KRISTAL AUDIO ENGINE

REFERENCE MANUAL

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GETTING STARTED

What is KRISTAL Audio Engine?

KRISTAL Audio Engine is a powerful multi-track recorder, audio sequencer and mixer – ideal for anyone wanting to get started with recording, mixing and mastering digital audio.

It is designed as a modular system. The main application provides a mixing console, while the audio sequencer, live audio input and so on are loaded as separate PlugIns.

KRISTAL Audio Engine is **free** for personal, educational and non-commercial use.

If you want to use it for **commercial** purpose, please purchase a license online at http://www.kreatives.org/kristal

Key Features

KRISTAL Audio Engine

- 16 audio tracks
- 32 Bit floating point audio engine
- 44.1 to 192 kHz sample rate*
- Downmix to 16/24/32 Bit audio files
- 3-band parametric EQ &
- 2 VST insert slots per channel
- 3 VST master effect slots
- ASIO low latency audio driver support
- 4 KRISTAL Plug-In slots
- Load/Save KRISTAL project files
- Supported file formats: WAVE, AIFF, FLAC, Ogg Vorbis

The following Plug-Ins are included in the KRISTAL package:

KRISTAL Waver

- the sequencer Plug-In for KRISTAL
- multichannel harddisk recording via ASIO/MME
- ASIO input monitoring
- audio clip arrangement
- audio clip fade-in/fade-out/crossfade
- unlimited undo/redo
- AES 31 Export

KRISTAL LiveIN

- connect your mic/guitar and play thru KRISTAL using VST effects in realtime

KRISTAL Effects Plug-Ins

- KristalMultiDelay
- KristalChorus
- KristalReverb
- Kristalizer

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* The available sample rates depend on the audio hardware you are using

KRISTAL User Interface Overview

When starting KRISTAL Audio Engine one or more of the following components appear on your screen.

Click a component to learn more about it...

1. Mixer
2. Transport Panel
3. Channel EQ
4. KRISTAL Waver
5. KRISTAL LiveIN

The KRISTAL Mixer

1. Audio Inputs
2. Audio Output
3. Performance Meter
4. Channel Strips
5. Master Channel

1. Audio Inputs

In the top-left of the mixing console window are four Audio Input 'slots', where you can choose an audio source to connect to.

By default, 'Audio Input 1' has the KRISTAL Waver PlugIn selected (although this is optional). The others default to 'No Input'.

Click on 'Waver' or 'No Input' and a pop-up menu appears. Here you can choose which of KRISTAL's 'input PlugIns' you want to use: the 'KRISTAL Waver' PlugIn, or the 'KRISTAL LiveIN' PlugIn.

- The KRISTAL Waver PlugIn is a powerful multi-track recorder, supporting up to 16 tracks, with extensive non-destructive audio editing capabilities. Since each Audio Input slot can host its own KRISTAL Waver PlugIn, a total of 64 audio tracks is theoretically available (although only 16 of these can be connected to the mixer simultaneously).
- The KRISTAL LiveIN PlugIn allows you to route any external sound source connected to your computer (for example, a microphone or a guitar) directly into the mixer, where it can be processed in 'real time' via VST effects PlugIns and the channel EQs.

Clicking the e button beside each of the input PlugIn slots opens or closes the main 'editor' window for the selected PlugIn. In the case of KRISTAL Waver, this is the main audio sequencer arrangement window.

2. Audio Output

The Audio Output pop-up menu allows you to choose which of your computer's audio devices will be used to play sound from KRISTAL.

The available options will depend upon what hardware and drivers you have installed.

Clicking the button beside the Audio Output slot opens a control panel where you can adjust special settings for chosen device. Only some (ASIO) sound card drivers provide this functionality.

3. Performance Meter

The Performance Meter shows what percentage of your computer's available processing power KRISTAL is using.

Ideally, you should try to keep the meter below about 75% in order to get the best 'real time' performance from your system.

If you find your computer is struggling (e.g. unresponsive mouse pointer, interruptions in the sound), you may need to reduce the number of VST effects or audio tracks in your project – perhaps by exporting a mixdown of some or all of the tracks.

4. Channel Strips

KRISTAL's mixer window features a total of 16 channel 'strips', much like those you'd find on a conventional hardware mixing console. Each channel strip offers the same basic controls:

A vertical 'fader' allows you to control the level or volume of the sound passing through the mixer channel.

By default the fader is set to '0.0', meaning that the level of the incoming signal is unchanged. Moving the fader down reduces the volume, moving it up increases it. Right-clicking the fader resets it to 0.0dB.

To the right of each fader is an animated meter, which displays the changing level of the signal.

If the level of the signal exceeds a certain threshold, a 'CLIP' warning will appear at the top of the display.

You should be careful when mixing not to allow any of the mixer channels to clip, as excessive clipping can result in unpleasant-sounding distortion in the final mix. If a signal clips, lower the fader slightly and click on the CLIP warning to reset the display. If it still clips, lower the fader again and repeat the process until no CLIP warnings are displayed.

Above each channel fader is a 'pan' control (a small horizontal display, containing a vertical bar).

- If a **mono** signal is connected to the channel, dragging the 'bar' to the left or right allows you to control on which side of the overall stereo 'image' the sound will sit.
- If a **stereo** signal is connected to the channel, the pan control adjusts its 'balance', i.e. the relative levels of the left and right channels.

Above the pan control are the 'mute' and 'solo' buttons, labelled 'M' and 'S' respectively.

