE: DSP-Quattro is compliant with the standards when it reads/writes markers information from/to PCM uncompressed audio files (AIFF, WAVE, CAF). These audio files can be exchanged among different applications and software/hardware samplers, maintaining the information about loop and other markers.

NOTE: DSP-Quattro gives you an option of **Auto Zero**. When this option is ON, releasing the mouse after moving a marker or setting the selection, DSP-Quattro automatically shifts the cursor point to the previous zero-crossing point. A zero-crossing point is the location in which the waveform intersects the zero level changing the sign. This option is very useful to place markers in positions that have the zero level in common.

To activate the Auto Zero option, use the Auto Zero button at the lower left of the main waveform view, or use the menu command **Options->Auto Zero**, or to use the combination of keys ⌘**U**. This command toggles the AutoZero ON/OFF.

The Markers view shows the Loop and the Generic Markers, the Regions view shows the Regions markers.

On the Marker view there are two main parts: on top there is a part to show the current values of the playback cursor, of the loop markers (they are visible only if the Loop is ON) and the start and end values of the waveform selection, if any. The bottom parts has a table showing the Generic markers list, and a Command button to work on the Generic markers.



To edit the value of a marker position, click on the numerical field of the value. DSP-Quattro will show a popup, where it is possible to type a new value. Use the tab key to move from one field to the next, the enter key to close the popup.

Menu commands to move the playback cursor:

There are several menu commands to move the playback cursor at specific points of the audio file.

Clicking on the Commands button on top of the waveform view, and then on the Playback Cursor submenu, it is possible to:

Go To Start:

to move the playback cursor at audio file start.

Go To Next Marker (or ⌘K):

to move the playback cursor to the position of the next marker.

Go To Prev Marker (or ⇧⌘K):

to move the playback cursor to the position of the previous marker.

Go To Selection Start:

to move the playback cursor to the current audio selection start. This command is not available if there is not an audio selection on the waveform.

Go To Selection End:

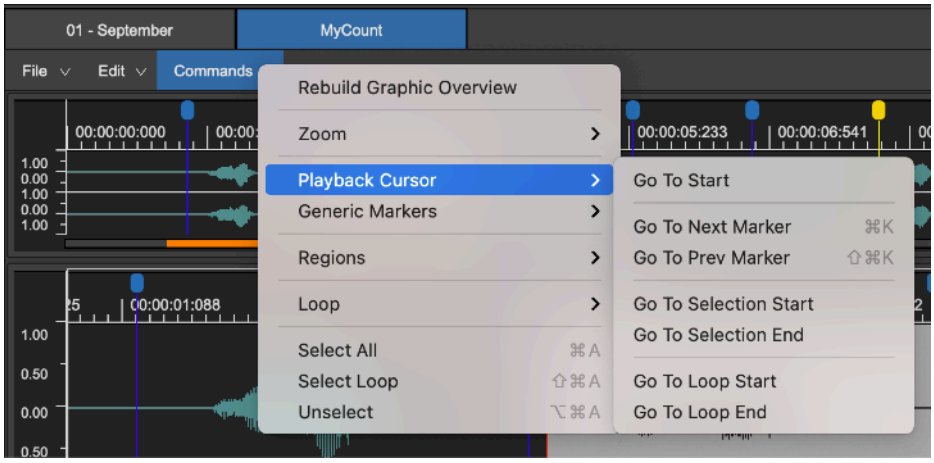
to move the playback cursor to the current audio selection end. This command is not available if there is not an audio selection on the waveform.

Go To Loop Start:

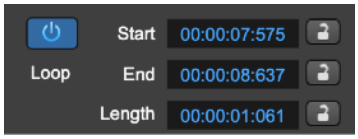
to move the playback cursor to the Loop start. This command is not available if the Loop is OFF

Go To Loop End:

to move the playback cursor to the Loop end. This command is not available if the Loop is OFF



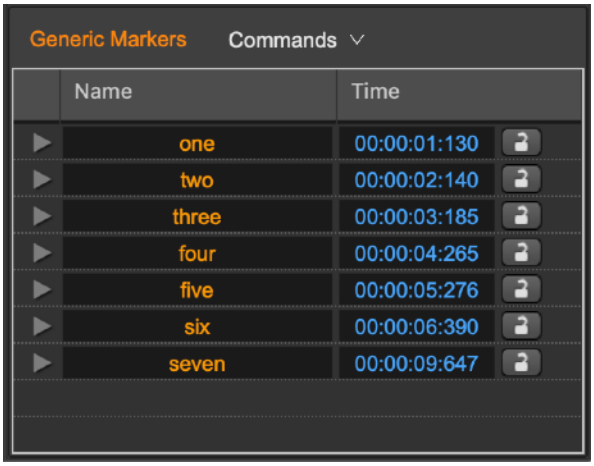
Among Loop options on the Markers side panel, there are also the buttons to turn On/Off the loop (the yellow start/end loop markers will appear/disappear on the waveform views) and to lock/unlock the loop points and loop length.



If one or both start/end loop markers are locked, the corresponding marker cannot be dragged or moved. And, if the loop length is locked, setting the start loop marker position will set also the end loop marker accordingly. Of course, the reverse is also true.

The Generic markers table

At the bottom of the Markers side panel, there is the Generic markers table:



All fields are editable. Just click on the filed to edit it, DSP-Quattro will show a popup to enter a new value.

On the right of each generic marker name there is an arrow which turns on red if the corresponding generic marker is the current selected generic marker. If you click on a blue generic marker on the waveform view, that becomes a selected generic marker.

NOTE: it is possible to define a group of generic markers, selecting them at the same time, just keeping the ⌘ or the ⇧ key pressed while clicking on the arrow on the left part of the generic marker row - or on top of the blue generic marker on the waveform view.

If there are more than one generic marker selected, dragging one of them on the waveform view will also make all the others slide along the time axis.

Generic markers can be locked. In this case, it is not possible to change their position, and it is not possible to move or drag them on the waveform view. If in a group there is a locked generic marker, it is not possible to move any of the others as well.

The Generic Markers commands

Clicking on the Commands button on top of the generic markers table, DSP-Quattro shows menu including the commands for Generic Markers:

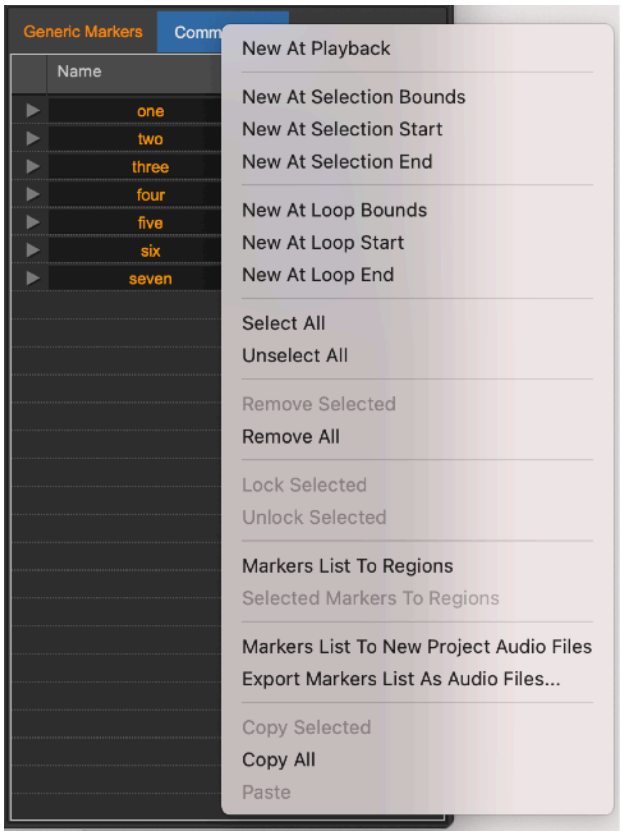
Use these menu commands (menu items are greyed-out if the command not applicable in a certain situation) to:

New At Playback (or ⌘M):

to create a new generic marker at playback cursor position

New At Selection Bounds (or ^⌘M):

If there is a selection, it creates two new generic markers at selection start and end positions. This command is not available if there is not a waveform selection.



New At Selection Start:

if there is a selection, it creates a generic marker at selection start. This command is not available if there is not a waveform selection.

New At Selection End:

if there is a selection, it creates a generic marker at selection end. This command is not available if there is not a waveform selection.

New At Loop Bounds (or ⌥⌘M):

if the Loop is On, it creates two new generic markers at loop start and end. This command is not available if the Loop is OFF.

New At Loop Start:

if the Loop is On, it creates a generic marker at loop start. This command is not available if the Loop is OFF.

New At Loop End:

if the Loop is turned On, it creates a generic marker at loop end. This command is not available if the Loop is OFF.

Select All:

to select all the generic markers. This command also groups them all together.

Unselect All:

to un-select all generic markers. This command is not available if there are not selected markers.

Remove Selected (or ⌥⇧⌘M):

to remove (delete) the selected generic marker(s). This command is not available if there are not selected markers.

Remove All (or ^⇧⌘M):

to remove (delete) all generic markers

Lock Selected:

to lock the selected generic markers. This command is not available if there are not selected markers.

Unlock Selected:

to unlock the selected generic markers. This command is not available if there are not selected markers.

Markers To Regions:

to create new regions from the generic Markers on the list. Each region will extend from one generic marker to the next one on the list, and so on, one after the other.

Selected Markers To Regions:

as above, with the difference that only the selected markers are considered.

Markers List to New Project Audio Files:

to create new audio files from the generic markers list, one for each marker. Each new audio file will extend from one generic marker to the next one on the list.

Export Markers List As Audio Files…:

to export to MacOS file system new audio files from the generic markers list, one for each marker. Each new audio file will extend from one generic marker to the next one on the list. Then, DSP-Quattro shows a dialog with the options to export the audio files and to ask a destination. Please refer to the chapter describing the options available to export audio files for the details.

Copy Selected:

to copy the list of selected generic markers into a special clipboard built-in into DSP-Quattro. This special clipboard is dedicated only to the generic markers. After copying a list of generic markers into the marker clipboard, it will be possible to paste this list from the clipboard into a new audio file.

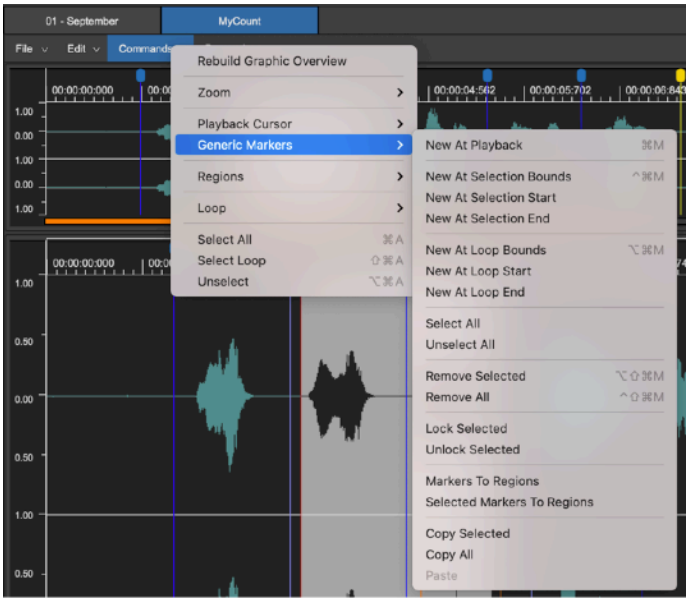
Copy All:

as above, with the difference that this command copies all the generic markers into the marker clipboard.

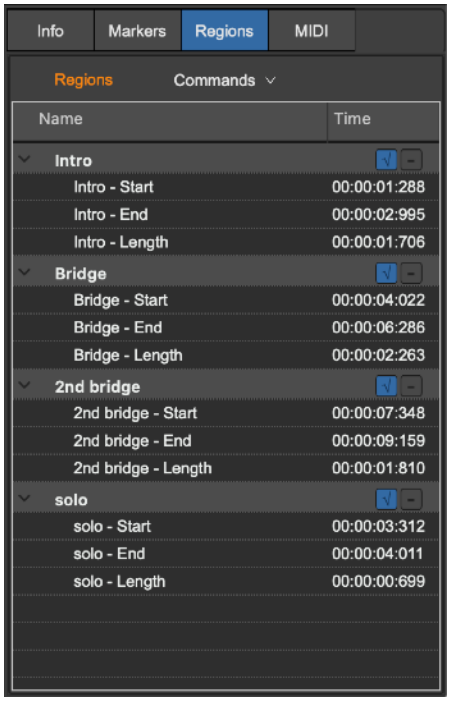
Paste:

to paste the list of the generic markers which are memorised into the marker clipboard into the current audio file. This command is not available if the marker clipboard is empty.

The same commands are available from the Commands button on top of the waveform view:



Working with Audio Regions



As already introduced, an audio region is a portion of the audio file which is identified by two markers, one at region start, one at region end, and by a region name.

The Audio Regions table

One of the tabs on top of the Info side panel switch to the Audio Regions view. DSP-Quattro allows you to add and remove audio regions, edit region name, show/hide the region markers on the waveform view. There are also several commands dedicated to audio regions.

Each row on the table is dedicated to the parameters of an Audio Region :

Click on the arrow on the left side of the audio region row to expose/collapse the details about the audio region start and end positions, and the region length.

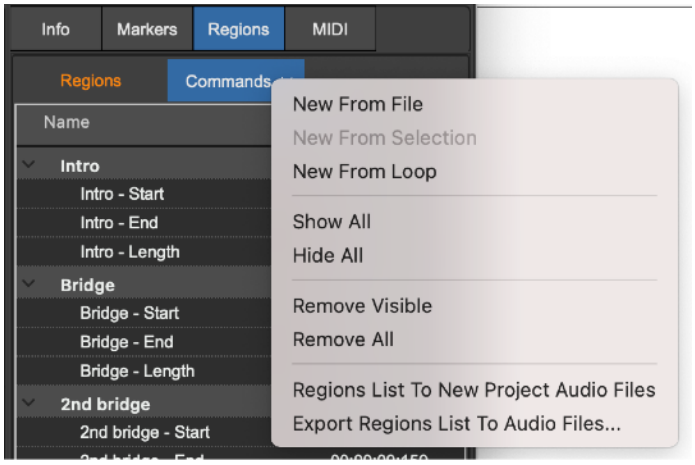
Click on the blue check mark on the right of the audio region row to show/hide the audio region markers (the orange markers) on the waveform view.

The minus (-) button on the right of the audio region row will remove (delete) that audio region.

You can edit the audio region name, start, end and length values just clicking on the corresponding text or value. DSP-Quattro will show a popup view to enter the new value.

The Audio Regions commands

Clicking on the Commands button on top of the Audio Regions table, DSP-Quattro shows this menu:



New From File (or ⌥⇧⌘U):

to create a new audio region starting at audio file start and ending at its end.

New From Selection (or ⌥⌘U):

to create a new audio region starting at selection start and ending at selection end. This command is not available if there is not a waveform selection.

New From Loop:

to create a new audio region starting at Loop start and ending at Loop end. This command is not available if the Loop is Off.

Show All (or ^⌘U):

to make all the audio region markers visibile on the audio waveform view.

Hide All (or ^⇧⌘U):

to hide all the audio region markers on the audio waveform view.

Remove Visible:

to remove (delete) all visible audio regions.

Remove All:

to remove (delete) all audio regions.

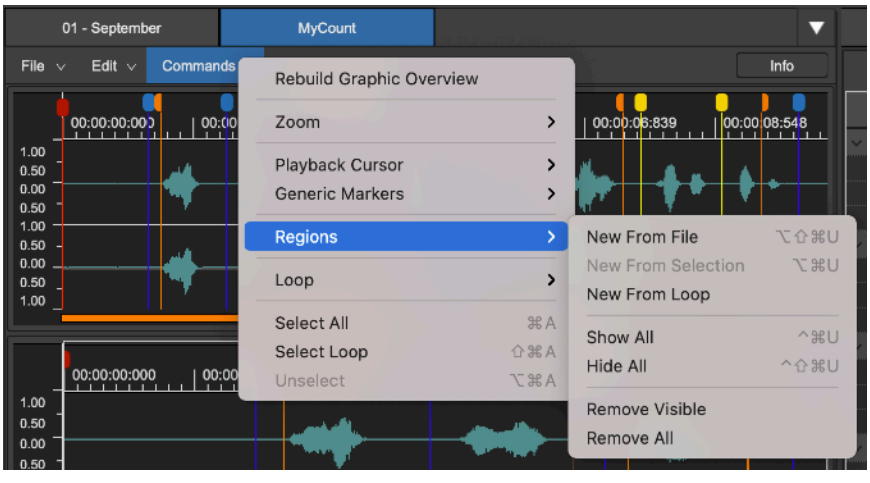
Region List to New Project Audio Files:

to create new audio files from the audio regions list, one for each audio region.

Export Region List to Audio Files…:

to export to MacOS file system a list of new audio files from the audio regions list, one for each audio region.

The same commands are available from the Commands button on top of the waveform view:



Working with the Loop

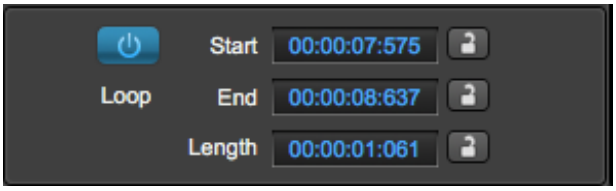
When it play an audio file, DSP-Quattro uses two different concepts for cycling on a certain region of an audio file: the Loop and the Cycle.

The Cycle Mode and the Loop

The **Loop** is a region of the audio file to cycle when playing it. It is identified by two markers, one is the loop start, the other one is the loop end (the yellow markers on the waveform view). These two markers are saved into file, and into the Project.

Also the **Cycle** is a portion of the audio file to cycle when playing it, BUT it is not identified by any marker. It is simply a region which DSP-Quattro will play again and again without any interruption.

The Loop can be ON or OFF accordingly to the status of the On/Off button on the audio file Info side panel, among Markers settings:



The Cycle can be ON or OFF accordingly to the state of the Cycle button on the Transport bar:

Q: When DSP-Quattro plays cycling on the Cycle instead of cycling on the Loop?

A: let's start from **the rule** which DSP-Quattro follows to play:

1) **If there an audio selection**, DSP-Quattro plays that audio selection ONLY, starting at the start of the audio selection and ending at selection end.

   Then, if the Cycle is ON, DSP-Quattro plays cycling on that audio selection. If the Cycle is OFF, it stops as soon as it reaches the end of the selection. This will happen no matter if the Loop is On or Off.

2) **If there is not an audio selection**, DSP-Quattro plays the audio file starting at the beginning of the audio file. Then:

   - If the Loop in ON, DSP-Quattro plays cycling on the Loop (yellow markers on the waveform view).

   - If the Loop is OFF, DSP-Quattro plays the audio file up to the end, then it will cycle starting again at the beginning of the audio file ONLY if the Cycle button is ON.

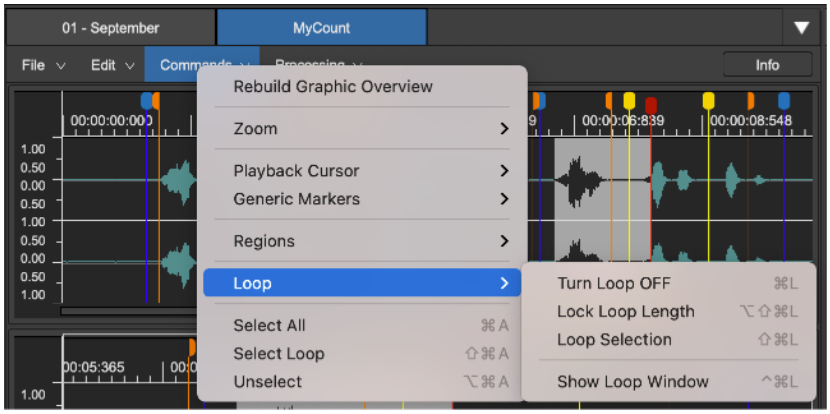
- If both Loop and Cycle button are OFF, DSP-Quattro will stop to play as soon as it reaches the end of the audio file.

NOTE: if there is an audio selection on the waveform view, DSP-Quattro plays that selection only, cycling on it if and only if the Cycle button is ON.

NOTE: and, if there is an audio selection on the waveform view, when playing that selection, DSP-Quattro does not consider the Loop (yellow markers) settings, even if the Loop is ON.

The Loop commands

Clicking on the Commands button on top of the waveform view, DSP-Quattro shows a menu which includes the following commands for Looping:



Turn Loop ON/OFF (or ⌘L):

to toggle the Loop ON and OFF. If the Loop has been turned ON, the two Loop markers (the yellow markers), will appear on the waveform view. Otherwise, DSP-Quattro will hide them.

Lock Loop Length (or ⌥⇧⌘L)

to lock/unlock the length of the Loop. If the Loop length is locked, moving any one of the two Loop markers, the other one will move accordingly. This option is useful in the case that, once you have found a good Loop, you wish to shift the Loop without changing its length. This command is not available if the Loop is OFF.

Loop Selection (or ⇧⌘L):

to place the Loop markers at the current selection start and end. (This command is not available if there is not a selection on the waveform view). If the Loop is turned Off, it will automatically be turned On.

Show/Hide Loop Window (or ⌥⌘L):

to show or hide the Loop floating window tool. More about this here below.

The Loop Window

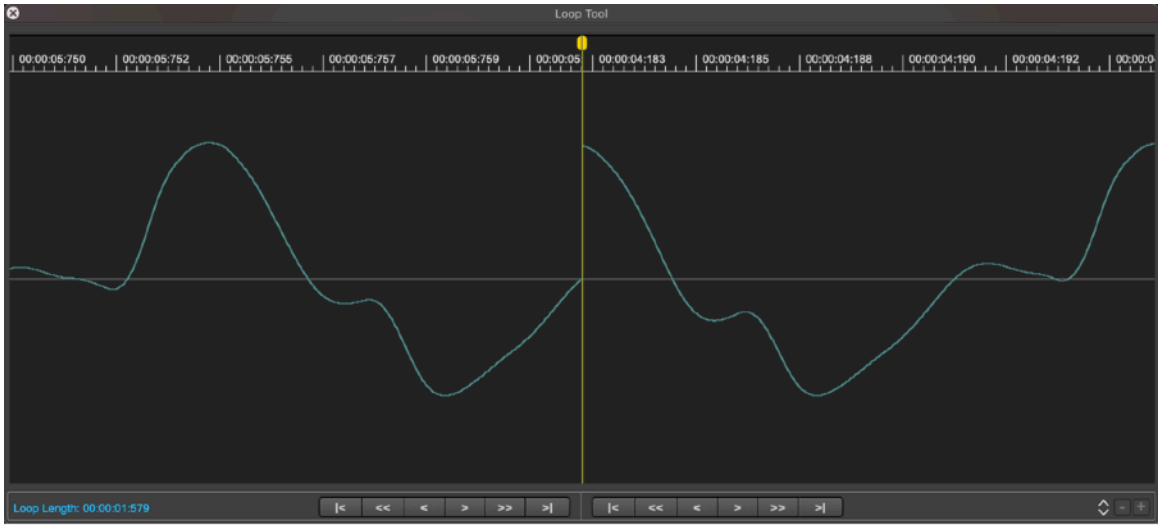
DSP-Quattro gives you a special tool for setting Loop points: the Loop Window and a very special X-Fade Looping tool. In this chapter the Loop Window will be described. To know about the X-Fade Looping tool, please

refer to the chapter describing the X-Fade Looping processing function of DSP-Quattro.

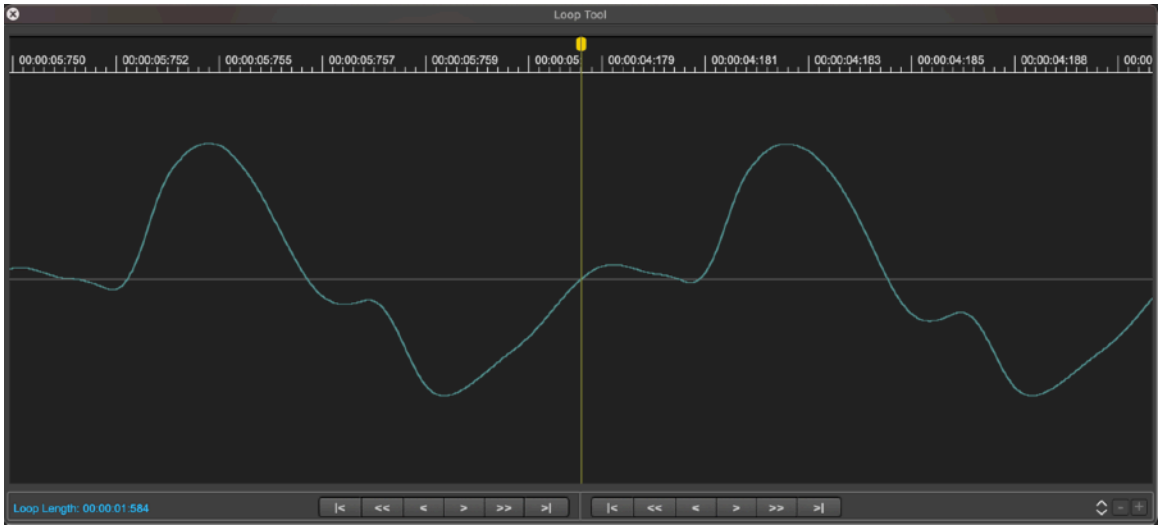
This tool allows you to monitor the waveform in correspondence of the Loop points.

NOTE: the window is a floating window. It means that it is always visible on top of the Editor window. At the same time, it is also possible to work on the waveform Editor view.

Any operation done on the waveform Editor view, like dragging a Loop marker, will result in a real time change in the Loop window, and vice versa.



This window consists of two parts, the left and right parts, divided by a yellow marker that corresponds to the loop point, where DSP-Quattro jumps back cycling: the left side of the view shows the final part of the waveform just before the Loop End point, the right side of the view shows the part of waveform which is immediately after the Loop Start point.



When playing the Loop, DSP-Quattro plays the samples up to the Loop End point, then it jumps and plays without any interruption from the sample at the Loop Start point. The Loop Window shows you what DSP-Quattro plays when it reaches the Loop point, showing the visual continuity of the waveform at loop. If the two points of start and end loop don't coincide or don’t grant a continuity to the waveform, as for example in the first above figure, it is clear that a very unpleasant click will be heard at loop point, when DSP-Quattro will cycle jumping from the loop end to the loop start.

On the other hand, if the loop points are placed in such way to guarantee a continuity to the waveform, as shown in this second figure, we may expect that there won’t be any audible click playing the loop, when DSP-Quattro jumps from the loop end to the loop start.

Unfortunately the visual continuity is not always sufficient to guarantee that the Loop will play without clicking, but surely the Loop Window is an essential tool to set the loop points at very good positions.

After doing this, it is also possible to use the X-Fade Looping algorithm of DSP-Quattro to produce a Loop which plays absolutely perfect. Of course, a certain experience is necessary to find the “perfect" Loop, especially for audio files which are harmonically complex, as in the case of samples of orchestral strings or of an acoustic piano.

The Loop Window has its own vertical Y-Axes zoom level. To do vertical zoom in/out, use the two -/+ buttons on the lower right part of the Loop Tool window.

There are also two custom transport bars to move the start/end points. One for setting the loop end, below the left view, one for setting the loop start, below the right view.

Respectively, from left to right, these buttons allow you:

- to Move the Loop point on the previous zero crossing point. A zero-crossing point is the location in which the waveform intersects the zero level changing the sign. This option is very useful to place markers in positions that have the zero level in common, if the the slope of the curve is the same at the end and loop positions. The waveform of a perfect loop has always the same level and same slopes at loop points, and the point of zero crossing can be very useful for having a common reference point for placing both start and end loop points.

- To quickly move the Loop point backward.

- To slowly move the Loop point backward.

- To slowly move the Loop point forward.

- To quickly move the Loop point forward.

- To move the Loop point to the next point of Zero Crossing.

NOTE: you are able to drag forward or backward the Time Ruler of every Loop view. The respective Loop point will move accordingly.

NOTE: to place the loop points in the right places is only the first step to have a file playing perfect when jumping at loop. After placing the loop markers, use the X-Fade looping algorithm (see the processing function in the following chapters) to smooth the waveform at loop. Surely, the result will surprise you.

Editing an Audio File using DSP-Quattro

This chapter describes in deep all the functions of audio editing offered by DSP-Quattro and how to use them.

Audio File Formats

DSP-Quattro loads audio file previously saved using almost all known formats, starting from the PCM uncompressed formats, like AIFF, WAVE, CAF having 8, 16, 24, 32 and 32 float bits/sample, and any sample rate, to compressed audio file formats as mp3, MPEG-4, mp2, ac3, aifc, 3gp, mpa, mp4, 3g2, m4a, AAC…

DSP-Quattro takes care to do all necessary conversion loading an audio file, and this process is totally invisible to you.

As a special option, DSP-Quattro is able to import an audio file as **RAW data**. It means that DSP-Quattro will read the file, loading it sample by sample without looking for any audio file header, as it usually does. It is useful to recover corrupted PCM files where the header is no longer valid. The RAW data import DOES NOT work at all the formats which are not PCM-based, ie if the source file is using any technique to encode or compress. See the following paragraph to know how to import an audio file as RAW data.

When DSP-Quattro needs to edit an audio file, it imports the source audio file into a temporary area, translating it to the internal uncompressed CAF 24 bits audio file PCM format. This is because the CAF guarantees the maximum audio fidelity and supports to audio long files. This means that you can work with audio files without any reasonable restriction on its length, as it happens if using the standard AIFF and WAVE formats.

In fact, AIFF and WAVE formats are limited to 2.1 GB for the single audio file and which is, working at 24bits/96kHz, a little bit more than 1 hour only. Instead, CAF audio files can be as long as needed, so you can work with even hours and hours of music at 24bits/96kHz without any problem.

Playing an audio file, DSP-Quattro plays always in sync with the current audio device. It means that its internal audio engine works at the same rate of the current audio device. If the sample rate of the audio file is not equal to that of the current audio device, DSP-Quattro applies a real time sample rate conversion (SRC) to play the audio file at the correct pitch.

NOTE: **the sample rate of the current audio device and sample rate of the current audio file should have always the same value, otherwise DSP-Quattro, playing that audio file, needs to process the audio stream with its SRC algorithm and you do not hear EXACTLY what you are going to save on the audio file after your edits.**

So, it would be always important to set the sample rate of the current audio device to the same value of the current audio file under editing OR to resample the audio file under editing to the sample rate of the current audio device using the off-line SRC algorithm of DSP-Quattro (it is a very high quality linear phase SRC) before to do your edits with it.

Undo/Redo

DSP-Quattro always allows to undo changes, using the **Undo command (or ⌘Z)**. The **Redo command (or ⇧⌘Z)** command does the opposite, restores again to the edited version exactly as it was just before to do Undo.

The Undo/Redo engine of DSP-Quattro allows an unlimited number of Undos/Redos: DSP-Quattro keeps track of all edits done since it opened the file – until it saves the audio file.

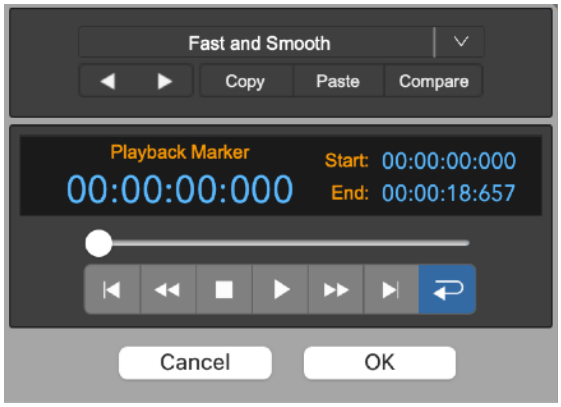
Please beware that saving an audio file also deletes the Undo/Redo history. The same happens when quitting the application.

NOTE: each file under editing has its own Undo/Redo history. Doing some edits on one file, and then switching to a different audio file and doing some edits on this new file, DSP-Quattro starts to save a new Undo/Redo history. Then, switching back to the previous audio file, its own Undo/Redo history is safe and it is possible to Undo/Redo last edits done on that file.

Introducing the Real-Time Previewer Controller

For previewing the processed audio, DSP-Quattro allows to hear the result of the edit before deciding whether to apply the changes or not. In this way it is possible to set the parameters of the algorithm in real time while hearing the result.

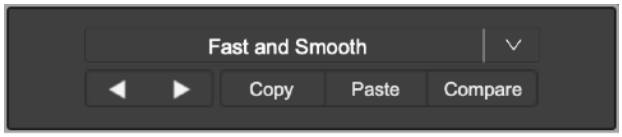
DSP-Quattro uses this Real-Time Previewer Controller in several occasions. Usually it is located on the right side of the dialog used to set the parameters which are specific to a certain edit function, and appears like this:



This controller consists of:

The Preset programmer:

On top there is the preset programmer, that manages the preset of the algorithm.

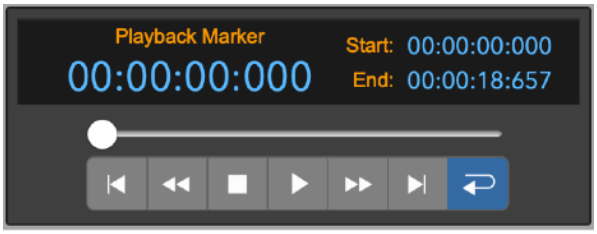


If the algorithm allows to store one or more preset, on top there is an active popup menu which allows to select one of the available preset.

This section allows to set, save and load a preset. A preset is a collection of all the parameters which are necessary to control the algorithm.

The preview transport bar:

On the bottom part there is the Transport bar, to control the playback of the audio file.

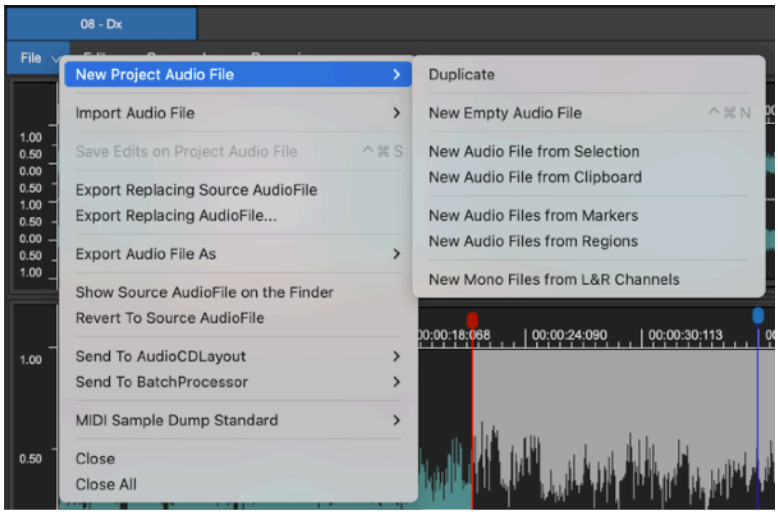


Transport buttons and the display are very similar to the transport bar used to control the playback of an audio file under editing. Please refer to the relevant character for the description of the use of each button and of the display.

The slider allows to move the playback cursor back and forth in time, along the audio file.

The File Menu Commands

Clicking on the File button on top of the waveform view, DSP-Quattro shows a menu with the commands for managing files.



New Project Audio File

This group of submenus includes several commands to create new audio files adding them to the Project.

Duplicate:

DSP-Quattro makes a exact copy of the current audio file and then adds it to the Document Manager and load it on the Audio File Editor, showing it as a new tab of the Waveform Editor view

New Empty Audio File (or ⌘N):

to create a new temporary audio file adding it to the Document Manager then showing it on a new tab of the Waveform Editor view.

New Audio File from Selection:

as above, with the difference that the new audio file is not empty but contains the samples of the source audio file from the selection start to the selection end. This command is not available if there is not a waveform selection.

New Audio File from Clipboard:

to create a new audio file filling it with contents of the current audio clipboard, then adding this new audio file to the Document Manager, and showing it on a new tab of the waveform Editor view. This command is not available if the audio clipboard is empty.

New Audio Files from Markers:

to create new audio files from the list of the generic makers, adding the new audio files to the to the Document Manager. Each new audio file extends from one generic marker to the next one on the list. This command is not available if there are not generic markers.

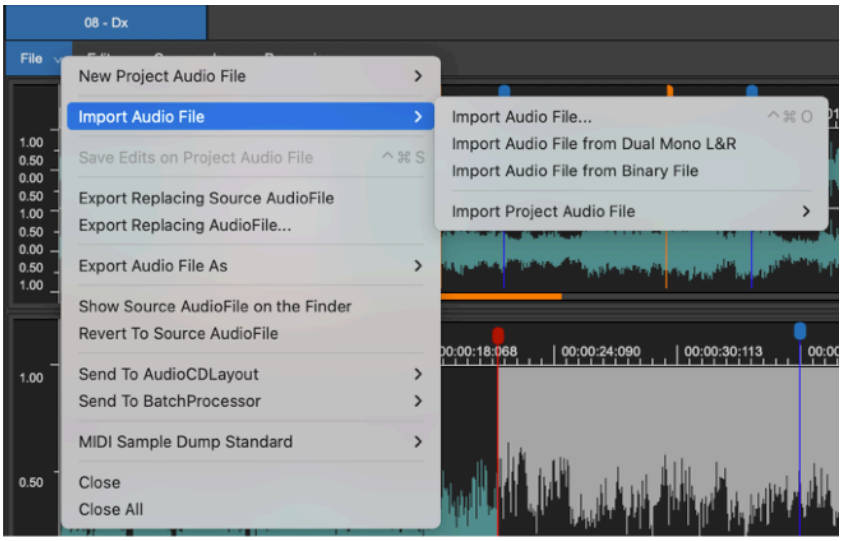
New Audio Files from Regions:

to create new audio files from the list of the audio regions, adding the new audio files to the Document Manager. This command is not available if there are not audio regions.

New Audio Files from L&R Channels:

to create two new mono audio files, one from the left and one from the right channels of the current stereo audio file, then adding the new audio files to the Document Manager. This command is not available if the audio file is not stereo.

Import Audio File



Import Audio File…

to load an audio file from the MacOS file system. DSP-Quattro shows a file browser to select one or more audio files to open, then adds them to the worksheet, also showing them on the waveform Editor view.

NOTE: you can select more than one audio file at the same time.

NOTE: DSP-Quattro allows to select any audio file in one of the possible supported format (.aif, .wav. .mp3, .m4a, .caf, ….), then - if necessary - it takes care to translate the audio file to a un-compressed PCM audio file, starting to work with it with the maximum audio quality. In the case in which it is not possible to select an audio file in file browser because it is greyed-out, it would be necessary to check if that the file name ends with the proper extension (.wav, .mp3, …).

Import Audio File from Dual Mono L&R:

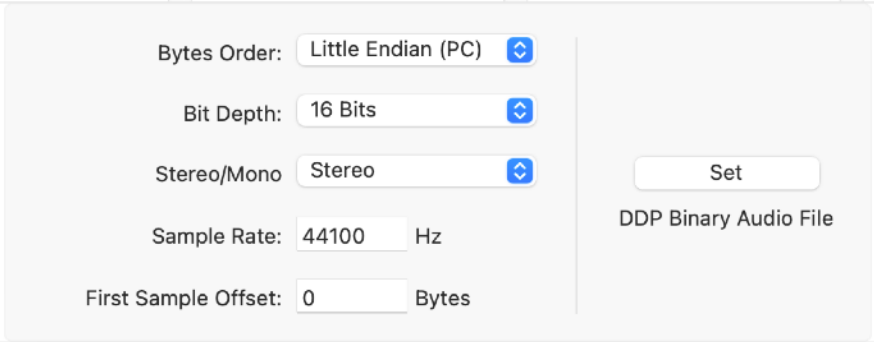
to load a stereo audio file selecting two mono audio files, one for the Left and one for the Right channels (Dual Mono). This command is useful if you need to edit in DSP-Quattro a stereo audio file generated by an external application which uses to save a stereo audio file as two -L and -R mono audio files.

Import Audio File from Binary File:

DSP-Quattro is able to import an audio file building it reading a RAW binary file. It is necessary to enter some parameters used by DSP-Quattro to translate the binary file to an audio stream to save into a new audio file.

DSP-Quattro will show a file browser. In the bottom part of this file browser it possible to set the parameters used to to translate the binary audio file to a playable audio file:

Bytes Order: when the below Bit Depth parameter is greater than 8 bits/ sample, each sample will use more than one byte. These bytes can be ordered by following the “Big Endian” standard, generally adopted by the Motorola microprocessors and PowerPC-based Macs, or “Little Endian” standard, generally adopted by Intel or Apple Silicon-based Macs and MSDOS/Windows PCs.



Bit Depth: to set if DSP-Quattro must read 8, 16, 24, 32 or 32 (floats) bits for each sample.

Stereo/Mono: to set the number of interleaved audio channels. For stereo audio files, DSP-Quattro will read one sample to fill the left channel, then one sample to fill the right channel, and again.

Sample Rate: to set the sample rate that will be adopted for playing the file.

First Sample Offset: to set the offset, expressed in bytes, from the beginning of the file, that will be used by DSP-Quattro before to start to read samples. This value is very important to skip the audio file header correctly to realign the audio sample reading position.

Click on the **Set button** to set the values to the default values to use to read a binary audio file produced accordingly to the DDP standard.

Import Project Audio File:

to load an audio file which has been already loaded into the Project. DSP-Quattro will show the same list of the audio files which are on the Document Manager table. Just select the audio file you wish to edit, DSP-Quattro will load it on the Audio File Editor and will show it on a new tab of the Audio File Editor view.

Save Edits on Project Audio File (or ^⌘S):

to save the current changes done on the audio file which DSP-Quattro keeps into the Project. Use this command to render to file your edits.

NOTE: DSP-Quattro always asks to save your edits - if any - when it quits.

NOTE: after saving changes, DSP-Quattro resets the Undo/Redo history.

Export Replacing Source Audio File (or ^⌘S):

to save the current changes done rendering the audio stream on the source audio file on MacOS file system (and not on the audio file imported into the Project).

Use this command to save the edits on the source audio file, external to the Project, which is also visible to the other audio applications.

NOTE: Saving on the source audio file, DSP-Quattro saves using the audio file format of the source audio file as it was before importing it into the Project.

NOTE: this command is not available if the source audio file is not present anymore in the original position on MacOS file system.

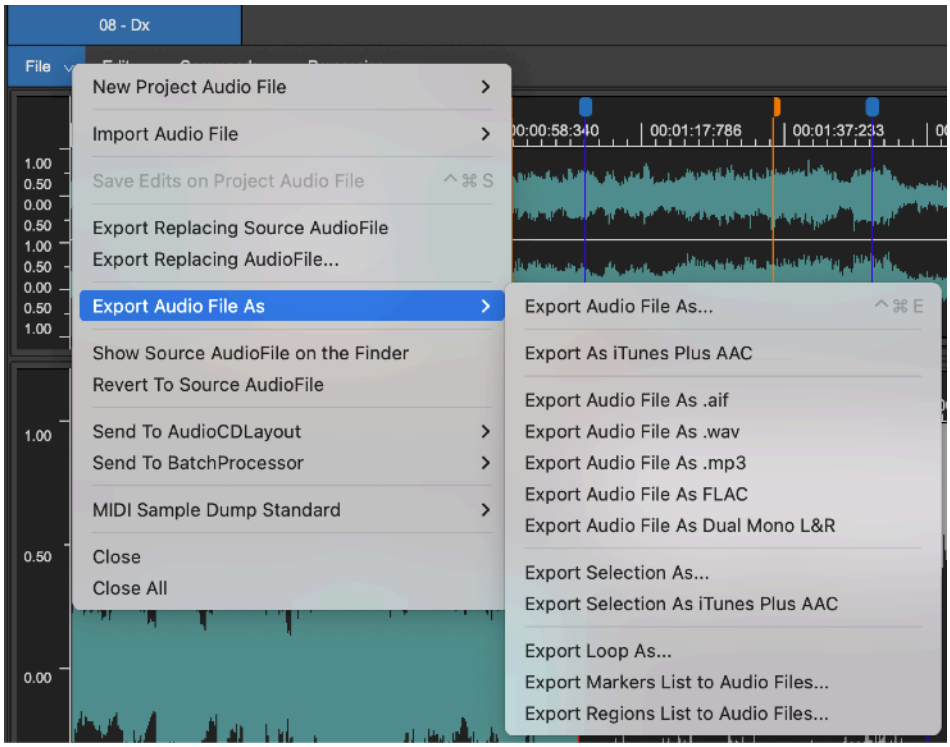
Export Replacing Audio File…:

to save the current changes done rendering the audio stream on an audio file to choose on MacOS file system. DSP-Quattro shows a file browser to choose which audio file to replace.

NOTE: Saving on the chosen external audio file, DSP-Quattro saves using the audio file format of that destination audio file.

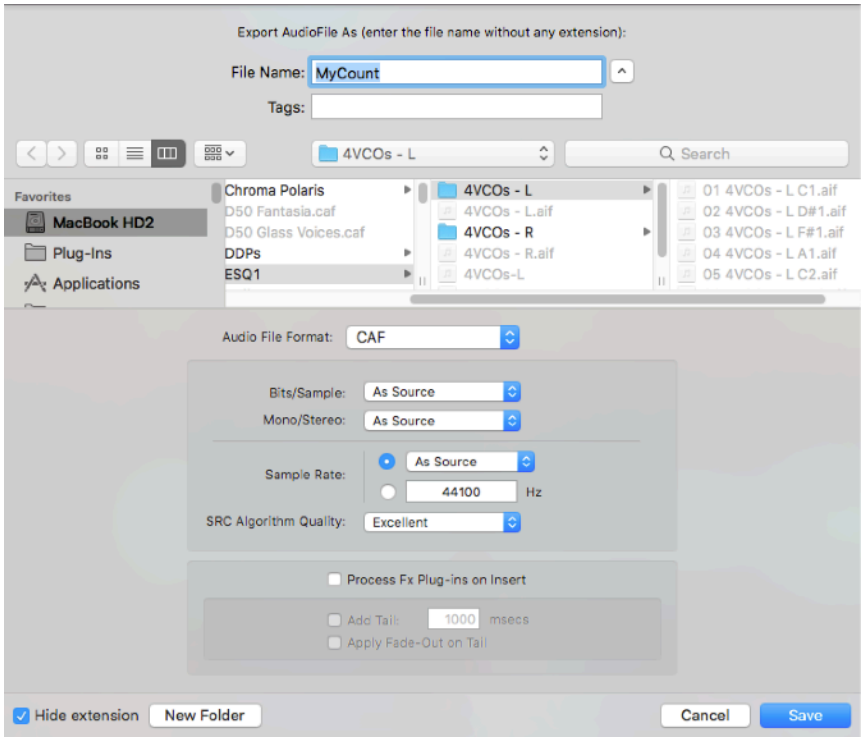
Export Audio File As:

This group of submenus includes several commands to export the edited audio file from the Project bundle to the MacOS file system, such to make it visible to other audio applications.