- Activating the mute button mutes the channel, i.e. the affected channel can't be heard in the final mix.
- Activating the solo button mutes **every other** channel, i.e. **only** the affected channel can be heard in the final mix.

Beside the mute and solo buttons is a small display which indicates whether a mono or stereo signal is connected to the channel. A circle icon appears when a mono signal is connected; two inter-locked circles appear for stereo signals.

Above the mute and solo buttons, each mixer channel has its own independent effects and EQ.

These are explained in their own sections of the manual.

5. Master Channel

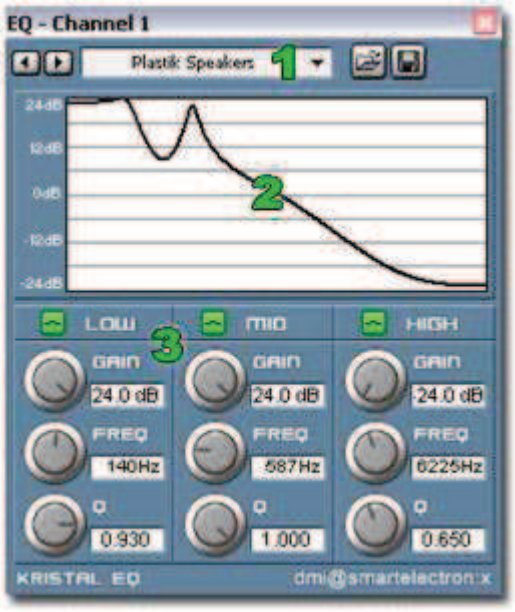
The Master Channel (at the far right of the mixer window) is similar to the other mixer channels, except that it is used to control

the **overall** level of the stereo mix.

While the other mixer channels have one fader, the Master Channel has two. By default these are 'linked', so that moving one causes the other to move as well.

Right-clicking either of the Master Channel faders resets both to '0.0'. Holding 'Alt' while dragging allows the faders to be adjusted independently.

Channel EQs



1. EQ Presets
2. EQ Curve Display
3. Low, Mid and High Bands

Using EQ

Each KRISTAL mixer channel has its own three-band parametric equalizer or 'EQ', which you can use to 'shape' the sound.

EQ can be used either subtly to fine-tune sounds as an aid to mixing, or 'creatively' as a way of making drastic alterations to the sound.

- Each channel EQ can be toggled on or off by clicking the 'activate' button.
- Clicking the e button opens the editor window, where you can access the EQ controls.

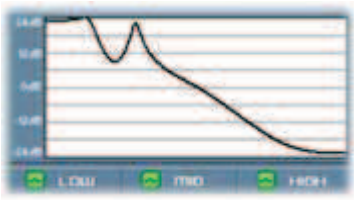
1. EQ Presets

At the top of the EQ editor window is a pop-up menu from which you can recall several 'presets' e.g.:

- 'Flat' is the default, and is effectively 'EQ Off'.
- 'Bass Boost' boosts the low-frequency content of the sound, to emphasise the bass.
- 'Sparkle' boosts higher frequencies, to emphasise the brightness in the sound.
- 'Telephone Vox' cuts the low and high frequencies, while boosting the mid-range. Try it on vocals!

The 'load' and 'save' buttons beside the preset menu allow you to save and re-load your own EQ presets. You can save individual presets as *.fxp files, or whole banks of presets as *.fxb files.

2. The EQ Curve Display



The EQ Curve Display (frequency response) is like a 'graph' of the equalization being applied.

The horizontal axis of the graph represents the range of audible frequencies; 'left to right' corresponds with 'low to high'.

The vertical axis represents the amount of 'cut' or 'boost' applied.

3. The Low, Mid and High Bands

The channel EQs allow you to adjust Low, Mid and High frequency 'bands' in the sound independently. Each of the three bands offers the same controls:

- 'Gain' adjusts the amount of cut or boost to be applied.
- 'Freq' controls where in the overall frequency spectrum the affected band will be.
- 'Q' determines the 'width' of the affected frequeny band (i.e. the 'sharpness' of the EQ curve).

The Transport Panel

1. Cycle Mode and Locators
2. Pre-count
3. Transport buttons, Time display
4. Metronome, Tempo, Time signature

1. Cycle Mode and Locators

KRISTAL can be set to automatically cycle or 'loop' round a section of an Arrangement.

This might be useful for rehearsing a part prior to recording an overdub, for example.

Cycle mode is activated by clicking the 'CYCLE MODE' button.

Before activating Cycle mode, you must specify a section of the arrangement to cycle around, by setting the Left and Right 'locators'. This can be done by holding 'Ctrl' and clicking on the timeline ruler at the top of the KRISTAL Waver window. Left-clicking sets the position of the Left locator, right-clicking sets the position of the Right locator.

The 'L' and 'R' displays show the exact positions of the Left and Right locators, in either seconds, samples or bars and beats (see 'Time display' below for more information about the different time formats).

For reasons of sanity, KRISTAL will ignore Cycle mode when the Left and Right locators are set less than 1 second apart!

2. Pre-count

Pre-count can be activated by clicking the 'PRE-CNT' button.

With Pre-count active, KRISTAL pauses for a 'count in' before starting to Play or Record.

You can set the length of the Pre-count by choosing the desired number of beats (1 to 10) from the pop-up menu (the default is '4').

Pre-count can be useful simply because it allows you a few moments to 'prepare yourself' before recording a take.

3. Transport buttons, Time display

KRISTAL's Transport buttons are very like the controls you'd find on a conventional tape or hard-disk recorder.

From left to right:

- 'Locate start' jumps the playback marker back to the start of the song.
- Rewind' moves the playback marker backward in time.
- 'Stop' halts playback or recording.
- 'Play' starts the playback
- 'Record' begins recording (see Recording for more details).
- 'Forward' moves the playback marker forward in time.

'Locate end' jumps the playback marker forward to the end of the song.

The Transport controls can also be accessed via keyboard shortcuts.

Above the Transport buttons is the Time display, which shows the current position of the playback marker, in the current time format.

You can change the current time format on the pop-up menu in the bottom right-hand corner of the Time display.

The available time formats are:

- Seconds ('SEC' appears in the time display). Time will be expressed as "**HH.MM.SS.ms**"
- Samples ('SAM' appears in the time display). Time will be expressed as raw sample frames.
- Bars and Beats ('BAR' appears in the time display). Time will be expressed as "**Bar.Beat.16th.Remainder"**

The time format chosen in the Transport Panel does not affect the time format used in the KRISTAL Waver window: both can be set independently.

4. Metronome, Tempo, Time signature

The Metronome can be activated by clicking the 'METRON.' button.

When active, it plays a simple 'click' on each beat to indicate the current tempo.

The vertical slider on the far right allows you to adjust the metronome volume to a comfortable level.

Beneath the 'METRON.' button is the Tempo field, which by default shows '120 BPM' ('Beats Per Minute').

Double-clicking the Tempo field allows you to enter a new value.

Beneath the Tempo field is the Time Signature field, which by default shows '4/4'.

Double-clicking the Time Signature field allows you to enter a new value.

'4/4' means 'four beats to the measure' (sometimes called 'common time'). This is probably the setting you'll want to use most often. Other common time signatures include '2/4', '3/4' ('waltz time'), 5/4 and 7/8. (Many others are possible, but are unlikely to be required often.)

Key Commands

KRISTAL allows a number of commonly-used commands and functions to be conveniently accessed via keyboard shortcuts.

Once you're familiar with them, these can help you to work much more quickly than by using the mouse alone.

General commands

These commands apply throughout the KRISTAL Audio Engine application:

[Ctrl] + N	New Project
[Ctrl] + O	Open Project
[Ctrl] + S	Save Project
[Ctrl] + [Shift] + S	Save Project As
[Ctrl] + Q	Quit
[F1]	Help
[F2]	Transport Panel
[F3]	Mixer

Transport controls

These commands apply to the Transport Panel:

[Enter]	Play
[Numpad 0]	Stop
[Numpad *]	Record
[Numpad ,]	Locate Start
[Numpad 1]	Jump to Left Locator
[Numpad 2]	Jump to Right Locator
[Space]	Toggle Play/Stop

KRISTAL Waver key commands

These commands apply to the KRISTAL Waver window (please note that the window must be in foreground for these commands to work):

[Ctrl] + A	Select all
[Ctrl] + D	Deselect all
[Ctrl] + C	Copy Selection
[Ctrl] + X	Cut Selection (to Clipboard)
[Ctrl] + V	Paste from Clipboard to selected track
[Ctrl] + Z	Undo

[Ctrl] + Y	Redo
[Del]	Delete Selection
[1]	Switch to Select tool
[2]	Switch to Cut tool
[3]	Switch to Glue tool
[P]	Set Cycle to Selection
[Numpad 3]	Jump to Selection
[H] or [Ctrl +]	Zoom In
[G] or [Ctrl -]	Zoom Out

VST Effects

Ctrl+Clicking the  button in a mixer channel strip opens a generic 'editor' window for the selected VST Plug-In, ignoring any custom editor window provided by the Plug-In.

Preferences

The Preferences dialog is accessed by choosing 'Preferences...' from the 'Engine' menu of the main KRISTAL Audio Engine window.

A range of different settings can be made, in four different categories.

- General
- Audio Setup
- VST Effects
- Devices

1. General

'Start with KRISTAL Desktop'

When 'Start with KRISTAL Desktop' is selected the KRISTAL Audio Engine application opens as a large 'parent' window, occupying the whole of your Desktop. The Mixer controls are then available in a smaller sub-window.

The default Desktop background pattern can be replaced by one of your own. Simply click the 'Select...' button and choose a suitable Bitmap (*.bmp) file in the dialog that appears.

'Load Sequencer Plug-In automatically'

By default, KRISTAL starts with the KRISTAL Waver Plug-In automatically loaded. Un-checking 'Load Sequencer Plug-In automatically' over-rides this. If you then want to open KRISTAL Waver, you'll need to select it as an Input Plug-In in the Mixer window.

'Open Last Project on Startup'

Forces KRISTAL to automatically load the last project (*.kristal) at startup.

'External Audio Editor'

Select the prefered application for editing audio files.

See also Edit in External Editor

1.1 General - Controls

'Knob Behavior'

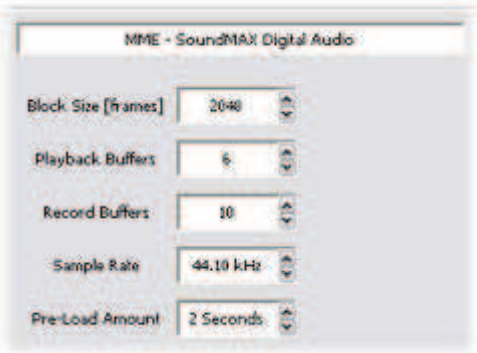
Changes the behavior of knob controls when clicking and dragging:

- 'Circular' means the knob must be 'turned around' similar to a real knob.
- 'Linear' means dragging the mouse up and down changes the value.