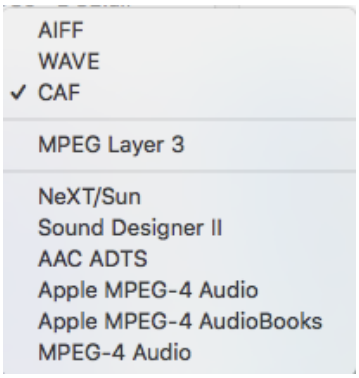
Export Audio File As… (or ^⌘E):

to export the current audio file to the MacOS file system. DSP-Quattro shows a file browser to type the destination file name, and with a custom view to set the audio file format to use exporting samples to the destination file.



The settings on this custom view are:

- **Audio File Format:** to set among the standard formats which are available on the list:



According to the chosen audio file format, the view which is on the bottom part of the the file browser changes.

The uncompressed PCM formats (AIFF, WAVE, CAF) need of these additional parameters:

- **Bits/Sample**: DSP-Quattro can save 8, 16, 24, 32 or 32 (floats) bits for each sample. Set “As source” to keep the bit depth of the source audio file.

- **Stereo/Mono**: to set the number of interleaved channels. Set “As source” to keep the number of channels of the source audio file.

- **Sample Rate**: to set the sample rate of the destination audio file. Set “As source” to use the same sample rate value of the source audio file.

- **SRC Algorithm Quality**: if the sample rate of the destination audio file is not the same of the source audio file, DSP-Quattro uses its internal Sample Rate Converter (SRC) to write the destination audio file. Four levels of quality of the advanced liner phase algorithm of DSP-Quattro are available, ranging from Fast to Excellent.

- **Process Fx Plug-in on insert**: if ON, DSP-Quattro renders the source audio file using the FX chain on insert on the audio file channel strip.

- **Add Tail**: if the option to process FX is ON, it is possible to add a tail to the destination audio file, setting also how much this tail must be long. This is very useful if the FX chain includes an effect like a reverb or space simulator which produces an additional tail after stopping the source audio file at its end. Turning ON the option “Add Tail”, DSP-Quattro continues to process the audio after reaching the audio file end, capturing the tail of the effect or of the chain of effects.

- **Apply Fade-Out on Tail**: If the options to process FX and to Add Tail are ON, it is possible to apply a fade-out curve to the tail, avoiding an abrupt end at the end of the destination file. Turning ON “Apply Fade-Out on Tail”, DSP-Quattro decreases the output gain while processing the tail, resulting in a smooth end.

- **Apply Fade-Out on Tail**: If the options to process FX and to Add Tail are ON, it is possible to process the tail thru a fade-out curve to avoid an abrupt end at the end of the destination file. Turning ON “Apply Fade-Out on Tail”, DSP-Quattro will decrease the output gain while processing the tail, to guarantee a smooth end.

Export As iTunes Plus AAC:

it is a shortcut to “Export Audio File As…” using the iTunes Plus AAC standard audio file format for the destination audio file. In this case, no additional parameters are required.

Export Audio File As .aif:

it is a shortcut to “Export Audio File As…” , setting AIFF as audio file format.

Export Audio File As .wav:

it is a shortcut to “Export Audio File As…” setting WAVE as audio file format.

Export Audio File As .mp3:

it is a shortcut to “Export Audio File As…” setting MPEG Layer 3 (mp3) as audio file format.

Export Audio File As FLAC:

it is a shortcut to “Export Audio File As…” setting FLAC as audio file format.

Export Audio File As Dual Mono:

given a stereo audio file, saves two mono audio files, one for the Left and one for the Right channels (Dual Mono), adding a “-L” to the file name of the first one, a “-R” to the file name of the second one.

Export Selection As…:

calls “Export Audio File As…”, exporting only the region of the selected audio file waveform. This command is not available if there is not an audio selection on the waveform view.

Export Selection As iTunes Plus AAC:

calls “Export Selection As…”, but using the iTunes Plus AAC standard audio file format for the destination audio file. This command is not available if there is not an audio selection on the waveform view.

Export Loop As…:

calls “Export Audio File As…”, exporting only the region of the Loop. This command is not available if the Loop is OFF.

Export Markers List to Audio Files:

to export audio files from the list of the generic makers. Destination audio files will extend from one generic marker to the next one on the list. This command is not available if there is not any generic marker.

Export Regions List to Audio Files:

to export audio files from the list of the audio regions. This command is not available if there is not any audio region.

Show Source Audio File on the Finder:

to ask to the application to reveals the position of the source audio file on the MacOS file system.

NOTE: this command is not available if the source audio file is not present anymore in the original position on MacOS file system.

Revert to Source Audio File:

to discard any changes made after the last command for saving. The application reloads the last saved version of the selected audio file.

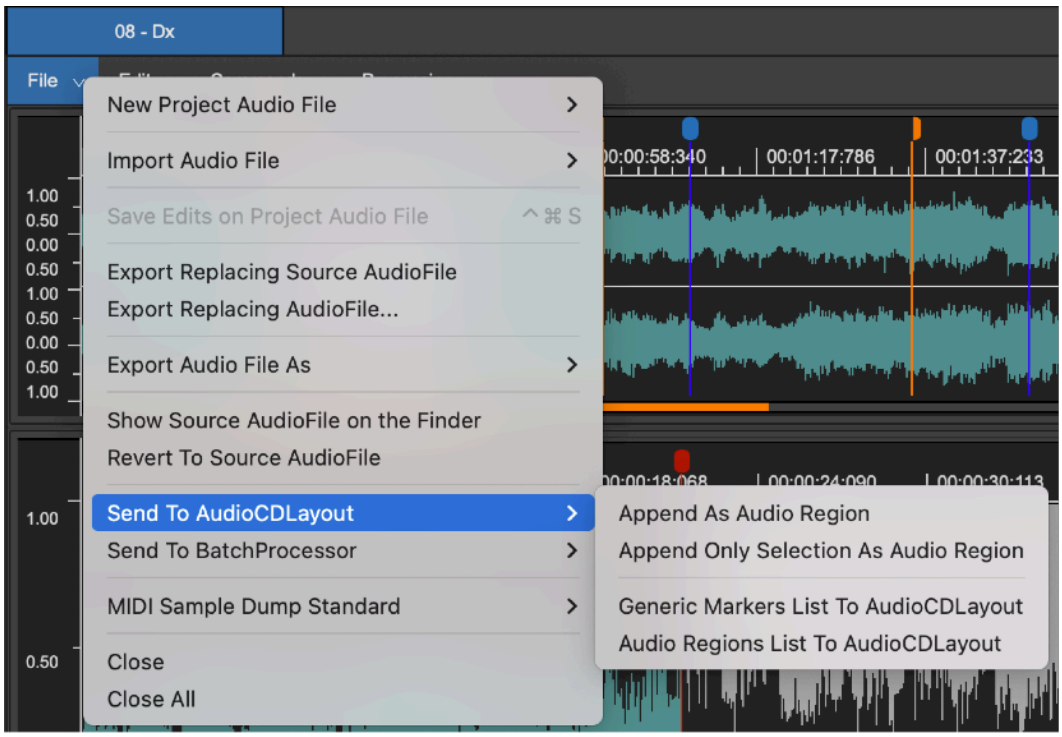
NOTE: this command is not available if the source audio file is not present anymore in the original position on MacOS file system.

Send to AudioCD Layout:

Append As Audio Region:

to add the current audio file to the AudioCD appending it at the end of the AudioCD. DSP-Quattro creates a new AudioRegion on the AudioCD, using

the default setting for the CDTrack preGap and the CD-Texts of the audio file to fill the CD-Texts of the new AudioRegion.



Append Only Selection As Audio Region:

as “Append As AudioRegion”, but using only the region of the selected audio file waveform. This command is not available if there is not an audio selection on the waveform view.

Generic Markes List To AudioCD Layout:

to create Audio Regions and CD-Tracks on the AudioCD from the generic markers list, one for each marker. Each Audio Region of the AudioCD will extend from a generic marker to the next one on the list. DSP-Quattro allows you to choose between clear the AudioCD before to build it, or to append the new Audio Regions to the end of the current AudioCD. This command is not available if there are not generic markers.

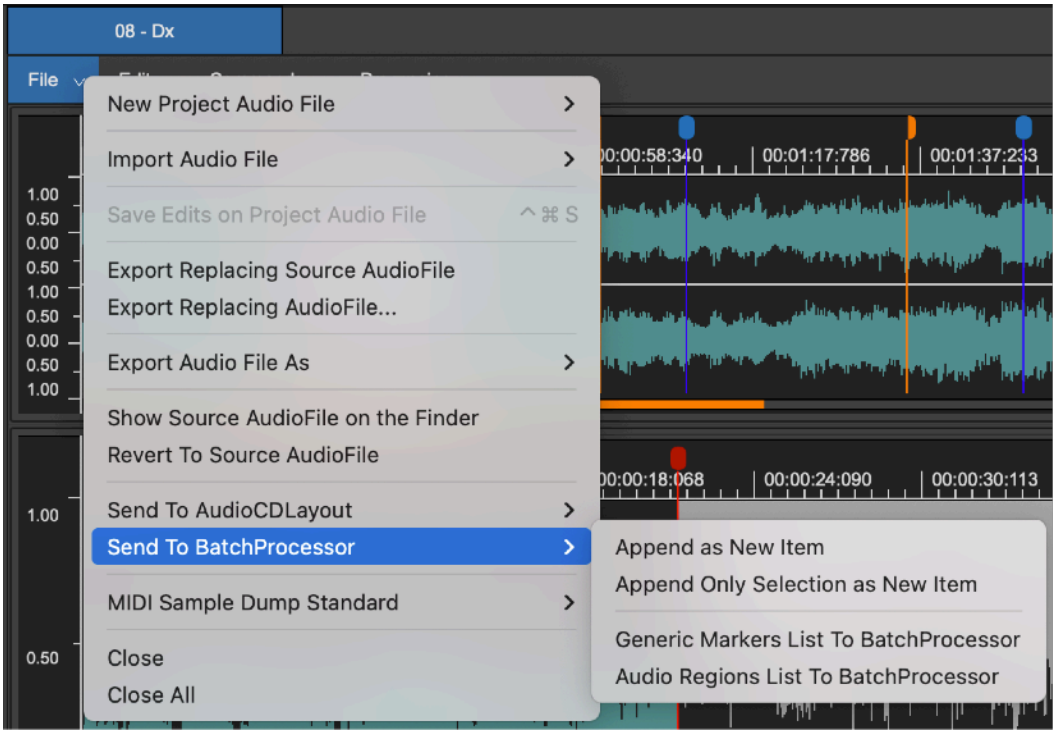
Audio Regions List To AudioCD Layout:

to create Audio Regions and CD-Tracks on the AudioCD from the audio regions list, one for each audio region. DSP-Quattro allows you to choose between clear the AudioCD before to build it, or to append the new Audio Regions to the end of the current AudioCD. This command is not available if there are no audio regions.

Send To BatchProcessor:

Append As New Item:

to add the current audio file to the Batch Processor table.



Append Only Selection As New Item:

as “Append As New Item”, but using only the region of the selected audio file waveform. This command is not available if there is not an audio selection on the waveform view.

Generic Markes List To BatchProcessor:

to create new items on the BatchProcessor from the generic markers list, one for each marker. Each item on the BatchProcessor will extend from a generic marker to the next one on the list. This command is not available if there are not generic markers.

Audio Regions List To BatchProcessor:

to create new items on the BatchProcessor from the audio regions list, one for each audio region. This command is not available if there are no audio regions.

MIDI Sample Dump Standard:

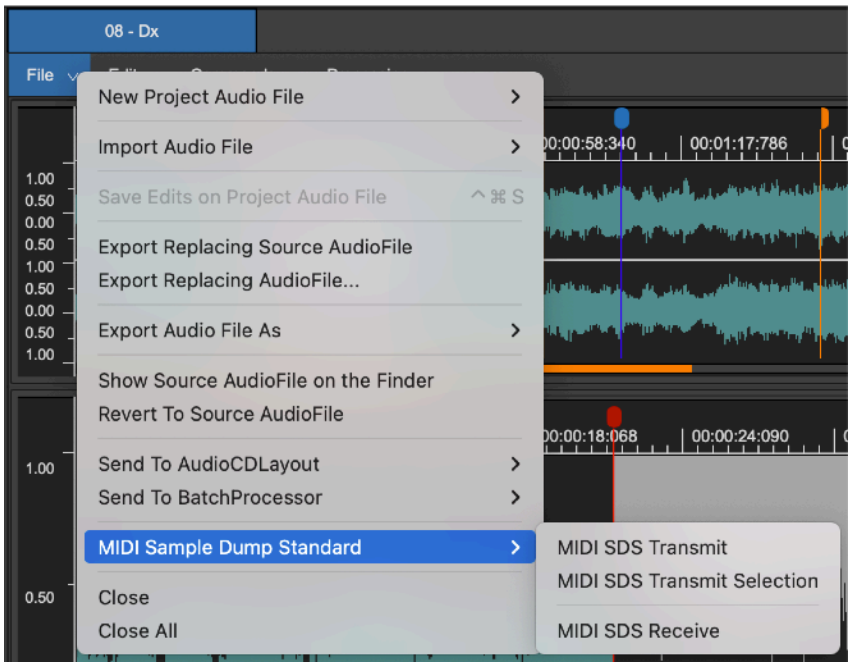
MIDI SDS Transmit:

To transmit the current audio file to an hardware sampler according to the Sample Dump Standard protocol to send and receive samples by a MIDI connection. If the file is stereo, DSP-Quattro transmits first the left channel, then the right channel as a different sample.

More about the MIDI Sample Dump Standard options in the appendix section of this manual.

MIDI SDS Transmit Selection:

As above, but DSP-Quattro transmits only the selected portion of the audio file. This command is not available if there is not an audio selection on the waveform view.



MIDI SDS Receive:

To receive a sample from an hardware sampler according to the Sample Dump Standard protocol by a MIDI connection. As soon as the reception ends, DSP-Quattro creates a new audio file with the received samples.

More about the MIDI Sample Dump Standard options in the appendix section of this manual.

Close:

to close the current audio file under editing. If the file has been changed, DSP-Quattro asks to save or to discard changes or to cancel the operation.

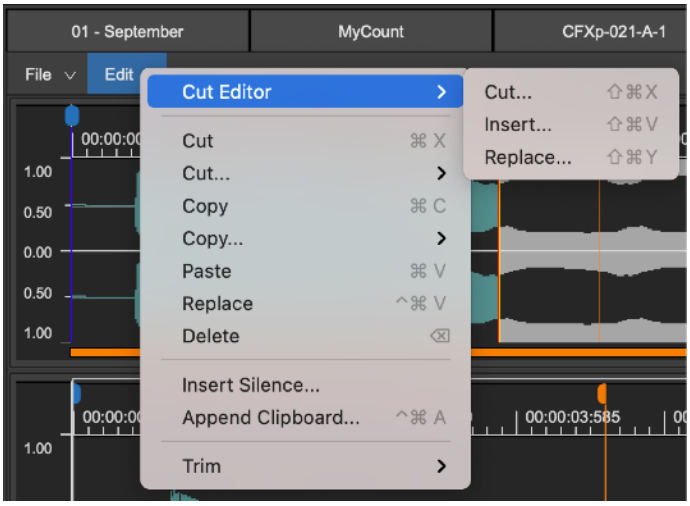
NOTE: to click on the left part of the tab on top of the waveform editor view of a certain audio file is equivalent to use the Close menu command.

Close All:

to close all the audio files under editing. For each audio file, if it has been changed, DSP-Quattro asks to save or to discard changes or to cancel the operation.

The Edit Menu Commands

Clicking on the Edit button on top of the waveform view, DSP-Quattro shows a menu with the commands for doing cut, copy&paste and similar edits on the audio file:



Cut Editor…

The Cut Editor Tool of DSP-Quattro is a very unique graphical tool to make cut&paste of audio regions without any problem caused by abrupt changes of the level and slope of waveforms at cut or paste points.

Please refer to the chapter dedicated to the Cut Editor Tool to know more about it and how to work with it.

Cut…

Cut (or ⌘X):

to cut the selected region of the audio file. DSP-Quattro will also copy that region into the built-in audio clipboard.

Cut Before:

a shortcut to cut a region of the audio file from the beginning of the audio file up to a certain point. DSP-Quattro allows the following commands:

Cut Before Playback Cursor:

to cut the region of the audio file before the playback cursor. This command is not available if the playback cursor is at the beginning of the audio file.

Cut Before Loop Start:

to cut the region of the audio file before the Loop Start. This command is not available if the loop is OFF or if the Loop starts at the beginning of the audio file.

Cut Before Selection Start:

to cut the region of the audio file before the of the audio selection start. This command is not available if there is not a selection or if the selected audio file waveform starts at the beginning of the audio file.

Cut After:

similar to the command above, but to cut a region of the audio file from a certain point up to the audio file end. DSP-Quattro allows the following commands:

Cut After Playback Cursor:

to cut the region of the audio file after the playback cursor. This command is not available if the playback cursor is at the end of the audio file.

Cut After Loop End:

to cut the region of the audio file after the Loop End. This command is not available if the loop is OFF or if the Loop ends at the end of the audio file.

Cut After Selection End:

to cut the region of the audio file after the the audio selection end. This command is not available if there is not a selection or if the selected audio file waveform ends at the end of the audio file.

NOTE: on DSP-Quattro Preferences, there is an option to add a certain number of frames before/after the cut point when applying the Cut Before, Cut After and Trim (more about the Trim command later in this chapter) commands. This option is very useful to keep an additional small portion of waveform before or after the portion of the audio file to keep. Some softwares or hardware samplers need of some samples after the end loop point to avoid to click at loop, due their internal interpolation algorithm when transposing the sample along the keyboard.

Copy…

Copy (or ⌘C):

to copy a portion or all the audio file into the built-in audio clipboard. If the is a selection on the waveform view, DSP-Quattro will copy only the selected region. If there is not a selection, DSP-Quattro will copy all the audio file into its audio clipboard.

NOTE: selecting only one channel of a stereo audio file and then doing copy, DSP-Quattro copies only that selected channel into the audio clipboard.

Copy Left into Right Channel:

to copy the left audio channel of the stereo audio file into its right channel, overwriting it. This command is not available if the audio file is a mono audio file.

Copy Right into Left Channel:

to copy the right audio channel of the stereo audio file into its left channel, overwriting it. This command is not available if the audio file is a mono audio file.

Paste (Insert) and Replace

Paste (or ⌘V):

if there is a selection on the waveform view, this command replaces the current selection with the current audio clipboard. If there is not a selection on the waveform view, this command inserts the current audio clipboard at the position of the playback cursor. In both cases, replacing or inserting, DSP-Quattro places all the audio file clipboard starting at the insertion point (this insertion point is the selection start when replacing, the playback cursor when inserting). DSP-Quattro also changes the audio file length accordingly. This command is not available if the audio clipboard is empty.

Replace (or ^⌘V):

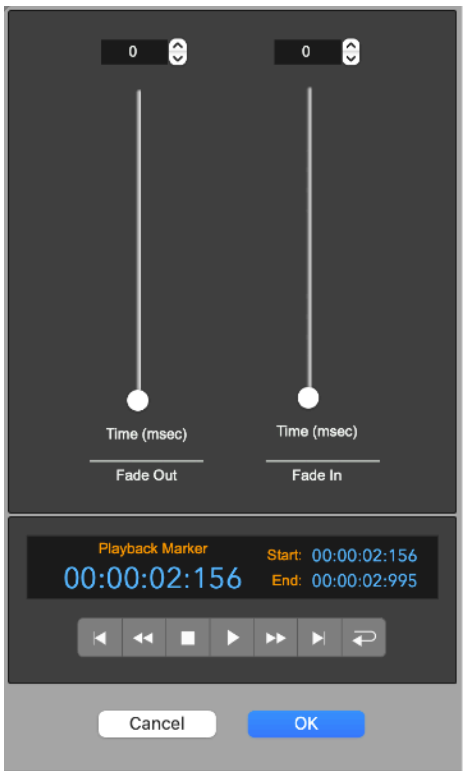
if there is a selection on the waveform view, this command replaces the current selection with the current audio clipboard. If there is not a selection on the waveform view, this command replaces the current audio file, starting at the position of the playback cursor, with the audio clipboard. This command is not available if the audio clipboard is empty.

Delete…

Delete (or backspace):

to clear (silencing, as with an eraser tool) the selected waveform or all the audio file if there is not a selection.

DSP-Quattro shows an additional view to set the fade-out and fade-in times to avoid abrupt changes. There is also a transport bar to preview the result of deleting.



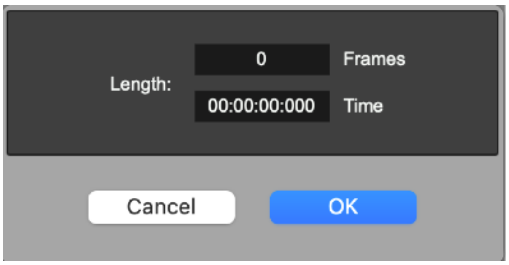
NOTE: this is a simplified version of the processing function Fade Out<->In, which is very much more powerful. Please refer to the part of this chapter describing the Fade Tool to know more about it.

Insert Silence…

Insert Silence…:

to insert a region of silence (no audio) at playback position.

Then, DSP-Quattro shows the above dialog to set length of the region to



insert, in frames and time units.

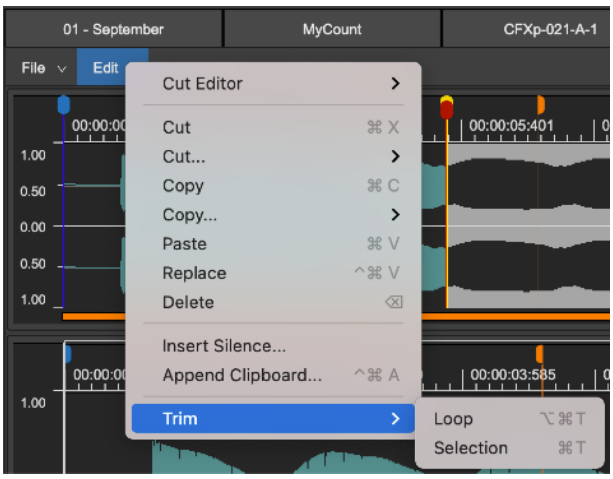
Append Clipboard…

Append Clipboard…:

to paste the current audio clipboard at the end of the audio file. This command is not available if the clipboard is empty.

Trim…

to cut the regions outside a certain region, that is to cut the two regions which are before and after the region to trim. It is the same as doing two cuts, one before the region start, one after the region end.



There are two options:

Trim Loop (or ⌥⌘T):

to cut the regions outside the Loop. If the Loop is OFF, this command is not available.

Trim Selection (or ⌘T):

to cut the regions outside the selection on the waveform view. If the there is not a selection, this command is not available.

NOTE: the option on Preferences to keep a certain number of samples doing cuts is used also by the TRIM command.

The Commands Menu

Clicking on the Commands button on top of the waveform view, DSP-Quattro shows a menu with various commands, among which the ones for managing the markers, regions and the Loop of the audio file:

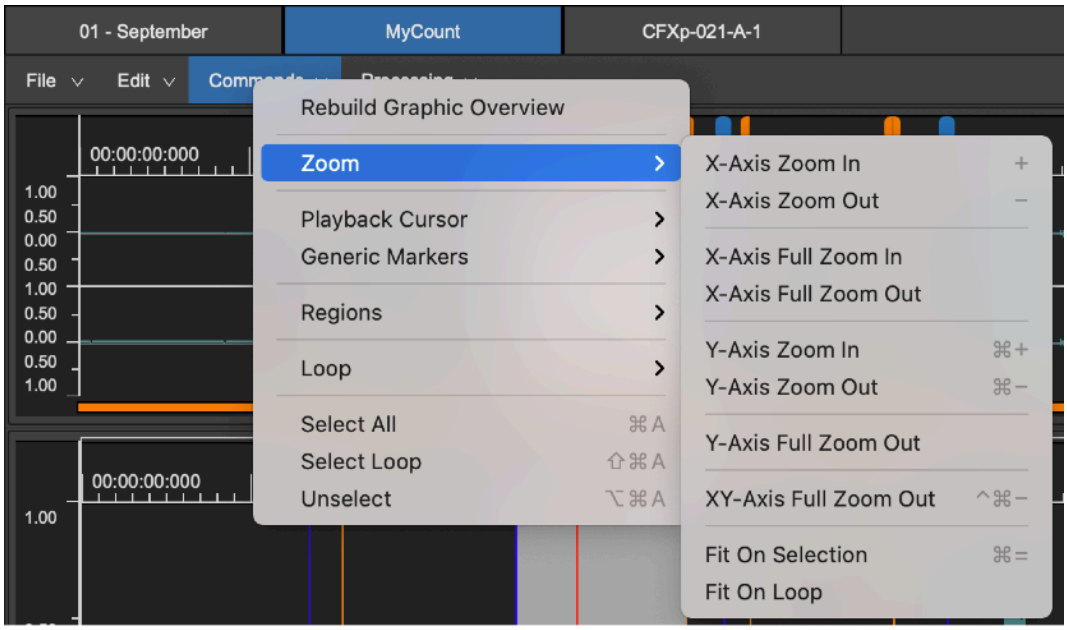
Rebuild Graphic Overview…

- **Rebuild Graphic Overview…**: doing edits as cut, copy, insert and similar operations, DSP-Quattro rebuilds the waveform overview using a zero-time algorithm. This method is very very fast, but may cause a small approximation on the time x-axis alignment of the displayed waveform after doing several edits. The waveform may appear out of sync of one pixel when zoomed-out. Use this command to reset the situation rebuilding the whole waveform overview. It may request some seconds to complete but, after this, the overview is perfectly aligned again.

NOTE: it is recommended to use this command every 20-30 operations of cut, copy, insert or similar.

Zoom…

- **Zoom…**: clicking on zoom opens a sub menu with the zoom commands to zoom in/out on both X and Y axis.



- **X-Axis Zoom In (or +)**: to zoom-in the waveform view on the X-Axis by a factor x2.

- **X-Axis Zoom Out (or -)**: to zoom-out the waveform view on the X-Axis by a factor x2.

- **X-Axis Full Zoom In**: to full zoom-in the waveform view on the X-Axis.

- **X-Axis Full Zoom Out**: to full zoom-out the waveform view on the X-Axis.

- **Y-Axis Zoom In (or ⌘+)**: to zoom-in the waveform view on the Y-Axis by a factor x2.

- **Y-Axis Zoom Out (or ⌘-)**: to zoom-out the waveform view on the Y-Axis by a factor x2.

- **Y-Axis Full Zoom Out**: to full zoom-out the waveform view on the Y-Axis.

- **XY-Axis Full Zoom Out**: to full zoom-out the waveform view on both the Y and X Axis.

- **Fit on Selection (or ⌘=)**: to zoom-in or zoom-out on the Y-Axis the waveform view such to see and center the current waveform selection. This command is not available if there is not a waveform selection.

- **Fit on Loop**: to zoom-in or zoom-out the waveform view on the Y-Axis such to see and center the Loop. This command is not available if the Loop is OFF.

NOTE: It is possible to **use the mouse wheel** to Zoom In/Out on the X-Axis. The same can be done moving vertically 2 fingers on the Apple Trackpad, if any. Use ⌘ **+ mouse wheel** to set the vertical Y-Axis zoom-in/out ratio.

Playback Cursor…

Clicking on Playback Cursor opens a sub menu with the commands to place the playback cursor (RED marker on the waveform view) on specific positions.

Please refer to the previous chapter about **Working with Markers** for a full reference of this menu commands.

Generic Markers…

Clicking on Generic Markers opens a sub menu with the commands to manage the Generic markers.

Please refer to the previous chapter about **Working with Markers** for a full reference of this menu commands.

Regions…

Clicking on Regions opens a sub menu with the commands to manage the audio regions of the audio file.

Please refer to the previous chapter about **Working with Markers** for a full reference of this menu commands.

Turn Loop ON/OFF… (or ⌘L)

To toggle the Loop ON and OFF. If the Loop has been turned ON, the two Loop markers (the yellow markers) will appear on the waveform view. Otherwise, DSP-AudioEditor will hide them.

See also the previous chapter about **Working with the Loop**.

Lock Loop Length… (or ⌥⇧⌘L)

To lock/unlock the length of the Loop. If the Loop length is locked, moving any one of the two Loop markers, the other one will move accordingly. This option is useful in the case that, once you have found a good Loop, you wish to shift the Loop without changing its length. This command is not available if the Loop is OFF

See also the previous chapter about **Working with the Loop**.

to place the Loop markers at the current selection start and end. (This command is not available if there is not a selection on the waveform view). If the Loop is turned Off, it will automatically be turned On.

More about this in the previous chapter about **Working with the Loop.**

Show/Hide Loop Window (or ⌥⌘L):

to show or hide the Loop floating window tool.

More about this in the previous chapter about **Working with the Loop**.

Select All…

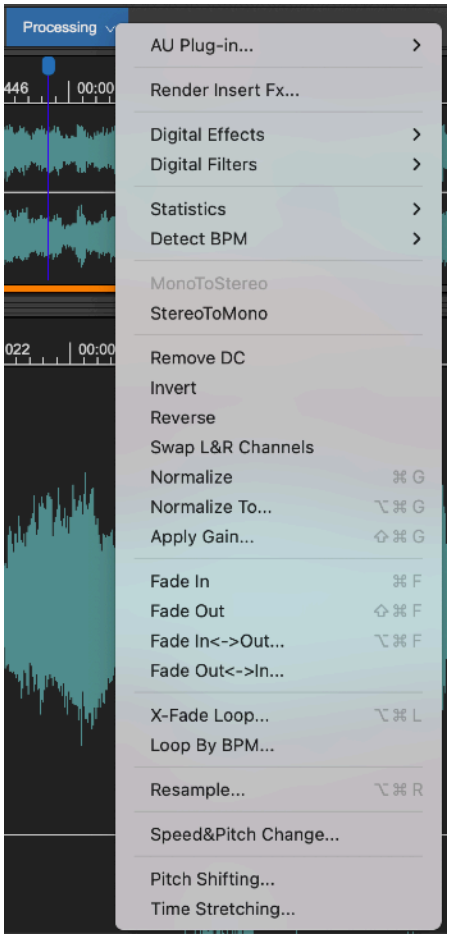
To select all the audio file on the waveform view.

Select Loop…

To select the Loop on the waveform view. This command is not available if the Loop is OFF.

The Processing Menu

Clicking on the Processing button on top of the waveform view, DSP-Quattro shows a menu with the commands for processing the audio file:



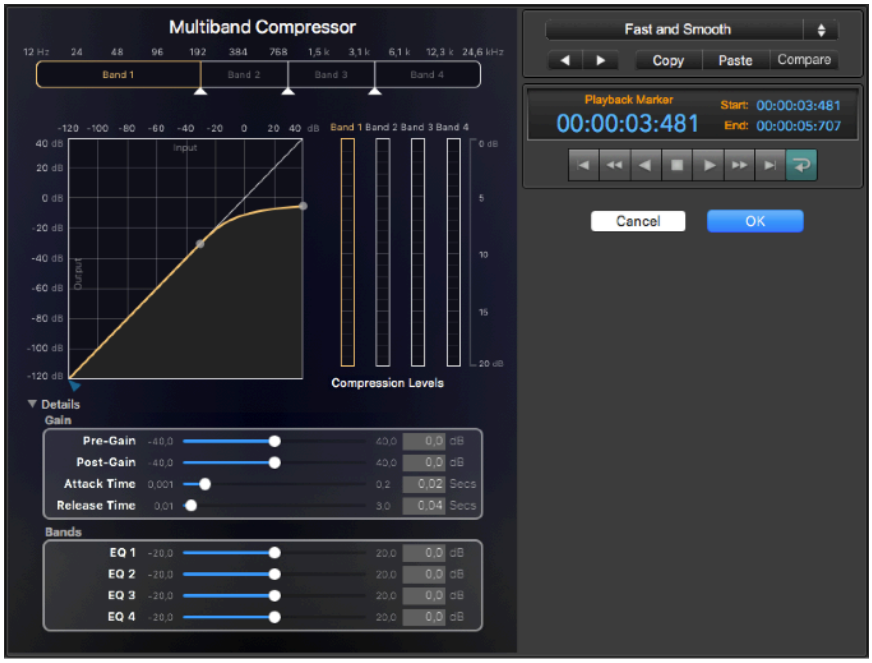
AU Plug-in…

Clicking on this menu item will open a sub menu on which DSP-Quattro lists all Audio Unit (AU) plug-ins installed on MacOS, grouped by manufacturers.

DSP-Quattro asks to MacOS the list of the installed plug-ins. To be visible, the AU plug-in must be a 64 bits effect plug-in.

Selecting one of the available plug-ins, DSP-Quattro opens a dialog displaying the custom interface of the AU plug-in (it depends on the plug-in itself) on the left part and, on the right, a preview controller to manage the plug-in preset and with a transport bar to preview the result before to apply it. DSP-Quattro will automatically resize the dialog accordingly to the plug-in custom view.

As an example, this is the dialog which DSP-Quattro shows loading the Apple Multiband Compressor plug-in which is built-in and available for free in MacOS:



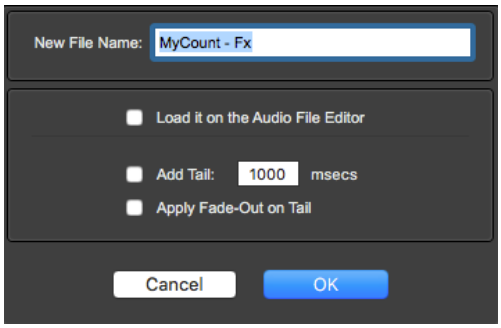
NOTE: it is highly recommended to explore the excellent Apple AU plug-ins which are always present because built-in into MacOS. They offer an excellent quality for free.

NOTE: If there is a selection on the waveform view, the function will process only the selected region, otherwise all the audio file.

Please refer to the previous chapter about the real time preview controller to know how to use it for loading/saving the current plug-in preset and for previewing the processed audio.

Render Insert FX…

Using DSP-Quattro is possible to load a serial chain of effect plug-ins on insert to the channel strip of the audio editor, which is different for each audio file under editing. Use this command to render this serial chain of effect plug-ins into a new audio file. The result is the same as playing the current audio file thru the effects chain and then saving the result into a new file which DSP-Quattro loads automatically on the Document Manager and - optionally - opens into a new tab of the waveform Editor view.



Clicking on this menu command, DSP-Quattro shows a dialog to set the parameters for rendering the plug-ins loaded on the channel strip into a new audio file:

New File Name:

type the new file name.

Load it on the Audio File Editor:

if turned ON, DSP-Quattro, after processing and loading the new processed audio file into the Document Manager, opens the new file into a new tab of the waveform Editor view.

Add Tail:

It is possible to add a tail to the destination audio file, setting also how much this tail must be long. This is very useful if the FX chain includes an effect like a reverb or space simulator which produces an additional tail after stopping the source audio file at its end. Turning ON the option “Add Tail”, DSP-Quattro will continue to process the audio after reaching the audio file end, capturing the tail of the effect or of the chain of effects.

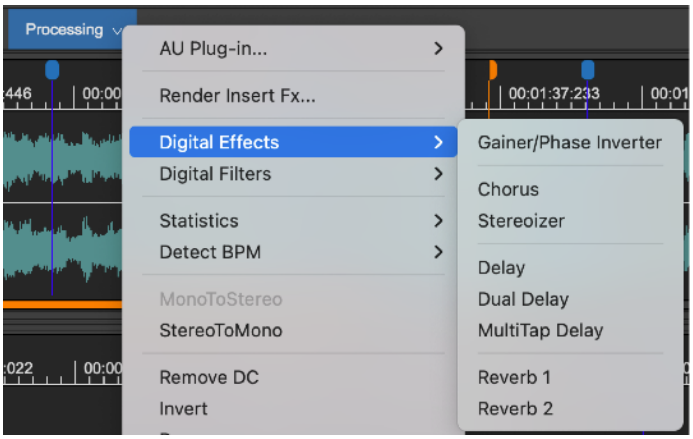
Apply Fade-Out on Tail:

If the option to Add Tail is ON, it is possible to apply a fade-out curve to the tail, avoiding an abrupt end at the end of the destination file. Turning ON “Apply Fade-Out on Tail”, DSP-Quattro decreases the output gain while processing the tail, resulting in a smooth end.

Digital Effects…

DSP-Quattro has several high quality digital effects which are built-in into the application itself. They can be seen as custom plug-in which are unique to DSP-Quattro.

NOTE: If there is a selection on the waveform view, the function will process only the selected region, otherwise all the audio file.



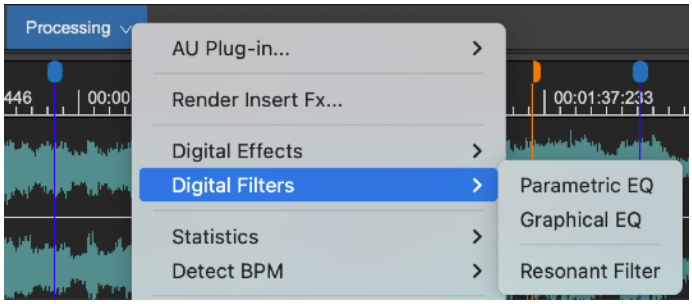
This group of effects includes the effects using modulated delay lines and chamber/hall simulations: Chorus, Stereoizer, Delay, Dual Delay, Multitap Delay, Reverbs 1&2.

More about using these effects in the chapter about Using the built-in Effects of DSP-Quattro.

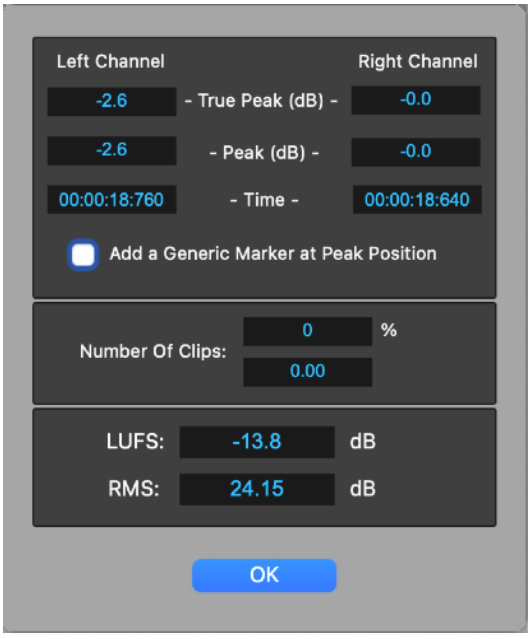
Digital Filters…

This group of effects includes the digital filters: Parametric & Graphic Equaliser, Resonant filters (Analog Filter Emulators).

More about using these effects in the chapter about Using the built-in Effects of DSP-Quattro which is later in this manual.



Statistics…



This command opens a dialog on which DSP-Quattro shows the *True Peak, Peak, RMS and LUFS* levels computed on the audio file.

If there is a waveform selection on the waveform view, DSP-Quattro computes the above values using only samples included in the selected region.

DSP-Quattro shows also the number of clips, defined as the points where the waveform reaches the maximum values of –1.0 or 1.0 for more than one consecutive samples, and the ratio between the number of clips and the number of frames of the audio file.

It is also possible to add a generic marker at the position of the detected peak (or at the position of the first clip, if there are more audio clips). If you want to add a marker, turn ON the check box.

Detect BPM…

This menu item opens a sub menu on which you can choose the region used by DSP-AudioEditor to calculate the Beats Per Minute (BPM).

These are the different options:

Use All

DSP-AudioEditor calculates the Beats Per Minute (BPM) using all the audio file length.

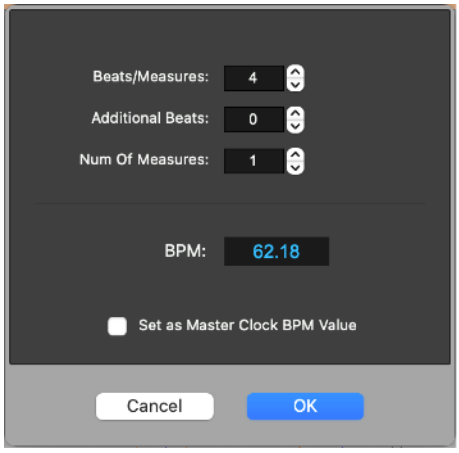
Use Selection

DSP-AudioEditor calculates the Beats Per Minute (BPM) using the length of the selection on the waveform view. This command is not available if there is not a selection.

Use Loop

DSP-AudioEditor calculates the Beats Per Minute (BPM) using the length of the Loop. This command is not available if Loop is OFF.

DSP-AudioEditor shows the following dialog:



To calculate the BPM value, it is necessary to enter:

- **Beats/Measures**: number of Beats for each Measure. This is the number of metronome hits. As an example, in case of a time signature of 3/4, it is equal to 3.

- **Additional Beats**: it is the rest of Beats.

- **Num Of Measures**: it is the total number of measures.

For example, in case we want to know the BPM from a region equal to 3 measures in 4/4, plus one in 3/4, we need to set:

Beats/Measures = 4
Additional Beats = 3
Num of Measures = 3

- **BPM** shows the calculated result. When one of the values in the upper part changes, the value of the BPMs updates in real time accordingly.

- Set As Master Clock BPM Value: check this flag to set the calculated BPM value as Master BPM Tempo value. It is the master clock use by DSP-AudioEditor as reference for sending the sync message to AU plug-ins, effects.

MonoToStereo

Given a mono audio file, this command change it to a stereo file duplicating the single audio channel.

This command is not available if the audio file is stereo.

StereoToMono

Given a stereo audio file, this command change it to a mono file mixing the left and right channels into a single audio channel. The source left and right channels will be gained by a factor x0.5 before mixing to avoid clipping.

This command is not available if the audio file is mono.

Remove DC…

To subtract (remove) the DC Level from an audio file.

The DC Level of an audio file is the average value of all samples. The waveform that represents the audio file should oscillate around the zero, and therefore its average value should be zero. But it can happen that the waveform oscillate around a value (DC) which is not the zero level. This can be caused by, for example, a bias current in the analog circuit of the Analog To Digital (A/D) converter used for sampling the signal.

If there is a selection, this function process only the selected region, otherwise all the file.

Invert…

To invert the audio signal around the zero level, ie to change the sign of all the samples in the region to edit.

If there is a selection, this function process only the selected region, otherwise all the file.

Reverse…

To reverse in time the audio signal of the audio file, playing it on reverse, from the end to the beginning.

If there is a selection, this function process only the selected region, otherwise all the file.

Swap L&R Channels…

To swap the samples between left and right channels of a stereo audio file.

If there is a selection, this function process only the selected region, otherwise all the file.

Normalize… (or ⌘G)

To apply an automatic linear gain to samples of the audio file such that the level of maximum peak of the processed audio file will be equal to 0 dB.

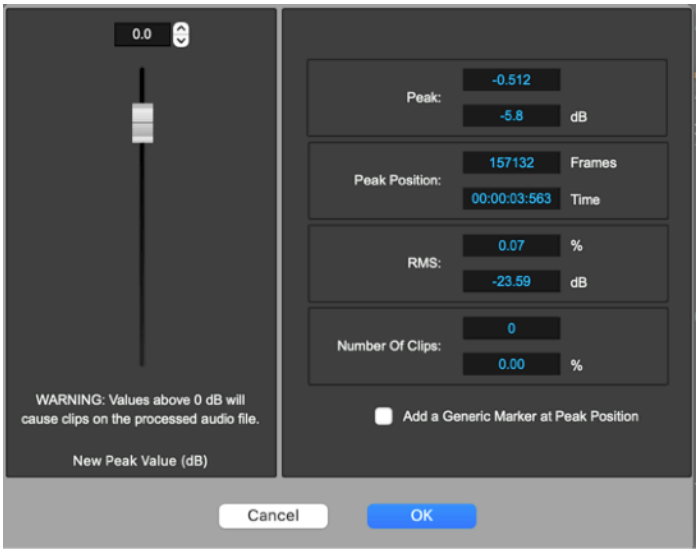
NOTE: this is one the most used editing function. Doing a recording, usually it is safer to keep the recording level low enough to avoid audio clips at 0 dB, which would cause a distortion. Then it is a good practice to apply this edit function to bring the level of the signal to the maximum allowed level.

If there is a selection, this function process only the selected region, otherwise all the file.

Normalize To… (or ⌥⌘G)

as the above Normalize processing function, with the difference that the target maximum peak of the processed audio file is a user programmable value.

Then, DSP-AudioEditor shows a dialog where:



On the right side, there are the results of the analysis of the region of the audio file to process. These results are the same as seen running the Find Peak&RMS command.

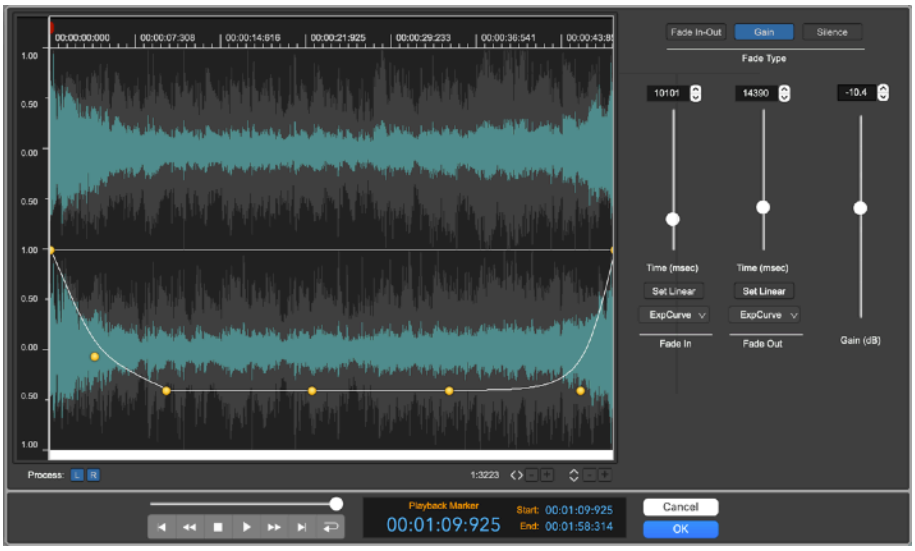
On the left a slider to set the target for the peak of the audio file after processing.