Circular Linear

2. Audio Setup

The 'Audio Setup' may differ, depending on the currently selected Audio Output device:



For MME devices you can set Blocksize, Playback Buffers, etc. here. ASIO drivers usually provide their own control panel.

'Block Size'

All mixing and effect processing is done in blocks of this size, e.g. a block size of 1024 audio frames equals approximately 23ms of audio material at a 44.1 kHz sample rate.

If you're using an ASIO compatible audio device, the block size is determined by the ASIO driver; it can usually be changed in the driver's control panel.

If you're a using a standard MME audio device, the block size can be changed directly from within KRISTAL.

With a smaller block size, KRISTAL will be more 'responsive', e.g. changes to volume, pan and effects parameters will happen more immediately. On the other hand, a too small block size may result in interrupted playback. You should experiment to find the optimum settings for your system.

'Playback Buffers' (MME only)

KRISTAL 'caches' all incoming and outgoing audio data in several memory 'buffers' to ensure smooth, uninterrupted sound. You can set the number of memory buffers to be used for playback and recording independently.

Increasing the number of buffers helps eradicate 'glitches' in the sound - but more buffers also results in greater 'latency'. Latency is the delay caused when the computer processes sound on its way in or out of the system.

The total audio system latency can be calculated as follows:

- Input Latency = Record Buffers * Blocksize
  e.g. 10 * 1024 = 10240 audio frames => ~232 ms @ 44.1 kHz
- Output Latency = Playback Buffers * Blocksize
  e.g. 6 * 1024 = 6144 audio frames => ~139 ms @ 44.1 kHz
- Total Latency = Input + Output Latency => 232 ms + 139 ms = 371 ms

An incoming signal (e.g. from a microphone) will be audible on the output (e.g. speaker) after 371 ms.

The above applies to MME audio devices. In contrast with these rather high latencies, ASIO provides latencies <= 10 ms, which makes recording real-time 'live' performances possible.

'Record Buffers' (MME only)

See 'Playback Buffers' above.

'Sample Rate' (ASIO and MME)

Altering the sample rate affects the 'frequency response' of the recordings you make. Generally, a higher sample rate results in 'better' sound quality, in the sense of greater 'clarity' in the high end.

A sample rate of 44.1 kHz results in 'CD quality' audio.

The available sample rates depend upon the capabilities of your audio hardware. KRISTAL supports hardware capable of 44.1, 48, 88.2, 96 and 192 kHz sample rates.

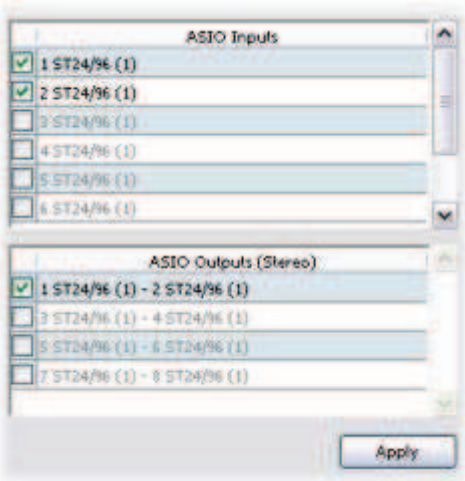
'Pre-Load Amount' (ASIO and MME)

The 'Pre-Load Amount' setting determines how much audio material should be read at once from the hard disk.

For example, a Pre-Load of 2 seconds means that KRISTAL Waver tracks are 'cached' 2 seconds in advance. (Similarly, changes made to clip volume/fades will be audible after 2 seconds, plus the current output latency.)

'No Pre-Load' means the mixer reads audio data directly from hard disk. This option should not be used in conjunction with small block sizes - take note, ASIO users!

2.1 ASIO Channel Setup



Different ports of multi-channel ASIO cards can be activated or deactivated independently. Only 2 inputs and outputs are active by default.

- Click 'Apply' to make your changes valid.
- Select the desired output port in the mixer master channel.
- Select the desired input port for recording in the KRISTAL Waver.

3. VST Effects

'Scan global VST Folder'

Windows allows applications to register a 'global' folder for VST Plug-Ins, so that every VST host application can look in the same place for Plug-Ins to load. Checking 'Scan global VST Folder' tells KRISTAL to scan this folder on start-up (if it exists) and load whatever it finds in there.

'VST Folders'

In addition to the global folder, up to three other, different VST Plug-In folders can be nominated.

VST Editor Windows 'Always on top'

If checked, VST editor windows stay 'on top', respectively above mixer and Waver window. Changing this setting does not affect currently opened editors immediately.

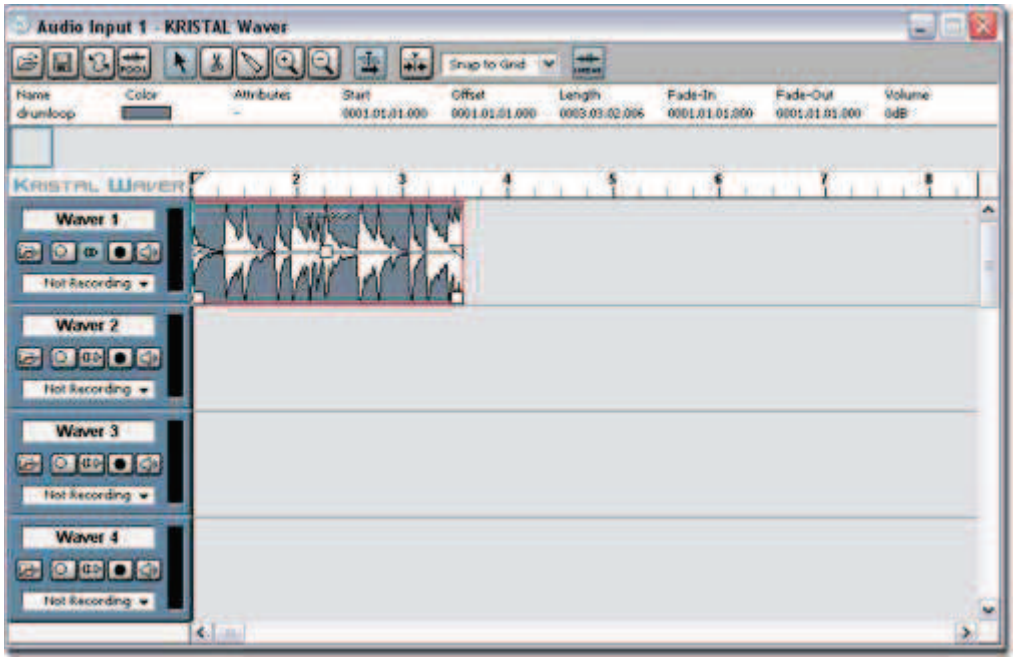
4. Devices

Here you can disable ASIO or MME devices, meaning that they do not appear in the menus anymore after program restart.

This can be useful e.g. if a device does not work correctly with KRISTAL. If you have an ASIO card the inputs/outputs appear a second time as MME devices. It is recommended to disable the MME devices in this case.

Please note that the actual output device/ASIO driver is selected in mixer window (see Audio Output).

KRISTAL Waver



What is KRISTAL Waver?

KRISTAL Waver is KRISTAL Audio Engine's audio sequencer Plug-In.

It provides the main workspace in which you'll do most of your recording, editing and arranging, and offers a variety of powerful tools to make your work as quick and easy as possible.

The User Interface

If you've ever worked with an audio sequencer or hard-disk recorder before, you'll probably be able to figure out the basics without any trouble.

> Even if you're a newcomer, absolutely the best way to learn KRISTAL is by using it, so feel free to Minimize this browser window for now, and start playing! A lot of KRISTAL Waver's features are fairly self-explanatory - and if you do get stuck, you know where to come for help...

KRISTAL Waver's user interface can be broken down in to the following basic components:

- The Waver Toolbar
- The Waver Arrangement
- Track Controls

In the course of looking at these, we'll also pause to talk about a couple of basic KRISTAL concepts:

- Audio Parts
- The Waver Pool

The Waver Toolbar

The Waver Toolbar can be found at the top of the KRISTAL Waver window, and contains the following controls:

Load/Save Arrangement

The Load and Save buttons can be used to load and save KRISTAL Waver Arrangement files (*.waver).

Arrangement files are different from the Project files (*.kristal) saved from the Mixer window (or from the main application window, if you have the KRISTAL desktop activated). While Project files contain a complete record of your work, including mixer settings and Plug-In parameters, Arrangement files contain only settings relevant to the KRISTAL Waver window, e.g. the names of the project's audio files, their relative positions on the timeline, etc.

Additionally, KRISTAL Waver can export the arrangement to AES 31 ADL files (*.adl).

AES 31 is an 'industry standard' developed by Audio Engineering Society (AES) for the exchange of edit data between DAWs (Digitial Audio Workstations). This could be useful if you want to transfer your songs to a professional recording studio for further mixing or post-production.
For more information on AES 31, see http://www.aes.org.

Edit History

The Edit History button opens the Edit History dialog, which can be used to re-trace your steps back through a list of the changes made in the course of the session.

The Edit History dialog shows a list of recent edits, each with a more or less descriptive name, e.g. **Edit Volume @ 'drumloop'** or **Cut part 'Bass line chorus'**.

To return to an earlier state, just click on the name of the edit you want to revert to; it's name will be underlined in red, and you'll see the KRISTAL Waver window update accordingly.

Once you've found the edit you want to revert to, click the 'Close' button to return the main KRISTAL Waver window.

The Edit History list can also be accessed by right-clicking in the Arrangement and choosing 'Edit History' in the context menu that appears. The most recent edit can be undone by choosing 'Undo:' in the same menu.

Waver Pool

Clicking the 'Pool' button opens the Waver Pool dialog, which displays a list of the audio files used in the current project. Click on a filename, and a summary of the file's properties is displayed at the top of the dialog.

- If a file can't be found (for example, if it's been deleted or moved) its name will be 'greyed-out' in the list. If you know where a missing file has been moved to, you can tell KRISTAL by clicking the 'Locate Missing...' button and navigating to the file's location in the dialog that appears.
- Recorded (or Bounced) files are displayed in red.

Select, Cut and Glue

Select, Cut and Glue are three different cursor tools available in KRISTAL Waver.

Select is the default, and it resembles an ordinary mouse pointer 'arrow'. You can use the Select tool to move audio parts around in the Arrangement, edit volume envelopes and so on.

Using the Select tool in conjunction with the 'Alt', 'Ctrl' and 'Shift' keys, alters its behaviour in several useful ways. We'll see examples of this when we look in more detail at working with audio parts.