If there is a selection, this function process only the selected region, otherwise all the file.

Apply Gain…

This command opens the **Fade Editor Tool** setting the Fade Type to Gain by default.

The Fade Editor is a graphical tool used to apply a gain on a certain region defining also user programmable curves for the fade-in and fade-out for smoothing the gain changes.



Please refer to the chapter describing the Fade Editor Tool to know more about how to use it.

If there is a selection, this function process only the selected region, otherwise all the file.

Fade In… (or ⇧⌘F)

To apply a linear fade-in gain curve to the region to process. The level of the processed audio file will start from zero at region start to reach the full level at region end.

If there is a selection, this function process only the selected region, otherwise all the file.

NOTE: this is a fast shortcut to fade-in a certain region, without any graphical tool. For more complex edits, it is possible to use the Fade Editor Tool. Please refer to the chapter describing the Fade Editor Tool to know more about how to use it.

Fade Out… (or ⇧⌘F)

To apply a linear fade-out gain curve to the region to process. The level of the processed audio file will start from the full level at region start to reach the zero at the region end.

If there is a selection, this function process only the selected region, otherwise all the file.

NOTE: this is a fast shortcut to fade-out a certain region, without any graphical tool. For more complex edits, it is possible to use the Fade Editor Tool. Please refer to the chapter describing the Fade Editor Tool to know more about how to use it.

Fade In<->Out… (or ⌥⌘F)

This command opens the **Fade Editor Tool** setting the Fade Type to Fade In-Out by default.

If there is a selection, this function process only the selected region, otherwise all the file.

Please refer to the chapter describing the Fade Editor Tool to know more about how to use it.

Fade Out<->In…

This command opens the **Fade Editor Tool** setting the Fade Type to Silence by default.

If there is a selection, this function process only the selected region, otherwise all the file.

Please refer to the chapter describing the Fade Editor Tool to know more about how to use it.

X-Fade Looping… (or ^⌘L)

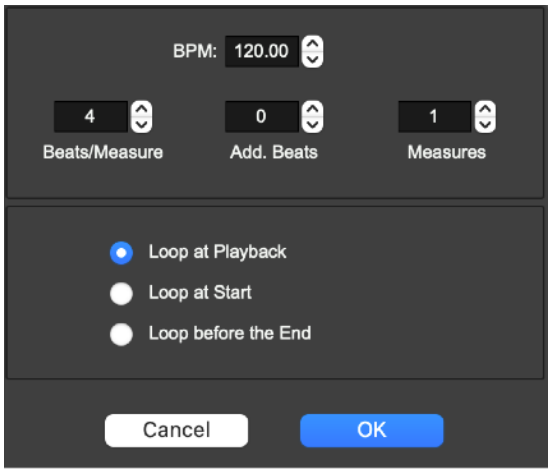
- This command opens the **X-Fade Looping Editor.**

The X-Fade Looping Editor is a graphical tool used to apply a X-Fade looping algorithm to the Loop region. It is possible to define the shape of the X-Fade curves, checking visually what happens to the processed audio file, previewing the waveform and listening to the result as well.

Please refer to the chapter describing the X-Fade Looping Editor to know more about how to use it.

Loop by BPM…

To set the Start and End Loop points such that its length is calculated from the value expressed as Beats Per Measures (BPM). It is also possible to set if the Loop must start at the beginning of the audio file, at the playback cursor, or if it must end at the end of the audio file.



NOTE: This is a very useful function when you want to set a Loop on rhythmic patterns. In this case the length of the Loop has to be based considering the Beats Per Measures metronomic tempo.

It is necessary to set the following parameters:

- **BPM**: it is the value of the target Beats Per Measures (BPM)

- **Beats/Measures**: number of Beats for each Measure. This is the number of metronome hits. As an example, in case of a time signature of 3/4, it is equal to 3.

- **Additional Beats**: it is the rest of Beats.

- **Measures**: it is the total number of measures.

As an example, in case we want to position the Loop points on a region equal to 3 measures in 4/4, plus one more in 3/4, with a BPM time of 120.32, we must set:

BPM	= 120.32
Beats/Measures	= 4
Measures	= 3
Add. Beats	= 3

It is also necessary to set where the Loop must start:

- **Loop At Playback** : the Loop starts at the playback cursor

- **Loop At Start :** the Loop starts at the beginning of the audio file

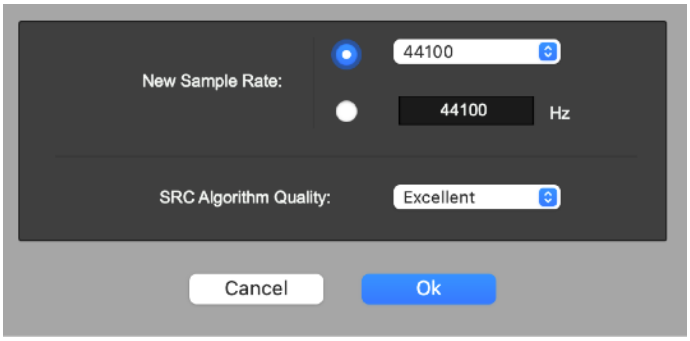
- **Before End :** the Loop ends at the end of the audio file

If the Loop was OFF, DSP-AudioEditor also turns it ON automatically.

Resample… (or ⌥⌘R)

To change the sample rate of the audio file by using a HQ linear phase Sample Rate Converter (SRC) algorithm of DSP-AudioEditor.

The Nyquist theorem demonstrates that the maximum frequency which can be reconstructed from a digital audio signal is the half of its sample rate. For this, lowering the sample rate, the SRC algorithm must also remove the highest frequencies components to guarantee that the maximum frequency of the digital audio signal is lower than the half of its sample rate. This will lower the audio spectrum range of the audio signal. The benefit is that the audio file will have smaller dimensions, saving space on the hard disk.



NOTE: the offline Sample Rate Converter (SRC) algorithm of DSP-AudioEditor uses a very High Quality **Linear Phase Sample Rate Converter** (**SRC**) Resampling algorithm, based on the state-of-art technology about the Digital Signal Processing and linear phase digital filtering. This SRC guarantees the maximum audio quality, in terms of frequency response and audio quality (the filter characteristic is outstanding and being Linear Phase, the algorithm does not introduce phase inversion at the transition band).

- **New Sample Rate**: to set the sample rate of the processed audio file. It is possible to choose one of the most common values on the popup menu or to enter the new value numerically.

- **SRC Algorithm Quality**: to set the quality of the offline Sample Rate Converter (SRC) algorithm. The Excellent quality needs more CPU time than the others. It will produce the result with the maximum quality but will be slower to complete the process. Possible values are Fast, Good, Better, Excellent.

Speed&Pitch Change…

To change the pitch of the audio file playing it faster (to rise the pitch) or slower (to lower the pitch). This is equivalent to modify the speed of a tape recorder. Also the length of the audio file will change accordingly. Playing it faster, it will take less time to reach the end, producing a shorter audio file, the opposite playing it slower.

DSP-Quattro shows a dialog where:

- **Ratio**: to set the ratio between the pitch of the processed audio file and the source as a float value (ratio = 1.0 means no change, ratio = 2.0 means an octave up, and so on).

- **Semitones**: to set the ratio between the pitch of the processed audio file and the source as semitones (semitones = 0.0 means no change, semitones = +12.0 means an octave up, and so on).

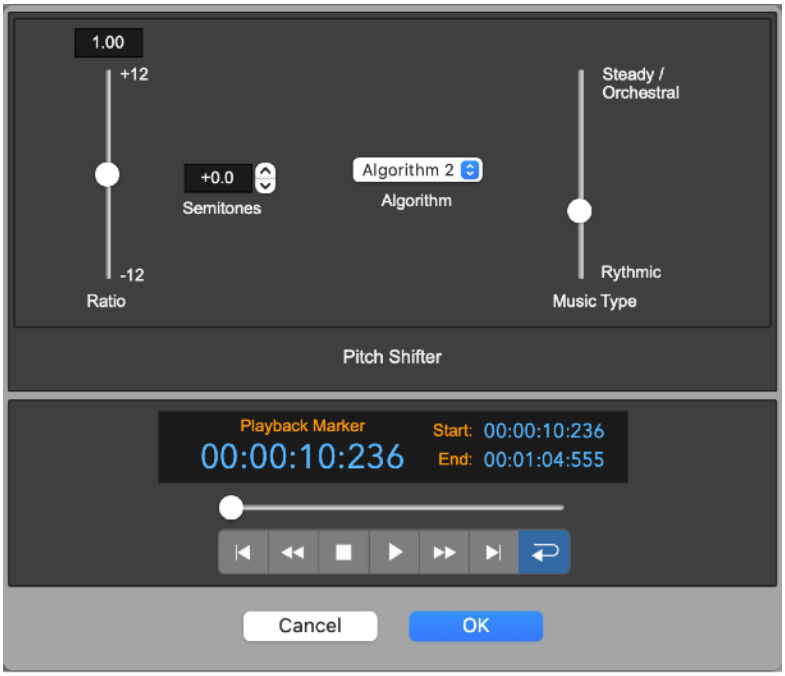
If there is a selection, this function process only the selected region, otherwise all the file.

NOTE: It is also possible to modify the pitch without change the speed - or time (duration of the audio file), using the Pitch Shifting command of DSP-Quattro.

Pitch Shifting…

To change the pitch of the audio file without changing the speed (duration of the audio file). This algorithm does not modify the time - length - of the audio file.

DSP-Quattro will show the following dialog:



As for the Speed&Pitch Change command,

- **Ratio**: to set the ratio between the pitch of the processed audio file and the source as a float value (ratio = 1.0 means no change, ratio = 2.0 means an octave up, and so on).

- **Semitones**: to set the ratio between the pitch of the processed audio file and the source as semitones (semitones = 0.0 means no change, semitones = +12.0 means an octave up, and so on).

- **Algorithm:** different algorithms are available, there is not a general rule to say if one is better than the other, try by yourself which one produces the best results depending on the type of music.

- **Music Type**: use this slider to make the algorithm smoother (Steady/ Orchestral) or more sensible to transients (Rhythmic)

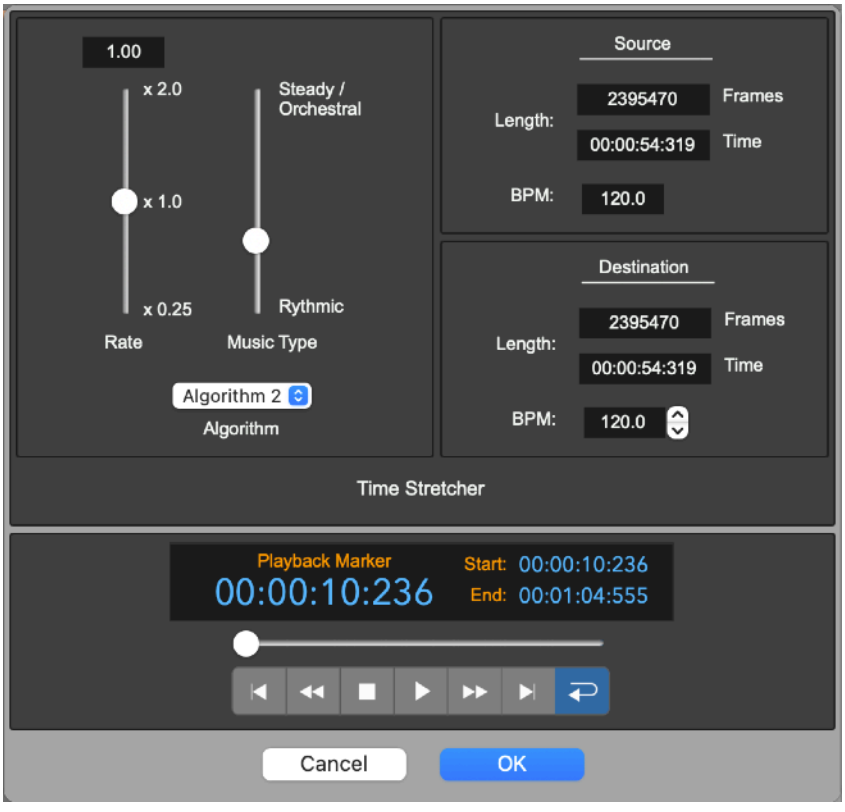
If there is a selection, this function process only the selected region, otherwise all the file.

NOTE: To achieve the result, DSP-Quattro uses a very High Quality Spectral Re-Synthesizer, which is a very sophisticated algorithm compared to the algorithm used for Speed&Pitch Change.

Time Stretching…

To change the speed (time) of the audio file without changing the pitch.

DSP-Quattro will show the following dialog:



There are different options to set the ratio between the length of the destination and of the source file:

- **Rate**: it is possible to set the ratio using the slider on the left, or using the numerical control above the slider as well.

- **Algorithm:** different algorithms are available, there is not a general rule to say if one is better than the other, try by yourself which one produces the best results depending on the type of music.

- **Music Type**: use this slider to make the algorithm smoother (Steady/ Orchestral) or more sensible to transients (Rhythmic)

Moreover:

- **Destination Length**: it is possible to enter directly the length of the destination audio file, expressing it as total number of frames or as total time.

- **Destination BPM**: it is also possible to set the ratio expressing it as Beats Per Minutes (BPM), which is a more usual form used by musician. For this, first it is necessary to set the BPM of the source file, clicking on the SET button in the section related to the parameters of the source file. This opens a dialog that allows you to set all the parameters needed to compute the source BPM, as previously described for the Detect BPM command. Then, use the numerical control to set the destination BPM in the section related to the parameters of destination file. DSP-AudioEditor will automatically set the time stretching ratio.

If there is a selection, this function process only the selected region, otherwise all the file.

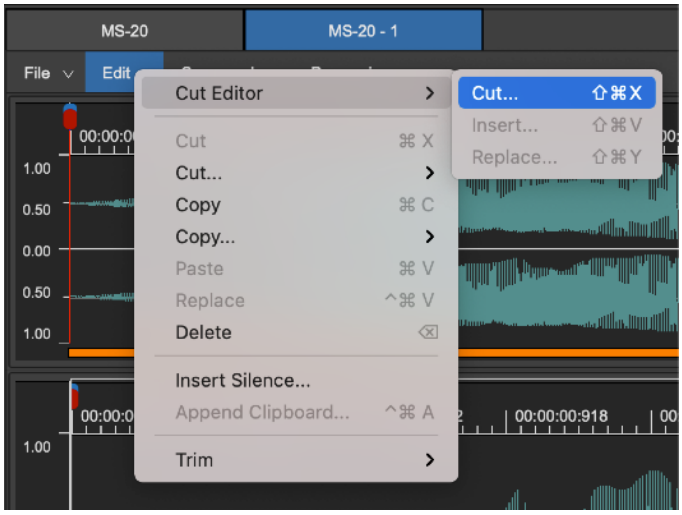
NOTE: DSP-Quattro uses an High Quality Spectral Re-Synthesizer doing Time Stretching.

The Cut Editor Tool

DSP-Quattro offers a very unique Cut Graphic Editor tool to make cuts on the audio file, as well as pastes of the clipboard into an audio file, without any problem caused by possible abrupt changes in the level and slope of waveforms at cut or paste points.

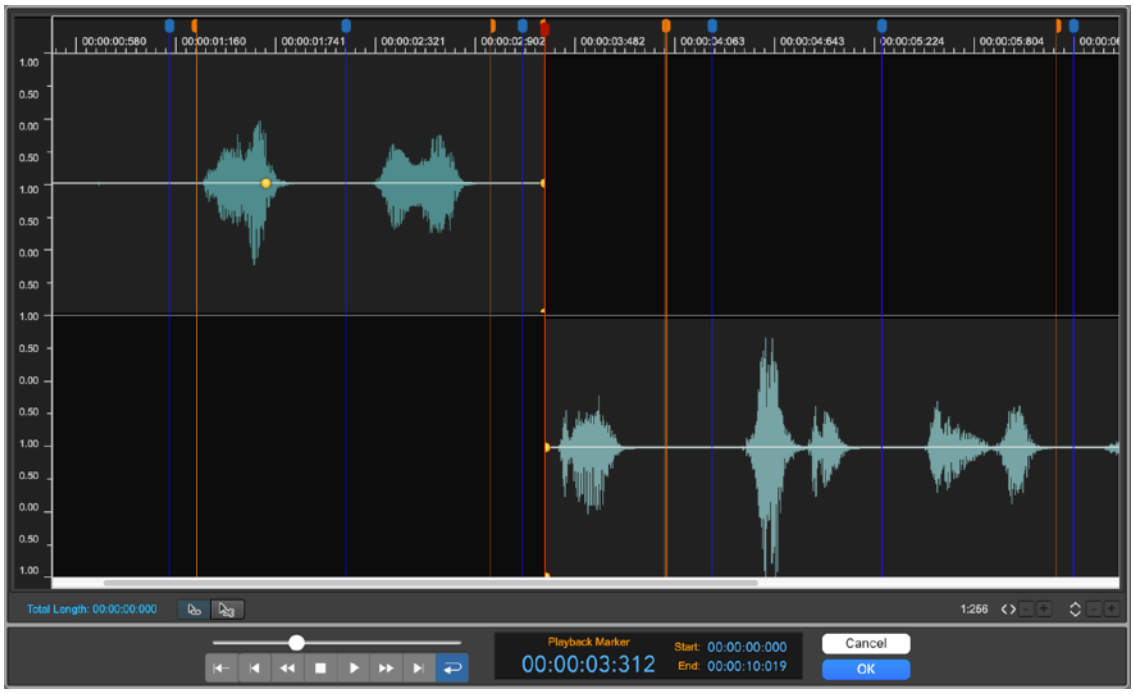
Doing a graphical Cut using the Cut Editor Tool

To start using the Cut Editor, click on the Edit button on top of the waveform view, and select Cut Editor, DSP-Quattro shows a submenu with the commands for opening the Cut Editor:



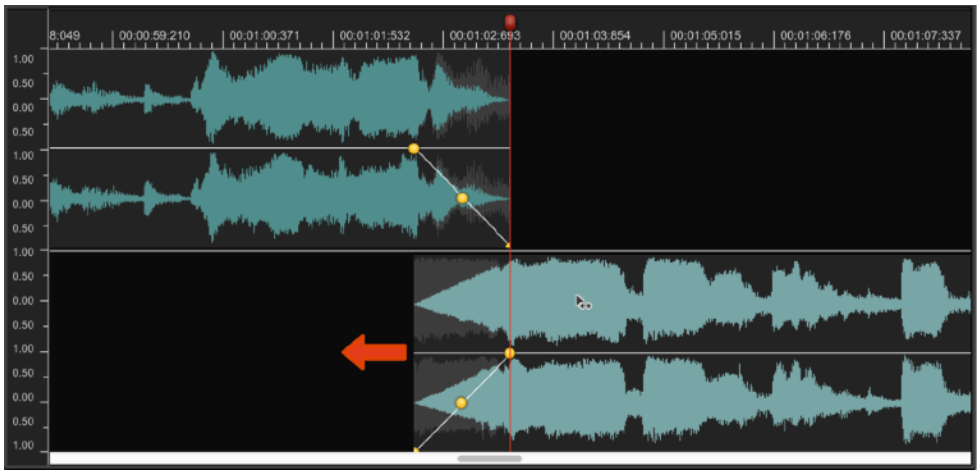
Cut… (or ⇧⌘X):

DSP-Quattro opens the Cut Editor to do a cut at playback position:



In the upper part, to the left, there is the waveform before the cut point. In the lower part, to the right, there is the waveform after the cut point.

Click on the waveform on the right, that's the audio file region after the cut point, and drag it to the left such to overlap the waveform in the upper part, that's the region before the cut point. DSP-Quattro automatically creates a cross-fade curve between the two overlapping regions:

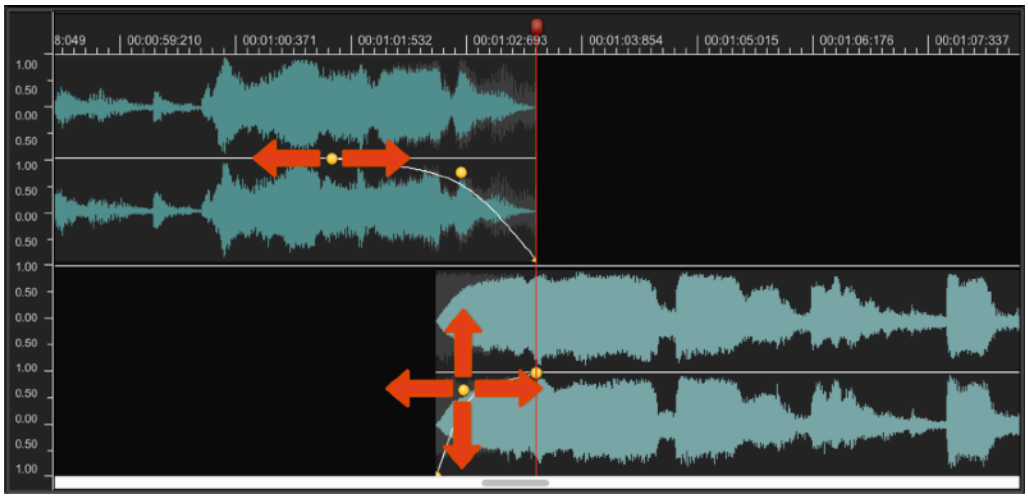


Setting fade-In/Out lengths and shapes of the curve

The Cut Editor Tool gives the complete freedom for setting the cross-fade lengths and the shape of the fade-in/out curves. Fade-In length and curve is independent from Fade-Out length and curve, if necessary.

To set the length only of the fade-out of the upper waveform, click with the mouse on the little yellow circle control at the beginning of the fade-out, and shift it backward or forward along the time axis. Do the same procedure to set the fade-in length of the lower waveform, that's the audio file region after the cut point.

To set the shape of the curve of the fade-out, click on the little circle control in the middle of the fade-out curve, and drag it to the four directions setting the slope which best suite your needs. Do the same to set the shape of the curve of the fade-in of the waveform after the cut point.



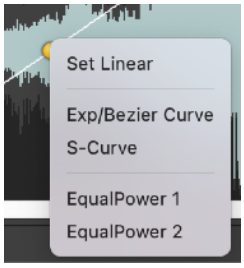
DSP-Quattro allows two different types of shapes for the Fade-In/Out curve:

- **Exponential/Bezier** type: in this case the shape control point can move on all directions, setting all the shapes ranging from logarithmic, linear, exponential.

- **S-Curve** type: in this case the shape control point can move only up or down, the shape is convex or concave according to the vertical position of the shape control point.

- **EqualPower 1 & EqualPower 2** type: in this case the shape control point cannot be moved, the shape follows the rule for having an equal power cross-fading between the overlapping audio regions.

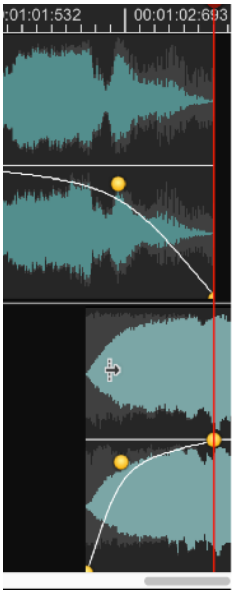
To set the type of the shape, click with the right mouse button on the shape control point, DSP-AudioEditor will show an utility popup menu with the command:



NOTE: if the shape type is different from EqualPower 1&2, by default, the shape of each curve is independent. Keeping the **SHIFT key** pressed while clicking and dragging the control to set the shape of a the fade-In or fade-Out curve, then also the other fade curve will follow such that the sum of the gain of the two curves is always constant.

Trimming the the start and end of the region at cut point

Moving the mouse to the border of the upper waveform or of the bottom waveform, the mouse mode will change to the Trimmer:



In this mode, clicking and dragging the mouse to the left or to the right, DSP-AudioEditor trims the region end (trimming the waveform before the cut point) or region start (trimming the waveform after the cut point).

Inserting the Clipboard or Replacing with the Clipboard using the Cut Editor Tool

On the Cut Editor sub menu, if the Audio clipboard if DSP-Quattro is not empty, these other commands are also available:

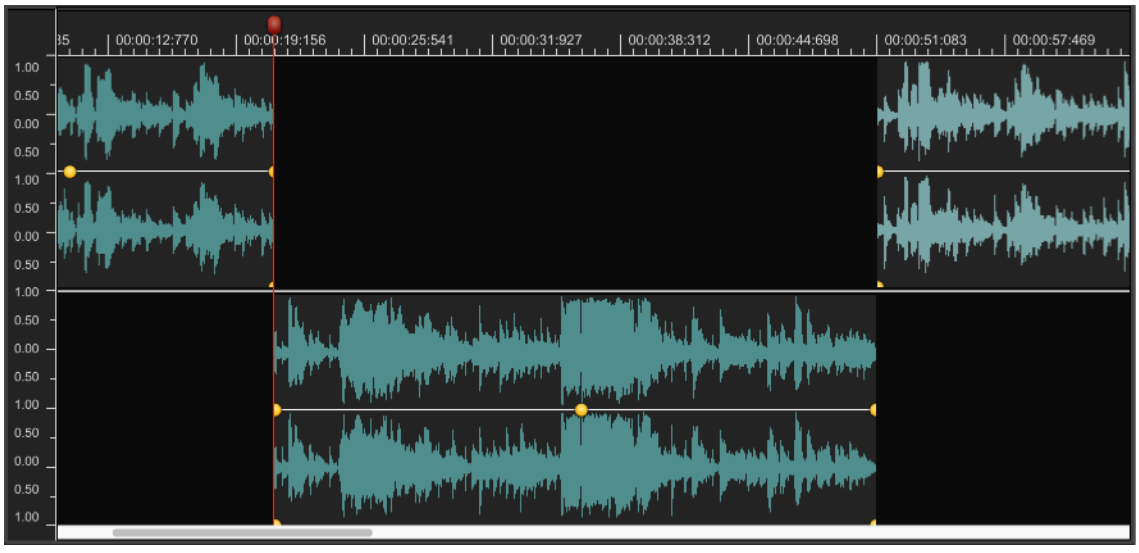
Insert… (or ⇧⌘V):

DSP-Quattro opens the Cut Editor, do the cut at playback position, and inserts the clipboard at the position of the cut. In the upper part, to the left, there is the waveform before the cut point. In the lower part, in the middle, there is the waveform of the audio clipboard then, again in the upper part, there is the waveform starting just after the cut point.

Replace… (or ⇧⌘Y):

DSP-Quattro opens the Cut Editor, do the cut at playback position, and places the clipboard at the position of the cut. In the upper part, to the left, there is the waveform before the cut point. In the lower part, in the middle, there is the waveform of the audio clipboard then, again in the upper part, there is the source audio file waveform without the presence of the clipboard in between.

The difference between Inserting and Replacing is that in the first case DSP-Quattro makes the space to place the clipboard at cut position, shifting the rest of the source audio file forward along the time axis. In the second case it keeps in sync the last section of the source audio file, without shifting it along the time axis.



Also in this case, it is possible to shift the waveforms of the clipboard and of the region after the cut along the time axis. It is possible to set the fade-in/out length as set the fade-in/out curve shapes as well.

Using the scissor mode to make additional cuts

The Cut Editor allows to make additional cuts and cross-fades, if needed. Clicking on the scissor button positioned to the bottom of the waveform view:

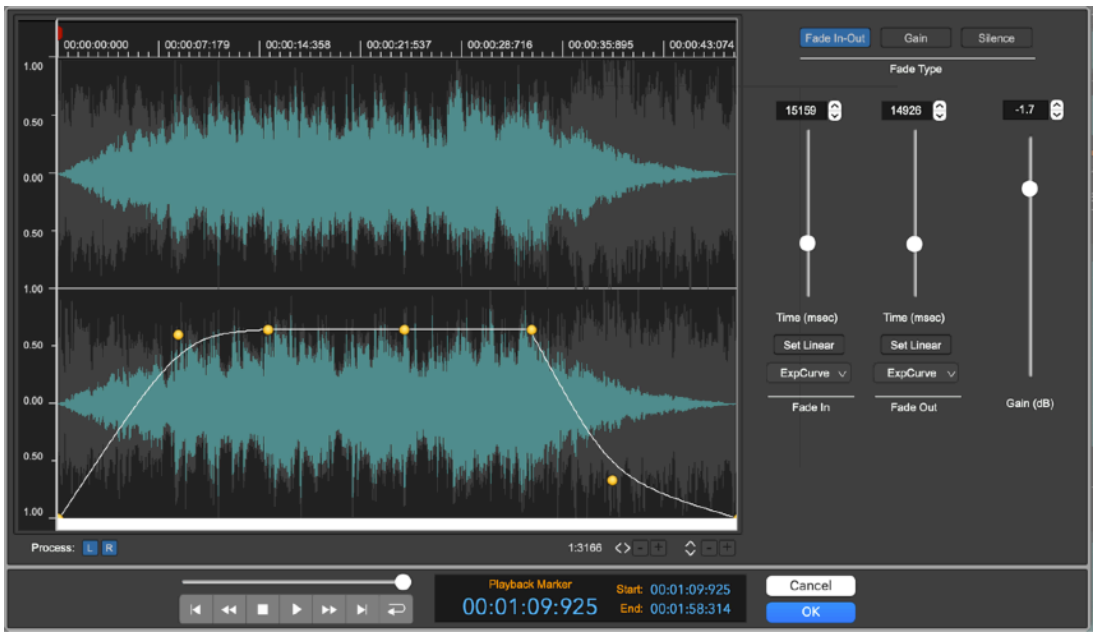
The mouse pointer will change to a scissor. Then, clicking on the waveform view, the Cut Editor splits the audio file exactly on that position, moving the waveform which follow the cut point on the other side of the view. It is possible to repeat the operation as many times as necessary.

To return to be able to shift the waveforms on the waveform view, click on the shifter button which is positioned to the right of the scissor button.

Zooming In/Out is possible as well. Use the mouse wheel, the keyboard or the buttons on the lower right part of the Cut Editor for zooming.

The Fade Editor Tool

The commands **ApplyGain…**, **FadeIn<->Out…** and **FadeOut<->In…**, available on the Processing menu, use the same Fade Editor tool window:



On the left part, the Fade Editor shows the graphical representation of the envelope curve composed by a Fade-In, a Gain level and a Fade-Out. It is possible to set the length as well as the shapes of the FadeIn/Out curves clicking and dragging the fade yellow circular controls.

On the right part, the Fade Editor shows sliders and editable fields to enter the fades and gain values numerically.

On the upper right part of the the Fade Editor, the possible settings of the Fade Types are:

- **Fade In-Out** (automatically set by calling the **FadeIn<->Out…** command): in this case the envelope curve starts at zero gain (-inf dB), to fade-in reaching the Gain level, then fades-out to reach the zero level at the end.

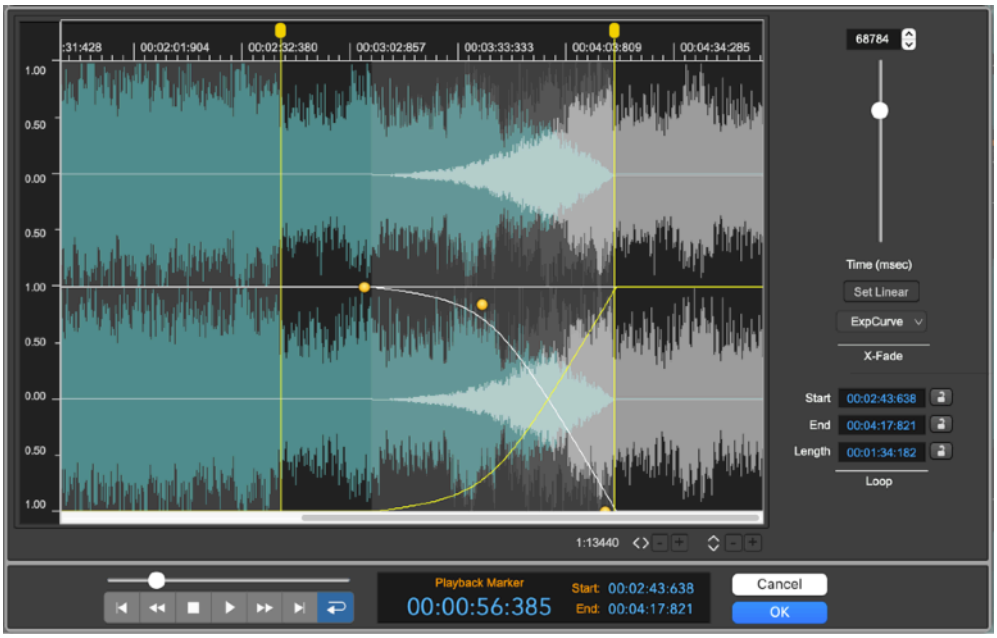
- **Gain** (automatically set by calling the **ChangeGain…** command): in this case the envelope curve starts at +0dB level (no level change on the source file), fades to the Gain value, then fades to reach again the +0dB at the end. Use this option to change the gain of the source audio file without changing the audio levels at the borders.

- **Silence** (automatically set by calling the **FadeOut<->In…** command): starts at +0dB level (no change of level on the source file), fades to the 0 level (silence), then fades again to +0dB. It is similar to Gain where the Gain level is at zero (-inf dB).

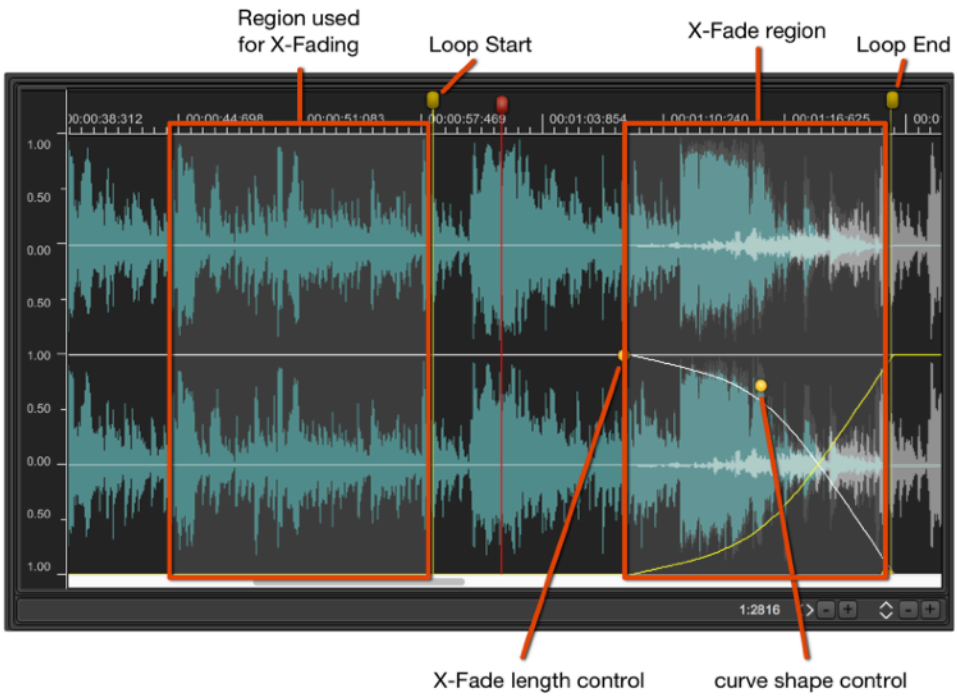
NOTE: by default, if the file is stereo, the envelope curve processes both the L&R channels. It is possible to process only one channel turning OFF the channel to keep as it is, clicking on the L or R square buttons below the waveform view, in the right part to the Fade Editor window.

The X-Fade Looping Editor Tool

The X-Fade Looping Editor is a graphical tool used to apply a X-Fade looping algorithm to the Loop region. It is possible to define the shape of the X-Fade curves checking in real time what happens to the processed audio file visually, previewing the waveform and listening to the result as well.



The X-Fade Looping algorithm, available only if the Loop is turned On, modifies the samples into the loop region mixing the region before the Loop Start with the region before the Loop End, applying a cross-fade (X-Fade) between the samples to copy and the samples already on that region.



The purpose to make the loop which plays as much as natural and as smooth as possible. Because, applying the X-Fade looping, the sample at the Loop End will be mathematically identical to the one at the Loop Start, there is not any abrupt change or audio click when playing and jumping from the loop end to the loop start. But it can happen that the result is not musical.

The success of the operation depends on several factors:

- before to apply the X-Fade, the loop points must be already positioned in places considered good for looping, even if the audio clicks at loop.

- The length of the X-Fade is a very important factor to achieve an acceptable result, and it is difficult to give in advance a precise rule about the best value to set. Generally, when applying the X-Fading Loop algorithm to short loops (less than 1 sec), it is recommended to enter high length values for the X-Fade, even equal to the full loop length. Instead, in case of long loops, smaller values for the X-Fade length are generally very much more appropriate.

The maximum value for the X-Fade length cannot never exceed the length of the loop, and it cannot exceed also the position of the loop start marker respect the beginning of the file. In other words, the maximum length of the X-Fade is smallest value between the length of the loop and the position of the loop start marker.

The AudioCD Layout

Introduction

Click on the AudioCD tab on top of the Project window to show the AudioCD main view.

As already introduced, the AudioCD Layout is a tool in DSP-Quattro to assemble, and master a sequence of audio files.
It is possible to create an audio CD-ROM by adding audio files or regions of

audio files to the AudioCD Layout. These appear as Audio Regions on the AudioCD Layout view.

DEFINITION: *The audio files appear as Audio Regions on the AudioCDLayout view*

Then, it is possible to move on the time line the Audio Regions of the AudioCD Layout graphically or entering numerical values for their settings. It is also possible to add effects on insert to each audio region or to the output of the AudioCD Layout as well. These effects can be chosen among the

built-in effects of the application or the AU effect plug-ins installed on MacOS.

Moreover, it is possible to set pre-gaps/pauses between CD-Tracks and to set fade-ins, fade-outs or crossfades between an Audio Region and the next one.

The output of the AudioCD Layout can be exported as a new audio file. It is possible to export CD-Tracks as separated audio files as well. And, last but not least, it is possible to burn a physical audio CD-ROM using the internal - if any - or external CD burner device - if connected to your Mac.

The application is able to export the AudioCD Layout in DDP 2 standard format as well.

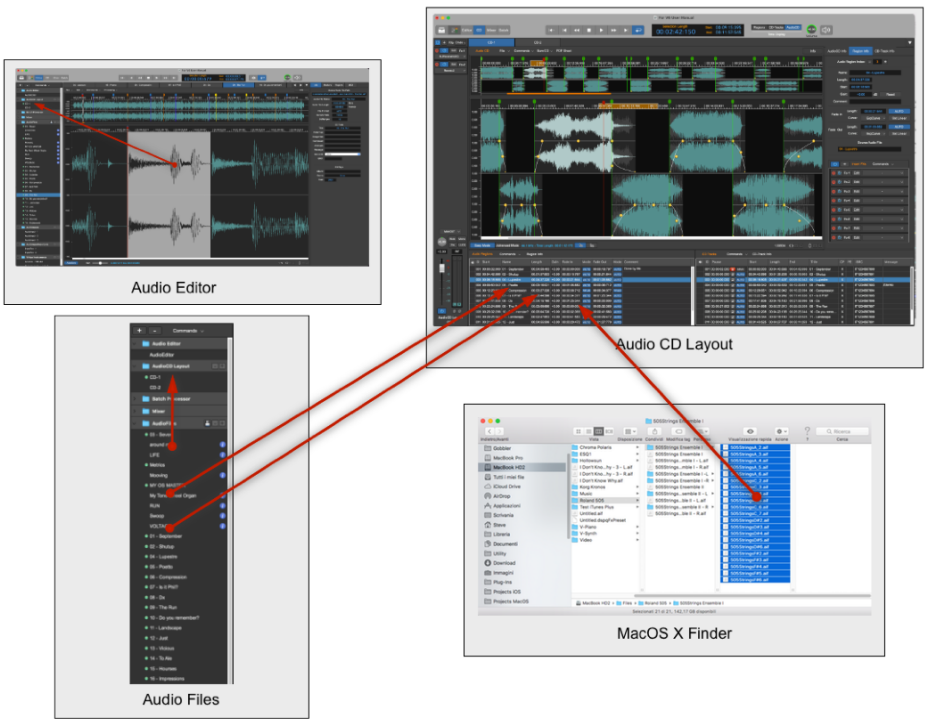
The AudioCD Layout allows to assemble an audio CD-ROM very easily and in only a few steps: in the simplest case, just add the audio files to the AudioCD Layout, the application will automatically create a CD-Track for each audio region added to the AudioCD Layout. Then, the audio CD-ROM is now ready for burning.

NOTE: the application offers also a very powerful Advanced MODE, to allow every kind of free combinations among audio regions and CD-Tracks. In Advanced Mode, it is possible to have configurations where a single CD-Track plays several audio files or audio regions, or where several CD-Tracks play the same audio file or audio region. More about the Advanced MODE later in this manual.

Creating your first audio CD-ROM:

It is very easy to create professional-quality audio CD-ROMs using DSP-Quattro. Just follow these a few steps:

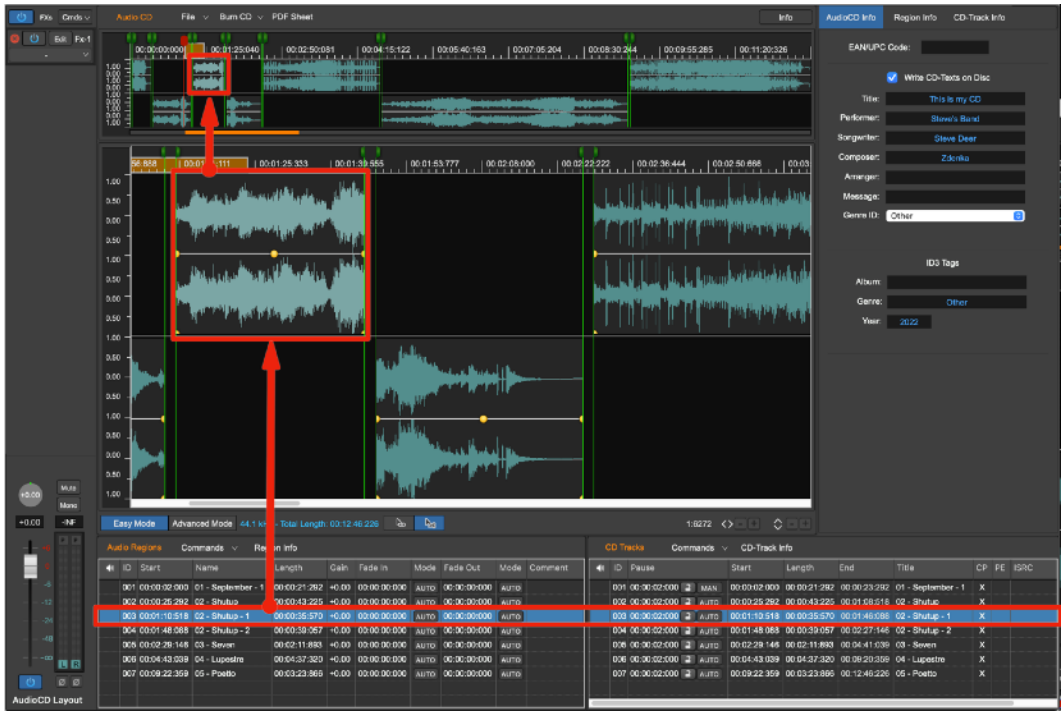
Step 1: Add audio files to the AudioCD Layout



Run the application and add your audio files dragging them directly from the MacOS file system on an empty AudioCDLayout waveform view.

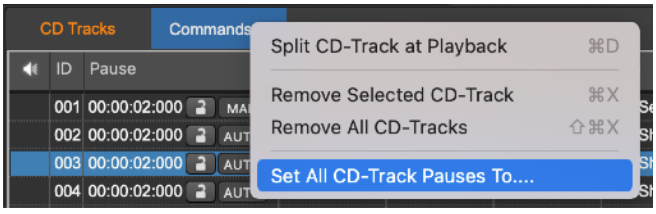
It is also possible to use the menu commands on top of the AudioCDLayout main waveform view to load new audio file on the AudioCD Layout.

When you add an audio file on the AudioCDLayout, the application creates an audio region and a CD-Track as well:



Step 2: Optionally - set preGaps between CD-Tracks

It is possible to set a pause, or pre-gap, between a CD-Track and the next one. When a CD-Player will play the audio CD-ROM, the pre-gap is seen as a countdown just before the CD-Track start.

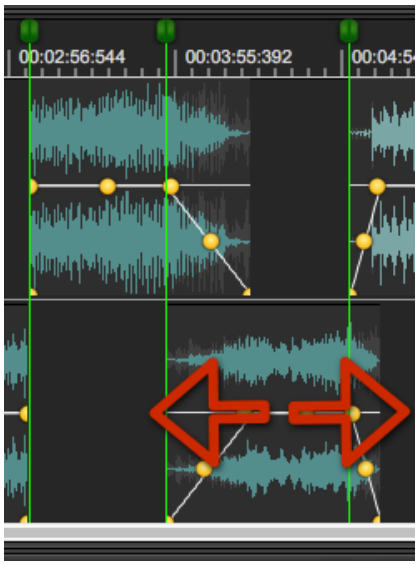


The application allows to do it by using only one command. Click on the Commands button on top of the CD-Track table, and select **Set All CD-Track Pauses to…**

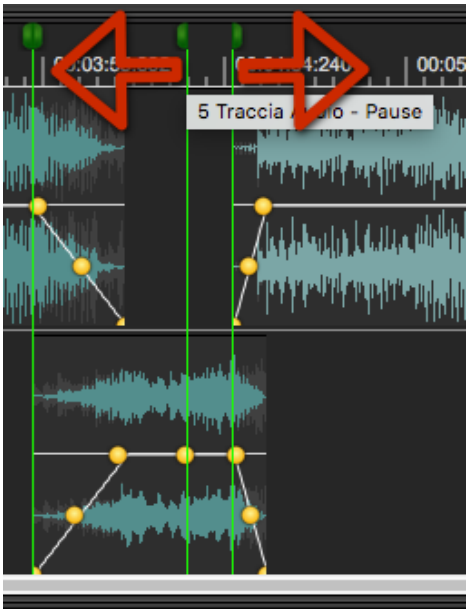
Then, enter the Pause length (the standard is 2 secs), click on OK. All the Audio Regions and CD-Tracks will move accordingly.

Step 3: Optionally - edit and adjust crossfades between Audio Regions

It is possible to set a crossfade an Audio Region and the next one, just clicking and dragging its waveform shifting it to the left or to the right along the time X-Axis. It is also possible to adjust the curves for the crossfade, to set the gain, and to trim audio region start and end points just using the mouse.



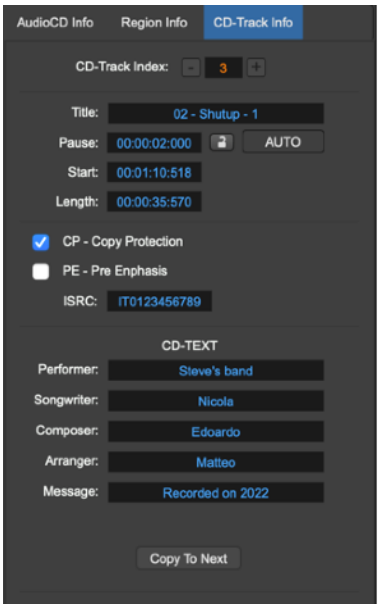
By default, setting a crossfade, the application reduces the preGap of the CD-Track corresponding to the start of the Audio Region. If needed, click and drag the left part of the header of the CD-Track marker to set the pause/ preGap between the this CD-Track and the previous one:



Each CD-Track marker is composed by two sub-markers, the left half for setting the pause/preGap length, the right half for setting the position of the CD-Track start as it will appear on the audio CD-ROM.

Step 4: Optionally - Enter CD-Texts for each CD-Track and for the audio CD-ROM

Clicking on the CD-Track Info button on top of the CD-Track table, the application shows a side panel view where it is possible to enter CD-Texts. This is possible for audio CD-ROM as well.



Step 5: Optionally - Add effects

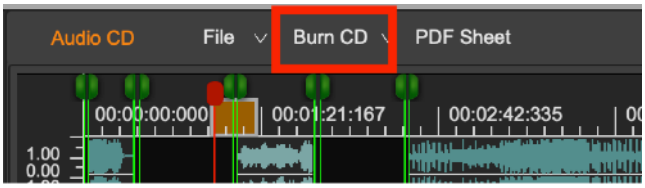
It is possible to add effects on insert to each Audio Region and/or to the AudioCD Layout channel strip, to enhance the sound of the final mix. Select the effects among the high quality internal effects of the application, or among the AU effect plug-ins from Apple or third-party manufacturers which are installed on MacOS.

Of course, it is possible to adjust effect parameters and save and recall their settings.

Step 6: Burn an audio CD-ROM or export as DDP

Last but not least, if a CD writer device is connected to your Mac, use the internal audio CD burning engine to burn to burn a physical audio CD-ROM.

To do it, just use the BurnCD button which is on top of the AudioCD Layout waveform view:



then, the application will do all the rest…

It is also possible to export the current AudioCD Layout as DDP, a standard used by most factories producing physical audio CD-ROMs. The DDP standard defines the file format to generate an image file of an audio CD-ROM, including ISRC, PQ, EAN codes and CD-Texts.

The AudioCD Layout view:

The AudioCD Layout interface offers all the tools that are needed to create and edit an audio CD-ROM: it is possible to add, to order the audio files - or audio regions -, to see their waveform graphically, it is possible to place and move CD-Track markers, to set CD-Track pauses/preGaps and crossfades between audio regions, to play the AudioCD Layout to preview your changes, and to add effect plug-ins on insert almost everywhere.

The AudioCD Layout interface consists of the following main areas:

- **The Transport Bar and Tool buttons:** this view consists of the buttons to control the playback, the display to show information about current CD-Track marker or playback cursor position and of the tool buttons to show/ hide the views on the bottom part of the AudioCD Layout and additional tools and dialogs of the application.

- **The AudioCD Layout Channel Strip:** On the left part of the AudioCD Layout view there is a channel strip. Use the channel strip to set the gain, the pan-pot and the other parameters and features - as a serial chain of real-time effects - common to all Audio Regions that are part of the AudioCD Layout.

- **Waveform Views**: in the center of the AudioCD Layout view, there are two views showing the audio CD waveform and CD-Tracks markers. This is the main part of the interface. There are two waveform views: on top there is overview, which always shows the entire AudioCD Layout waveform, from start to end. Below it there is a waveform view which can be zoomed-in/out, allowing precise edits.

  On the AudioCD Layout waveform view, each Audio Region is represented by its own waveform placed alternately on the upper section and lower section, and so on, one after the other one. This allows to see graphically what happens when Audio Regions overlap one each other.

  The lower waveform view area allows to place graphically the Audio Regions in the time line. It is also to set cross-fades between them, to place and move CD-Track markers for setting pre-gaps and CD-Track start locations. It is possible to zoom on any part of the AudioCD Layout time line. The scroll bar underneath the scrolling view allows to scroll the waveform view along the x-axis, ie in time. The level of zoom can be easily modified by menu commands, by the keyboard, or by the zoom buttons located in the lower right corner of the waveform view.

- **The Audio Regions Table**: this table shows information about the Audio Regions in chronological order, one on each row of the table.

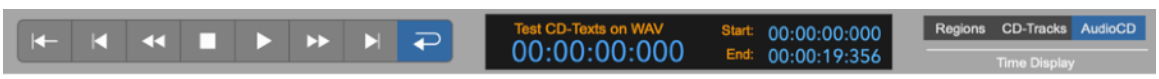
- **The CD-Tracks Table:** this table shows the list of the CD-Tracks in the same order with which they appear on the audio CD-ROM, one for each row of the table. Each row displays the information of each CD-Track.

- **The Info Side Panel:** it consists of three views. It is possible to switch among these views by using the tabs in the upper part of the side panel. These views show all the settings for the audio, like CD-ROM CD-Texts, the settings for each audio region, including the effect plug-ins on insert to each audio region, the settings for each CD-Track, like the CD-Text, position, X-Fades, and more.

NOTE: It is possible to resize freely each part (waveform/overview view areas, audio regions and CD-Track tables) of the AudioCD Layout view, just clicking&dragging the borders of the views. Vertical borders can be dragged horizontally, horizontal borders can be dragged vertically.

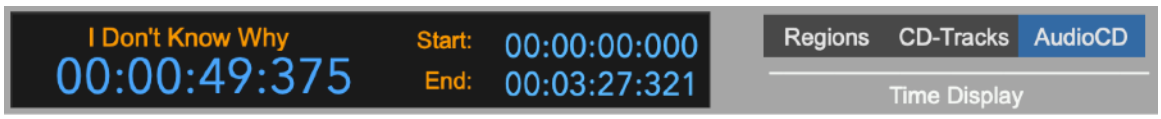
The Transport Bar

The transport controls are in the upper part of the Project window.



Please refer to the chapter describing the Transport Bar for the playback controls which are common with the Audio File Editor and Mixer elements of DSP-Quattro.

The Counter Display



In the central part of the Transport Bar there is the Counter Display, which shows you information regarding the playback cursor, the current audio region, or the current CD-Track, or the audio CD-ROM.

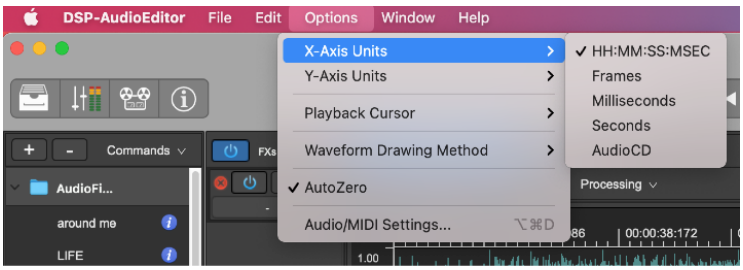
What the application shows on the display depends on which button of the group on the right of the display is turned ON:

- **Regions**: if the Regions button on the right of the display is ON, then on the left part the display shows the playback cursor position relative to the current Audio Region and, above it, its title. On the right there are the current Audio Region start and end positions, relative to the start of the AudioCD Layout.

- **CD-Track**: if the CD-Track button on the right of the display is ON, then on the left part the display shows the playback cursor position relative to the current CD-Track and, above it, the current CD-Track title. On the right there are the current CD-Track start and end positions, relative to the start of the AudioCD Layout.

- **AudioCD**: if the AudioCD button on the right of the display is ON, then on the left part the display shows the playback cursor position relative to the start of the AudioCD Layout and, above it, the current CD-Track title. On the right there are the start and the length of the AudioCD Layout.

The default time unit is hours:minutes:seconds:milliseconds. Possible choices are Frames, Seconds, Milliseconds or AudioCD (CDDA).



Use the menu command **Options->X-Axis Unit->...** which is on the application menu bar to make your selection.

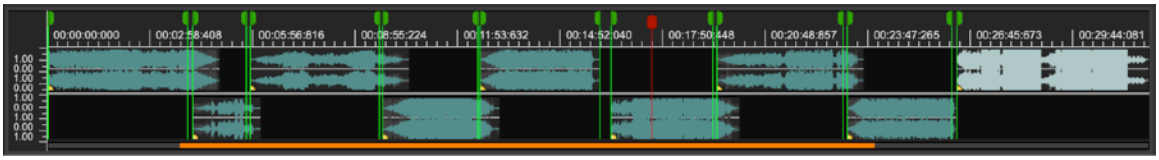
On application Preferences, it is possible to enter the default value for X-Axis units used by the application creating new Project Documents.

Waveform Views

In the middle of the AudioCD Layout view there are two waveform views: the waveform overview and the main zoomable waveform view.

The AudioCD waveform overview

The upper waveform view is the overview. It always shows the whole AudioCD Layout waveform, from the beginning up to the end.



This view is a waveform view without the controls to zoom in/out. It is very useful to always know which Audio Region is playing.

It is possible to use the waveform overview to make new waveform selection, move the markers or the playback cursor, and set the zoom level for the main waveform view area below.

At the top of the waveform there is the Time Ruler. The application uses the same X-Axis unit used for the Counter Display control. As described into the corresponding chapter, to set the X-Axis unit for the time ruler, use the application menu command

Options->X-Axis Units…

Possible choices are

- HH:MM:SS:MSEC (hours:minutes:seconds:milliseconds)
- Frames
- Seconds
- Milliseconds
- AudioCD (CDDA)

On the right side there is the Level Ruler, that shows the level of the signal accordingly to the Y-Axis unit. To set the Y-Axis unit, use the menu command

Options->Y-Axis Unit…

Possible choices are

- Floats, normalized into the range [-1.0..1.0[
- dB (decibel).

Clicking on the time ruler and dragging the mouse, it is possible to define a specific region of the AudioCDLayout to play. The same can be accomplished by clicking and dragging the time ruler of the main waveform view. Please refer to the next chapter describing the AudioCD Layout main waveform view to know more about it.

Below the waveform display, there is a special **Zoom Controller**, that can be used to set the zoom level of the main waveform view area. This control highlights in orange the region that the main waveform view area displays. By clicking on it and then dragging the mouse, the application sets the zoom level of the main waveform view scrolling it accordingly.

Using the Zoom Controller

It is easy to use the zoom controller:

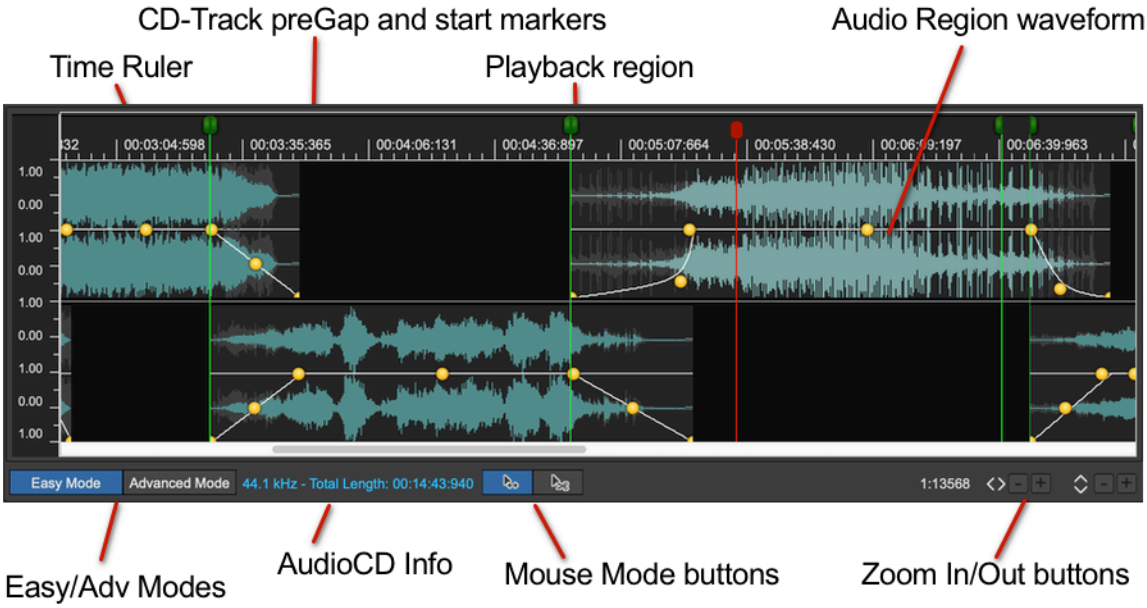
- **hover** the mouse over the zoom controller, the mouse pointer changes to a magnifying glass.

- **clicking on it and dragging** the mouse, the control draws an orange region. Then, releasing the mouse button, the main waveform view scrolls to the position corresponding to the orange rect start, zooming up to the position corresponding to the orange rect end.

- ⌥ **+ mouse click and dragging**, scrolls the main waveform view to the region pointed by the mouse, without modifying the zoom level.

The AudioCD Layout main waveform view area

The main waveform view area is the main workspace for working with the AudioCD Layout. On the main waveform view, it is possible to edit audio regions and CD-Track markers graphically. The application places the audio regions, alternately, between the top and bottom areas of the waveform view. The two rows are functionally identical, this design makes very easy and user friendly to edit overlapping regions.



Each Audio Region is displayed as a rectangle, containing a green waveform. Each Audio Region has also an envelope curve, to set the gain level and fade-in/out lengths and curves. CD-Track preGap/pause and start markers are displayed with a green head.

Zoom In/Out Buttons:

Exactly like the overview, the main waveform view shows the waveforms of Audio Regions. However, this view can zoom-in any part of the waveform up to the level one sample = one pixel. X and Y axis have independent zoom levels. It is possible to zoom-in the vertical axis without limits, even up to show the quantization noise in the audio file.

To zoom In/Out:

- **Use the mouse wheel**: to set the horizontal X-Axis zoom-in/out ratio. The same can be done moving vertically 2 fingers on the Apple Trackpad, if applicable. ⌘ **+ mouse wheel** does vertical Y-Axis zoom-in/out.

- **Use the +/- buttons**: use the +/- at the bottom right of the waveform view to zoom in/out horizontally on the X-Axis or vertically on the Y-Axis.

After zooming-in, the scroll bar lets to scroll the main waveform view to wanted position.

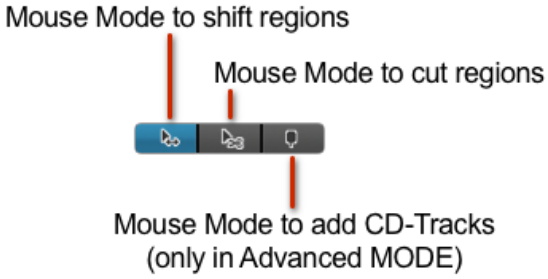
Do not forget that it is also possible to use the zoom controller of the waveform overview to zoom in/out on a certain region of the AudioCD Layout.

NOTE: it is possible to scroll the view also by **clicking and dragging** the Time Ruler **while keeping the ALT key pressed**. The effect is the same as using the scroll bar, but often it is smoother and very much more precise.

If it is playing, the Audio Editor waveform view area will scroll following the playback cursor.

Mouse Mode Buttons:

These buttons choose one of the edit pointer modes, to perform different tasks on audio regions and CD-Tracks on the main waveform view.



Depending on the AudioCD current edit mode, which can be EASY or ADVANCED (more about this later on this manual), there are two or three mouse edit modes:

- **Audio Region Shifter**: in this mode, clicking on an audio region waveform and dragging the mouse, shifts that audio region forward or backward along the time axis.

- **Audio Region Scissor**: in this mode, clicking on an audio region waveform, the application splits that audio region in two audio regions on that position. The application also creates a new CD-Track at split point, where the second audio region starts. All other audio regions and CD-Tracks remain unaffected.

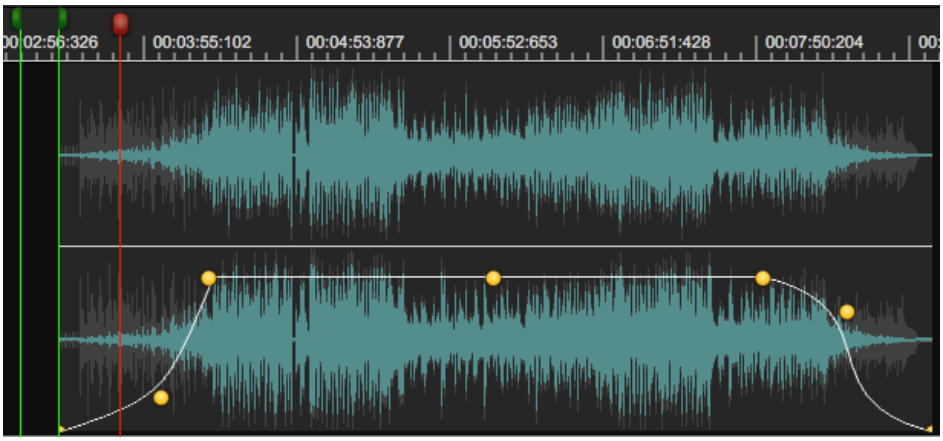
- **CD-Track Scissor (available only if the AudioCD is on ADVANCED edit Mode)**: in this mode, clicking on an Audio Region waveform, the application splits the CD-Track in two CD-Tracks on that position, adding a CD-Track marker. Other Audio Regions and CD-Tracks remain unaffected.

NOTE: While the mouse mode is in Regions Shifter mode, press the ^ key to switch momentary to the Region Scissor Mode.

NOTE: more about the AudioCD EASY and ADVANCED edit modes later in this manual.

The Audio Region Waveform view:

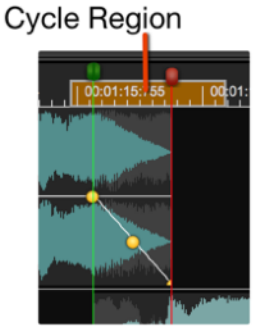
Each Audio Region loaded in the AudioCD Layout appears in the main waveform view and in the Audio Region table. The main waveform view displays the waveforms of each Audio Region chronologically from left to right, in the upper or lower half of the view area alternately, to make it easier to view any overlapping areas between two regions.



Each audio region waveform view has its own envelope curve for the gain level, with parameters to set the attack and decay times and the shape of the curves, and the gain level. It is also possible to edit audio regions, as you can resize, trim the start and the end, shift them back and forth in time, split, and very much more. More about this later in this chapter.

The Playback Cycle:

It is possible to loop (or cycle) a region of the AudioCD Layout, so that the application plays only that region. This is useful to preview a specific region, like a crossfade between Audio Regions, or how the audio at CD-Track start plays. It possible to set a cycle region using one of the two time rulers, the one on the AudioCD Layout waveform overview and the one on the AudioCD Layout main waveform view.



- **to set a Playback cycle region**: click on the time ruler of the overview or main waveform views and drag the mouse from the wanted cycle start to end.

- **to remove the Playback cycle region**: Click anywhere on the time ruler outside the current playback cycle region.

If there is a playback cycle region, the application plays only that region. If the cycle button on the transport bar is ON, as soon as the playback cursor reaches the end of the cycle region, it jumps back to cycle region start without any interruption. If the cycle button on the transport bar is OFF, the playback stops as soon as it reaches the cycle region end.

The Time Ruler:

Above the waveform there is the Time Ruler. To set the X-Axis unit for the time ruler, use the application menu command

Options->X-Axis Units…

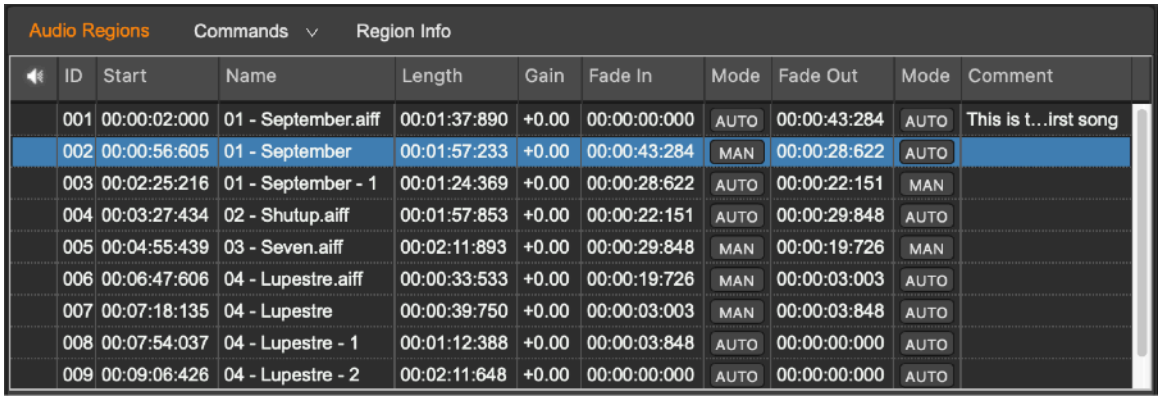
Possible choices are

- HH:MM:SS:MSEC (hours:minutes:seconds:milliseconds)
- Frames
- Seconds
- Milliseconds
- AudioCD (CDDA)

On Time Ruler the application draws also the heads of CD-Track markers (the green markers), each one of these is constituted by two sub-markers, the preGap/pause and start CD-Track markers. The playback cursor is the red marker. More about CD-Track markers later in this chapter.

The Audio Regions Table and Audio Region Info View

Audio Regions table shows the audio files - or audio file regions - which constitute the AudioCD, one for each row of the table:
Audio Regions are listed chronologically, from top to bottom, identified by an ID#. Selecting an Audio Region in the Audio Region table, the same Audio Region is also selected on the AudioCDLayout waveform view.



ID	Start	Name	Length	Gain	Fade In	Mode	Fade Out	Mode	Comment
001	00:00:02:000	01 - September.aiff	00:01:37:890	+0.00	00:00:00:000	AUTO	00:00:43:284	AUTO	This is t…irst song
002	00:00:56:605	01 - September	00:01:57:233	+0.00	00:00:43:284	MAN	00:00:28:622	AUTO	
003	00:02:25:216	01 - September - 1	00:01:24:369	+0.00	00:00:28:622	AUTO	00:00:22:151	MAN	
004	00:03:27:434	02 - Shutup.aiff	00:01:57:853	+0.00	00:00:22:151	AUTO	00:00:29:848	AUTO	
005	00:04:55:439	03 - Seven.aiff	00:02:11:893	+0.00	00:00:29:848	MAN	00:00:19:726	MAN	
006	00:06:47:606	04 - Lupestre.aiff	00:00:33:533	+0.00	00:00:19:726	MAN	00:00:03:003	AUTO	
007	00:07:18:135	04 - Lupestre	00:00:39:750	+0.00	00:00:03:003	MAN	00:00:03:848	AUTO	
008	00:07:54:037	04 - Lupestre - 1	00:01:12:388	+0.00	00:00:03:848	AUTO	00:00:00:000	AUTO	
009	00:09:06:426	04 - Lupestre - 2	00:02:11:648	+0.00	00:00:00:000	AUTO	00:00:00:000	AUTO	

NOTE: it is possible to ***reorder Audio Regions*** by clicking and dragging them up or down. **Alt-click** and drag to ***duplicate that audio region***.

NOTE: it is also possible to ***change the order of the columns of the table*** by clicking and dragging the column header to left or right. It is possible to ***resize each column width*** by dragging its left or right header border as well.

The Audio Regions table displays the following information about each audio region:

- The *Speaker* icon shows which region is currently playing.

- *Start* time of that audio region (expressed in the units used also by the time ruler)

- Audio region *Name*

- Audio region *Length* (expressed in same units also used by time ruler)

- Audio region *Gain* level (dB)

- *FadeIn* Length (expressed in same units also used by time ruler)

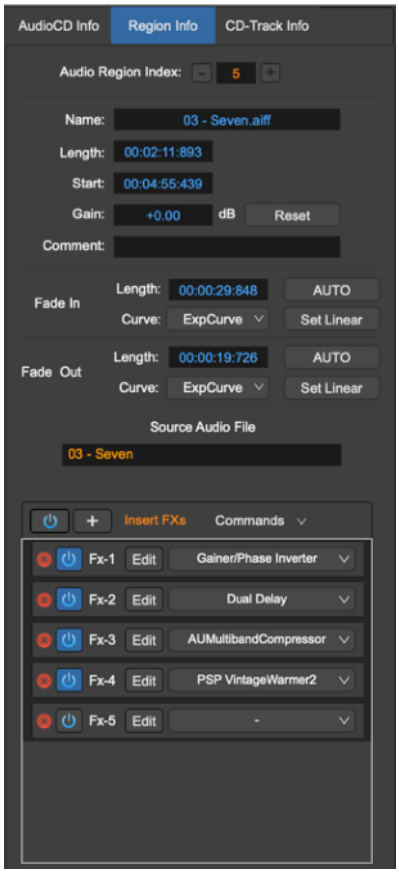
- FadeIn *Auto/Manual* mode (see the details about this later in this chapter)

- *FadeOut* Length (expressed in same units also used by time ruler)

- FadeOut *Auto/Manual* mode (see the details about this later in this chapter)

- *Comment*

The Audio Region Info view:



To show the Region Info view:

- Double-click on an Audio Region row of which you wish to know or edit info.

- Select the Audio Region, then click on the Region Info button on top of the Audio Regions table.

- Click on the “Info” button among the Tool buttons which are on the left part of the Transport Bar and Tool buttons in the upper part of the worksheet. Then, click on the Region Info tab.

The Info side panel, under the Region Info view tab, allows you to view and edit information about the currently selected region and its source audio file. Some of these fields are editable, some are not.

The + and - buttons which are on the upper section of the Info side panel allow you to step between an audio region and the previous or next one in the audio region list. This is very useful when you wish to edit a particular parameter on several regions.

To close the Region Info view, click again on the Region Info button on top of the Audio Regions table.

The Region Info view displays the following information:

- ***Name*****:** it is the audio region name. It is an editable field, just double click on it and type the new name.

- ***Length***: the audio region length (expressed in same units also used by time ruler). It is an editable field.

- ***Start***: the audio region start expressed as offset from the AudioCDLayout start. It is an editable field, double click on it and type the new value. In case, the application automatically corrects the new value in the allowed range.

- ***Gain***: the audio region Gain level, expressed in dB. It is an editable field, double click on it and type the new Gain. In case, the application automatically corrects the new value in the allowed range.

- ***Gain Reset***: to reset the Gain to +0dB.

- ***Comment***: it is the Comment text for that audio region. It is an editable field, double click on it and type the text.

- ***Fade-In Length and Curve***: the Audio Region Fade-In time and its curve shape. To edit the value of the fade length, double click on it and type the new value. In case, the application automatically corrects the new value in the allowed range.

- ***Fade-In Set Linear*****:** to reset the Fade-In shape to linear curve.

- ***Fade-In Auto Mode****:* to switch ON/OFF the auto mode for that Fade-In. More about the Auto Mode for cross-fades later in this chapter.

- *F****ade-Out Length and Curve***: the audio region Fade-Out time and its curve shape. To edit the value of the fade length, double click on it and

type the new value. In case, the application automatically corrects the new value in the allowed range.

- ***Fade-Out Set Linear***: to reset the Fade-Out shape to linear curve.

- ***Fade-Out Auto Mode****:* switch ON/OFF the auto mode for that Fade-Out. More about the Auto Mode for cross-fades later in this chapter.

- ***Audio File***: it is the name of the source audio file.

At the bottom of the Region Info view, there is a section to load, edit and manage to the AU plug-ins and/or internal effects on insert to that Audio Region only. These effects process the output of only that audio region.

This serial chain of Effects will be also rendered to file burning or exporting the AudioCD Layout, ie the application will process the audio region thru these effects when burning an audio CD-ROM or exporting a DDP image.

It is possible to add any number of Fx slots. Use the + button on top of the Insert Fx table to add a new empty slot. To remove a slot, click on the red close button on the slot to remove.

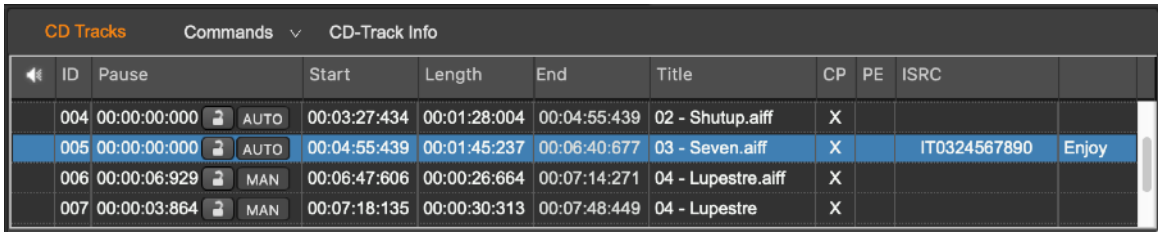
It is possible to load effects to choose among the high quality built-in effects of the application, or among the built-in in MacOS Audio Unit effect plug-ins by Apple which are available for free, or among the commercial Audio Unit effects plug-in by third-parties manufacturers which are installed on MacOS.

Refer to the previous chapter about built-in Effect and Plug-in Fx slots for the complete description of the commands for using Fx slots, the preset management and for loading Fx.

Please refer to next chapters to know how to work with the Region list and how to add, remove, edit Regions on the AudioCD Layout.

The CD-Tracks Table and CD-Track Info View

The CD-Tracks table shows the CD-Tracks as they will appear on the audio CD-ROM. It shows information about each CD-Track, one for each row of the table.



Selecting an Audio Region on the Audio Regions Table, the corresponding CD-Track will be also selected on the CD-Tracks table.

NOTE: it is also possible to ***change the order of the columns of the table*** by clicking and dragging the column header on left or right. It is possible to ***resize each column width*** by dragging its left or right header border as well.

The CD-Tracks table displays the following information about each CD-Track:

- The *ID* is the index for that CD-Track.

- CD-Track *Pause* (expressed in same units also used by time ruler)

- CD-Track *Lock/Unlock* icon. Shows if it is possible to set the pause length (unlocked) or not (locked). See the details about this later in this chapter.

- CD-Track *Auto/Manual* mode. See the details about this later in this chapter.

- CD-Track *Start* (expressed in same units also used by time ruler). It is the offset from the audio CD-ROM start.

- CD-Track *Name*

- CD-Track *Length* (expressed in time or samples unit)

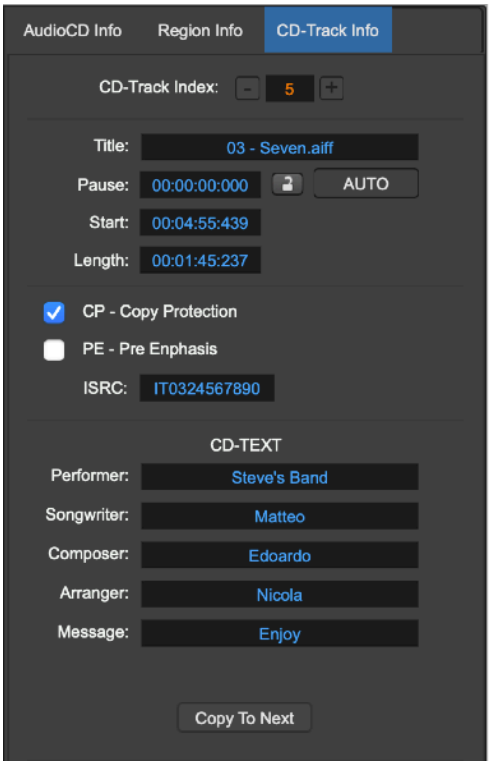
- CD-Track *CP - Copy Protection* flag ON/OFF (it is and practically obsolete flag on Redbook Standard)

- CD-Track *PE - Pre-Emphasis* flag ON/OFF (it is and practically obsolete flag on Redbook Standard)

- CD-Track *ISRC code*

- CD-Track *Message*

The Info side panel, under the CD-Track Info view tab, allows you to view and edit information about the currently selected CD-Track. Some of these fields are editable, some are not.



To show the CD-Track Info view:

- Double-click on a CD-Track row of which you wish to know or edit info.

- Select the CD-Track, then click on the CD-Track Info button on top of the CD-Tracks table.

- Click on the “Info” button among the Tool buttons which are on the left part of the Transport Bar and Tool buttons in the upper part of the worksheet. Then, click on the CD-Track Info tab.

The + and - buttons which are on the upper section of the Info side panel allow you to switch between the CD-Tracks on the list. This is very useful to edit a particular parameter on a CD-Track and then the same parameter on the others.

To close the CD-Track Info view, click again on the same button used to show it.

The CD-Track Info view displays the following information:

- ***Title***: it is the CD-Track title. It is an editable field, double click on it and type the new title.

- ***Pause*****:** the CD-Track PreGap/Pause. It is an editable field, double click on it and enter the new value for the CD-Track Pause. **NOTE:** the pause in front of the first CD-Track is fixed to the Redbook Standard value of 2 seconds.

- ***Pause Auto Mode:*** switch ON/OFF the auto mode for that CD-Track Pause. More about the Auto Mode for setting the Pause length later in this chapter.

- ***Pause Lock/Unlock:*** Lock/Unlock the CD-Track Pause length. If locked, it is not possible to enter a new value of the CD-Track pause, and it is not possible to engage the Pause Auto Mode.

- ***Start*****:** the CD-Track start position expressed as time or samples offset from the AudioCD Layout start. It is an editable field, double click on it and enter the new value. In case, the application automatically corrects the new value in the allowed range.

- ***Length*****:** the CD-Track length expressed in the units used also by the time ruler. It is an editable field, double click on it and enter the new value. In case, the application automatically corrects the new value in the allowed range.

- ***CP - Copy Protection****:* switch ON/OFF the Copy Protection flag for that CD-Track. This info will be written on the audio CD-ROM during the CD Burning process. **NOTE:** this is a practically obsolete flag of the Redbook Standard. Most CD-Players do not take care of it.

- ***PE - Pre Emphasis:*** switch ON/OFF the Pre-Emphasis flag for that CD-Track. This info will be written on the audio CD-ROM during the CD Burning process. **NOTE:** this is a practically obsolete flag of the Redbook Standard. Most CD-Players do not take care of it.

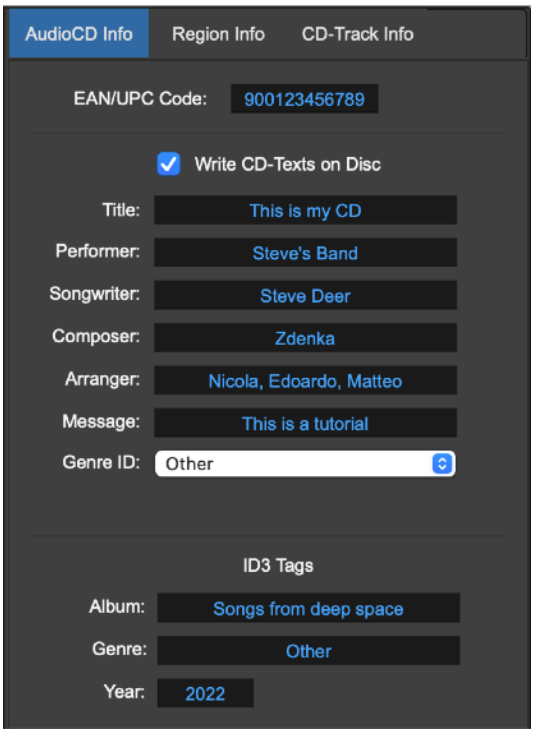
- ***ISRC*:** it is the ISRC code of the CD-Track. It is an editable field, double click on it and enter the new value. The application checks if the new code has an acceptable format and if it fails it will show a warning dialog refusing the new code. If the ISRC code is not an empty string, it will be written on the audio CD-ROM during the CD Burning process.

- ***CD-Text*:** They are editable fields, click and enter the CD-Text strings for the current CD-Track, they will be written on audio CD-ROM during the CD Burning process.

Please read next chapters to know how to work with the AudioCD Layout Regions and CD-Tracks and how to add, remove, edit CD-Tracks.

The AudioCD Info view

Similarly to how described for Audio Regions and CD-Tracks Info, the AudioCD Info view is a subview of the Info side panel, under the AudioCD Info view tab. On the AudioCD Info view, the application allows you to enter also the **EAN/UPC** sub-code and **CD-Text** strings for the Audio CD-ROM.



To show the AudioCD Info view:

- Click on the AudioCD Info button on top of the AudioCD waveform view.

- Click on the “Info” button among the Tool buttons which are on the left part of the Transport Bar and Tool buttons in the upper part of the worksheet. Then, click on the AudioCD Info tab.

To close the AudioCD Info view, click again on the same button used to show it.

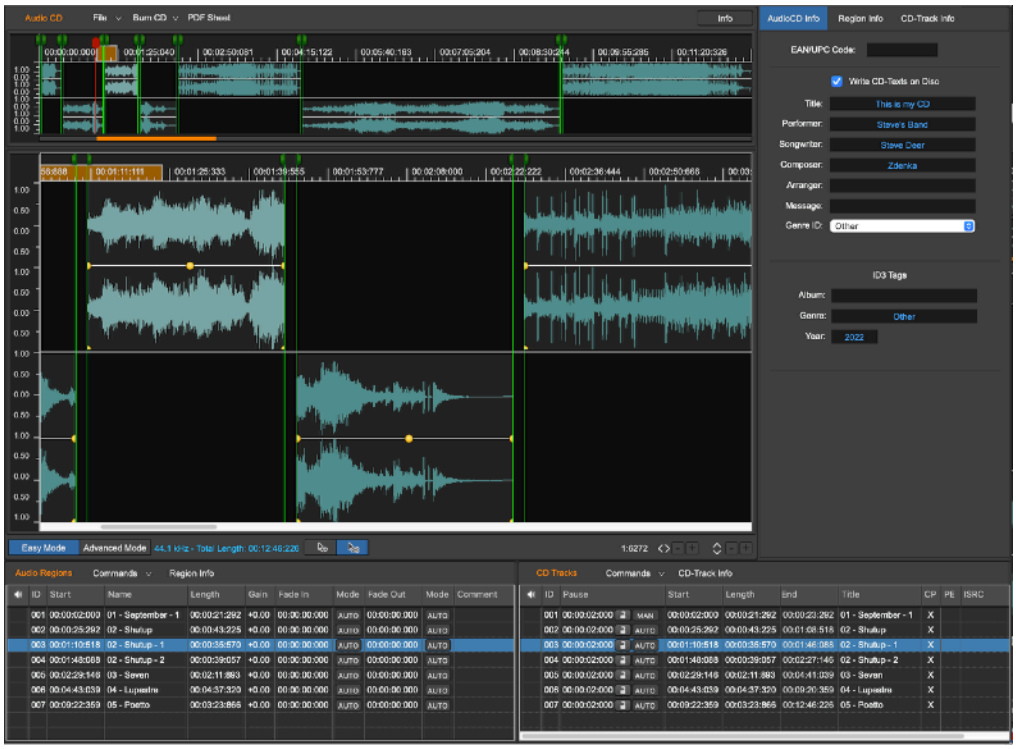
The CD-Track Info view displays the following information:

- **EAN/UPC Code**: this is the EAN/UPC sub-code for the audio CD-ROM. It should be a string of 12 or 13 numerical digits.

- ***CD-Text*:** They are editable fields, click and enter the CD-Text strings for the current CD-Track, they will be written on audio CD-ROM during the CD Burning process if the **Write CD-Texts on Disc** flag is ON.

Working with the AudioCD Layout

Audio files - or regions of audio files - and CD tracks are the elements which constitute your audio CD. The application creates one Audio Region and one CD-Track automatically when an audio file is added to the AudioCD Layout.



To describe how the AudioCD Layout works, let's introduce the following definitions:

- *Audio files*: audio files are the source material for the audio regions used by the AudioCDLayout.

- *Audio Regions*: adding an audio file to a AudioCD Layout, the application creates an *audio region* automatically. This *audio region* can address the entire source audio file or any section of the audio file. Editing an *audio region* on the waveform view or in the Audio Regions table of the AudioCD Layout, the changes concern only the *audio region*, not the source audio file.

- *CD-Tracks*: adding an audio file to a AudioCD Layout, the application, in correspondence to the new Audio Region, automatically creates also a CD-Track. CD-Tracks are the "tracks" which a CD-Player will show to the user selecting a track number on its display or pressing the forward/backward buttons when playing the audio CD-ROM.

NOTE: the application allows an Advanced Mode to work with the AudioCD Layout. In Advanced Mode, a CD-Track can include several Audio Regions, or several CD-Tracks can play sections of the same Audio Region as well. In other words, it's possible to combine several audio files into one CD-Track, or create several CD-Tracks which use only one audio file (very useful creating Audio CD-ROMs from a live recording).

Easy and Advanced Modes

There are two operational Modes to work on the AudioCD Layout: the Easy and the Advanced mode. The difference between these two modes is the allowed relationship between Audio Regions and CD-Tracks.

AudioCD Layout EASY Mode

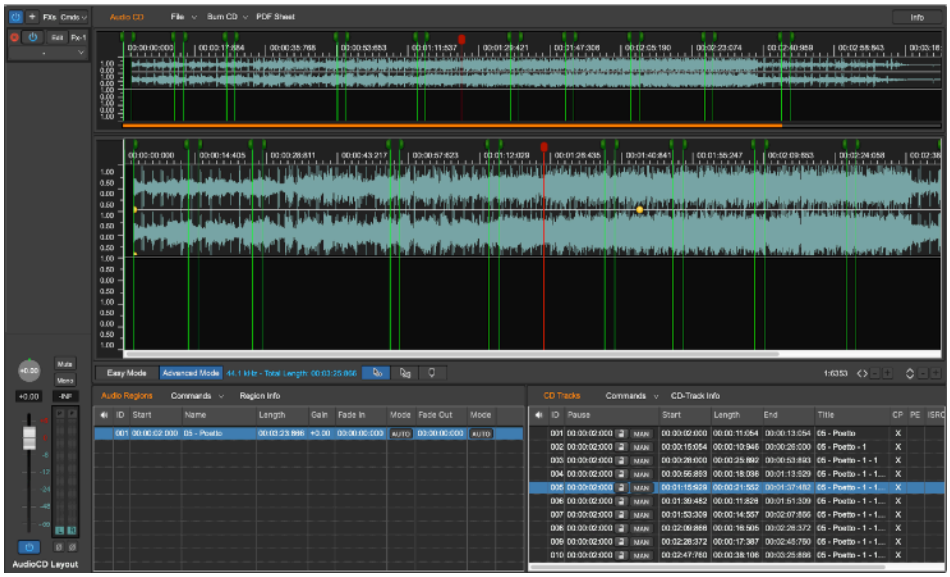
In the **EASY MODE**, the relationship between audio regions and CD-Tracks is fixed to one-to-one (1:1). This means that it is possible to have only the configuration where to one Audio Region (or audio file) corresponds one CD-Track - which will be the track that a CD-Player shows playing that Audio Region (ie song on the audio CD-ROM).

In the Easy mode, clicking on an Audio Region waveform and dragging it, shifting it in time, the corresponding CD-Track shifts as well. And, clicking on a CD-Track start marker and dragging it, shifting it in time, the corresponding Audio Region will shift as well.

NOTE: in the Easy Mode, it is also possible to place several CD-Tracks on the same source audio file (useful to make audioCD ROMs from live recording) using the scissor mouse mode. Using the scissor, the application splits the source audio file (or Audio Region) into two Audio Regions, creating a new CD-Track at the beginning of the new second Audio Region. More about the mouse modes later in this chapter.

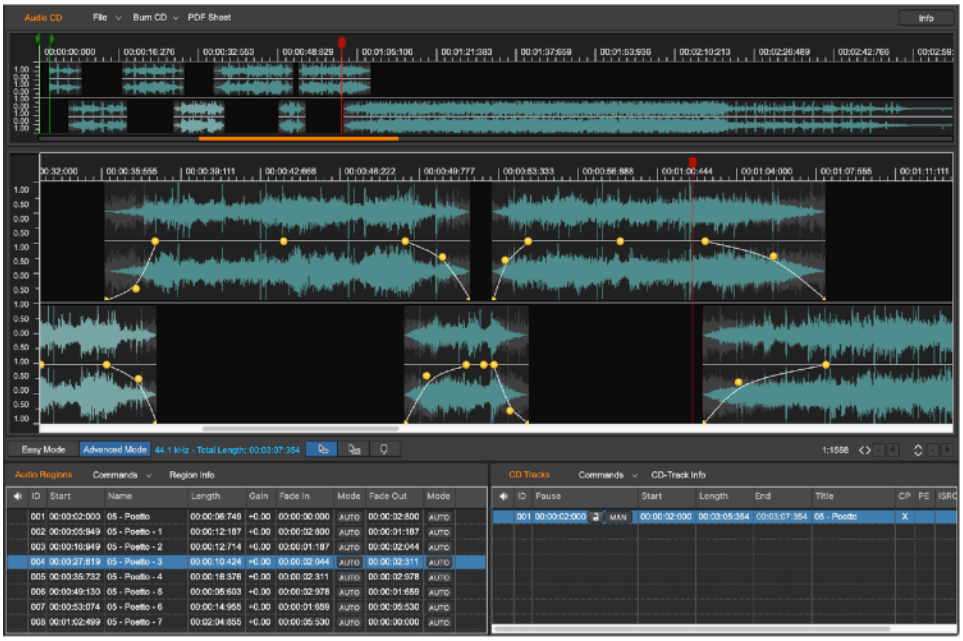
AudioCD Layout Advanced Mode

In the **ADVANCED MODE**, the relationship between Audio Regions and CD-Tracks is free, there is not a fixed relationship between the number of Audio Regions and CD-Tracks, which can be different (n:m). This means that it is possible to have configurations where several CD-Tracks markers are placed on only one Audio Region (or audio file), or where a single CD-Track extends over several audio regions.