The **Cut** tool is activated by clicking the 'Scissors'. The mouse pointer changes to a smaller arrow icon, with a floating 'hint' beside it showing the current pointer position, expressed in whatever the chosen time units are (for more information about time units, see The Waver Arrangement).

Clicking on an audio part with the Cut tool causes it to be split in two at the point where you clicked. The two halves can then be treated as separate parts, moved to different tracks, etc.

The **Glue** tool is more or less the opposite of the Cut tool, i.e. it joins two separate parts together to create a new one. First select the Glue tool, then click on the first of the two parts you want to join together, then click on the second. A special kind of 'Folder part' is automatically created in the track, containing the two chosen parts, and any empty space between them required to maintain their relative positions.

Note: only audio parts on the same track can be Glued together.

Clicking on an audio parts within a selected Folder part, causes the part to be separated and removed from the Folder, effectively undoing the Glueing process.

Zoom In/Out

The Zoom In and Out buttons provide a simple way to enlarge or reduce the size (width) of the audio parts displayed in the arrangement.

- Zoom In when (for example) you need to make careful, precise edits with the Cut tool.
- Zoom Out when (for example) you want a clear, at-a-glance overview of the whole arrangement.

It's also possible to use keyboard shortcuts to Zoom In and Out. You can Zoom In by pressing 'H' or 'Ctrl' and '+'. You can Zoom Out by pressing 'G' or 'Ctrl' and '-'. In addition, clicking and dragging on the blue rectangle in the strip above the timeline ruler allows you to Zoom In or Out dynamically, as required.

Autoscroll

When Autoscroll is activated, the arrangement window will automatically re-draw during playback and recording, so that the song position marker is always visible on screen.

When Autoscroll is not activated, the song position marker will run off the edge of the screen when it reaches the end of the visible portion of the arrangement.

Playback and recording are unaffected, regardless of whether Autoscroll is on or off.

Snap, and Snap Preset menu

The Snap option can be used to make editing and arranging in the KRISTAL Waver window easier.

When Snap is activated, it's as if an invisible 'grid' has been super-imposed over the Arrangement.

Any audio parts moved using the Select tool will automatically adjust their positions when released to 'Snap' to the nearest grid line. You can change the 'resolution' of the Snap grid by choosing a new value in the 'Snap to Grid' drop-down menu.

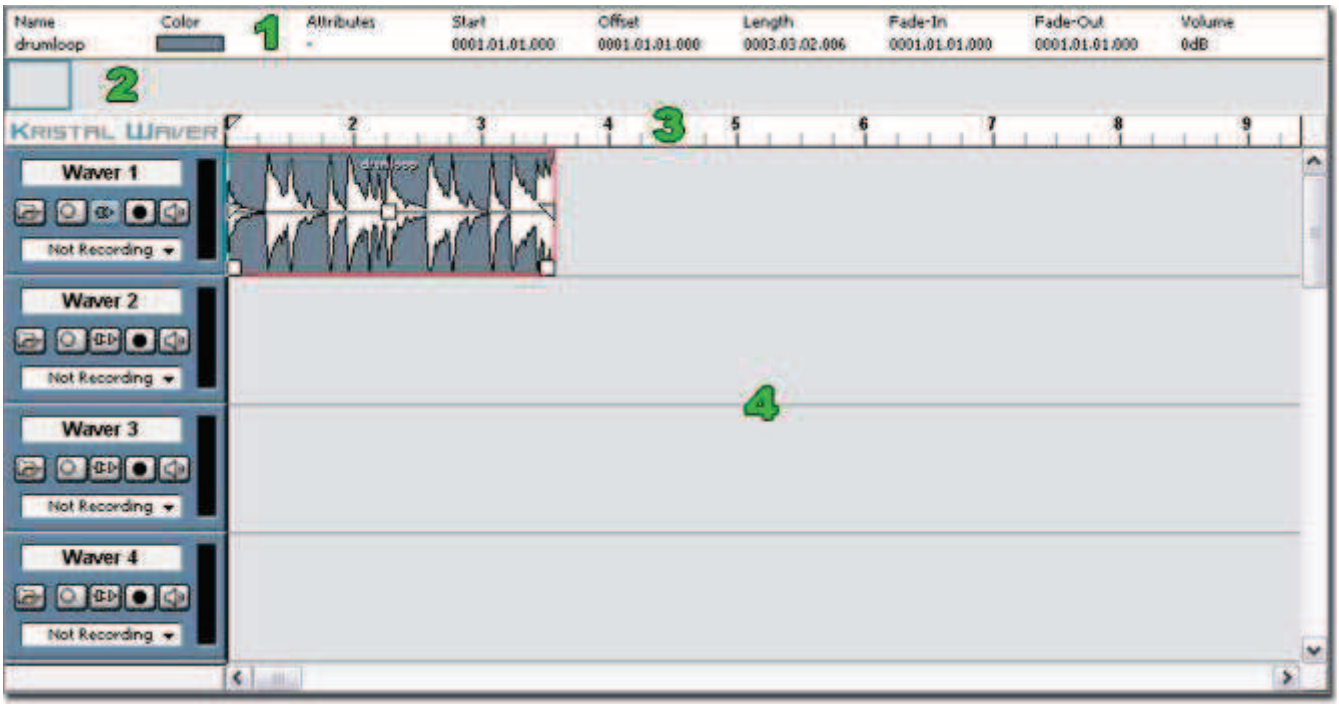
By default, the Snap grid is calibrated in 'Seconds'. You can change this by right-clicking on the ruler along the top of the Arrangement, and choosing 'Samples' or 'Bars+Beats' from the context menu that appears. 'Bars+Beats' will probably be the most useful setting when you're arranging a song, since it allows you to ensure that your different takes can be edited to play perfectly in time with one another.

Timebase Linear/Musical

Clicking this button toggles the Timebase of all tracks between 'Linear' (default) and 'Musical'.

- 'Linear' means the sample positions of audio parts remain unaffected when changing the tempo in Transport Panel. This results to an offset in 'Bars+Beats' raster.
- 'Musical' means the PPQ position (quarter position) remains if the tempo is changed (the sample position is corrected accordingly).

The Waver Arrangement



The Waver Arrangement is where you can work 'hands-on' with the various audio parts and folders that make up your project.

1. Info Line

The white strip at the top of the Arrangement (immediately below the Toolbar) shows various information about the currently selected object.

If no object is selected, the Info Line (unsurprisingly) displays the message 'No Object Selected'.

When an audio part is selected in a track, the part is outlined in red and the Info Line displays the following:

- **Name** is the name of the audio part (by default, this is the name of the audio file minus its filename suffix, e.g. 'sound' rather than 'sound.wav'). Double-click this field to enter a new name of your choice. Renaming the audio part does not rename the audio file on your harddisk.
- **Color** shows a small rectangle of the color of the audio part as it appears in the Arrangement. Clicking the rectangle opens a color selector dialog, where you can choose a new color.
- **Attributes** has no value by default. Clicking the '-' field allows you to choose one of three options from a drop-down menu:
    - **Muted** mutes the part, so it won't be heard on playback or included in a mixdown.
    - **Locked** locks the part, so it can't be moved or modified in any other way.
    - **Transparent** makes the part appear transparent in the Arrangement - which may be useful if you have over-lapping parts on a track.

- **Start** shows the start time of the part, expressed in the currently-selected time units (see 'Time Ruler' below).
- **Offset** shows the difference between the start of the audio part and the start of its parent audio file, (see Audio Parts and Folders for more details).
- **Length** shows the length of the selected part, expressed in the currently-selected time units. Note: the length of a part may be less than the length of its parent audio file. It's also affected by the Offset value (see above).
- **Fade-In** gives the length of any Fade-In applied to the selected part, expressed in the current time units (see Audio Parts and Folders for more details).
- **Fade-Out** gives the length of any Fade-Out applied to the selected part, expressed in the current time units.
- **Volume** shows the amount of cut or boost applied to the selected part, expressed in decibels (see Audio Parts and Folders for more details).

Folder parts provide similar information, but they do not have separate Volume settings (no Fade-In, Fade-Out, Volume).

2. Zoom Strip

The Zoom Strip is the pale blue strip immediately below the Info Line.

The blue rectangle in the Zoom strip represents the section of the Arrangement visible in the KRISTAL Waver window. Resizing the rectangle (by clicking and dragging either end of it) consequently Zooms the Arrangement view in or out.

Shrinking the blue rectangle effectively Zooms **in** on the Arrangement, since the whole window is then used to display a smaller section of the Arrangement. Conversely, expanding the blue rectangle effectively Zooms **out**, since a larger section of the Arrangement will then be shrunk to fit within the window.

3. Time Ruler

The Time Ruler is immediately below the Zoom Strip, and provides a clear visual indicator of the current time positions of objects in the Arrangement.

Left-clicking on the Time Ruler moves the playback position marker to the point where you clicked.

Right-clicking on the Time Ruler opens a context menu, from which you can choose which time units the ruler is calibrated in:

- 'Seconds' means that time will be expressed as "**HH.MM.SS.ms**"
- 'Samples' means that time will be expressed as raw sample frames.
- 'Bars and Beats' means that time will be expressed as "**Bar.Beat.16th.Remainder**"

Changing the selected time units for the Time Ruler also changes the time units used in the Info Line (see above). However, changing time units in the KRISTAL Waver window does **not** affect the time format used in the Transport Panel; both can be set independently.

You can set the **Left** and **Right locator** by holding 'Ctrl' and clicking on the timeline ruler. Left-clicking sets the position of the Left locator, right-clicking sets the position of the Right locator.

See also Cycle Mode and Locators

4. Tracks

KRISTAL Waver is a 'multi-track' audio sequencer, allowing you to use up to 16 parallel tracks in an Arrangement.

Usually (although not necessarily), only one KRISTAL Waver Plug-In will be used in a project - in which case the 16 tracks in the Arrangement correspond directly with the 16 channels in the mixer window.

A track can accommodate mono and/or stereo audio parts. If parts over-lap, they will be 'mixed' together.

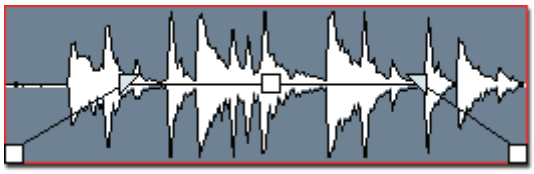
Audio parts can be added to tracks in one of two ways:

- By importing existing audio files.
- By making new recordings.

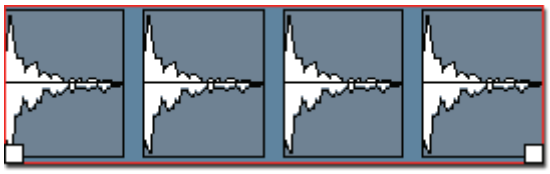
We'll see how to do both of these things in the next section, when we take a look at Track Controls...