In the figure above, as an example, there is only 1 source audio file (or audio region) on which there are several CD-Tracks markers.

In the figure below, as another example, therein only 1 CD-Track which will play several audio files (or Audio Regions):



In this case, clicking on an Audio Region waveform and dragging it, shifting it in time, the corresponding CD-Track shifts as well, as it happens on Easy Mode, too. BUT, clicking on a CD-Track start marker and dragging it to shift it in time, the underneath Audio Region does NOT shift accordingly. This allows complex configurations where it is possible to place CD-Track start markers freely, without the restriction to be always at the beginning of the underneath Audio Regions, as it always is in Easy Mode.

Please note that it is highly recommended to step from the Easy to the Advanced Mode only if it is STRICTLY necessary to place CD-Track start markers freely, in positions which are different from the beginning of an Audio Region or audio file start. In most cases the Easy mode is sufficient, and guarantees a clear, easy and linked 1:1 correspondence between Audio Regions and CD-Tracks. In the Easy Mode, the application adjusts CD-Track start positions accordingly to the underneath Audio Regions automatically. In Advanced Mode, this correspondence can be broken and, if it is not due an intentional action, it may bring to unwanted results.

NOTE: stepping from Easy Mode to Advanced Mode, an additional mouse mode is possible, the CD-Track marker mouse mode. In this additional mode it is possible to click on the AudioCD Layout waveform view to add CD-Track start markers freely over Audio Regions, without any restriction on their positions or number. More about the mouse modes later in this chapter.

NOTE: switching back from Advanced Mode to Easy mode, it may happen that the current AudioCDLayout is not compliant to the restrictions of the Easy Mode. As an example, it happens when there are several CD-Tracks belonging to the same Audio Region. In these cases, the application warns you and adjusts the current AudioCDLayout moving, removing or adding CDTrack start markers to be compliant with the Easy Mode. If the result is not acceptable, it is possible to undo the operation to return to the Advanced Mode and to the AudioCD Layout as it was just before to switch to the Easy Mode.

Working with AudioCD Layout Regions

It is possible to copy, reorder, trim, split, adjust the gain curve shape of each Audio Region. It also possible to play all, or any part, of the AudioCDLayout to immediately hear the results of the changes made.

Adding an audio file or audio region on the AudioCD Layout

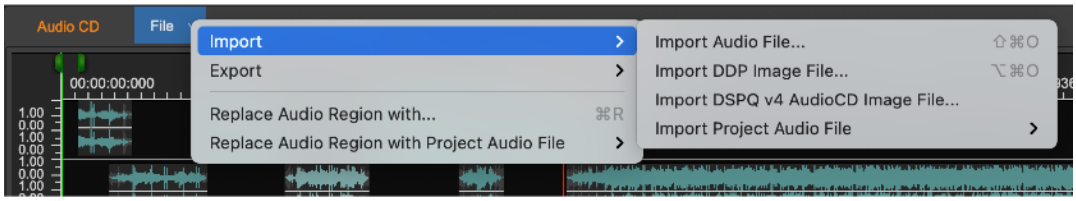
- **From the Document Manager table:** drag&drop a title of an audio file from the Document Manager table over the waveform view area of the AudioCDLayout. In this case, the application uses all the source audio file for adding the new Audio Region on the Audio Regions table. The application adds a new CD-Track on the CD-Tracks table and a new waveform on the AudioCDLayout waveform view area as well.

- **Directly from the MacOS finder**: drag&drop one or more audio files from the MacOS finder over the AudioCDLayout row on the Document Manager table or on the AudioCDLayout waveform view of the AudioCDLayout. In this case, the application uses all the source audio file for adding the new Audio Region on the Audio Regions table. The application adds a new CD-Track on the CD-Tracks table and a new waveform on the AudioCD waveform view area as well.

- **By Menu Commands**:

A) menu commands on the AudioCDLayout:

- clicking on the File button on top of the AudioCD Layout waveform view, the following menu appears:



- **Import Audio File… (or ⇧⌘O)**: the application shows a file browser for choosing one or more audio files from the MacOS file system. Then, the application uses these audio files to create new Audio Regions on the AudioCD Layout table and, for each new Audio Region, one CD-Track on the CD-Tracks table and a new waveform on the AudioCD Layout waveform view.

- **Import DDP Image File… (or ⌥⌘O)**: the application shows a file browser to locate on the MacOS file system the folder containing the DDP files to import. Just navigate to locate the folder, the application will check the integrity of the files and will create a new AudioCD Layout accordingly to what saved on DDP files.

- **Import DSPQ v4 AudioCD image File…**: use this command to import an audio CD-ROM image file saved by version 4.x of DSP-Quattro. The application shows a file browser to locate on the MacOS file system the image file to import. Then, it will create a new AudioCD Layout accordingly to what saved.

- **Import Project Audio File**: in correspondence of this menu item the application shows a sub menu where it lists all the audio file loaded into

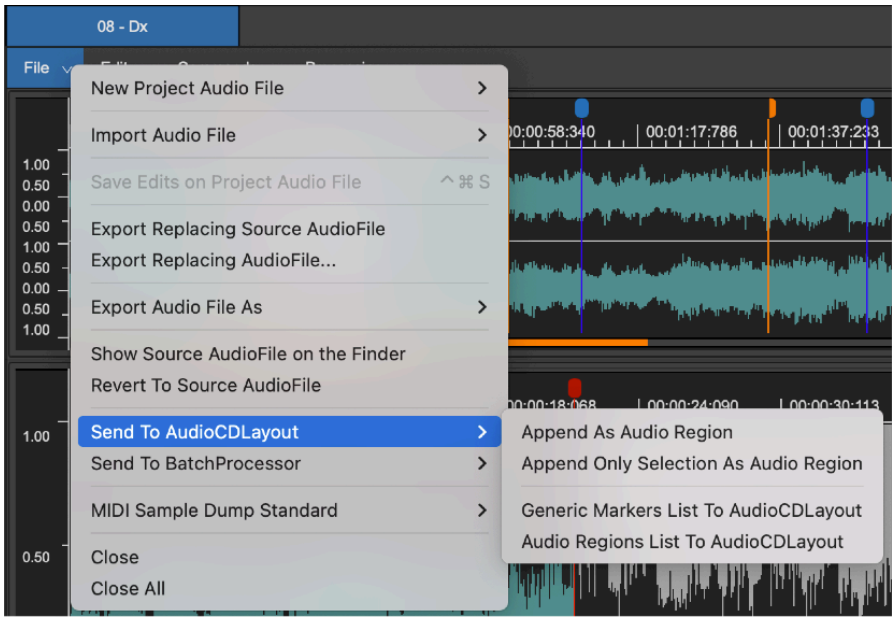
the current Project. Selecting one of these audio files, the application will create a new Audio Region on the AudioCD Layout using all the source audio file. It adds a new CD-Track on the CD-Tracks table and a new waveform on the AudioCD Layout waveform view as well.

NOTE: All the audio files loaded on the AudioCD Layout must have the same sample rate.

B) menu commands on the Audio Editor view:

To load a new audio region on the AudioCD Layout, there are some menu commands on the Audio Editor as well.

On the Audio Editor, clicking on the File button on top of the waveform view, there is a sub menu under the item **Send to AudioCD Layout**:



- **Append As Audio Region:** to add the current audio file to the AudioCD appending it at the end of the AudioCD. DSP-Quattro creates a new audio region on the AudioCD, using the default setting for the CDTrack preGap and the CD-Texts of the audio file to fill the CD-Texts of the new audio region.

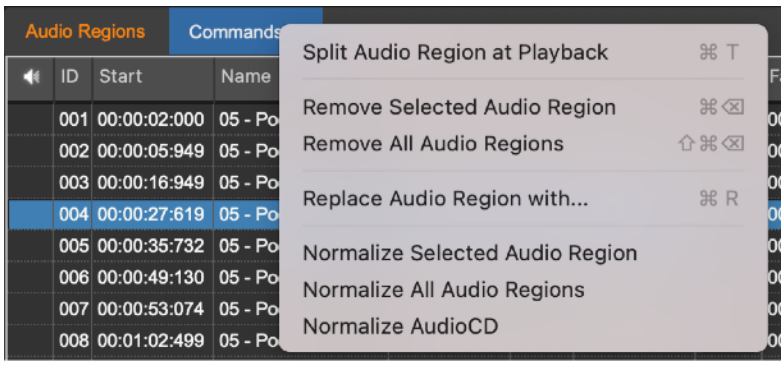
- **Append Only Selection As AudioRegion:** as “Append As Audio Region”, but using only the region defined by the selected audio file waveform. If there is not an audio selection on the waveform view, this command is not available.

- **Generic Markers List to AudioCDLayout:** to create audio regions and CD-Tracks on the AudioCD from the Generic markers list, one for each marker. Each audio region on the AudioCD will extend from one generic marker to the next one on the list. DSP-Quattro allows you to choose between clear the AudioCD before to build it, or to append the new audio regions to the end of the current AudioCD. If there are not generic markers, this command is not available.

- **Audio Regions List to AudioCDLayout:** to create audio regions and CD-Tracks on the AudioCD from the audio regions list, one for each audio region. DSP-Quattro allows you to choose between clear the AudioCD before to build it, or to append the new audio regions to the end of the current AudioCD. If there are not audio regions, this command is not available.

NOTE: DSP-Quattro will always use the source files which it imported into the Project bundle for the audio regions on the AudioCD Layout. All the edits you will do on the same source audio files on the Audio Editor will reflect on the corresponding audio regions on the AudioCD Layout. For this, DSP-Quattro does not allow to process and audio file if the result is not compatible with the current AudioCD Layout like, as an example, it is not possible to change the sample rate of source audio file if it is also loaded on the AudioCD Layout.

Removing an audio region from the AudioCD Layout:



To remove an audio region from the AudioCD Layout, first select it on the Audio Regions list on the Audio Regions table (or click on its waveform on the AudioCDLayout waveform view), then click on the Commands button on top of the Audio Regions table and use the menu command **Remove Selected Audio Region** (or press ⌘ + backspace).

If you need to clear the AudioCDLayout, use the menu command **Remove All Regions** (or press ⇧⌘ + backspace).

Changing the order or duplicate an audio region on the AudioCD Layout:

Selecting an Audio Region on the Audio Regions table, the application selects the same region on the AudioCDLayout waveform view.

To change the order of audio regions, use the Audio Regions table. First select the Audio Region on the Audio Regions table or on the AudioCD Layout waveform view, then click the row on the table - except for the speaker column - and drag the row up or down on the Audio Regions table up to reach the destination row.

NOTE: It is also possible *to duplicate the audio region*, just keeping the alt key pressed when releasing the mouse button on the destination row.

NOTE: The application will reset any cross-fade between the Audio Region to re-order and previous and next Audio Regions, if any.

The AudioCD Layout Mouse Modes

In the EASY mode, at the bottom of the AudioCD Layout waveform view, there are two buttons to set the mouse modes.

- **Shifter Mode** (the default mouse mode, the left button): when the mouse pointer is in Shifter Mode, clicking and dragging the waveform of an Audio Region on the AudioCD Layout waveform view, that audio region shifts back and forth on the time line accordingly, and the CD-Tracks and Audio Regions which are after that Audio Region will also shift.

- **Scissor Mode** (the right button in EASY Mode): when the mouse pointer is in Scissor Mode, clicking the waveform of an audio region on the AudioCD Layout waveform view, the application splits that Audio Region into two Audio Regions. The application also adds a CD-Track marker at the start of the new Audio Region, which is also the split point.

NOTE: it is possible to switch temporary between shifter and scissor mouse modes pressing the **ALT key** before to click with the mouse on a certain position of the waveform of an Audio Region. Releasing the **ALT key** returns to the shifter mouse mode.

In **ADVANCED** mode, there is one more option:

- **CD-Track Start Marker Mode** (the right button, available only in ADVANCED Mode): when the mouse pointer is in CD-Track Start Marker Mode, clicking on the waveform of an Audio Region on the AudioCD Layout waveform view, the application adds a CD-Track start marker on that position, without splitting the underneath Audio Region. The application also sets the preGap of the new CD-Track to the default value (it is possible to set it on Preferences). If for any reason the operation is not possible (as an example, it is not possible to place a CD-Track marker on a cross-fade between Audio Regions), the application shows a warning.

Editing the gain envelope of an audio region

There are two ways to edit the parameters of an Audio Region of the AudioCDLayout:

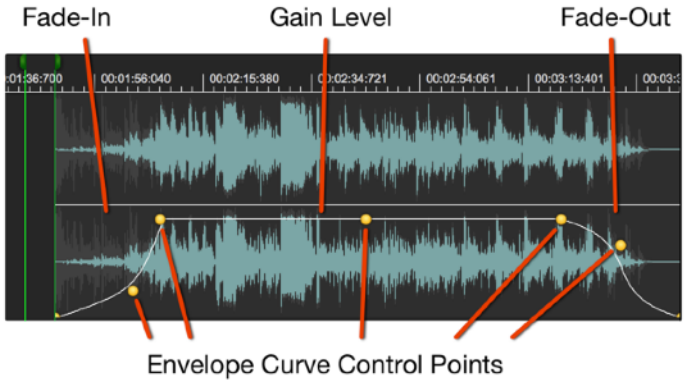
- ***Numerically***, using the Audio Region Info view

- ***Graphically***, using the AudioCDLayout waveform view area.

As described in previous chapters, adding an audio file to a AudioCD Layout, the application automatically creates an Audio Region. The application shows this new audio region as a new row on the Audio Regions table and as a new graphical waveform item on the AudioCDLayout waveform view area.

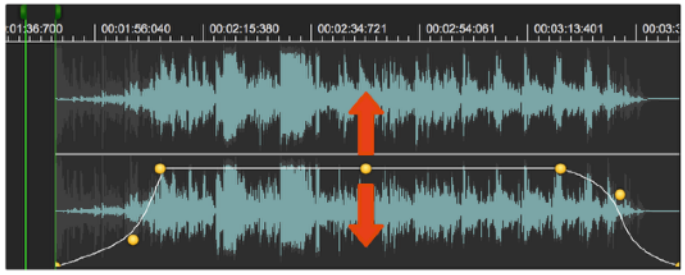
To edit an Audio Region numerically, use the Region Info button on top of the Audio Regions table to open the Audio Region Info side panel as described in the previous chapter about the Audio Regions table and Audio Region Info view.

To edit an Audio Region graphically, use the Audio Region waveform on the AudioCD Layout waveform view:



- Editing the gain value of an audio region

To set the gain level of an Audio Region, click and drag up or down the Gain level control point of the Audio Region envelope curve:

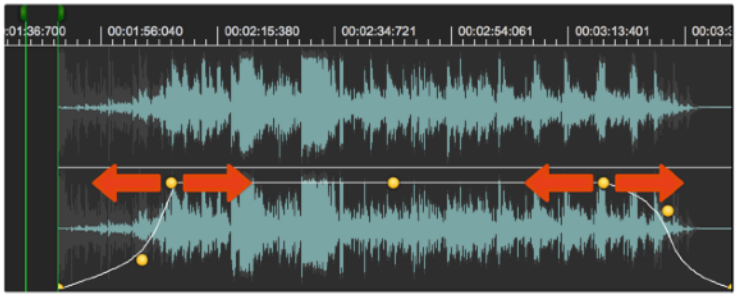


The Audio Regions table updates the Gain dB value of that Audio Region in real time. The application updates in real time also the Gain value on the Audio Region Info view as well.

NOTE: editing stereo audio files, Gain envelope curve and control points for the left and right channels are linked. Editing the envelope curve or a control point reflects in Gain changes for both channels.

- Editing the Fade-In or Fade-Out length of an audio region

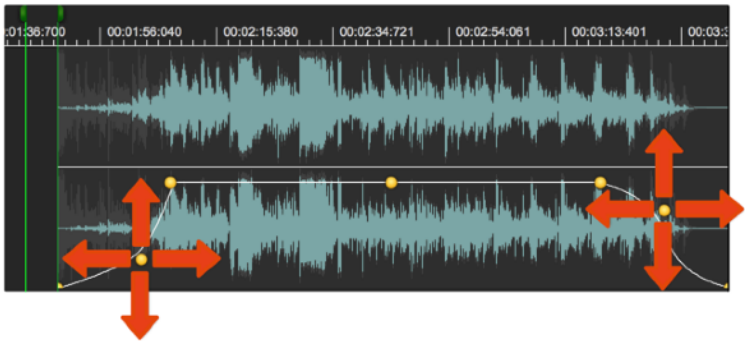
To set the fade-in or fade-out length of an audio region, click and drag left or right the Fade-In or Fade-Out length control points of the audio region envelope curve (the control point on the left border of the audio region waveform sets the fade-in length, the one on the right border sets the fade-out length):



DSP-Quattro changes the Fade In/Out times accordingly. As you would expect, also the Audio Regions table and the Audio Region Info view will update the Fade In/Out values in real time.

- Editing the shape of the Fade-In or Fade-Out curve of an audio region

To change the shape of the fade-in or fade-out curve of an audio region, click and drag left or right the Fade-In or Fade-Out shape control points of the audio region envelope curve (the control point on the left border of the audio region waveform sets the shape of the fade-in curve, the one on the right border sets the shape of the fade-out curve):



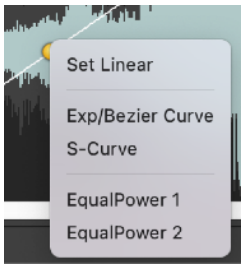
DSP-Quattro allows different types of shapes for the Fade-In/Out curve:

- **Exponential/Bezier** type: in this case the shape control point can move on all directions, setting all the shapes ranging from logarithmic, linear, exponential.

- **S-Curve** type: in this case the shape control point can move only up or down, the shape is convex, linear or concave according to the vertical position of the shape control point.

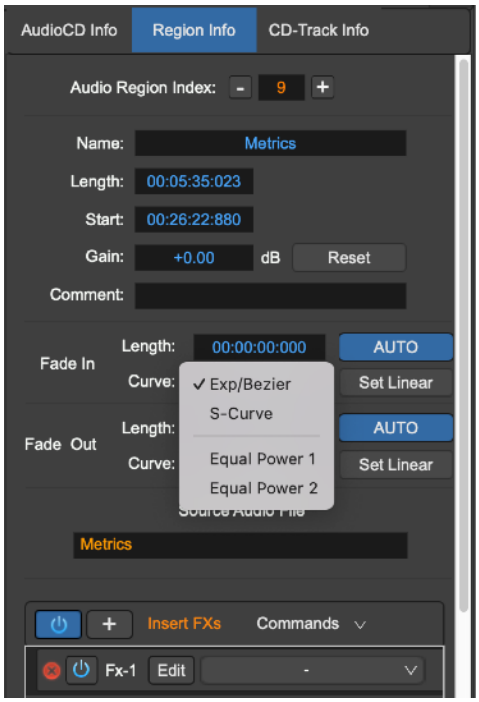
- **EqualPower 1 & EqualPower 2** type: in this case the shape control point cannot be moved, the shape follows the rule for having an equal power cross-fading between the overlapping audio regions.

To set the type of the shape, click with the right mouse button pressed on the shape control point, DSP-Quattro will show an utility popup menu with the command:



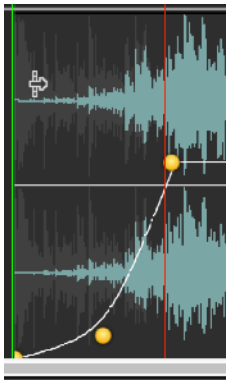
It is also possible to edit the shape clicking on the Curve button on the Audio Region Info view, the application shows a popup menu with the different possible options

NOTE: the “Set Linear” command on the popup menu of the shape control point or button on the Audio Region Info view, sets the shape curve to linear.



Trimming the start and end points of an audio region

If the AudioCD Layout is in Shifter Mouse Mode, placing the mouse pointer near to the left or right borders of an Audio Region waveform, after a few seconds, it changes its shape, becoming the tool for trimming:

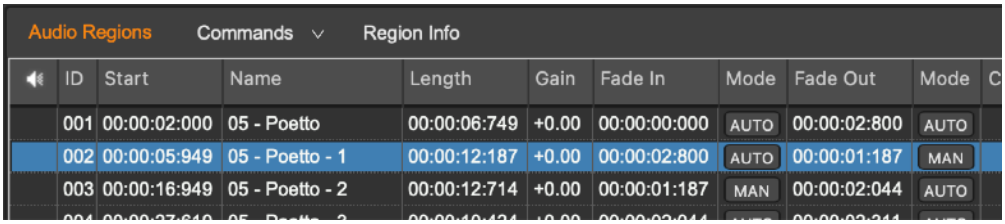


Then, clicking and dragging it in the direction of the middle of the Audio Region waveform, the application modifies the Audio Region start position (trimming the Audio Region waveform left border) or Audio Region end position (trimming the Audio Region waveform right border) accordingly to the right or left movements of the mouse.

All the CD-Tracks and Audio Regions which are after that Audio Region move accordingly to the change of the Audio Region length.

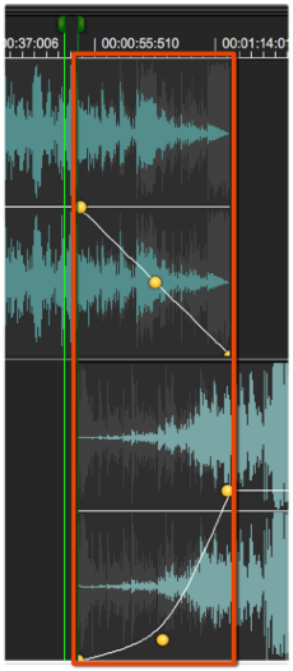
The AUTO MODE for audio region Fade-In/Out

On the Audio Regions table, after the Fade-In and Fade-Out columns, there are the MODE columns, respectively the Fade-In MODE and Fade-Out MODE:



The Fade MODE sets the rule for changing the cross-fade between two Audio Regions when one of them shifts and overlaps the other one.

If the AudioCDLayout is in Shifter Mouse Mode, clicking on an Audio Region waveform and dragging the mouse to the left, the application shifts that Audio Region back along the time x-axis. If the Audio Region begins to overlap the previous one, then there will be a cross-fade region.



Cross-fade

Then, for what concerns the Audio Region which is shifting backward in time, if:

- **Fade-In Auto MODE is ON:** the application automatically sets the Fade-In length to the length of the overlapping section.

- **Fade-In Auto MODE is OFF:** shifting the audio region to overlap the previous one will not affect the Fade-In length previously set.

At the same time, considering the previous audio region which stays on its position:

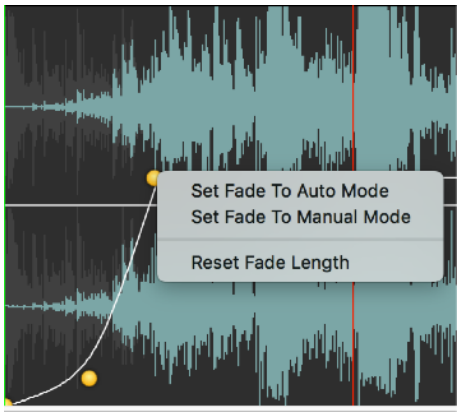
- **Fade-Out Auto MODE is ON:** the application automatically sets the Fade-Out length to the length of the overlapping section.

- **Fade-Out Auto MODE is OFF:** the audio region Fade-Out length does not change.

By default, the application turns ON the Fade-In and Fade-Out Auto MODES when creating Audio Regions on the AudioCD Layout.

To Turn ON/OFF the Auto MODE for the Fade-In or Fade-Out of a certain Audio Region, click on the AUTO/MAN button on the Audio Regions table, or on the AUTO/MAN button on the Audio Region Info view, in correspondence to that Audio Region.

It is also possible to Turn ON/OFF the Audio MODE by clicking on the Fade-In or Fade-Out control points with the right mouse button, In this case, the application shows the following a popup menu:



NOTE: dragging the Fade-In or Fade-Out control points of the Audio Region envelope curve, as soon as the fade-in or fade-out length changes (without shifting the underlying Audio Region), the corresponding Fade-In or Fade-Out Fade MODE automatically switches to OFF.

The AUTO mode is a very powerful tool for doing cross-fades. Having the Auto Modes turned ON, the application automatically sets the cross-fades between audio regions, and the resulting AudioCDLayout will play smoothly when two audio regions overlap. If necessary, turning OFF Auto modes, it is always possible to set the lengths of fade-in and fade-out independently to better meet the specific needs, of course.

Setting Equal Power curves for cross-fades between audio regions

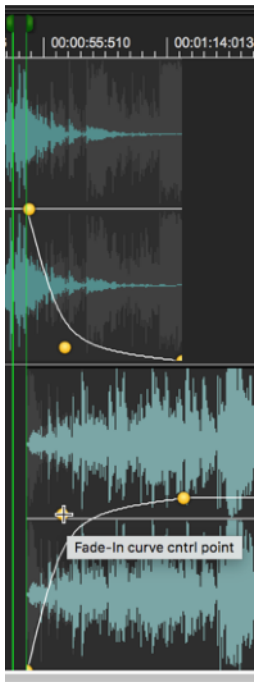
By default, each fade-in/out curve slope is independent from the others, even in the case of overlapping cross-fades.

There is an option to make these linked, such that the sum of fade-out and fade-in curves gives always 1.0, and in particular the **EQUAL POWER curve slope Cross-fade modes.**

if the Cross-fade AUTO mode is ON, **keeping the SHIFT key** pressed while clicking and dragging the fade-in or fade-out shape control to set the shape

of one the fade curves, then also the other fade curve will follow such that the sum of the two curves remains constant.

In the case of cross-fade EqualPower 1&2, this is done automatically and the shape control cannot be moved.



Working with CD-Tracks:

By default, the application creates a CD-Track for each Audio Region added to the AudioCDLayout. In ADVANCED Mode, it is also possible to combine several Audio Regions into one CD-Track, or to create several CD-Tracks which uses only one Audio Region.

CD-Tracks are made of two sub-markers:

- The **CD-Track PreGap or Pause marker**, which is connected to the CD-Track start marker.

- The **CD-Track start marker**

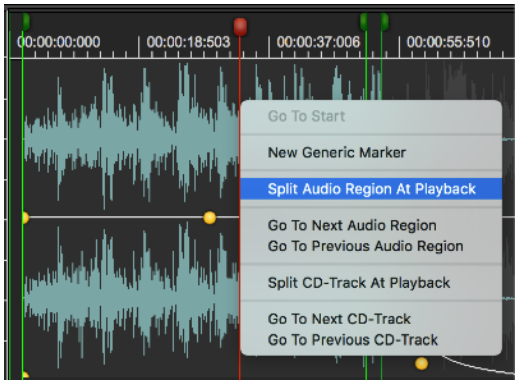
To Create a New CD-Track Marker:

As already described, adding an audio file or an Audio Region to the AudioCDLayout, the application automatically creates also a CD-Track.

There are two ways to add a CD-Track on an existing audio region:

1. **Splitting an Audio Region**: it is possible to split an Audio Region into two Audio Regions. The application will also create a new CD-Track at split point, where the new second Audio Region starts. All other Audio Regions and CD-Tracks remain unaffected.

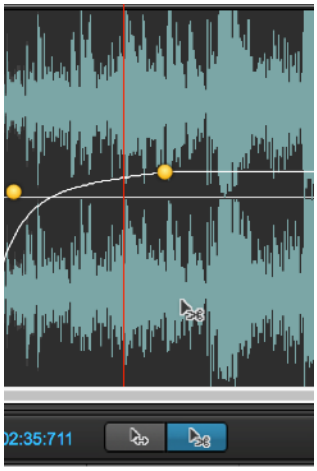
To split an Audio Region, first place the playback cursor on the wanted position, then



- use the menu command **Split Audio Region at Playback (or ⌘D)** on the popup menu of the Command button on top of the Audio Regions table

- The same command is available clicking on the playback cursor with the right mouse button

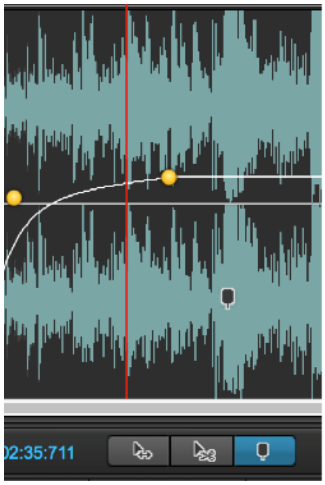
- Step to the **Audio Region Scissor Mouse Mode.** In this mode, clicking on an audio region waveform, the application splits that Audio Region in two Audio Regions in correspondence of the mouse pointer.



2. **Splitting the CD-Track without splitting the audio region (available only in ADVANCED MODE):** in Advanced mode, it is possible to split a CD-Track without splitting the underlying audio region.

To do it:

- Step to the **CD-Track Scissor Mouse Mode**: in this mode, clicking on an audio region waveform, DSP-Quattro will split the CD-Track in two CD-



Tracks on that position, adding a CD-Track start marker. The underlying and the other audio regions and CD-Tracks will remain unaffected.

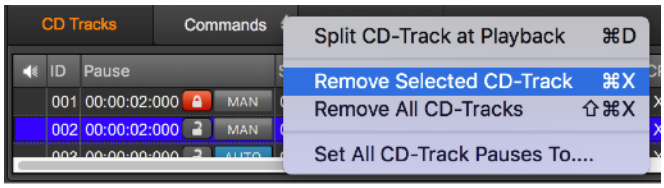
- use the menu command **Split Audio Region at Playback (or ⌘D)** from the popup menu pressing the Command button on top of the CD-Tracks table

- The same command is available clicking on the playback cursor with the right mouse button

To remove a CD-Track marker:

In **EASY MODE** it is not possible to remove a CD-Track marker without removing the underlying audio region. In this case, just use the command to remove the underlying Audio Region to remove also the CD-Track marker.

In **ADVANCED MODE**, first select on the CD-Tracks table the CD-Track row which must be removed, then:

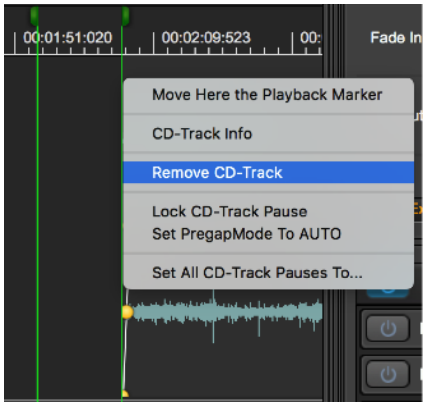


- use the menu command **Remove Selected CD-Track (or ⌘X)** rom the popup menu pressing the Command button on top of the CD-Tracks table

- The same command is available clicking on the CD-Track preGap or start markers with the right mouse button:

NOTE: in the command popup menu there is also a command to **Remove All CD-Tracks (or ⇧⌘X)** in only one step,

NOTE: if there at least one audio region on the AudioCD Layout, at least one CD-Track must exist. DSP-Quattro will not allow to delete the last CD-Track of a AudioCD Layout which is not empty.



NOTE: there is an internal mechanism to link a CD-Track to the underlying Region. In other words, also in Advanced MODE, CD-Tracks belongs to the underlying audio region. If you remove a audio region from the AudioCD Layout, also all the CD-Tracks belonging to that audio region will be removed. More about this mechanism later in this chapter.

Editing a CD-Track:

There are two ways to edit the parameters of a CD-Track:

- ***Numerically***, using the CD-Track Info view.

- ***Graphically***, using the AudioCD Layout waveform view.

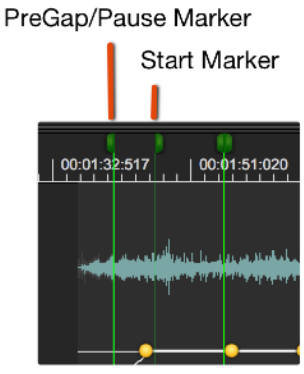
Creating a CD-Track, the application automatically shows it as a new row on the CD-Tracks table and as a new CD-Track green marker on the AudioCDLayout waveform view.

To edit an CD-Track numerically, use the CD-Track Info button on top of the CD-Track table to open the CD-Track Info view as described in the previous chapter about the CD-Tracks table and CD-Track Info view.

To edit a CD-Track graphically, use the CD-Track markers on the AudioCDLayout waveform view.

As already introduced, the head of a CD-Track marker is composed by two sub-markers, the CD-Track PreGap/Pause and Start sub-markers:

- The **CD-Track start marker:** the right half of the CD-Track marker.



- The **CD-Track PreGap or Pause marker**, the left half of the CD-Track marker

- *Moving CD-Track Start Markers:*

clicking on the right side of the CD-Track marker head and shifting it on left or right on the time ruler, the application sets the CD-Track Start position. In the case of EASY Mode, when CD-Track lies exactly on the start position of an Audio Region, the underlying Audio Region shifts accordingly.

NOTE: it is not possible to step over the previous or next CD-Track markers, because CD-Tracks are always ordered chronologically. If it is necessary to change the CD-Tracks order, change the order of the Audio Regions which own those CD-Tracks markers, the application automatically changes also the CD-Tracks accordingly.

- *Setting CD-Track Pause:*

It is not possible to change the preGap/pause of a CD-Track if the Pause length value is locked (if the red lock button on the CD-Tracks table is ON). Unlock the CD-Track Pause to edit its value numerically or graphically.

Clicking on the left side of the CD-Track marker head and shifting it on left or right on the time ruler, the application sets the CD-Track Pause length.

NOTE: it is not possible to step over the previous CD-Track markers, CD-Tracks are always ordered chronologically.

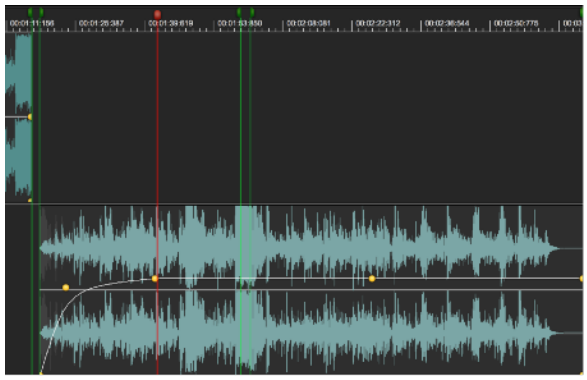
NOTE: Moving the CD-Track start marker, the Pause length remains constant except in the special case when a CD-Track Start marker lies exactly at start of the underlying Audio Region AND the CD-Track Auto MODE is ON. More about CD-Track Auto MODE later in this chapter.

The connection between a CD-Track Marker and underlying audio region:

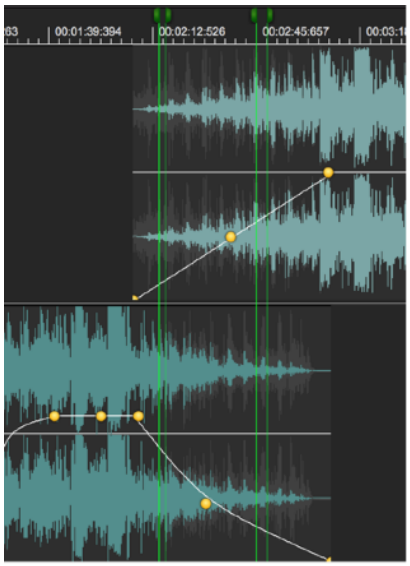
A CD-Track always belongs to a certain Audio Region. Shifting or removing that always shifts or removes also all CD-Track markers which it owns.

In **EASY Mode**, there is only the case in which an Audio Region owns one and only one CD-Track. It is not possible to have a different situation.

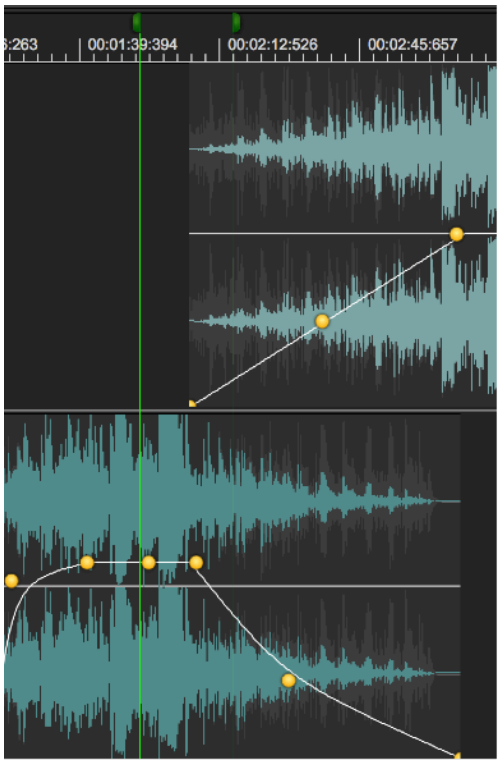
In **ADVANCED Mode**, where it is possible to have complex configurations, it is very easy to know which Audio Region owns a certain CD-Track marker: given a CD-Track marker, it is the Audio Region which is under that CD-Track Start marker or, if the marker is over a region where that are two overlapping Audio Regions, the owner is the Audio Region which starts after the other one. Let's see some examples:



In the above figure both CD-Tracks belong to the underlying audio region.



Instead, this figure shows a case in which there is a CD-Track starting on the overlap zone between audio regions. This CD-Track belongs to the second audio region (the Region in the upper part of the AudioCD Layout waveform view), because the CD-Track is over this audio region and this audio region begins after the other audio region involved in the overlap.



In the above figure the CD-Track belongs to the second audio region.

This figure shows a case in which there is a CD-Track starting on the overlap zone between two audio regions, and the preGap extends over the first audio region. The CD-Track, both start and preGap markers, belongs to the second audio region, where the CD-Track starts.

The CD-Tracks AUTO MODE

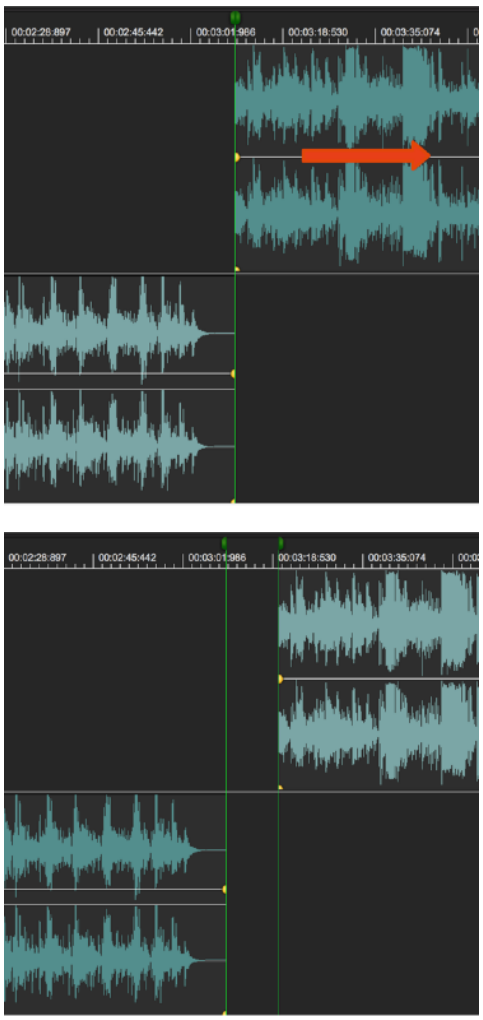
As already introduced, it is possible to shift an Audio Region forward or backward along the time axis. By default, CD-Tracks owned by the shifted Audio Region (ie positioned later on the time line) shift accordingly. Also all next Audio Regions and CD-Tracks shift as well.

Now, what happens to CD-Track markers if, shifting an Audio Region, the AudioCDLayout creates a gap with the previous Audio Region?

Usually nothing very special, EXCEPT when there is a CD-Track Start which is positioned exactly over the beginning of the underlying Audio Region (this is always the case in EASY mode). In this case:

- if the **CD-Track Auto MODE is ON**, the application sets the CD-Track Pause length to be equal to the gap between the two Audio Regions (ie the preGap will follow the gap between the Audio Regions).

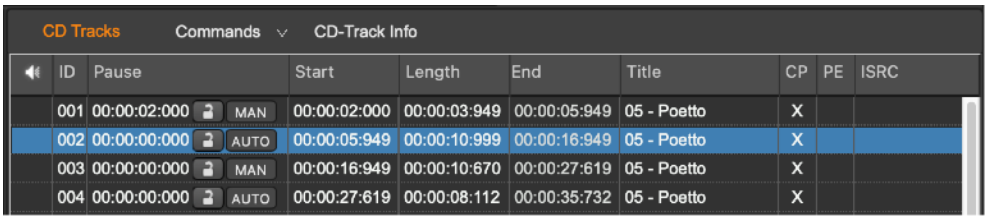
- if the **CD-Track Auto MODE is OFF**, the Pause length remains constant.



In the figures above, if the CD-Track Auto MODE is ON, CD-Track Pause follows to the gap between Audio Regions

By default, CD-Track Auto MODE of newly created CD-Tracks is turned ON if the CD-Track start coincides with the Audio Region start.

To Turn ON/OFF the CD-Track Auto MODE click on the AUTO/MAN button on the Pause column on the CD-Tracks table, correspondingly to the row of the CD-Track to edit. The value toggles, ie it turns ON if it is OFF or it turns OFF if it is ON.



NOTE: in ADVANCED Mode, dragging the CD-Track start marker away from the start of the underlying Audio Region, the application automatically turns OFF the CD-Track AUTO MODE.

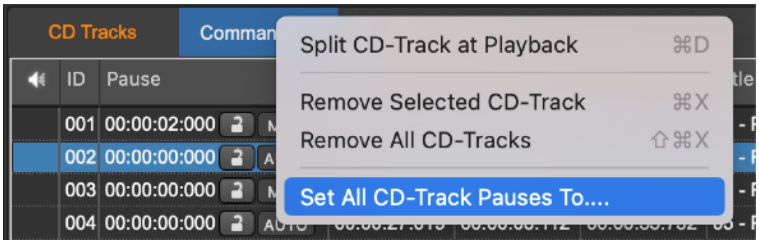
NOTE: the pause length cannot be locked if the CD-Track AUTO mode is ON. If in a certain moment the pause length is locked and the CD-Track AUTO mode is OFF, turning ON the CD-Track AUTO mode, the application automatically unlocks the pause length.

Turning ON the CD-Track Auto MODE, the application moves the corresponding CD-Track Start marker to the start of the underlying Audio Region. If it is not possible due a conflict with the previous CD-Track, it shows a warning dialog.

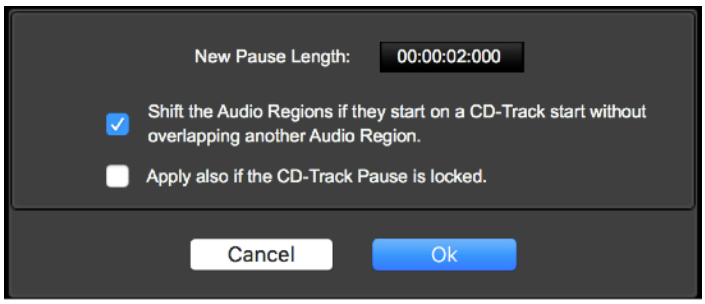
The AUTO mode is a very powerful tool making audio CD-ROM in EASY Mode. In just a few steps it is possible to drag the audio files on the AudioCD Layout view, then by default the application automatically creates also the CD-Tracks, one for each audio file. Shifting audio regions in time automatically moves CD-Tracks, too.

Setting all CD-Tracks Pauses to...

A very common situation is when it is necessary to set all CD-Track preGaps to the same value, adjusting the underlying audio regions accordingly. To do it, DSP-Quattro offers a very useful menu command, **Set All CD-Track Pauses To..** , available from the Command button on top of the CD-Track table:



The following dialog appears:



Where:

- **New Pause Length:** it is the wanted value you wish for the preGaps of all the CD-Tracks

- **Shift the Audio Regions if they start on a CD-Track start without overlapping another audio region:** enable/disable this option.

- **Apply also if the CD-Track pause is locked:** to bypass the lock flag on the CD-Track preGap length, if enabled.

NOTE: the preGap in front of the first CD-Track is fixed to 2 secs according to the Redbook standard and cannot be changed.

In the case in which there is a CD-Track Start on a cross-fade between Audio Regions, to avoid to reset cross-fades between them. the application does not shift these Audio Regions.

Cancel closes the dialog without modifying the AudioCD Layout; OK closes the dialog setting the preGaps to the wanted value.

Using Audio Unit and Built-in Plug-in Effects on the AudioCD Layout

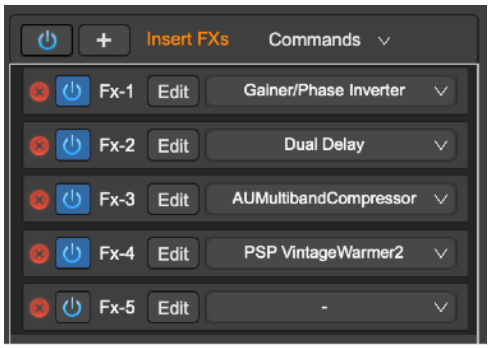
DSP-Quattro allows to configure a serial chain of effects on the output of the AudioCD Layout or, if needed, independently on each Audio Region of the AudioCDLayout.

The effects on insert on the output of the AudioCD Layout are available on top of the AudioCD Layout Channel Strip, which is on the left of the AudioCD Layout view.

As already described earlier in this manual, these effects process the audio stream on output of the AudioCD Layout, ie all Audio Regions. In other words, the application applies the same serial chain of effects when it plays the different Audio Regions which are part of AudioCD Layout.

The application renders to file this serial chain of FX when it burns an Audio CD-ROM or exports the AudioCD Layout, ie the application processes the Audio Regions through these effects when it burns an audio CD-ROM or exports a DDP image.

If necessary, it is possible to load different effects for each Audio Region of the AudioCD Layout, using the Audio Region info view:



It is possible to load effects choosing them among the high quality internal effects of the application, or among the Audio Unit effect plug-ins by Apple

always present on MacOS, or commercial Audio Unit plug-ins by third-party manufacturers, if installed on MacOS.

It is also possible to copy the chain of effects to duplicate it into other FX chain on insert to a different object.

WARNING: exactly as it happens when the application burns an Audio CD-ROM from the AudioCD Layout, all the functions to export the AudioCD Layout into a new file or group of audio files, process the AudioCD Layout using the effects on insert to each Audio Region and then the effects on insert to the AudioCD Layout Channel Strip.

Please refer to the previous chapter for the description of the insert FX interface and about how to load and manage plug-ins on insert.

Loading, Saving and Exporting the AudioCD Layout:

The AudioCD Layout is part of the Project Document. The application saves all the information of the AudioCD Layouts into the Project bundle, including all the files it needs to reload it in the future. Loading a Project document, the application restores the AudioCD Layouts as well.

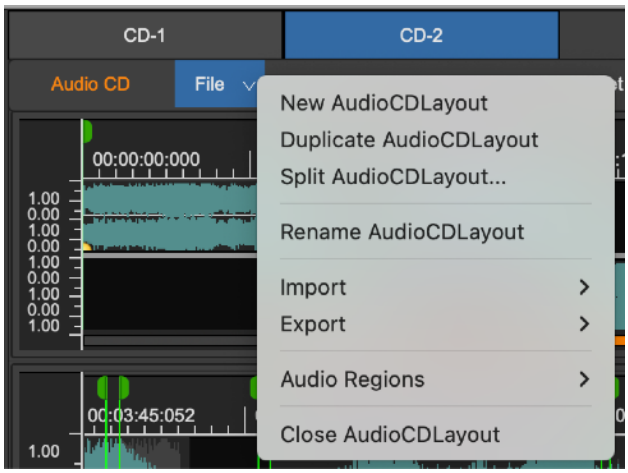
NOTE: it is important to know that to be able to rebuild again an AudioCD Layout, the application also needs all Audio Unit plug-ins used on insert to Audio Regions and on channel strip of the AudioCD Layout. These plug-ins, if any, must be installed on MacOS when the application loads again the same Project. It is also valid loading the Project on a different Mac.

DSP-Quattro can work on several AudioCD Layouts at the same moment. You can independently create, duplicate, split and close each AudioCD Layout.

The application is also able to export off-line the AudioCD Layout rendering it into a new audio file or as audio CD-ROM image according to the DDP standard format.

Moreover, the application allows to create as AudioCDLayout importing the regions from an audio file, or folder with the audio CD-ROM image files compliant with the DDP standard.

Commands to Multiple AudioCD Layouts



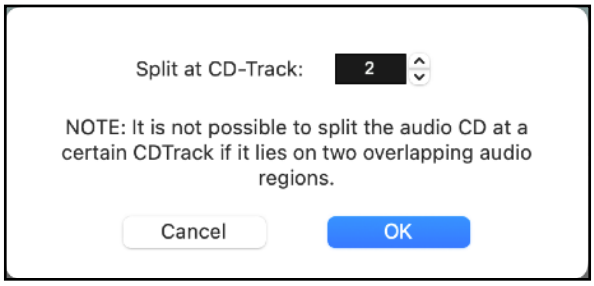
New AudioCD Layout

Creates an empty AudioCD Layout adding a new row on the Document Manager table.

Duplicate AudioCD Layout

Makes an exact copy of the current AudioCD Layout, adding it in a new row on the Document Manager table.

Split AudioCD Layout…



DSP-Quattro asks at which CD-Track start it must split the AudioCD Layout, then creates a new AudioCD Layout including the copy of the current AudioCD Layout from that CD-Track up to the end, removing the same portion from the current AudioCD Layout.

NOTE: it is possible to split the AudioCD Layout at a certain CD-Track start if it lies on a region which overlaps two Audio Regions.

Rename AudioCD Layout

To assign a title to the current AudioCD Layout.

Import…

- **Import Audio File… (or ⇧⌘O)**: the application shows a file browser for choosing one or more audio files from the MacOS file system. Then, the application uses these audio files to create new Audio Regions on the AudioCD Layout table and, for each new Audio Region, one CD-Track on the CD-Tracks table and a new waveform on the AudioCD Layout waveform view.

- **Import DDP Image File… (or ⌥⌘O)**: the application shows a file browser to locate on the MacOS file system the folder containing the DDP files to import. Just navigate to locate the folder, the application will check the integrity of the files and will create a new AudioCD Layout accordingly to what saved on DDP files.

- **Import DSPQ v4 AudioCD image File…**: use this command to import an audio CD-ROM image file saved by version 4.x of DSP-Quattro. The application shows a file browser to locate on the MacOS file system the image file to import. Then, it will create a new AudioCDLayout accordingly to what saved.

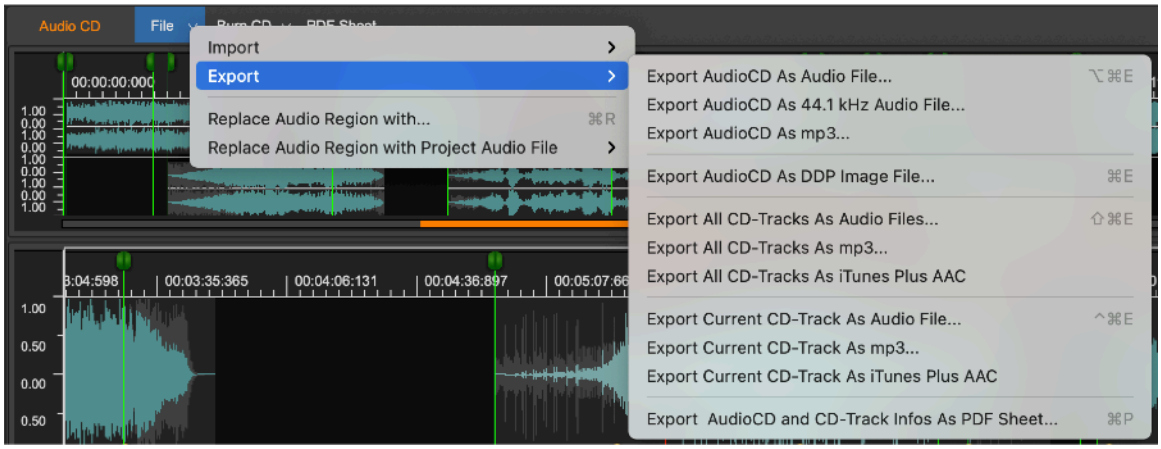
- **Import Project Audio File**: in correspondence of this menu item the application shows a sub menu where it lists all the audio file loaded into

the current Project. Selecting one of these audio files, the application will create a new Audio Region on the AudioCD Layout using all the source audio file. It adds a new CD-Track on the CD-Tracks table and a new waveform on the AudioCD Layout waveform view as well.

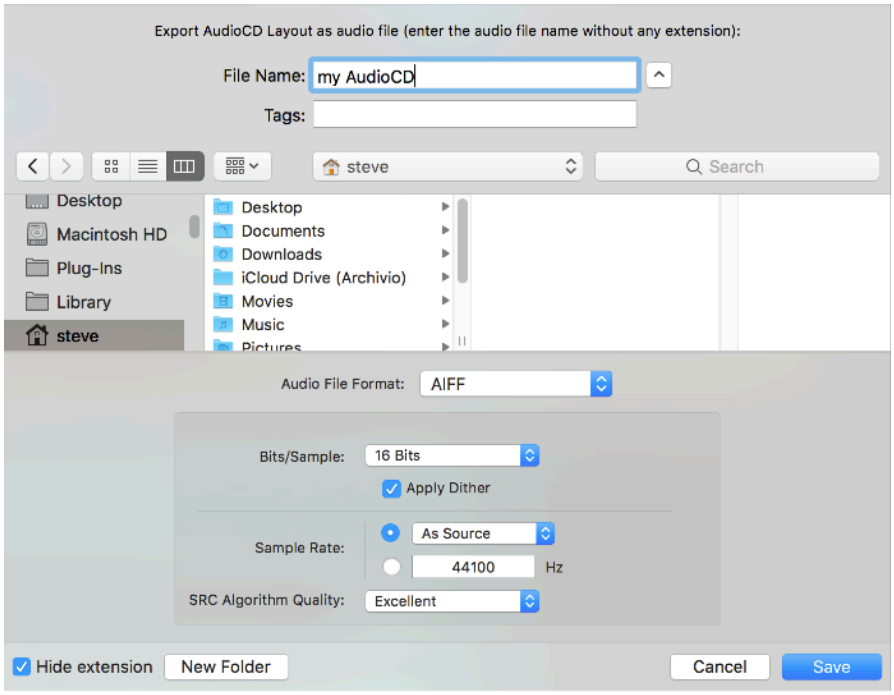
NOTE: All the audio files loaded on the AudioCDLayout must have the same sample rate, so it is not possible to import in the current AudioCD Layout an audio file having a different sample rate value respect the audio files already loaded on it.

Export…

Clicking on the File button on top of the AudioCD Layout main waveform view, a popup menu will appear, where:

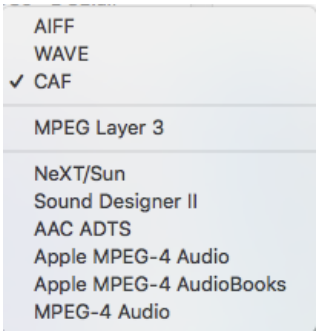


- **Export AudioCD As Audio File… (or ⌥⌘E)**: before to export the current AudioCDLayout, rendering it into an audio file, DSP-Quattro shows a file browser to select the destination audio file, including several options.



Type the name for the audio file to create, without any extension (the application will take care to add the most suitable extension according to the chosen file format). Use the file browser to navigate to the destination folder, and the bottom section to set the destination audio file format:

- **Audio File Format:** several standard audio formats are available:



According to the chosen audio file format, the view which is on the bottom part changes.

The uncompressed PCM formats (AIFF, WAVE, CAF) need of these additional parameters:

- **Bits/Sample**: the application can save 8, 16, 24, 32 or 32 (floats) bits for each sample.

- **Apply Dither**: to turn On/Off the internal algorithm for dithering. It is high recommended to set this option ON if and only if you are exporting the final audio CD-ROM master at 44.1 kHz/16 bits which does not require any other processing. NEVER apply dither if further processing is necessary.

- **Stereo/Mono**: to set if the destination audio file must be mono or stereo. In the case of mono, the application will mix the last and right channels on output from the AudioCD Layout.

- **Sample Rate**: to set the sample rate of the destination audio file.

- **SRC Algorithm Quality**: if the sample rate of the destination audio file is not the same of the audio files loaded the AudioCDLayout, the application uses its internal Sample Rate Converter (SRC) to write the destination audio file. Four levels of quality of the advanced liner phase algorithm of the application are available, from “Fast” to “Excellent”.

- **Export AudioCD As 44.1 kHz Audio File…:** as above but setting automatically the destination sample rate to 44.1 kHz, the audio CD-ROMs standard sample rate value.

- **Export AudioCD As .mp3…:** calls “Export AudioCD As Audio File…” setting the default audio file formats to MPEG Layer 3.

- **Export AudioCD As DDP Image File… (or ⌘E):** the application exports the current AudioCD Layout rendering it into an audio CD-ROM image file according to the DDP 2 standard. The application asks for selecting a folder where to export all the files which are compliant to DDP Standard, including also the optional .md5 checksum file.

NOTE: The DDP standard is the best format to export/import an audio CD-ROM image file in a standard format. This standard includes all the AudioCD Layout informations like CD-Texts, ISRC, PQ, EAN/UPC sub-codes. And, being a data file, it also guarantees the full integrity of the written audio file, byte after byte.

- **Export All CD-Tracks As Audio Files… (or ⇧⌘E):** similar to "Export AudioCD As Audio File…" but saving each CD-Track as a separate audio file. The application asks for a folder where to save all audio files, then their audio file format. **NOTE:** the preGaps in front of each CD-Track - if any - will be rendered at the end of the audio file rendered from the previous CD-Track.

- **Export All CD-Tracks As .mp3…:** to do "Export All CD-Tracks As Audio Files…" setting the default audio file formats to MPEG Layer 3.

- **Export All CD-Tracks As iTunes Plus AAC…:** to do "Export All CD-Tracks As Audio Files…" using the iTunes Plus AAC standard audio file format for the destination audio files. In this case, after choosing the destination folder, no additional parameters are required.

- **Export Current CD-Track As Audio File… (or ^⌘E):** similar to "Export AudioCD As Audio File…" but saving only the current CD-Track as only one audio file. The application will ask the location and the audio file format of the destination audio file.

- **Export Current CD-Track As .mp3…:** to do "Export Current CD-Track As Audio File…" setting the default audio file formats to MPEG Layer 3.

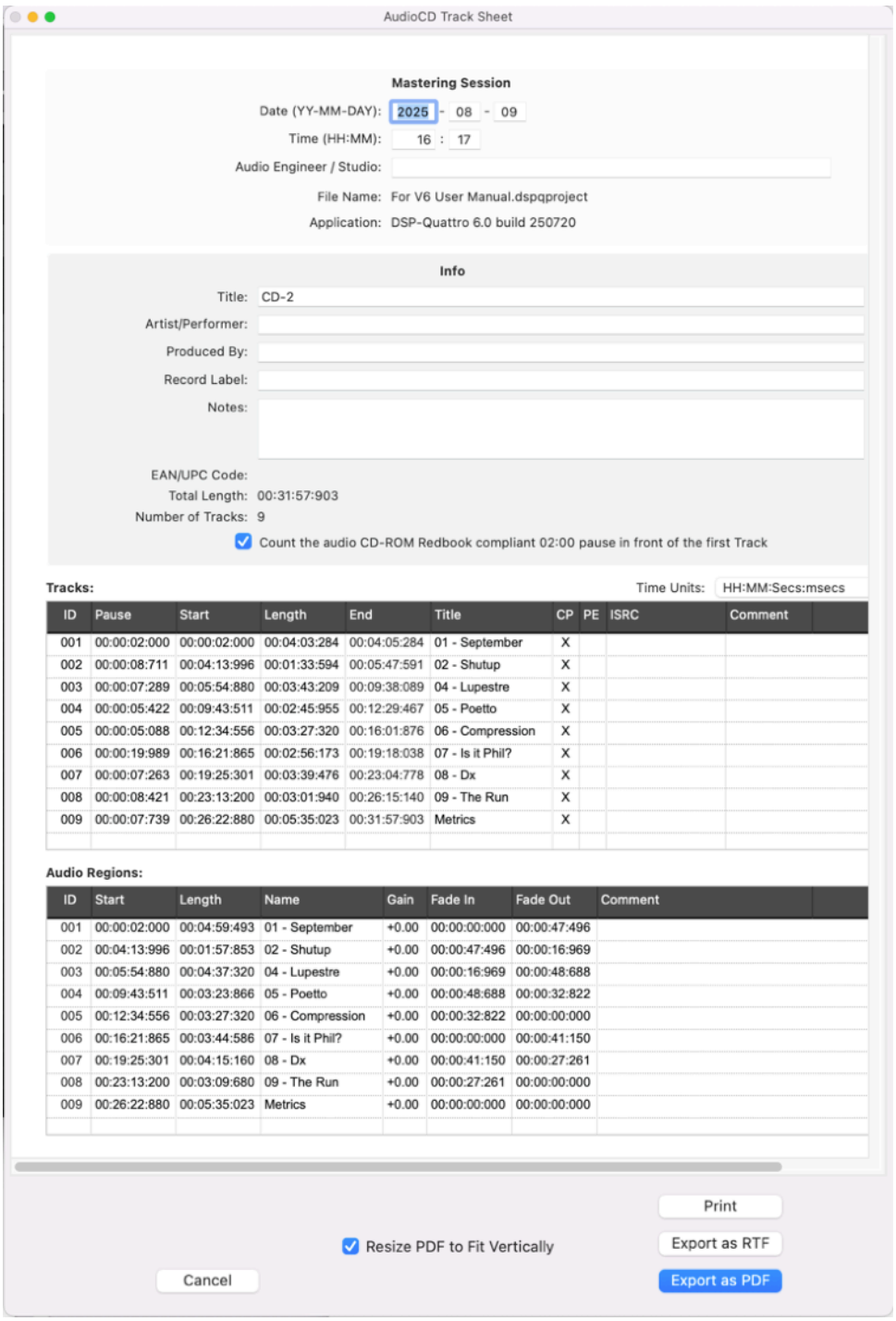
- **Export Current CD-Track As iTunes Plus AAC…:** to do "Export Current CD-Track As Audio File…" using the iTunes Plus AAC standard audio file format for the destination audio files. In this case, after choosing the destination location, no additional parameters are required.

- **Export AudioCD and CD-Tracks Info as PDF Sheet…:** the application asks for name and location where to save in a PDF document the AudioCD Layout Regions Table, CD-Tracks tables and some other useful information about the current AudioCDLayout.

On this sheet, it is possible to type the info of the mastering session and the most important AudioCD info.

It is also possible to resize each column of the Audio Regions and CD-Tracks tables, and even to change the order of the columns on the tables, just clicking and dragging to the left or to the right the headers on the tables. Then, clicking on the OK button, DSP-Quattro will generate a PDF file.

NOTE: this menu command is equivalent to click on the PDF Sheet button on top of the main waveform view of the AudioCD view.

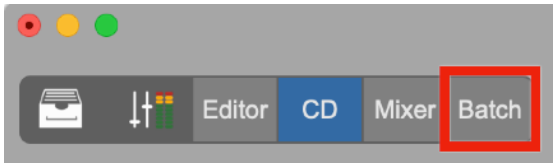


If the option “Count the audio CD-ROM Redbook compliant 02:00 secs pause in front of the first Track” is ON, starting positions on the tables are exactly as they will appear on a burned Audio CD-ROM.

If this option is OFF, there is not the 2 secs offset in front of the first track. Turn this option OFF to print a sheet if you wish to have a layout of the times exporting the AudioCD Layout as audio file, for example in the case of a vinyl.

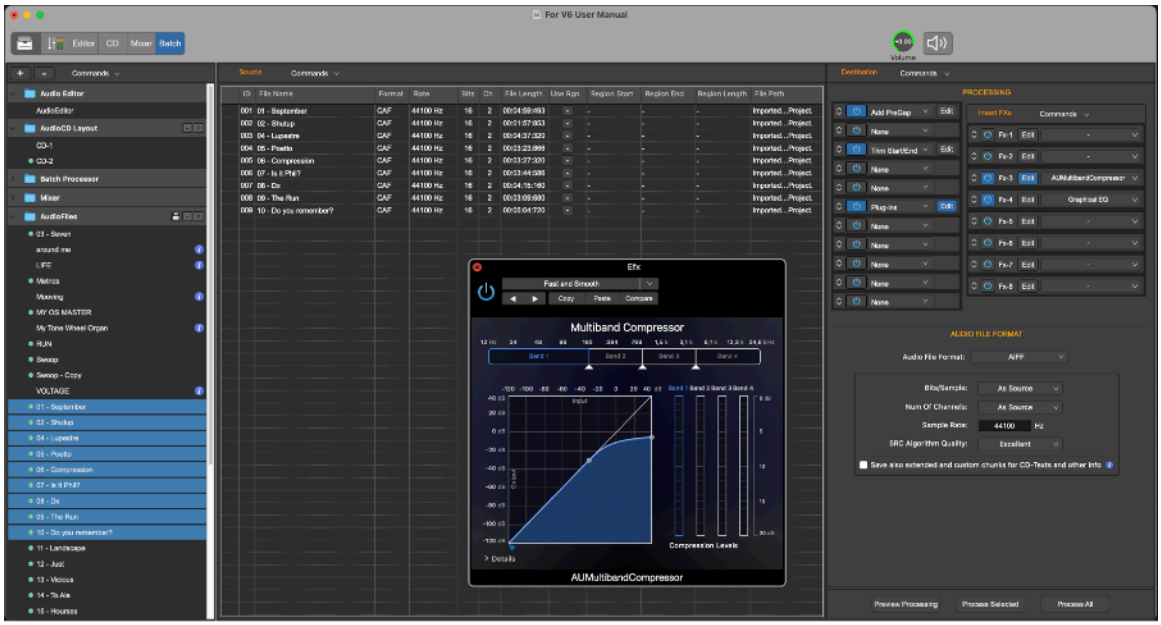
The BatchProcessor

Click on the BatchProcessor tab on top of the Project window to show the BatchProcessor main view.



The BatchProcessor is a tool to apply the same - or same chain of – editing functions on several audio files – or simply portions of audio files – with just a few mouse clicks. As an example, if you want to change the audio file format or sample rate to hundreds of audio files, the BatchProcessor allows you to do this with just a few steps, without the need to load each audio file one after the other, and then process it. The BatchProcessor will do it for you!

The BatchProcessor includes all the most useful functions, such as audio file



format conversion, sample rate conversion, internal effects or Audio Unit plug-ins that can be used as edit functions, auto gain adjustment, Fade In/ Out, dithering, and much, much more.

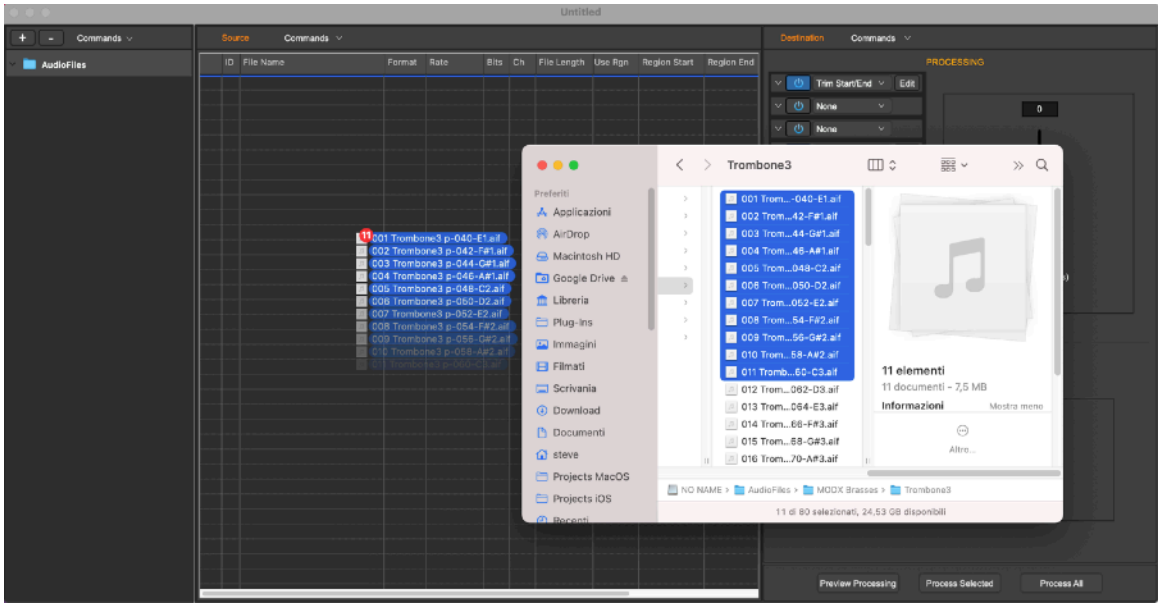
And, as very unique feature, the BatchProcessor allows you to setup serial chains of effects to choose from the internal list of high quality digital effects or from the Audio Unit effect plug-ins installed on your system. Being able to host AU plug-ins, the BatchProcessor gives a tremendous additional power.

When the chosen destination audio file format allows to save such information, audio loops, audio regions, CD-Texts, ID3Tags, ISRC, are fully supported.

Using the BatchProcessor:

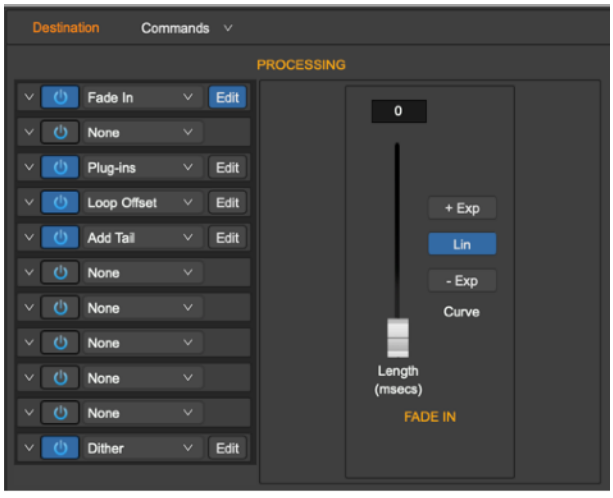
The BatchProcessor is incredibly simple to use. It is a matter of only a few steps:

1) **Load your audio files on the table:**



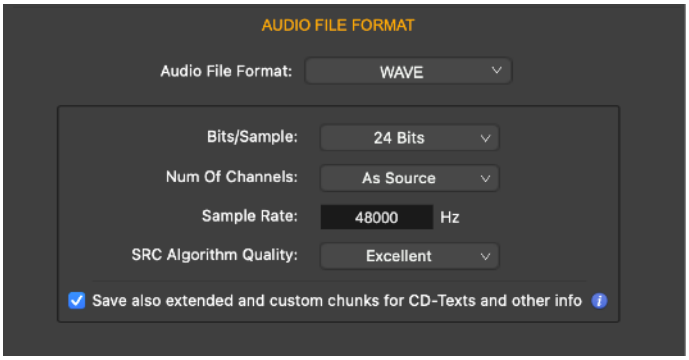
drag the audio files from the MacOS finder or use the popup menu commands on top of the BatchProcessor table view. More about this in the chapter describing the Document Manager.

2) **Select the processing functions**:



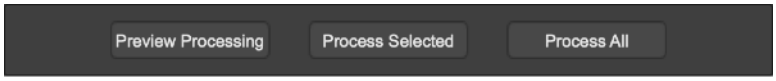
if you want to do a common processing for all files, on the Processing view on the right part of the BatchProcessore window, it is possible to enable one or more edit functions to apply on each audio file loaded on the BatchProcessor files table. The application allows also to set the parameters to control each edit function, of course. More about this in the chapter regarding the Processing functions.

3) **Set the destination audio file format**:



in the Audio File Format view in the right part of the window, there are the options for the audio file format of destination audio files. It is possible to decide if they must be stereo or mono, the destination sample rate, number of bits/sample and also other setting. More about in the chapter about the Destination Audio File Settings.

4) **Start Processing**:



then, click on the 'Process All' button in the lower right part of the window (or use the Commands->ProcessAllItems menu command on top of the BatchProcessor table view)) to start the batch processing.

DSP-BatchProcessor shows a file browser asking for a destination folder, then it does all the rest for you!

The worksheet

The DSP-Quattro BatchProcessor uses one main window, the worksheet. Even if the BatchProcessor also uses some additional accessory floating windows for using internal effects or plug-ins, most of the work is done on the main worksheet.

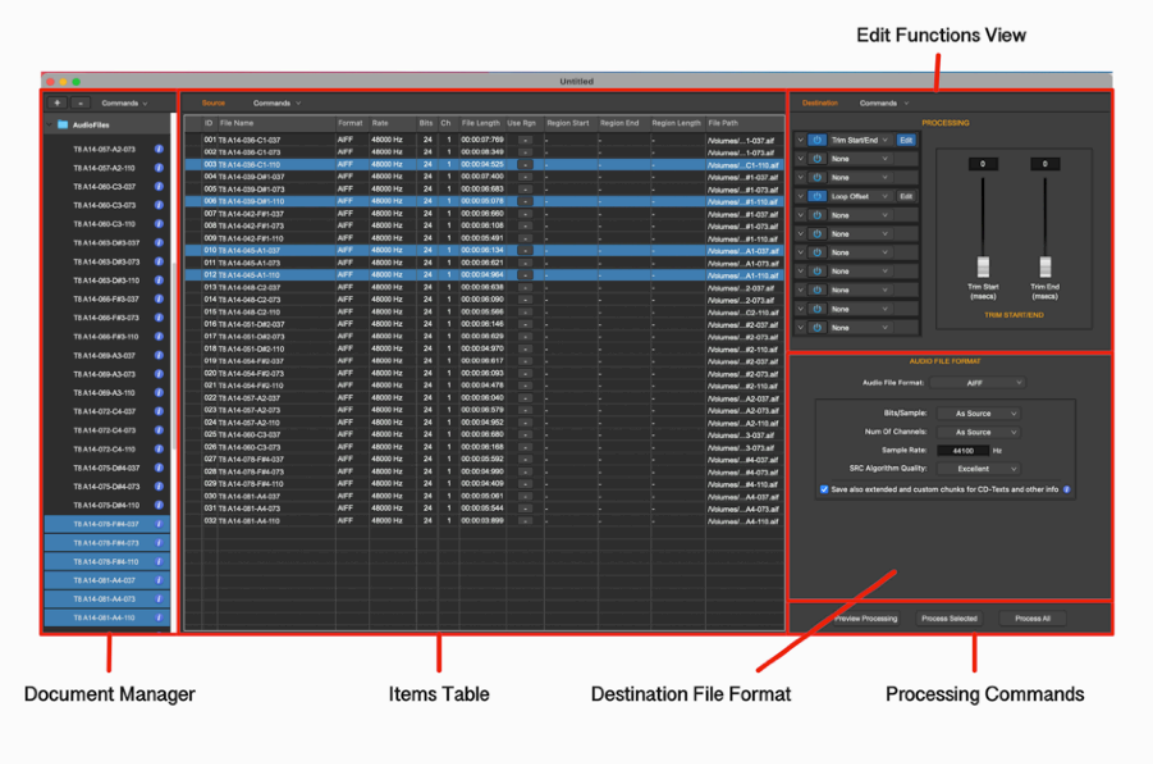
The worksheet consists of:

- **The Document Manager**: the Document Manager shows a list of the audio files which are open in the Project.

- **The BatchProcessor Files Table:** it is the main view of the worksheet. The items on the table are the audio files to process.

- **The Edit Functions View:** it shows the list of edit function to apply on each audio file as well as the graphic controls to set the parameters for each edit function.

More about these views in the following chapters of this manual.

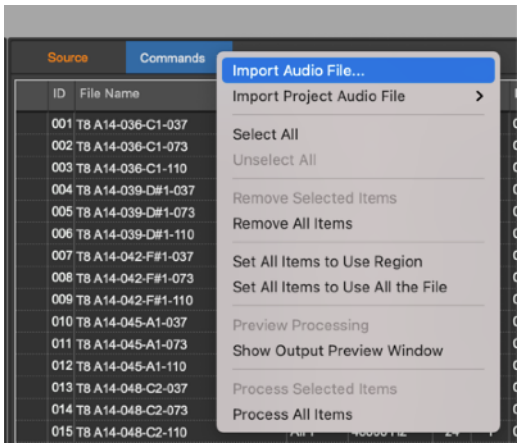


NOTE: it is possible to resize the views of the worksheet. Just click and drag with the mouse the border of the view to resize it.

Loading Audio Files on the BatchProcessor

If you have not already loaded an audio file into the BatchProcessor, the BatchProcessor will show an empty Files Table view.

There are two main options to load an audio file into BatchProcessor:



1 - Two Step procedure:

first load an audio file into the Document Manager, then open it into the BatchProcessor by one of the following actions:

- drag the file name from the audio file table to the BatchProcessor Items table view.

- Right-click the audio file name on the audio file table and select the "**Add To BatchProcessor**" command

- Select on the Document Manager file table the audio files you wish to add to the BatchProcessor, and use the command to add them to the BatchProcessor clicking on the Command button on top of the Document Manager file table.

- On the Audio File Editor, it is possible to send to the BatchProcessor the current audio file under editing, a waveform selection, the Generic Markers list or the Audio Regions list to add as different items on the BatchProcessor Files table.

2 - SingleStep procedure:

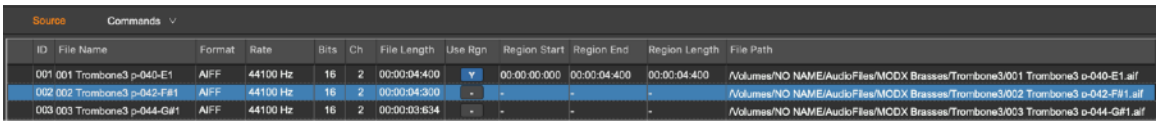
- use the command on popup menu control **File->Import Audio File…** on top of the BatchProcessor Items Table:

the BatchProcessor opens a file browser, then select the audio file(s) you wish to add to the BatchProcessor.

NOTE: It is possible to select multiple files by ⇧+Clicking or ⌘+Clicking on the file names.

The BatchProcessor Files Table view

Each row of the BatchProcessor Files table consists of (from the left to right):



- **Item ID**: it is a unique counter identifying the table row.

- **File Name**: the name to use exporting the audio file processing the table. It is an editable field.
NOTE: adding a new audio file on the BatchProcessor table, if the application finds that an item with the same name already exists, it appends a unique counter identifier ('- 1', '- 2', …) at the end of the new item name.

- **Format**: it is the audio file format (AIFF, WAVE, mp3, CAF, …) of the source audio file.

- **Rate (Hz)**: it is the sample rate of the source audio file.

- **Bits:** it is the number of bits per sample rate of the source audio file. Possible values are 8, 16, 24, 32 or 32f (32 floats).

- **Ch (channels)**: it is the number of channels.

- **File Length**: it is the source audio file length.

- **Use Rgn (Region)**: if **Yes (Y)**, the BatchProcessor process only a certain region of the source audio file. If **No (-)**, the BatchProcessor will process all the audio file, from start to end. It is an editable field.

- **From**: it shows the offset from the beginning of the source audio file from where to start to process. It is an editable field, available only if Use Region is ON.

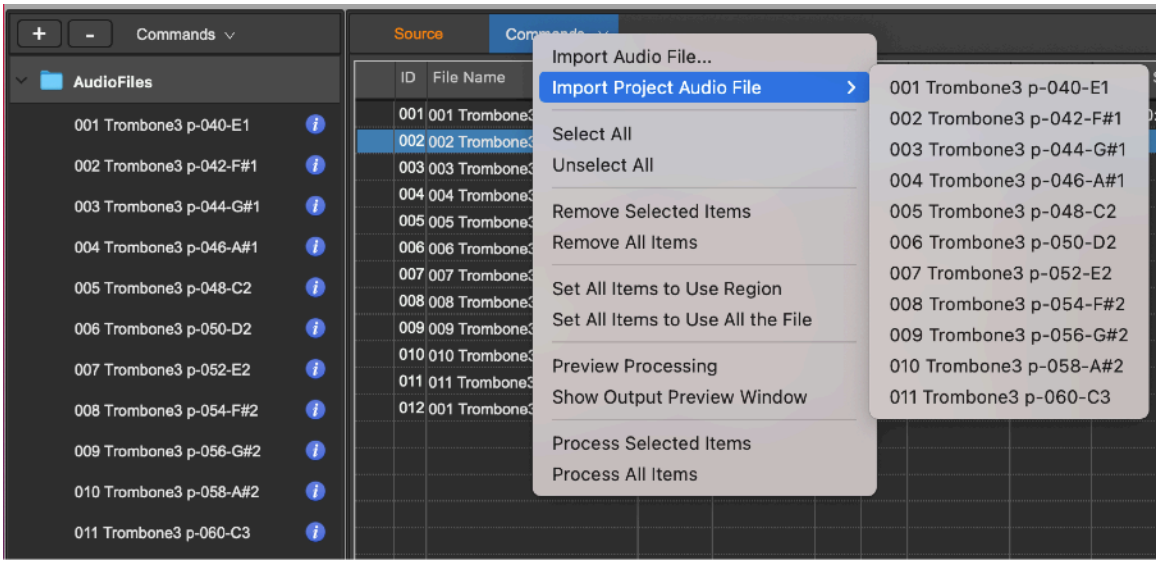
- **To**: it shows the end point where to stop to process the source audio file. It is an editable field, available only if Use Region is ON.

- **Region Length:** it is the length of the region of the audio file to process. It is an editable field, available only if Use Region is ON.

- **File Path**: it shows the file path of the source audio file.

BatchProcessor file table menu commands

On top of the BatchProcessor file table, there is a Commands popup menu button:



Where:

- **Import Audio File… :** to load one or more audio files from the MacOS finder. The application shows a file browser to select one or more audio files to add to the BatchProcessor audio file table. The application adds the selected audio files to the Document Manager table as well.

- **Import Project Audio File:** to add to the table one of the audio files already listed on the Document Manager.

- **Select All:** to select all the audio file items on the table.

- **Unselect All:** to deselect all the audio file items on the table.

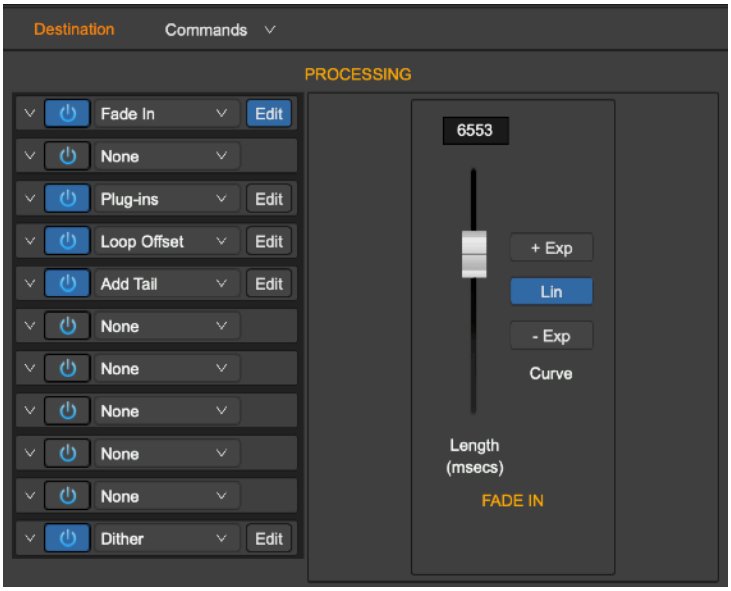
- **Remove Selected Items:** to remove the selected audio file items from the table.

- **Remove All Items:** to remove all audio file items from the table.

- **Set All Items to Use Region:** to set Use Region to ON for all audio file items from the table.
- **Set All Items to Use All the File:** to set Use Region to OFF for all audio file items from the table.
- **Preview Processing:** the application processes the first or the first selected audio file item of the table using the processing functions, and opens an Output Preview Processing window showing the result. It is possible to play the processed audio file to listen the result as well.
- **Show Output Preview Window:** to Show/Hide the Output Preview Processing window which shows the result of Preview Processing. This command is available only after using the command Preview Processing.
- **Process Selected Items:** to start processing only the selected audio file items.
- **Process All Items:** to start processing all audio file items.

BatchProcessor Processing view

In the right part of the BatchProcessor worksheet, at the top, there is the BatchProcessor Processing View:



There are several slots, each of which represents a programmable processing function. Several processing functions are available, and any processing function can be freely assigned to each slot.

The application processes the processing functions from top to bottom. The top slot will be the first, the bottom one the last.

NOTE: it is possible to change the sequence of Processing Slots dragging one slot up or down along the list.

The Processing Function Slot

Each slot consists of (from left to right):

- **The Drag Control**: click and drag up or down the arrow on the left to change the slot position in the processing sequence. The application processes the slots from top to bottom.
- **Bypass Button:** to enable/disable the processing function.
- **The Processing Function Selector:** it is a popup menu to select the processing function of the slot. More about the list of possible processing functions later in this manual.
- **Edit Button:** to show the graphic interface to set the parameters controlling the processing function of the slot.

Processing view Commands

On top of the view there is a Commands popup menu button:

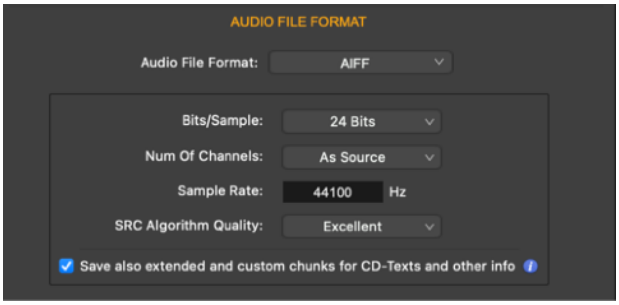
If it possible to save and load a preset, which is the current list of processing functions and related settings.

The commands are:

- **Load Preset:** to load a previously saved preset from disc.
- **Save Preset:** to save the current list of processing functions and related settings to disc.
- **Reset Func Table:** to initialise all processing functions to “none”, resetting all settings.

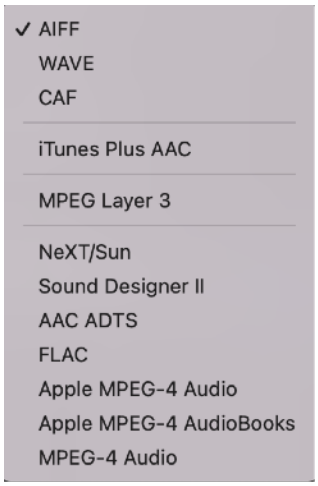
Destination Audio File Format view

The view at the bottom right of the BatchProcessor window shows the settings of destination audio files format:



Where:

- **Audio File Format:** the application, after processing the source audio files, saves the result using this audio file format. Possible values are:



The options in the box below the audio file format changes accordingly to the chosen file format.

AIFF, WAVE and CAF options

Correspondingly to AIFF, WAVE and CAF are PCM uncompressed audio formats, the options are:

- **Bits/Sample:** it is the number of bits for each sample. Possible values are: As Source, 8, 16, 24, 32 or 32f (32 floats)

- **Num Of Channels:** it is the number of channels of destination audio files. Possible values are: As Source, Mono or Stereo.

- **Sample Rate:** it is the sample rate of the destination audio files. It is also the sample rate used processing the source audio files.

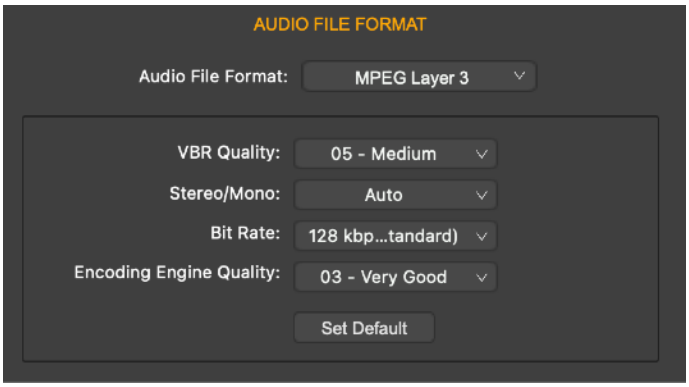
- **SRC Algorithm Quality:** it is the quality of the Sample Rate Converter. Fast is the lower quality and requires less time and CPU processing power to complete. Excellent Quality is the very best option but slower to complete. Four quality options are available: Fast, Good, Better, Excellent.

- **Save also extended and custom chunks for CD-Texts and other Info:** if enable, the application saves also all supported informations on audio file, as Markers, Regions, CD-Text, ID3Tags. Otherwise, only the Loop information is saved with the audio file. It may happen that some hardware and software samplers fail to load loop information if other information is also present. If this is the case, disable this option. This option is not available for CAF audio files.

NOTE: Exporting to Mono a Stereo audio file, the L&R channels are mixed using a 0.5 gain factor to avoid any clipping on the destination audio stream.

MPEG Layer 3 (mp3) options

These are the options correspondingly to MPEG Layer 3 (mp3) format:



Where:

- **VBR Quality:** it is quality for the algorithm used by the mp3 encoder. 10 values are available, ranging from 01 - Highest (slower) which corresponds to the very best quality algorithm requiring more CPU power to 10 - Lowest (Fast), which corresponds to a faster algorithm but producing mp3 files having a a lower quality. The value of 05 is the default value.

- **Stereo/Mono:** to set if the destination audio files is stereo or mono as the source audio file, or if it is always mono.

- **Bit Rate:** it is the most important setting to determine the quality of the processed mp3 file. Higher values of Bit Rate correspond to a better quality but produce bigger audio files. The most widely used Bit Rate value is 128 kbps, which corresponds a very good quality and a good compromise for the size of the target file.

- **Encoding Engine Quality:** together with the VBR Quality and Bit Rate, it determines the quality of the processed audio file. 10 values are available, ranging from 01 - Best (slower) which corresponds to the very best quality algorithm requiring more CPU power to 10 - Worst (Fast), which corresponds to a faster algorithm but producing mp3 files having a a lower quality. The value of 03 - Very Good is the default value.

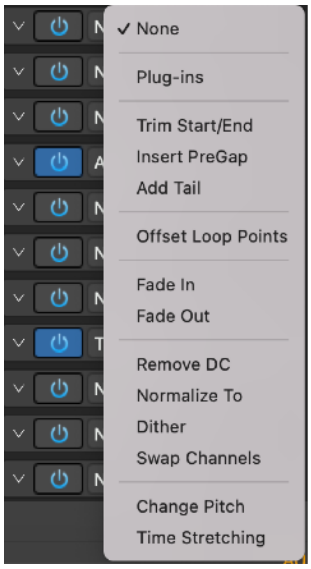
Other audio file formats options

Correspondingly to other audio file formats, only default options are available. These other formats do not guarantee the support of additional info as Loop, Markers, Regions, CD-Texts and ID3 tag.

List of BatchProcessor Edit functions

As has already been introduced, it is possible to configure a serial chain of processing functions, to be applied serially one after the other for each file. There are several slots, each slot corresponds to a processing function.

Several processing functions are available. In this chapter all the processing functions are described in detail.
Clicking on the processing function selector control of the slot, the application shows a popup menu to set the assigned edit function. In correspondence to each editing function, the right view changes to show the controls to modify the parameters of the processing algorithm.



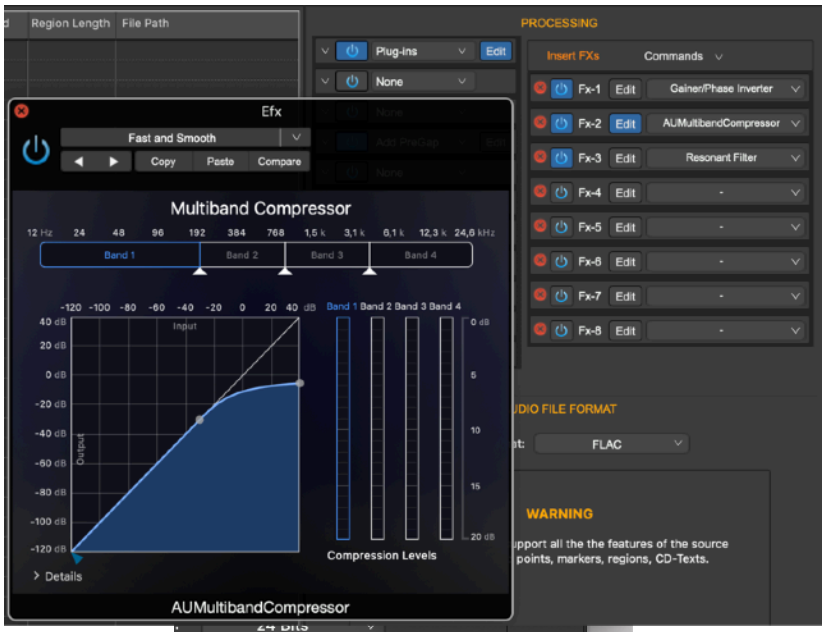
Plug-ins

This processing function consists of a serial chain of effects to choose among internal built-in effects or among Audio Unit (AU) plug-ins installed on your Mac.

It is possible to insert up to 8 effects for each slot assigned to plug-in. as there are 11 slots, it is possible to load up to a maximum number of 88 plug-ins in series.

Each slot consists of:

- **The plug-in selector:** it is popup menu control to choose the plug-in for each slot.
- **The Edit button:** show/hide the graphic interface of the plug-in on a floating window.
- **The Bypass button:** to turn On/Off the plug-in.



It is possible to change the sequential order of the plug-ins clicking and dragging up or down the double-arrows on the left part of the plug-in slot.

The the BatchProcessor built-in effects are:

- Gainer/Phase Inverter
- Parametric EQ
- Graphical EQ
- Resonant Filter (LP, BP, HP, Notch)
- Chorus
- Stereoizer (Stereo Enhancer)
- Delay
- Dual Delay
- Multitap Delay
- Reverb 1
- Reverb 2

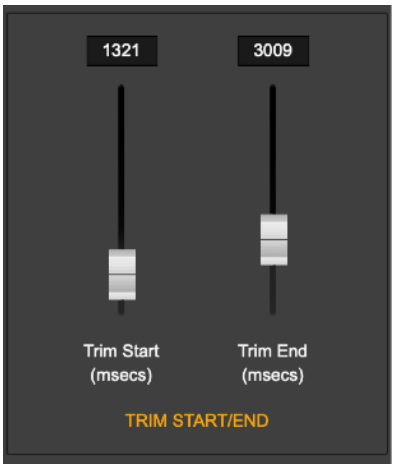
See the chapter about the built-in effects in DSP-BatchProcessor to know the details of the built-in effects which are listed among the possible plug-ins.

The last item at the bottom of the menu shows a sub-menu where the application shows the list of the Audio Unit (AU) plug-ins installed on your Mac.

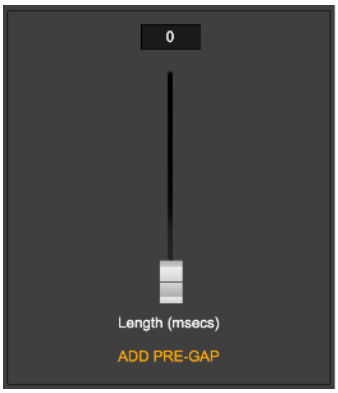
NOTE: About the compatibility with Audio Unit (AU) plug-ins, DSP-BatchProcessor is able to host only 64 bits AU effect plug-ins.

Trim Start/End:

This processing function trims the start (ie cuts the first milliseconds) and the end (ie cuts the last milliseconds) of each audio file.



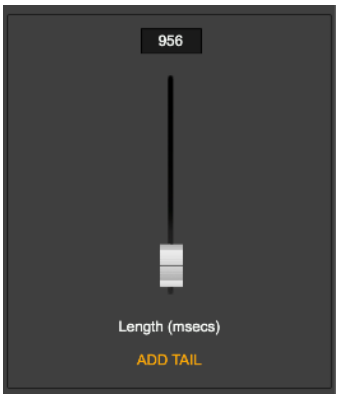
Insert PreGap:



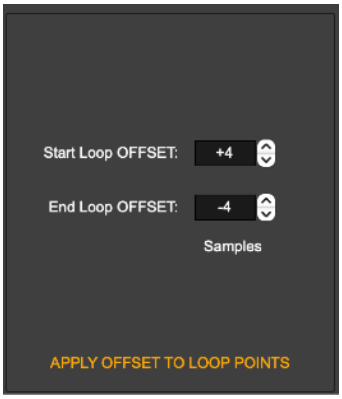
This processing function adds a certain number of milliseconds of silence in front of each audio file.

Add Tail:

This processing function appends a certain number of milliseconds of silence at the end of each audio file.



Offset Loop Points:



If the loop is ON, this processing function moves by a certain number of samples the start and end loop points of each audio file.

Fade In:

This processing function applies a Fade-In at the beginning of each audio file. It is possible to set the Fade-In length (expressed in milliseconds) and the Fade-In curve.

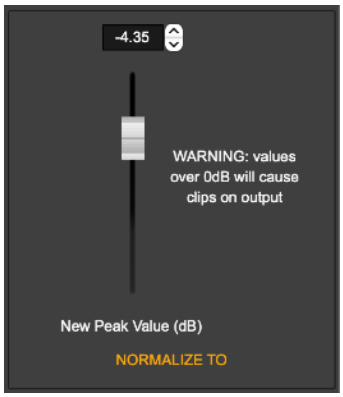
Fade Out:

This processing function applies a Fade-Out at the end of each audio file. It is possible to set the Fade-Out length (expressed in milliseconds) and the Fade-Out curve.

Remove DC:

This processing function removes the DC level. The DC level is the waveform offset respect the zero level. Usually the waveform of an audio signal oscillates around the zero. If it oscillates around a level which is not zero, that's the DC level.

Normalize To:



This processing function applies a gain to each audio file, such that the peak level reaches a certain value expressed in dB. It is very common to normalise the audio file to +0dB. If normalised to +0dB, the waveform oscillates between the -1.0..+1.0, ie using its maximum possible range.

Dither:

This processing function adds a very small amount gaussian noise throughout the entire audio file. This process is called dithering.

Tips about dithering:

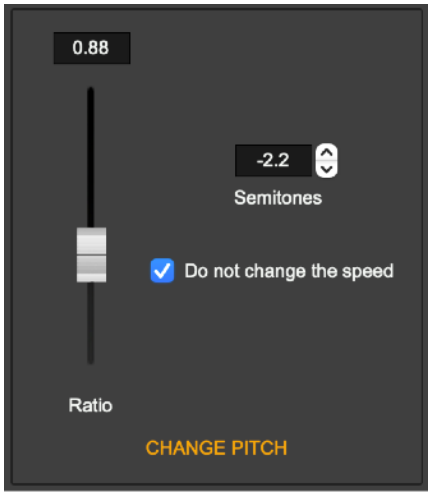
- You should apply dithering **ONLY AS THE VERY LAST PROCESSING FUNCTION IN CHAIN**. In other words, you must avoid to process also the dithering noise.
- In general, you should apply dithering any time you're rendering audio to a lower bit depth (like converting from 32-bit to 16-bit, or 24-bit to 16-bit)
- If you're exporting at 32-bit file, you usually don't need to dither, since data isn't being truncated (removed) during the rendering process.
- Don't apply dithering if you're converting to .mp3, AAC, or other formats that compress the audio, since this introduces its own artifacts that dither won't fix.

Select the 8, 12, 16 bits option according to the resolution of the bit/sample value of destination audio file.

Swap Channels:

This processing function swaps the L&R channels of stereo files.

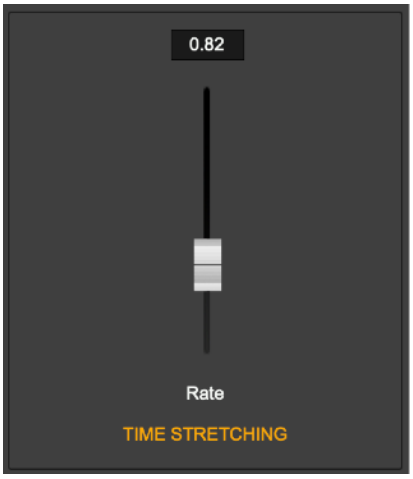
Change Pitch:



This processing function changes the pitch of each audio file. It is possible to set the ratio by using the slider or the numerical value on top. Possible values are in the [0.5..2.0], corresponding to one octave down and one octave up. It is also possible to enter the ratio as semitones.

Turning ON the “Do not change the speed”, the application applies a very complex algorithm to keep constant the time length of the audio file.

Time Stretching:



This processing function changes the speed (time) of the audio file without changing the pitch. Possible values are in the [0.5..2.0], corresponding to stretch the time axis by a factor x0.5 or by a factor x2.0.

The Mixer

One of the main views of the Project Document of DSP-Quattro is the Mixer.

The mixer controls the audio routings and output settings of all the audio generators loaded into DSP-Quattro. From here, together with the Output Recorder interface, it is possible to control what plays, how everything plays. Gains, pan-pots, insert effects of each component of DSP-Quattro.

On the mixer it is also possible to control audio inputs, input recorders and virtual instruments modules.

This is really a high professional mixing desk, which transforms DSP-Quattro into an excellent tool to use on stage as well as in your recording studio for live performances.

The mixer is composed by channel strips. DSP-Quattro creates automatically one different channel strip for each different audio generator which is loaded into the Project.

- **AudioEditor Channel Strip**: this channel strip is always present, and it is the replica of the channel strip which is also on the left part of the Audio File Editor main view, described into the chapter dedicated to the Audio File Editor.

- **AudioCD Channel Strip**: also this channel strip is always present, and it is the replica of the channel strip which is also on the left part of the AudioCD Layout main view, described into the chapter dedicated to the AudioCD Layout.

- **Output Channel Strips**: always present, to the right of the mixer view, these are hosted into a side view. This group of channel strips show the audio outputs of DSP-Quattro and allow the complete control of the mix on output.

- **Audio Input Channel Strip**: this is an optional channel strip. DSP-Quattro creates an Audio Input Channel Strip when an audio input module is added to the Project by using the corresponding command on the Document Manager. More about how an Audio Input module works later in this chapter.

- **Audio Input Recorder Channel Strip**: this is an optional channel strip. DSP-Quattro creates an Audio Input Recorder Channel Strip when an audio input recorder module is added to the Project by using the corresponding command on the Document Manager. More about how an Audio Input Recorder module works and about how to make a new recording later in this chapter.

- **Virtual Instrument Channel Strip**: this is an optional channel strip. DSP-Quattro creates a Virtual Instrument Channel Strip when a AU instrument plug-in is added to the Project by using the corresponding command on the Document Manager. More about how a Virtual Instrument works and about how to load and play it later in this chapter.

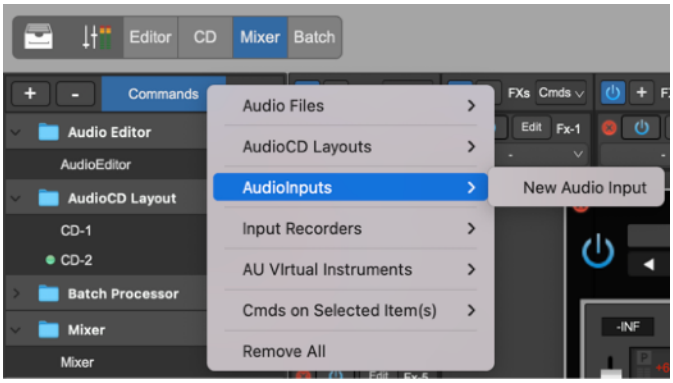
- **File Player Channel Strip**: this is an optional channel strip. It is possible to assign a special file player to an audio file to choose among the ones loaded on the Document Manager. More about how a File Player Channel Strip works and about how to load and play it later in this chapter.

The Audio Input Module and its channel strip

The Audio Input module is an object routing the mono/stereo audio from the input to the Mac to the mixer and then to the output channel strips of DSP-Quattro.

It is the prefect tool if you wish to transform your Mac into a real time effect unit. Just add an Audio Input Module to your Project, load your FX on insert on its channel strip, and… go.

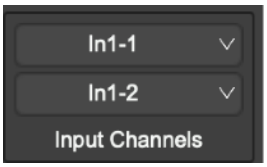
To add an Audio Input Module, click on the **Command button** on the top of the Document Manager table, then select **AudioInputs->New Audio Input.**



DSP-Quattro adds a new Audio Input module to the Project and then it switches to the Mixer panel showing the new Audio Input channel strip. By default, DSP-Quattro will mute the output of the added Audio input module to avoid unwanted audio feedbacks on output.

Several of the elements of the audio input channel strips are well known. Please refer to the chapter describing how the Channel Strip works to know how to use them.

The only controls which are new on the audio input channel strip are on the Input Channels subview:



Use the two popup menus to assign the audio ports to the left and right input channels. Each popup menu lists the available audio input ports of the current input audio device(use the application Audio Settings describer later on this manual to set which audio device DSP-Quattro uses).

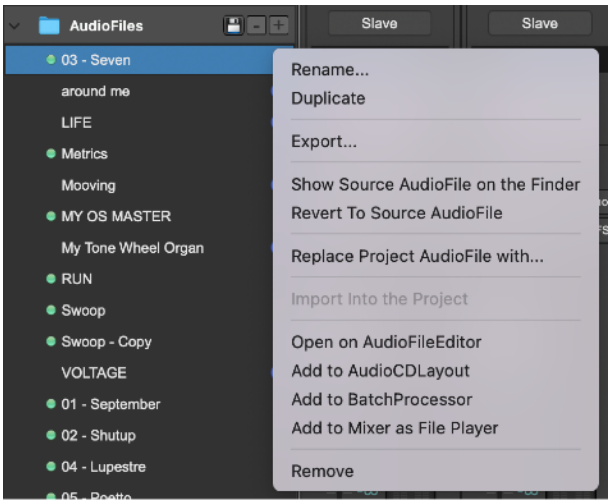
NOTE: you can open how many Audio Input Channel Strips you like, and use all of them at the same time. If you have an input device with several audio inputs, it is also possible to assign a different stereo input to each one of them. Of course, it is even possible to load different effects on insert to each audio input for maximum flexibility.

The Audio File Player Module and its channel strip

The Audio File Player module is an object to play an audio file loaded in the Project of DSP-Quattro independently or in sync with the other elements on the Mixer.

To add an Audio File Player Module:

- drag an audio file from the Document Manager table to the Mixer row on the same table or on the Mixer Main view
- Right-click on an audio file on the Document Manager and use the menu command **Add to Mixer as File Player**:



DSP-Quattro adds a new Audio File Player module to the Mixer and then it switches to the Mixer panel showing the new Audio File Player channel strip.

Several of the elements of the audio input channel strips are well known. Please refer to the chapter describing how the Channel Strip works to know how to use them.

The only controls which are new on the audio file player channel strip are on the this subview:

- **Play/Pause button**: to start or pause playing the audio file.
- **Counter Display**: shows the current playback position
- **Slave button**: if ON, the Audio File Player Play/Pause button is slave to the transport bar of the Project window. If the Audio File Player is slave, clicking on the play/stop button on the transport bar of the Transport Bar on the Project window also control the play/stop button of the Audio file Player.

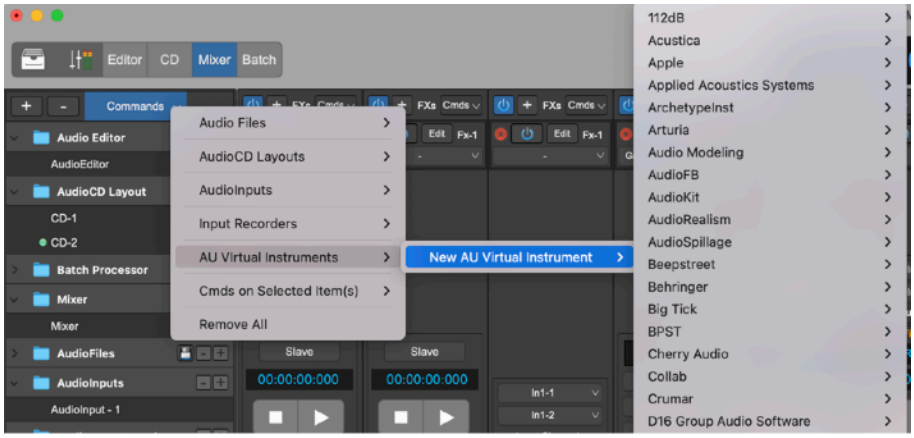
NOTE: you can open how many Audio File Player Channel Strips you like, and use all of them at the same time.

The AU Virtual Instrument Module and its channel strip

The AU Virtual Instrument module is an object to play a virtual instrument plug-in using DSP-Quattro. Because DSP-Quattro has not an internal sequencer, it is supposed that you play a virtual instrument by an external MIDI device or by routing a virtual MIDI cable internally to MacOS. Use the Apple AudioMIDI Utility which is into the Applications/Utility folder to configure the current MIDI network.

NOTE: DSP-Quattro asks to MacOS the list of the available AU Virtual Instrument plug-ins. To be visible to DSP-Quattro, a plug-in must be installed on MacOS as 64 bits Audio Unit plug-in before to run DSP-Quattro.

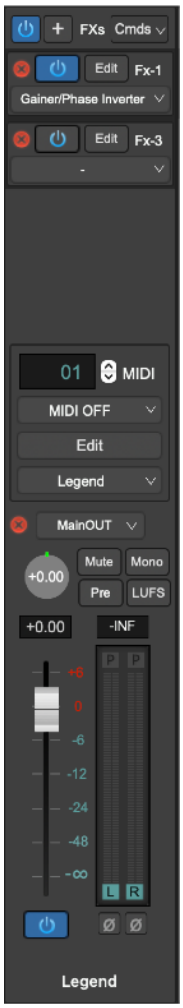
It is the prefect solution if you wish to transform your Mac into a real time musical instrument to play by an external MIDI keyboard. Just connect the MIDI Keyboard to your mac, add an AU Virtual Instrument Module to your Project, configure the MIDI device to use, and… go.



To add an AU Virtual Instrument Module, click on the **Add button** on the top of the Document Manager table, then select **AU Virtual Instrument,** DSP-Quattro will list all the AU Virtual instrument installed on MacOS, order by Companies.

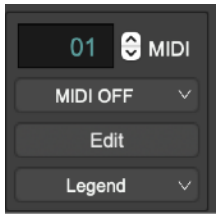
Then, select the AU Virtual Instrument you wish to play.

DSP-Quattro adds the new AU Virtual Instrument module to the Project, naming it with the name of the loaded plug-in, then it switches to the Mixer view showing the AU Virtual Instrument channel strip. By default, DSP-Quattro will open the GUI to edit the AU plug-in on a dedicated floating window.



As for the Audio Input Module, several of the elements of the AU virtual instrument channel strip are the same of the other channel strips described previously on this manual.

The only controls which are new on the AU virtual instrument channel strip, are the ones on the following subview:



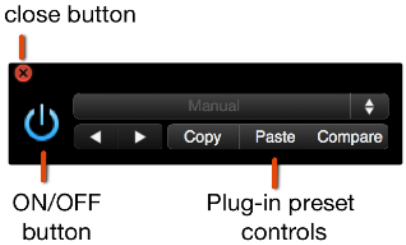
In the upper part there is the control to set the MIDI device and MIDI channel to use. DSP-Quattro lists all the available MIDI devices, select the one you wish to use to play the virtual instrument. If needed, select one of the sixteen MIDI channels to use, or ALL to receive from all MIDI channels (OMNI).

Use the Edit button to open/close the custom AU plug-in graphical interface to edit its parameters and manage its internal patches.

It is also possible assign a different AU Plug-in to the Virtual Instrument channel strip choosing it from the popup menu in the lower part of the box.

The GUI which DSP-Quattro will show depends on the third party AU plug-in, each plug-in has its own interface. DSP-Quattro shows the plug-in GUI on a floating window, together with the controls to load/save and to manage the current plug-in patch/preset. Here below there is an example:

In the upper part DSP-Quattro shows the controls to turn it ON/OFF and to manage the current patch - or preset - of the plug-in:



DSP-Quattro place the custom plug-in GUI is in the lower part.

NOTE: the current plug-in, including the current patch which it is playing, is part of the current Project Document. DSP-Quattro saves automatically the

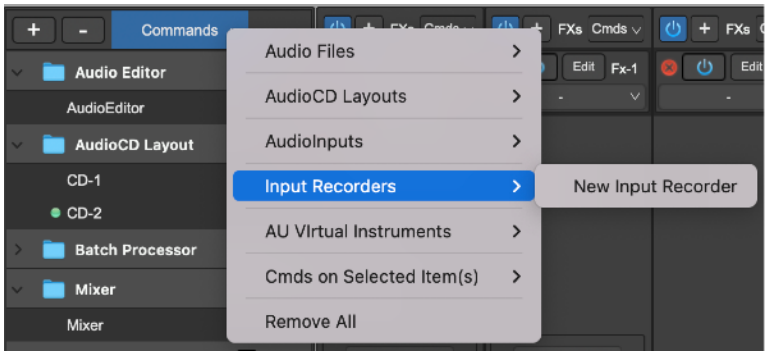
current present together with the plug-in reference to restore the current situation later when it will load back the Project Document.

The Audio Input Recorder Module and its channel strip

The Audio Input Recorder module is very similar to an Audio Input Module, with the additional feature to be able to record to file the audio from the assigned L&R inputs.

It is the prefect solution if you wish to transform your Mac into a real time recorder. Just add an Audio Input Recorder Module to your Project and set up the new recording session as explained in the next paragraph.

To add an Audio Input Recorder Module, click on the **Command button** on the top of the Document Manager table, then select **New Input Recorder**



or press the + button on the AudioInputRecorders row.

DSP-Quattro adds a new Audio Input Recorder module to the Project and switches to the Mixer panel showing the new Audio Input Recorder channel strip. By default, DSP-Quattro will mute the output of the added Audio Input Recorder module to avoid unwanted audio feedbacks on output.

Several of the elements of the audio input recorder channel strips are the same of the audio input channel strip described previously in this chapter.

The audio input recorder channel strips adds the following subview:

This subview contains the controls to make a new recording. Let's see how it works.

How to make a new recording using DSP-Quattro

To make a new recording from the audio input, you must use an Audio Input Recorder Module.

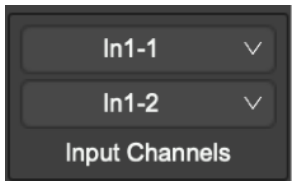
The procedure is easy to accomplish:

1) Configure DSP-Quattro to use the wanted audio device using the **Options->AudioSettings…** menu command from the top application menu bar, as described in the chapter Audio Settings in this manual.

2) **Add an Audio Input Recorder module to the current Project (see the previous chapter).**

   Click on the **Command button** on the top of the Document Manager table, then select **New Input Recorder**, or press the + button on the AudioInputRecorders row. DSP-Quattro adds a new Audio Input Recorder module to the Project, then it switches to the Mixer panel showing the new Audio Input Recorder channel strip.

3) **Use the popup menu controls on the Input Channels view to set the input ports for the L&R input channels**:

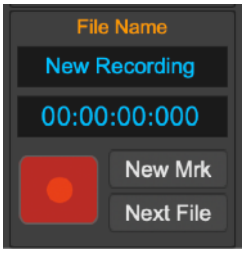


   The VuMeters of the Audio Input Recorder module will start to show the input signal levels.

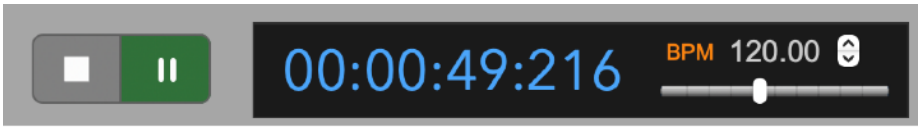
4) **Click on the File Name on the Audio Input Recorder module to set the file name of the new recording and the audio file format.**

   It is possible to set if the recording must be stereo or mono, and the bit depth (8, 16, 24, 32 and 32 floats) of the new recording. Click on the OK button to confirm.

5) **Click on the REC button to set on PAUSE the recording**, DSP-Quattro engages the recording, setting the input recorder on pause (DSP-Quattro still does not start to record at this stage). The REC button will turn ON.



6) **To start the recording, click on the PLAY button on the Transport Bar** on the upper part of the Project window. The counter will show the elapsed recording time.

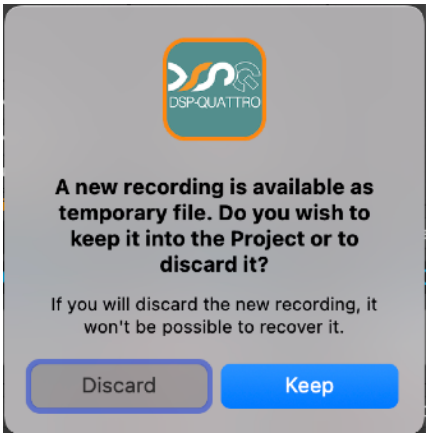


7) **To stop the recording:**

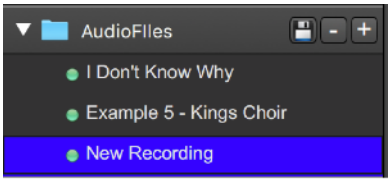
- **click on the STOP button on the Transport Bar**. The counter stops and the PLAY button turns OFF.

- **Click on the REC button on the Audio Input Recorder module**. In this case, the counter on the Transport Bar does not stop.

8) DSP-Quattro shows you a dialog to keep or discard the recording:



If the recording is ok, you MUST SAVE the new recording clicking on the Keep button. Then, DSP-Quattro adds the new recording to the Document Manager table adding it to the list of the audio files.



If you wish, double-clicking on the new file name row on the Document Manager table to open the new recording waveform on the Audio File Editor to see it.

NOTE: IF YOU DO NOT CLICK ON THE KEEP BUTTON, DSP-QUATTRO WILL DISCARD THE LAST RECORDING.

9) **To start a new recording, loop returning to the point 5)**.

NOTE: it is possible to add how many Audio Input Recorder modules you wish, and it is also possible *to start - in sync - several recordings on different audio files*. To do it, just set on pause all the Input Recorder modules, then clicking on the Play button on the Transport Bar, the engaged Input Recorders start, synched one each other.

NOTE: it is possible to start/stop in sync the Output Recorder as well, as it is possible to start in sync the AudioEditor and the AudioCD Layout putting then on SLAVE mode, to start playing when the recording starts.

NOTE: click on the **New Marker button** on the Audio Input Recorder

Channel Strip to add a generic marker at the current cursor position while recording. DSP-Quattro saves the generic markers on file at the moment of saving the new recording into the Project Document.

The Output Channel Strips

If the main view is the Mixer view, on the right part of the Project window, you find the Output Channel Strips. There are five Output Channel Strips: the L&R MainOUT and four Aux channel strips.

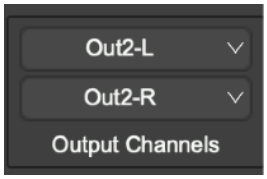
The Output Channel Strips view shows the audio outputs of DSP-Quattro and allows the complete control of how DSP-Quattro plays on output.

Use the rightmost button on the top of the Project window to show/hide the Output Channel strips view:

or you can drag the left border of the Output Channel Strips view to enlarge or reduce it, showing/hiding it partially.

Several of the elements of the Output Channel Strips are the same of the other channel strips described previously in this manual.

The Output Channel Strips add the following subview:



Use these two popup menus to set which audio port of the output audio device DSP-Quattro addresses to play its Left and Right output audio channels of that Output Channel Strip.

Usually, if you have not configured any multi-outputs audio device, the two popup-up menus show the standard L&R output ports. If an audio device with several audio outputs ports is connected to your mac, you can set which pair of audio ports the channel strip must address for playing its L&R output channels.

NOTE: By default, DSP-Quattro uses the audio device which also MacOS is using as system device. If you wish to assign a different output audio device to DSP-Quattro, you must first configure this by using the Audio Device Settings dialog from the Options menu or on the Settings dialog. See later in this manual to know how to do this.

NOTE: **Neither the effects loaded in insert to the MainOUT Output Channel Strip, nor those in insert to the AUX Output Channel Strips are rendered to disk when exporting audio files from the Audio File Editor or from the AudioCD Layout when burning an audio CD-ROM or exporting a DDP. The Output Channel Strips are common and process the audio stream coming from all the Channel Strips of the all audio generators in DSP-Quattro, as the Audio Inputs, Audio Input Recorders, Virtual Instrument, Audio File Players.**

To render effects or plug-ins on insert to the AudioCD Layout, load them on insert on the AudioCD Layout channel strip, and not on the MainOUT Output Channel Strip.

The Aux Busses

DSP-Quattro allows to address up to four additional Auxiliary (AUX) channel strips which play in parallel to the L&R MainOUT channels. Each AUX channel strip can address its own pair of audio ports of the current output audio device. An AUX channel strip has its own FX send, and has its own settings about being in Solo, Mute and Mono modes.

Each AUX channel strip has the same feature and offer the same controls of the L&R MainOUT channel strip.

As you would expect, each audio generator module can address the L&R MainOUT channel strip or one of the four AUX Channel strips.

Using the AUX Channel strips, if you have a multi-output audio device connected to your mac, you can configure DSP-Quattro to play different modules on different audio outputs, applying also different effects on each output.

Configuring the AUX Channel strips, if all them play thru the same port of the output audio device, it is possible to apply different effects to different audio generators just setting a different AUX channel strip as output on each channel strip of the audio generator.

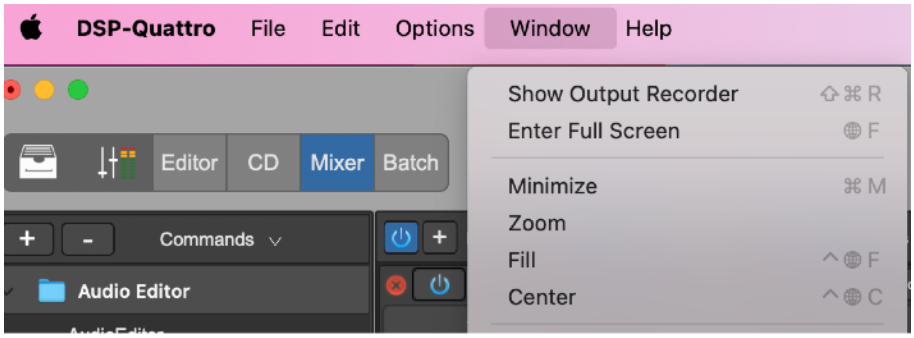
The Audio Output Recorder

The Audio Output Recorder of DSP-Quattro is able to record to file the audio on output from the applications itself.

DSP-Quattro creates always an Audio Output Recorder at startup, and there is always only one Audio Output Recorder. Differently from the other objects

that we have seen, the Audio Output Recorder is part of the application and not of the current Project document.

To open the audio Output Recorder, use the command **Show Output Recorder (or ⇧⌘R)** from the top menu bar of the application:



DSP-Quattro shows the Audio Output Recorder floating window.

The Audio Output Recorder interface consists of:

- **Gain sliders and Vu-Meters**

these are the same elements also used by the channel strip.

- **The Transport Bar**

  - **REC button,** to put a new recording on standby.
  - **PLAY/STOP button,** to start and stop the new recording.
  - **New Marker button,** to add a generic marker at the current recording position.

- **Time Display**

  - **Current Recording Time**: it shows the time elapsed since the start of the recording session.

- **Partial Rec Time,** it shows the time elapsed since the last click on New Marker button, ie the position of the generic marker added last.

- **Time On HD**: the free space on the HD used for recording.

- **Other controls**

- **File Name and Format**: they show the current file name and file format. Clicking on it, the application shows a dialog to enter a new file name and the audio file format to use:

It is possible to set if the new recording must be a Mono or Stereo file and, if Mono, if the audio recorder must mix the input (or output) L&R channels, if it must use only the L or only the R channel.

It is possible to set the Bit Depth (8, 16, 24, 32 and 32 floats) as well.

- **Left/Right popup menus**: these popup menus show the list of the output audio ports to the current audio device used by the application.

- **On/Off button**: to turn On/Off the audio recorder

- **Mute button**: to mute/un-mute the output of the audio recorder.

- **Next button**: to switch the file to the “next” on the fly during recording. Clicking on this button, the application closes the current recording, automatically switching to another file, naming it with a numerical extension to distinguish it from the closed recording. Then, the application continues to record on this new file. The application adds the previous recording to the Project Document Manager as well.

- **Slave button**: if ON, the Audio Recorder transport bar is slave to the transport bar of the Project window. If the audio recorder is slave, clicking on the play/stop button on the transport bar of the main Editor window will control also the play/stop button of the audio recorder. In any case, to start/stop a new recording, the audio recorder must already be in stand-by, ie its Rec button must already be turned on, otherwise nothing happens.

NOTE: turning the Slave button ON, it is possible to dump to file in real time and in sync the output of the Audio File Editor, AudioCD Layout or any other elements loaded on Mixer.

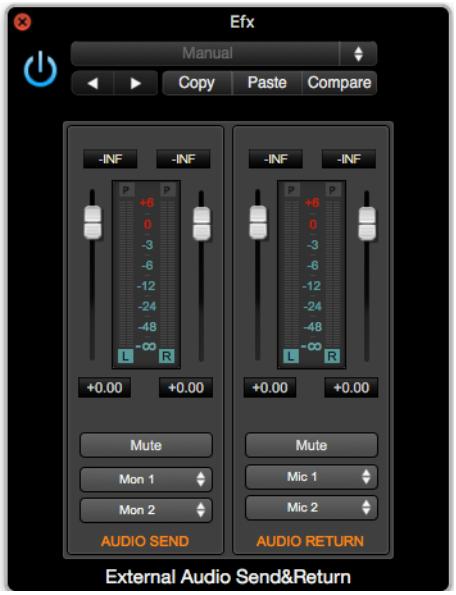
NOTE: At startup, by default the audio recorder is muted to avoid unwanted audio feedbacks between inputs and outputs.

Rendering to file the audio processed by an external hardware unit

Using the Output Recorder as Slave to the transport bar of the Audio File Editor, the AudioCD Layout or the Mixer is an important feature of DSP-Quattro which allows you to create a new file as result of the processing on an audio file thru an external hardware effect unit.

To do it, open the Output Recorder, configure it to get audio from the MainOut L&R channels, click on its Slave button to set it slave to the Project Document transport bar. Then, set it on pause clicking on the REC button.

Go to the Audio File Editor, or AudioCD Layout or Mixer, and set as effect on insert the External I/O special plug-in of DSP-Quattro to process the wanted audio steam:



configure it to send and get audio to/from the external hardware effect.

Then, start playing. The Output Recorder starts automatically to record because on slave mode. Stop when finished, and Keep the new recording done by the Output Recorder. A new audio file will now be into the Project listed among the audio files on the Document Manager table.

NOTE: to work properly, due an restriction of the internal audio routing of DSP-Quattro, the sample rate of the current audio file to process must be the same of the sample rate of the current output audio device used by DSP-Quattro to play its output.

The Effects Built-in in DSP-Quattro

DSP-Quattro has a series of built-in digital effects of very high quality. they range from the various uses of modulated digital delay lines, to the simulation of analog filters and bank of filters. Algorithms for the room and hall simulations are available as well.

It is possible to use the built-in effects in the same way as all the other Audio Unit (AU) Effect plug-ins installed on MacOS.

Using an effect on insert to a certain Audio Region, the effect processes only that Audio Region. If the effect is on insert to the AudioCD Layout channel strip, it processes the audio stream on output from all Audio Regions.

Among these different effects, there are several shared graphic objects, such as knobs, sliders, and Vu-Meters.

This chapter describes in detail all their characteristics.

The application built-in effects can be grouped into two main categories:

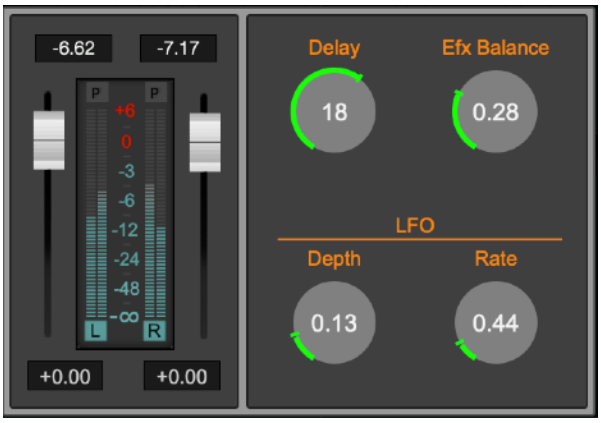
- **Digital Effects**: these are the effects using modulated delay lines and room/hall simulations (Delay, Chorus, Reverb)

- **Digital Filters**: these are the effects using digital filters (Parametric & Graphic Equalizer, Analog Filter Emulators).

- **Tools**: there are special plug-ins. One is a Gainer/Phase Inverter, one is a very special Send&Returns to/from the hardware audio device. More about this later in this chapter.

Chorus

The chorus algorithm uses dual delay lines, modulated by a Low Frequency Oscillator (LFO).



- L&R Gain Sliders: on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- Efx Balance [0.0...1.0]: to set the ratio between the processed and the input audio signals.

- Delay [0.0...30.0 msecs]: to set the delay time used by the algorithm. Higher values produce a more noticeable and deep chorusing.

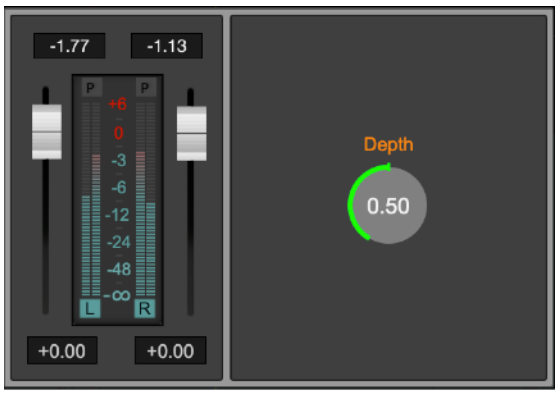
- LFO Depth [0.0...1.0]: to set the amount of the modulation of the delay time by the LFO (Low Frequency Oscillator). Higher values produce more noticeable and deep chorusing.

- LFO Rate [0.0...5.0 Hz]: to set the speed of the LFO. Lower values produce a lighter and less intrusive effect.

Stereoizer

The Stereoizer effect uses pass-band filters to enhance the stereo image of the input signal.

NOTE: it is highly recommended to check the mono compatibility of the signal on output, due to phase cancellation side-effect when summing the Left and Right channel if listening in mono.

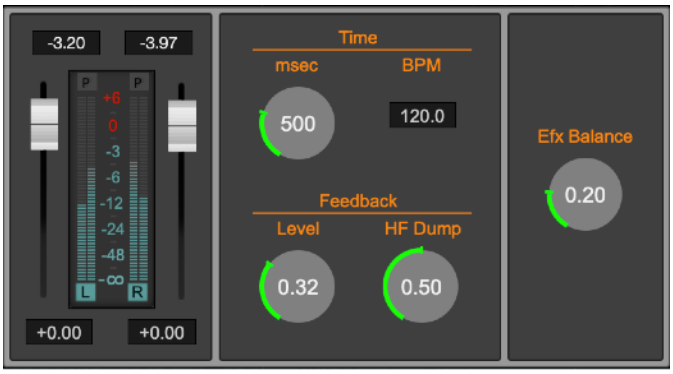


- L&R Gain Sliders: on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- Depth [0.0..1.0]: to set the depth of the effect.

Delay

Using one or more Delay effects it is possible to create very special mono and stereo echoes.



The Delay effect of the application is a single delay line, which mixes the L&R input channels before to process the signal into a delay line. It is very good to simulate the vintage sound of delay pedals used mostly by guitarists.

- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- **Efx Balance [0.0...1.0]:** to set the ratio between the processed and the input audio signals.

- **Time [0..2000 msec]**: to set the time of the delay line, in msec. and in BPM (Beats Per Minute). Changing one of the values, the application will automatically change the other one in real time as well.

- **Feedback Level [0.0..1.0]**: set the feedback level of the output signal back to the input. The feedback level changes the number of repetitions (echoes) of the effect.

- **Feedback Filter Cutoff [20..16000 Hz]**: the feedback line is processed by a lowpass filter to emulate the absorption of reflecting materials, which higher for the high frequencies.

Dual Delay

The Dual Delay effect uses two independent delay lines, one for the left and one for the right channel. It is very good to produce ping-pong stereo effects and to spread the stereo image of a stereo input signal.

- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- **Efx Balance [0.0...1.0]:** to set the ratio between the processed and the input audio signals.

For each delay line:

- **Time [0..2000 msec]**: to set the time of the delay line, in msec. and in BPM (Beats Per Minute). Changing one of the values, the application will automatically change the other one in real time as well.

- **Feedback Level [0.0..1.0]**: set the feedback level of the output signal back to the input. The feedback level changes the number of repetitions (echoes) of the effect.

- **Feedback Filter Cutoff [20..16000 Hz]**: the feedback line is processed by a lowpass filter to emulate the absorption of reflecting materials, which higher for the high frequencies.

MultiTap Delay

The MultiTap Delay effect is uses four independent delay line, each with its own controls for setting its level and pan-pot on output signal.

- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- **Efx Balance [0.0...1.0]:** to set the ratio between the processed and the input audio signals.

For each delay line:

- **Time [0..2000 msec]**: to set the time of the delay line, in msec. and in BPM (Beats Per Minute). Changing one of the values, the application will automatically change the other in real time as well.

- **Feedback Level [0.0..1.0]**: set the feedback level of the output signal back to the input. The feedback level changes the number of repetitions (echoes) of the effect.

- **Feedback HF Dump [20..16000 Hz]**: the feedback line is processed by a lowpass filter to emulate the absorption of reflecting materials, which higher for the high frequencies.

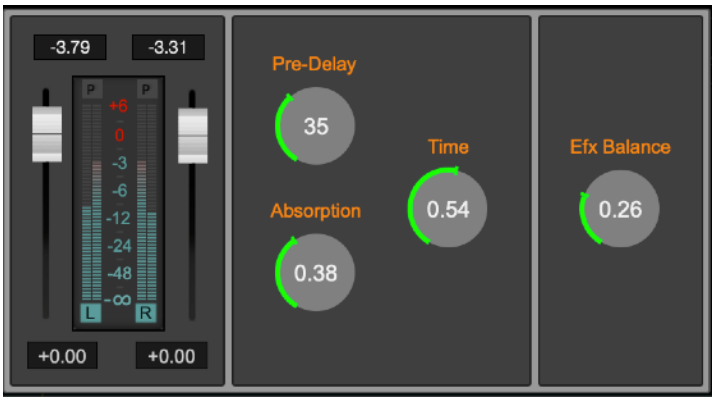
- **Panpot [-64..0..64]**: to set the balance between L&R channels of the output signal of each delay line. -1.0 means full to the Left channel, 0

means equally balanced between L&R channels, and +1.0 full to the R channel.

- **Level [0.0..1.0]**: sets the level of the output signal from each Delay unit.

Reverb 1 and Reverb 2

There are two reverb effects in the application. They differ from one each other for their internal algorithm. The first one is more intense, the second is lighter. Depending on the audio file that you are working with, one could be more suitable than the other.



- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- **Efx Balance [0.0...1.0]:** to set the ratio between the processed and the input audio signals.

- **Time [0.0..1.0]**: to set the reverb time. This value is expressed as the ratio between the minimum value (time = 0) and the higher possible value (time=1.0).

- **Absorption [0.0...1.0]**: to set the factor which emulates the reflecting properties of the walls in function of the frequency spectrum. Lower values correspond to materials having an higher absorption at high frequencies.

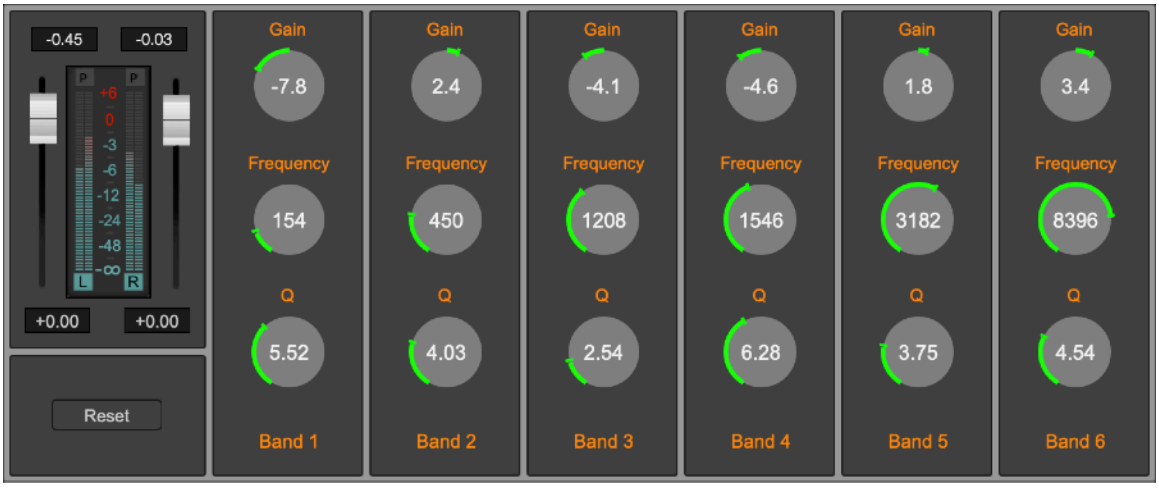
- **PreDelay [0...100 msec]**: to set the time of the delay line on input to the reverb effect. It simulates the time that it takes the first echo to be heard due to the distance of the reflecting surface as it happens, as an example, when playing in a church or a very large hall.

Parametric EQ

The Parametric EQ of the application has six full parametric filters.

It is possible to set the frequency, gain, and bandwidth (Q) of each filter. Since all the filters have a full excursion on the frequency range, it is possible to overlap two or more filters, to let them to work on the same frequency range.

- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of



the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- **Reset:** to reset each parametric filter to the default values.

For each parametric filter:

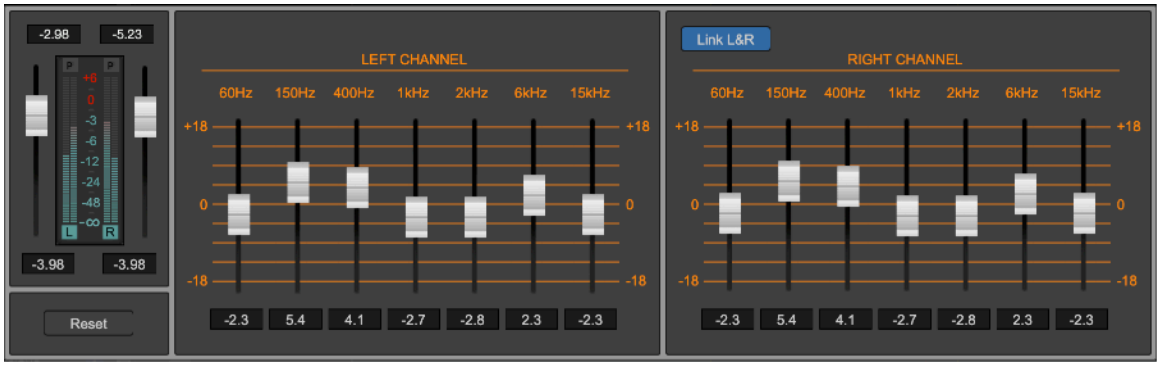
- **Gain [-18..+18 dB]:** to set the gain of the parametric filter.

- **Freq [20..16000 Hz]**: to set the central frequency of the frequency band.

- **Q [0.0..5.0]**: it controls the width of the frequency response curve of the filter. Higher values correspond steeper curves, ie a more selective filter.

Graphic EQ

The graphic equalizer uses a bank of seven filters to modify the frequency contents of the audio signal. Each filter is centered around a different



frequency according to a logarithmic scale. It is possible to set the gain of each filter in the ±18 dB range.

- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

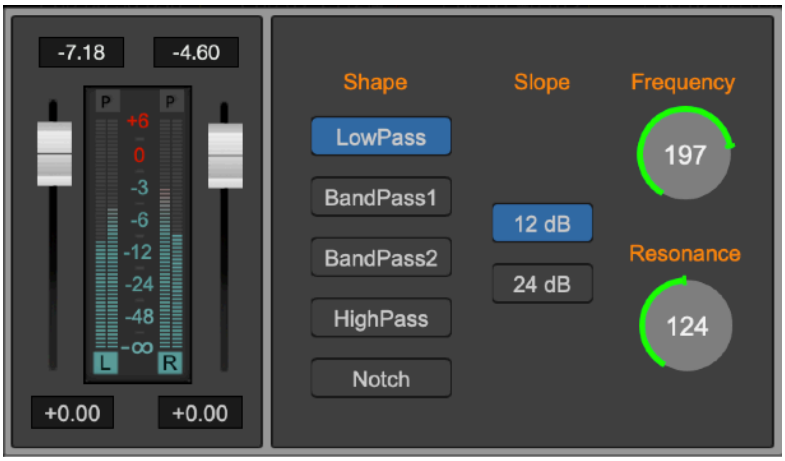
- **Reset:** to reset all gains to 0 dB.

- **Gain [-18...+18 dB]:** to set the gain of each frequency band. It is also possible to enter the numerical value clicking on the control below the slider.

- **Link L&R**: when turned On, setting a gain value for one channel, will set the same value for the other channel as well.

Resonant LowPass, BandPass, HighPass and BandReject Analog Filter emulations

Among the effects of the application, there are the filters that simulate the resonant analog filters, that became famous in the music world during the ’70s, in vintage analog synthesizers. The following analog resonant filters are available: LowPass, HighPass, BandPass and Notch.



Each filter uses its own interface which however is very similar to the others. It is possible to set the cutoff frequency, the resonance at cutoff frequency – called Resonance for LowPass and HighPass, or Q in the other cases – and the slope of the curve, measured in -dB/octave. Higher slopes bring to more selective filters, that are more resonant and that cut frequencies with steeper curves.

- **L&R Gain Sliders:** on the left there is a section with two gain sliders, one for the Left, one for Right channel. Use these sliders to control the gain of the input signal. Peak and RMS Vu-Meters show the input L&R signal levels.

- **Shape:** to choose among one of the following:

  - **Resonant LowPass**: it cuts all frequencies above the cutoff frequency. Slope can be set to -12 or -24 dB/Octave.
  - **Resonant BandPass 1**: it cuts the frequencies outside the band centered around the cutoff frequency.
  - **Resonant BandPass 2**: similar to BandPass 1, but a lot more resonant.
  - **Resonant HighPass**: it cuts all frequencies below the cutoff frequency. Slope can be set to -12 o -24 dB/Octave.
  - **BandReject**: to cut the frequencies in the band just around the cutoff frequency. It can be very selective with high values of Q, and it is very useful when it is necessary to remove a specific frequency from the audio signal, such as the power line noise at 50 o 60 Hz.

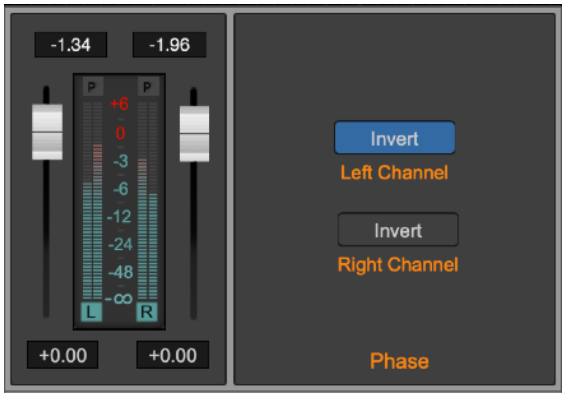
- **Slope**: to set the slope (-12 or -24 dB) of the filter.

- **Frequency [20..16000 Hz]:** to set the value of cutoff frequency.

- **Resonance/Q**: to set the resonance value or the filter bandwidth. Higher resonance values produce higher gains around the frequency of cutoff that may cause the auto-oscillation of the filter, exactly as it happens working with analog filters.

The Gainer and Phase Inverter

This is a very basic and very useful built-in plug-in. It applies a Gain with the option to invert independently the phase of the Left and Right channels.



Audio CD-ROM Burning

This chapter describes the procedure to burn the output of the AudioCDLayout on an audio CD-ROM.

If you have an internal or external CD-ROM writer device connected to your Mac and, if external, this device is supported by the disc burning component of MacOS, the application allows you to burn an audio CD compliant with the Redbook standard including also CD-Text, ISRC, EAN-UPC, PQ sub-codes extensions.

The Redbook standard defines several specs about the format of an audio CD-ROM. If the audio CD-ROM is compliant to the Redbook standard, all the audio CD-Players should always be able to play it.

Among the others, the Redbook standard defines that an audio CD-ROM cannot have more than 99 CD-Tracks. An audio CD-ROM must start with a preGap of 2 secs. Each CD-Track cannot be shorter than 4 secs, and the CD-Track Start markers can be placed only at quantized time intervals, multiple of a certain small constant value.

Most of these specs will be invisible to you, the application takes care to follow the specs for you. If it will be not possible to produce automatically an audio CD-ROM compliant with the rebook standard, the application, at the time of rendering the AudioCDLayout for burning, shows a warning message (as, for example, in the case in which a CD-Track will result to be shorter than 4 secs), letting you to choose to continue or not.

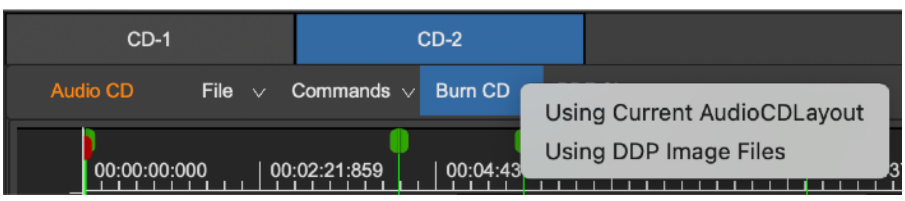
The application burns an audio CD-ROM from the output of the AudioCDLayout converting it - if necessary - to the standard 44.1 kHz sample rate using its internal Sample Rate Converter at maximum quality.

Rendering the AudioCDLayout into the audio file used by the CD-Burning engine, when converting the audio samples from the internal floating point numerical representation to the fixed 16 bits/sample precision of the audio CD-ROM Redbook standard, by default the application uses its internal dithering algorithm The dithering algorithm is necessary to avoid audio distortion on low level signal levels for audio signal at 16 bits/sample.

If you wish to use an external Audio Unit plug-in for dithering, just insert it as effect FX on the AudioCDLayout channel strip (it must be the last one on the chain, ie the one at bottom on the interface), and turn OFF the internal dithering algorithm of the application. This can be done on the Preference dialog. Under the Default settings for the AudioCD, there is a button to turn on/off the internal dithering algorithm exporting audio CD-ROM image file (the same algorithm is used by default also exporting DDP image files).

NOTE: if external, the CD-Burner device must be connected and turned ON before to start this operation.

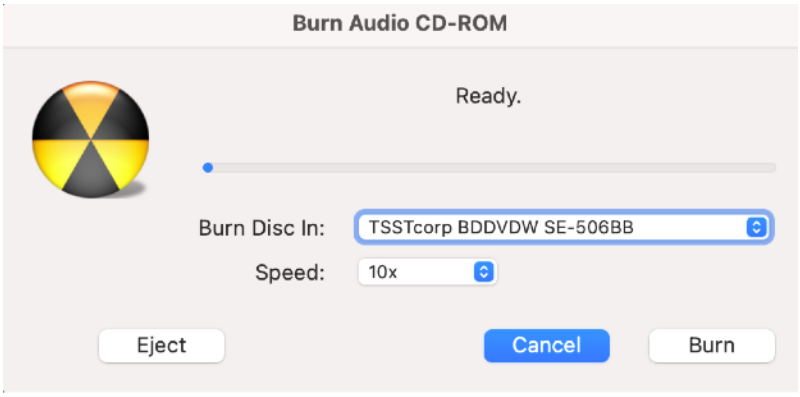
To burn an audio CD-ROM, press the BurnCD button on top of the AudioCD Layout main waveform view:



It is possible to burn the audio CD-ROM using the current AudioCDLayout or using a DDP Standard Image file previously saved or produced by another application .

In the first case, the application first renders the AudioCD Layout to a temporary internal data file. In the second case, the application shows a file browser to select the folder where there are the DDP image files.

Then, it shows the Audio CD-ROM Burning dialog:



if there are several CD-Burner devices connected to your Mac, use the Burn Disc In popup menu to choose the device to use.

The application asks to insert a blank disc. Inserted a blank disc, it populates and activate the popup menu to set the speed for burning.

NOTE: It is highly recommended to choose ALWAYS THE SLOWEST speed among the available values listed on the speed popup menu.

Press the ***Burn*** button to start the process, the application shows a progress dialog until the burning session is completed.

At the very end, the application asks if you want to keep a copy of the Audio CD-ROM on the HD as DDP image file. If yes, it shows a file browser to choose a folder when to sane the Audio CD-ROM image files according to the DDP standard.

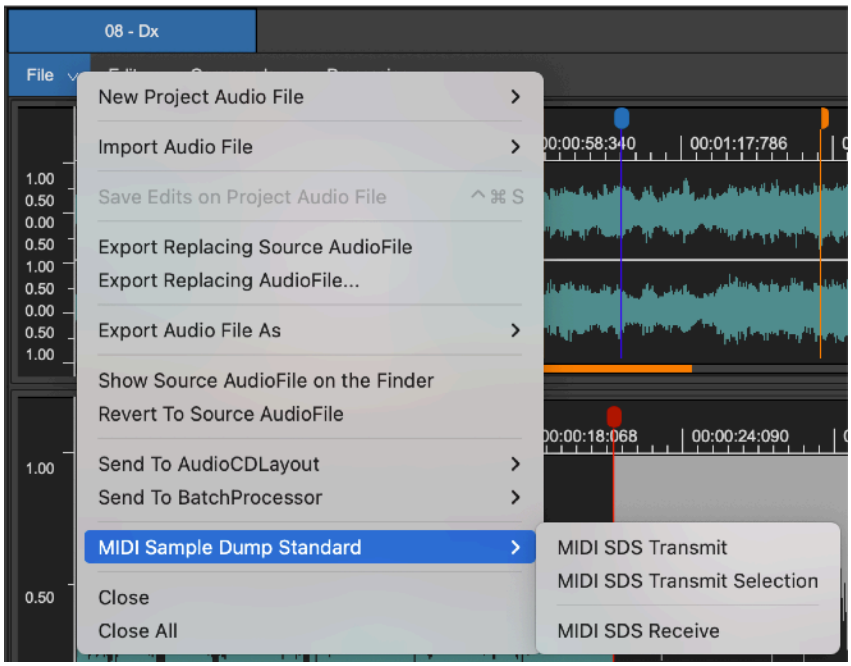
MIDI Sample Dump Standard:

DSP-Quattro is able communicate with an external hardware sampler by MIDI Sample Dump Standard, a protocol to transmit and receive samples by MIDI.

NOTE: this was a protocol quite common among (now vintage) samplers and sample-based drum machines appearing on the market in the ’80. MIDI is very slow for transmitting and receiving large amount of data as when transferring samples. For this, when possible, it is better to find a different way to transfer samples between the Mac and the external hardware sampler or sample-based drum machine.

NOTE: not all vintage samplers and drum machines are able to receive and transmit samples by MIDI Sample Dump Standard. Check on the sampler owner’s manual to know if it is compatible with the MIDI Sample Dump Standard protocol.

In DSP-Quattro, MIDI Sample Dump Standard commands are available on the Audio File Editor, under the File commands, on top of the main waveform view.



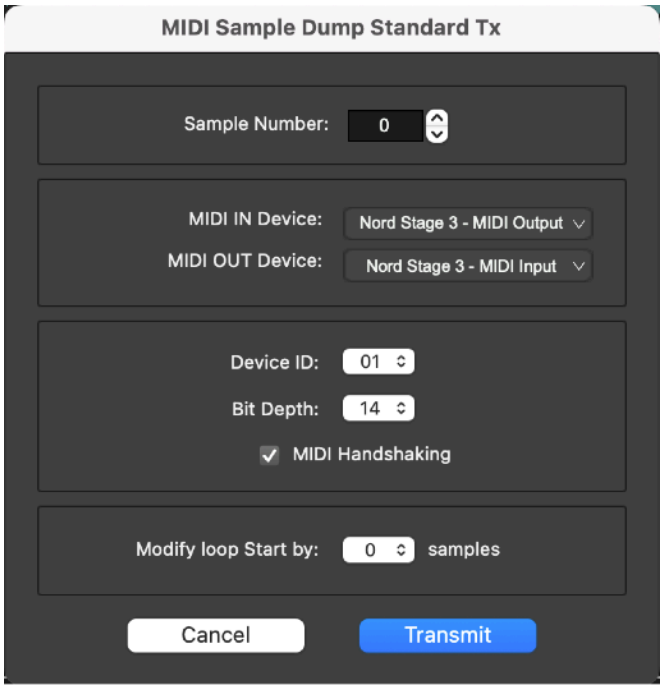
MIDI SDS Transmit:

To transmit the current audio file to an hardware sampler according to the Sample Dump Standard protocol to send and receive samples by a MIDI connection. If the file is stereo, DSP-Quattro transmits first the left channel, then the right channel as a different sample.

MIDI SDS Transmit Selection:

As above, but DSP-Quattro transmits only the selected portion of the audio file. This command is not available if there is not an audio selection on the waveform view.

In both cases, DSP-Quattro shows the following dialog, where:



- **Sample Number:** not all samplers accept the sample number, most append the received sample to the others already in memory.

- **MIDI IN and OUT Devices**: Use the popup menus to select the MIDI device used to connect the Mac to the sampler.

- **Device ID**: a number between 01 and 16, usually 01.

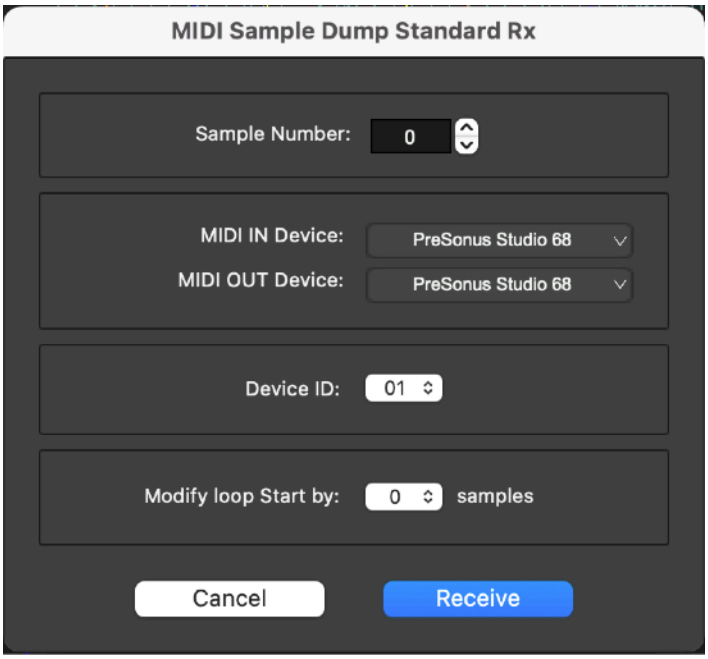
- **Bit Depth**: the protocol accepts values of 8, 12, 14, 16 bits/sample. Please consider that 16 bits/sample option requires more sample data to transfer.

- **MIDI Handshaking**: if ON, DSP-Quattro waits for MIDI acknowledge messages from the sampler at each sample packet transmission. If ON, it is necessary a bi-directional connection between the Mac and the sampler. Moreover, the transmission is safer but slower.

- **Modify loop Start by**: a potential problem can arise when playing the same loop on different samplers, because there is not a standard saying if the loop point must be considered part of the loop or not. It means that in some cases it is necessary to adjust of 1 sample the loop length to play it without any audio glitch. Use this option if playing the same audio file on the destination sampler there is a glitch at loop point to adjust the loop length during the MIDI Transmission such that the same file plays perfectly in both cases

MIDI SDS Receive:

To receive a sample from an hardware sampler according to the Sample Dump Standard protocol by a MIDI connection. As soon as the reception ends, DSP-Quattro creates a new audio file with the received samples.



NOTE: to receive a sample, it is always necessary a bidirectional MIDI connection between the Mac and the sampler or sample-based drum machine.

- **Sample Number:** not all samplers accept the sample number, most append the received sample to the others already in memory.

- **MIDI IN and OUT Devices**: Use the popup menus to select the MIDI device used to connect the Mac to the sampler.

- **Modify loop Start by**: a potential problem can arise when playing the same loop on different samplers, because there is not a standard saying if the loop point must be considered part of the loop or not. It means that in some cases it is necessary to adjust of 1 sample the loop length to play it without any audio glitch. Use this option if playing the same audio file on the destination sampler there is a glitch at loop point to adjust the loop length during the MIDI Transmission such that the same file plays perfectly in both cases

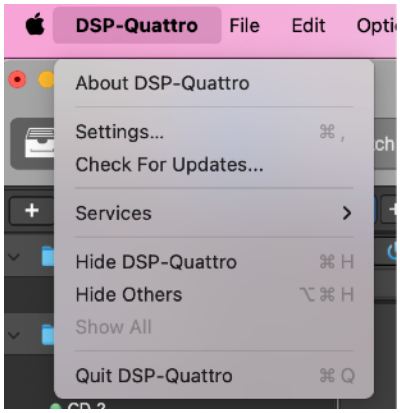
NOTE: some samplers do not listen to the MIDI request for MIDI Sample Dump Standard. In the event that, after clicking on the Receive button, the sampler does not start the transmission automatically, use the manual command on the sampler to start the sample transmission.

After clicking the Receive button, DSP-Quattro always waits several seconds before showing a dialogue about the non-response by the sampler, so that you eventually have the necessary time to start the transmission with a manual command on the external sampler.

More about the MIDI Sample Dump Standard options in the appendix section of this manual.

DSP-Quattro Settings

Use the Settings… menu command on DSP-Quattro application menu bar to open the Settings dialog, where to set the default parameters used by DSP-Quattro at startup or when creating a new Project.



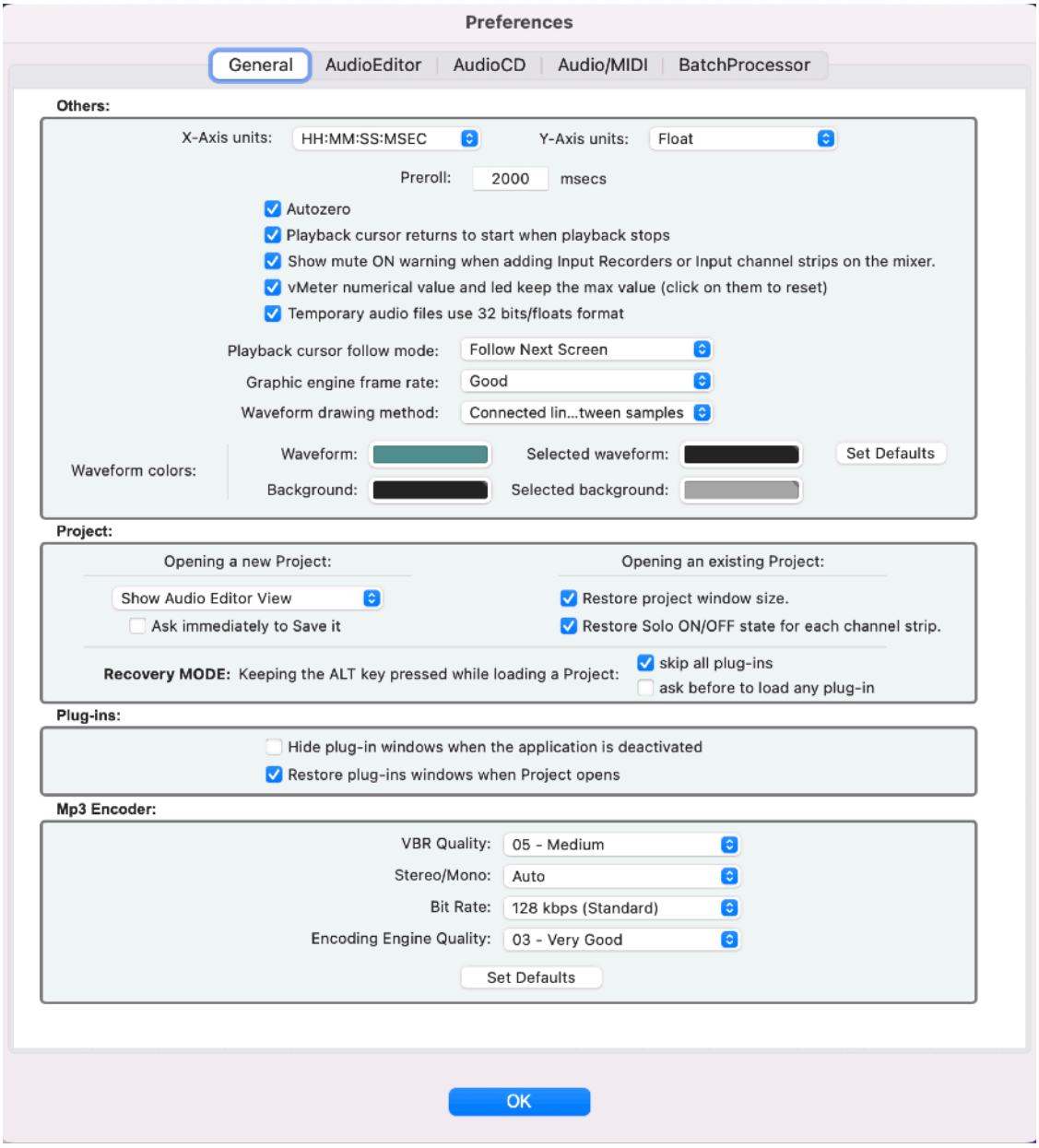
The Settings dialog shows a multi-panel view that gathers all the user configurable settings, split in the following categories:

- **General**: general settings
- **AudioEditor**: Audio Editor settings
- **AudioCD**: AudioCD settings
- **Audio/MIDI:** Audio and MIDI settings
- **BatchProcessor**: BatchProcessor settings

In upper part there are the different tabs to choose the category of configurable settings to show on the lower part.

General Preferences

Selecting the General tab, this view appears.



X-Y Units Options:

- **X-Axis Units:** it allows you to choose the default unit used by DSP-Quattro to represent the time axes on the Time Ruler and for displaying time values. Choose one of the possible options: hh:mm:sec:msec, Seconds, Samples, milliseconds or AudioCD.

- **Y-Axis Units**: the default unit used by DSP-Quattro to represent the audio signal level. Choose one of the possible options: floats (-1.0, 1.0), Decibels (dB).

Other Options:

- **PreRoll:** When DSP-Quattro starts playing, it starts from the cursor playback position minus the PreRoll value. For example, if the playback cursor is positional 10 secs from the beginning of the song, and the PreRoll is equal to 2000 msecs, or 2 secs, at the time of starting to play. DSP-Quattro will start at 8 seconds from the beginning of the song.

- **AutoZero**: if turned ON, when DSP-Quattro sets the position of a marker or of a waveform selection, it automatically moves it to the previous point of Zero Crossing. A Zero Crossing point is the location in which the waveform passes thru the zero level changing its sign. This option is very useful when we want to place markers in a position that has a shared zero level.

- **Playback cursor returns to start when the playback stops**: if turned OFF, the playback cursor remains on the last position reached when DSP-Quattro stops to play. If ON, the playback cursor returns to the position where it started to play.

- **Show mute ON warning when adding Input Recorders or Input Channel Strips to the mixer**: by default, allocating an audio input or input recorder module, DSP-Quattro shows a warning about the fact that it automatically mutes the audio monitoring to avoid unwanted feedbacks between audio inputs and outputs. Set this flag OFF to avoid to see that warning (you can always instruct DSP-Quattro to do not show that warning after the first time).

- **VUMeter numerical value and led keep the max value (click on them to reset)**: By default, The VUMeters maintain their maximum peak values reached. To reset, click on their value. If this option is OFF, the values do not remain fixed on their maximum value.

- **Temporary audio files use 32 bits/floats format**: by default, temporary files used by DSP-Quattro for processing are 32 bits/floats. Turn OFF this option to use 24 bits/Integer to save disk space.

- **Playback cursor follow mode**: by default, DSP-Quattro, playing a song, scrolls the waveform view to follow the playback cursor (follow next screen). It is possible to turn OFF the scrolling.

- **Graphic engine frame rate**: to set how much fast must be the graphic refresh of graphics. “Good” setting is the recommended compromise between smooth graphics and CPU power consumption.

- **Waveform drawing method**: set the method used drawing the waveform. It has a big impact at high x-axis zoom-in levels, like 1:1 or more. Possible methods are: connected lines between samples, one dot for each sample, one vertical line for each sample.

- **Waveform Colors**: it allows you to assign the colors used to draw waveforms and backgrounds. Use the Set Default button to restore these settings to factory values.

Project Options:

- **Show Audio Editor View popup menu**: to set which main view among Audio File Editor, AudioCD Layout or Mixer DSP-Quattro shows when opening a new Project.

- **Ask immediately to save it**: if ON, DSP-Quattro, opening a new Project, immediately asks to save it. If OFF, DSP-Quattro asks to save it when it quits or closing the new Project.

- **Restore project window size**: If ON, when DSP-Quattro opens an existing Project, it restores the Project window size and position as it was when it saved that Project.

- **Restore Solo ON/OFF Status for each Channel Strip**: If OFF, when DSP-Quattro opens an existing Project, it does not restore the Solo button status as it was when saving that Project.

- **Recovering MODE**: keeping the ALT Key pressed while opening a Project, DSP-Quattro opens it in RECOVERING MODE. It is possible to set if it must skip all plug-ins or it must ask before to load each plug-in. Use the Recovering Mode in case of problems loading a saved Project.

Plug-ins:

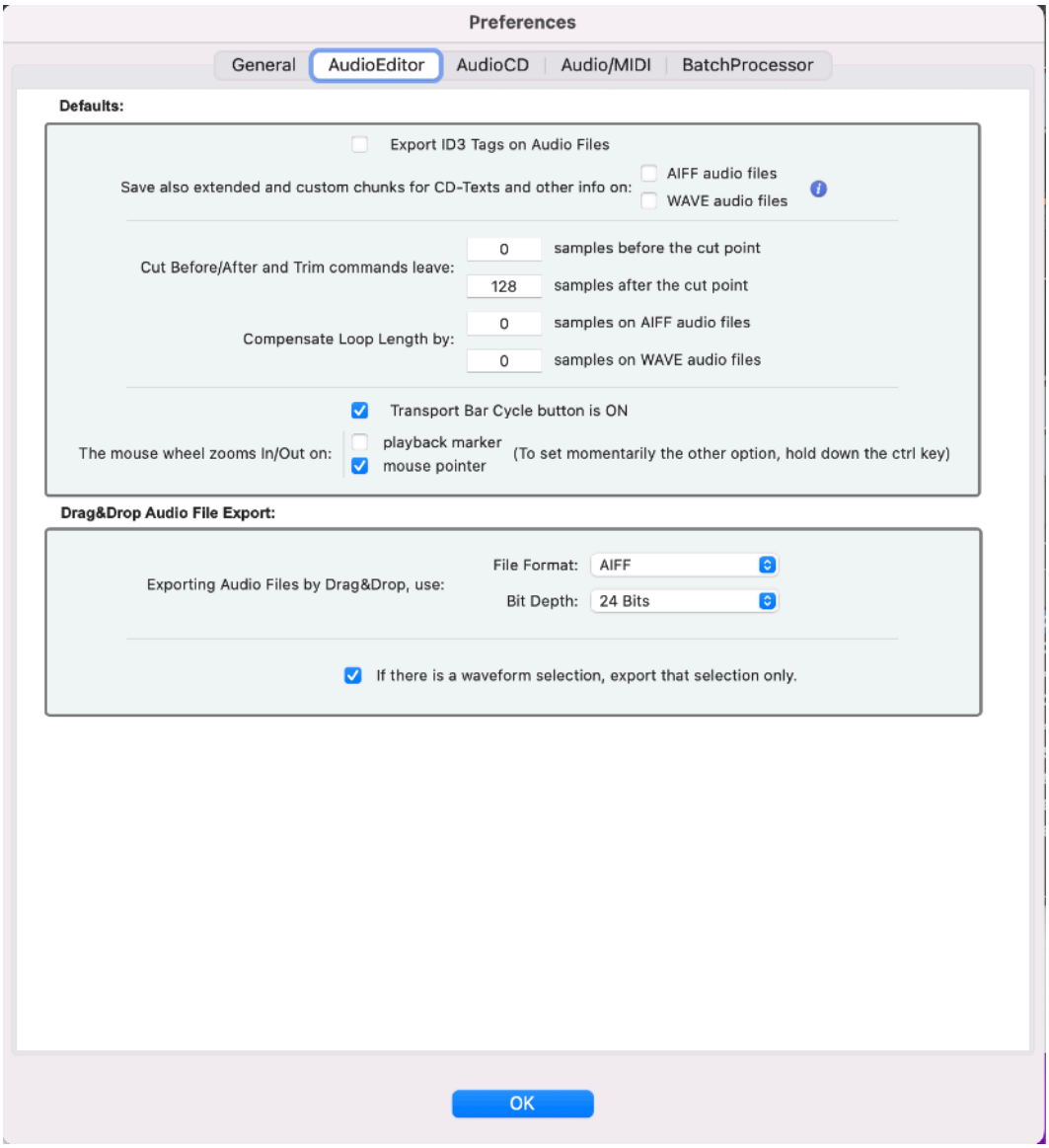
- **Hide plug-in windows when the application is deactivated**: If OFF, when the application goes background, all plug-in windows remains visible on screen. Otherwise, they will disappear until the application becomes foreground again.

- **Restore plug-in windows opening a Project**: If OFF, when DSP-Quattro opens an existing Project, it does not show the plug-ins windows left visible when saving that Project. Otherwise, it restores also the status of all plug-ins windows.

Mp3 Encoder:

These are the advanced settings for the internal mp3 encoder. It is highly recommended to keep the default values if not strictly necessary.

AudioEditor Preferences



Selecting the AudioEditor tab, the above view appears.

- **Export ID3 Tags on Audio Files**: if turned On, DSP-Quattro, saving audio files, writes also the ID3Tag chunk. Be aware that not all applications support ID3Tag standard. If an external application or services has problems reading audio files generated by DSP-Quattro, turn OFF this option for better compatibility.

- **Save also extended and custom chunks for CD-Texts…** Usually custom information and additional chunks for CD-Texts are well supported by other applications, but some hardware samplers are not able to read these chunks on AIFF and WAVE audio files, failing to read correctly also the loop information. Because, even if this option is turned OFF, DSP-Quattro always saves the loop information on AIFF and WAVE audio files, it is recommended to turn this option OFF when using DSP-Quattro to build sample libraries for software or hardware samplers.

- **Cut Before/After commands leave**: it allows you to set two values for the number of samples that DSP-Quattro leaves before and after the cut points, when it is applicable. It is very useful doing sample editing, because several samplers need of some samples after the loop end to loop correctly.

- **Compensate Loop length by**: playing loops on different hardware or software samplers, a potential problem can arise when playing loops, because there is not a standard saying if the loop point must be considered part of the loop or not. It means that in some cases it is necessary to adjust of 1 sample the loop length to play it without any audio glitch. To know if this is necessary or not, create a sine wave audio file for testing, and place the loop points such that it plays without any glitch using DSP-Quattro. Use this option if playing the same audio file on the destination sampler there is a glitch at loop point to adjust the loop length during the import/export until the same file plays perfectly the same in both cases.

- **Transport Bar Cycle button is ON:** if this flag is ON, the Cycle button on the Transport bar will be ON by default on the Audio File Editor main view when opening new Projects.

- **The mouse wheel zooms in/Out on:** to set if, using the mouse wheel for zooming In/Out, DSP-Quattro should scroll the waveform view on the Playback cursor or on the current position of the mouse pointer. Keeping the Cntrl key pressed is always possible to switch between these two options momentarily.

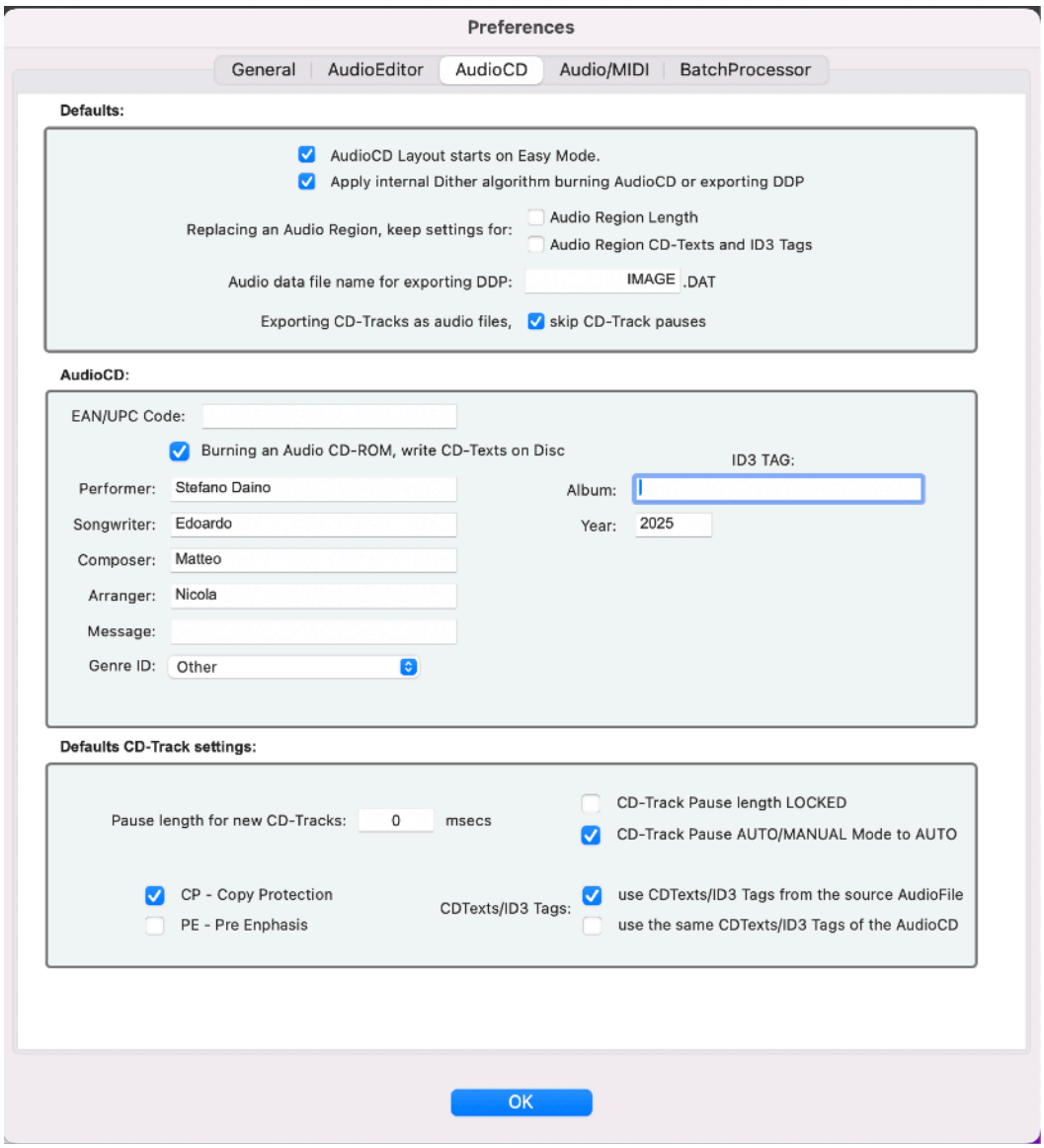
Drag&Drop Audio File Export:

- **Exporting Audio Files by Drag&Drop, use:** it allows to set the file format and bit depth of the destination audio files when exporting an audio file by Drag&Drop to the MacOS file system.

- **If there is a waveform selection, export that selection only:** If OFF, exporting by Drag&Drop to the MacOS finder will always export all the file, even if there is waveform selection.

AudioCD Preferences

Selecting the AudioCD tab, this view appears:



Defaults:

- **AudioCDLayout starts in EASY mode** if turned On, the application sets the AudioCD Layout in EASY mode when loading a New Project. It is the default setting.

- **Apply internal dither algorithm burning Audio CD or exporting DDP** if turned ON (the default setting), the application applies its internal dithering algorithm as final processing stage, just before to burn an audio CD-ROM or exporting it as DDP image. It is necessary to turn it OFF only if the current AudioCD Layout is using a plug-in to do dithering as last processing on the output of the AudioCD Layout.

- **Replacing an Audio Region, keep settings for…** Using the command to Replace a certain Audio Region on the AudioCD Layout, the application can replace also CD-Text and ID3 tags or can keep the existing setting. Moreover, the AudioCD Layout can maintain the length of the Audio Region as it is before to replace, or to set the length of the Audio Region to the length of imported audio file.

- **Audio data file name for exporting DDP:** the DDP defines that the name used for audio data binary file can be whatever you want, and it is indicated into an accessory file into the DDP folder. Use this setting if for any reason it is important to change the default string used by the application.

AudioCD:

These are the default values for CD-Texts and ID3 Tags.

- **Burning an Audio CD-ROM, write CD-Texts on disc**: if OFF, the application does not include CD-Texts when it burn an audio CD-ROM.

Default CD-Track Settings:

- **Pause length for new CD-Tracks:** to set the default value (expressed in milliseconds) for the preGap/pause to use when the application automatically creates a new CD-Track after adding new audio regions on the AudioCDLayout. **NOTE**: the preGap in front of the first CD-Track is fixed to 2 secs according to the Redbook Standard.

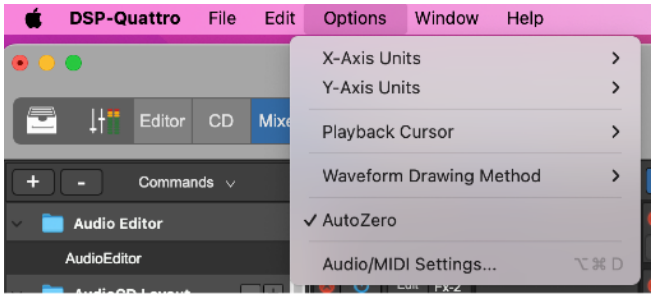
- **CD-Texts/ID3 Tags**: to set if the application, creating a new CD-Track, must use the the CD-Texts/ID3 Tags from the audio file or from the default CD-Texts settings for the AudioCD (see the above AudioCD section).

Use the other fields of this section to set the default settings for the options on the AudioCD Layout CD-Track table. The application uses these setting adding new CD-Tracks on the AudioCD Layout

Audio Settings

Even if the application doesn't need any additional audio hardware to work properly, it supports and manages all audio devices which are compatible with CoreAudio of MacOS. To verify if an external audio device is compatible with MacOS and the application, run the Apple Audio MIDI Configuration utility which is into the Applications/Utility folder. If an audio device is visible among the list of available audio devices on the Audio Configuration window, then the application is surely be able to use it for audio I/O.

NOTE: To assign and configure the audio device used by the application for audio input/output, it is also possible to use the menu command on the application top menu bar **Options->AudioSettings…** menu command from the application top menu bar:



These are the options for Audio I/O settings:

- **Audio Settings**: in the upper part, two popup menus allow you to set which I/O device must be used by the application to play on output (output device) and to receive audio on input (input device).

Among the available devices, there is always a “System” device, which is the one assigned as default to MacOS for audio I/O. By default, the application starts using the System device.

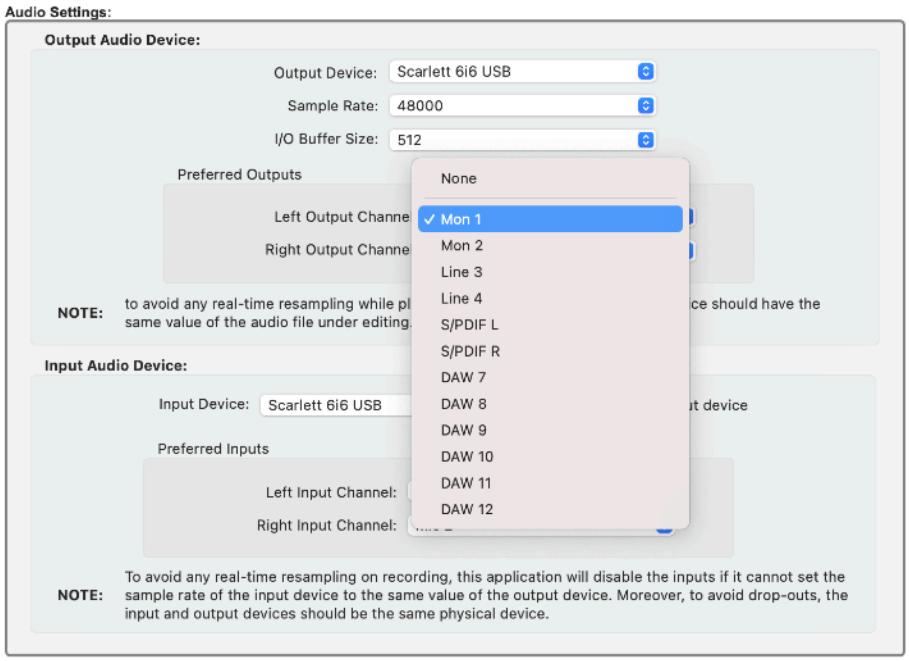
NOTE: **it is highly recommended to set the same physical audio device for both inputs and outputs. Other settings may produce audio drop outs and clicks**.

Turning ON the **Sync menu selections** check box, choosing an audio device for output and/or input, the application tries to do the same choice for the other device (input device when choosing the output, and the contrary) automatically. This with the purpose to assign the same physical hardware interface for both Inputs and Outputs. It is highly recommended to keep this option On.

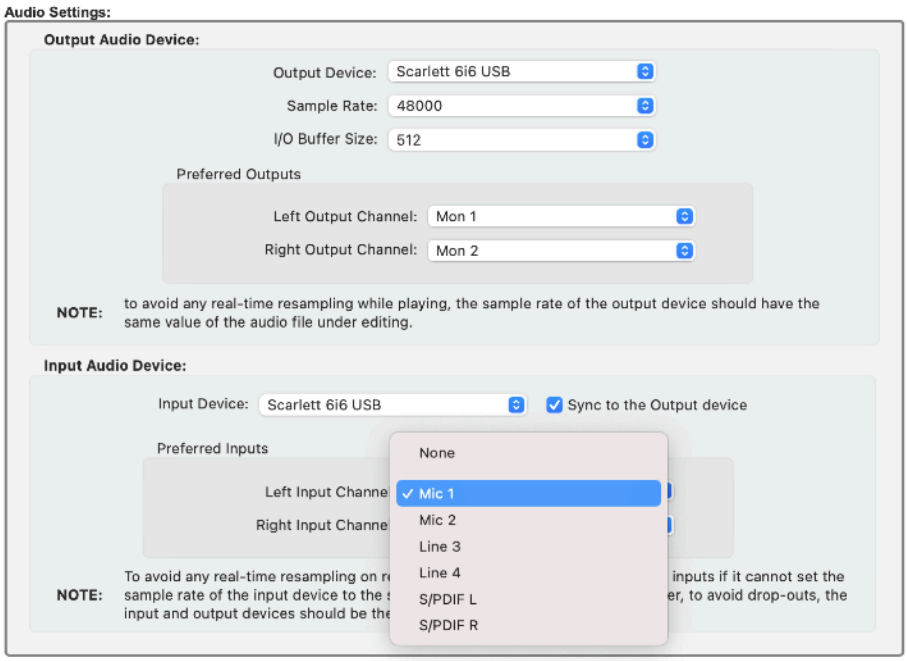
- **Preferred Inputs/Outputs**: these popup menus list the available audio input or output ports available on the current audio device (ie the audio device which is selected on the I/O Audio Device popup menu above).

These preferred Input and Output channels are the channels which the application uses by default as input ports on the audio recorder and which uses for playing its output.

As an example, choosing the Scarlett 6i6 as input and Output audio device, which is a multi-port audio device, this is what the application shows as a possible choice for the preferred output channels:



And this for the preferred input channels:



With the above settings, the application plays always using the Mon1 and Mon2 output audio ports of the Scarlett 6i6 audio device. Opening the Audio Recorder to record the Inputs, the Mic1 and Mic2 are the default input ports.

Of course, when working on a DSP-Quattro Project, it is always possible to manually set a different audio port for both inputs and outputs, regardless of the default values set by default.