Audio Parts and Folders

There are two different (but related) kinds of objects that you work with in KRISTAL Waver Arrangements:



1. 'audio parts'



2. folders, or 'folder parts'

About audio parts

Audio parts are the fundamental objects in an Arrangement.

An audio part appears as a box, containing a 'waveform' (or a pair of waveforms, in the case of stereo parts).

A waveform can be thought of as a kind of 'graph' of a sound, with 'amplitude' or volume on the vertical axis, and time on the horizontal axis.

An audio part is effectively a block of sound, which you can move, resize, split and work with in various other ways.

By carefully editing and arranging your audio parts, you can have complete control over the structure of your project.

Audio parts vs. audio files

There is a close relationship between audio files and audio parts - but they are not identical.

An audio part is really just a 'pointer' to an audio file on your hard drive. It doesn't actually contain any audio data; instead it contains information about which section(s) of the audio file KRISTAL should play, and when.

This means that if you create several duplicates of an audio part, KRISTAL will **not** create copies of the audio file it points to:

Instead, it will play the same audio file once for each time it encounters a part pointing to that file.

Similarly, if you split an audio part into three smaller parts and then rearrange them, KRISTAL will **not** split the audio file:

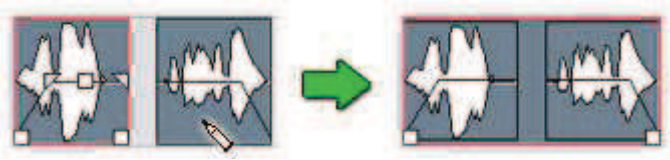
Instead, it will play the sections of the audio file pointed to by the smaller parts, in the order that those parts occur.

This is known as **non-destructive** audio editing (since no permanent changes are made to the files).

About folder parts

A folder part is very similar to a normal audio part, except that it is created by joining one or more audio parts together, using the Glue tool.

The Glue tool joins two separate parts together to create one new one. First select the Glue tool, then click on the first of the two parts you want to join together, then click on the second. A folder part is automatically created, containing the two chosen parts, and any empty space between them required to maintain their relative positions.



Once a folder part has been created, it can be treated more or less as if it was an ordinary part; it can be split, moved, duplicated, re-sized and so on. Note, however, that Volume settings and Fades cannot be applied to folder parts. An audio part requiring Volume changes or Fades should have them applied before being added to a folder part.

You can remove an audio part from a folder part by clicking on it again with the Glue tool.

Moving and resizing parts

To move a part within an Arrangement, choose the Select tool, click on the part you want to move, and drag it to the desired location.

Parts can be moved left and right (backwards and forwards in time), and up and down (from one track to another).

When moving a part, make sure you click in either the top or bottom half of the part box. Avoid clicking on the line running through the middle, or any of the square or triangular 'handles'. These have special functions, as we'll see...

The small square icons that appear in the bottom left and bottom right-hand corners of a selected part are 'handles', which can be used to re-size the part.

Click on the handle in the bottom left of a part, and drag it to the right. You'll see that the left-hand edge of the part moves as you drag, but that the waveform remains static. This is because you are only re-sizing the part, **not** the audio file it points to.

Now when KRISTAL plays the part, you'll only hear the section of the audio file represented by the visible portion of the waveform in the part box - any sound before the beginning of the part will not be played.

Clicking and dragging on the handle in the bottom **right** of a part box works in much the same way, except that it allows you to adjust the end of the part, rather than the beginning. As before, the waveform remains static.

Resizing parts like this can be an easy way to remove unwanted noise from the beginning or end of a take, retaining just the musically useful section. If you need to remove a section from the middle of a part, use the Cut tool.

Using the edit tools

The main edit tools (Select, Cut and Glue) are explained in more detail in The Waver Toolbar.

There are some special modifier keys you can use in conjunction with the Select tool to make your work with Arrangements easier:

- Holding down 'Shift' while dragging with the Select tool constrains part movements to the current track - i.e. with Shift held down, a part cannot be moved from one track to another.
- Holding down 'Ctrl' while dragging with the Select tool constrains part movements vertically - i.e. the start position of a part remains fixed.
- Holding down 'Ctrl' when clicking with the Select tool allows you to make multiple selections - i.e. when Ctrl is held down, each part you click on is added to a group of selected parts, which can then be affected (moved, cut, copied, pasted etc.) together. Clicking again on a part (with 'Ctrl' still held) will remove that part from the selected group.
- Clicking and dragging a part with 'Alt' held down causes a duplicate copy of the part to be created at the point where the mouse is released. Used together with the Snap to Grid option, this can be a good way to quickly arrange repeating verse and chorus sections of a song, for example.

Cut, Copy, Paste and Delete

The Cut, Copy, Paste and Delete commands can be accessed either by right-clicking on a part and choosing the desired command from the context menu that appears, or by selecting one or more parts and using the appropriate keyboard command:

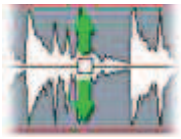
- 'Cut' (Ctrl and X) removes selected parts(s) to the clipboard.
- 'Copy' (Ctrl and C) copies selected part(s) to the clipboard.
- 'Paste' (Ctrl and V) inserts the contents of the clipboard into the arrangement at the playback position.
- 'Delete' (the 'Del' or 'Delete' key) removes the selected part(s) from the Arrangement.

If you click (with the Select tool) in a desired destination track before pasting, the part will be inserted there. This also works with multiple selections - in which case the top-most part(s) in the selected group will be inserted into the chosen track, with the rest appearing in the tracks below (assuming sufficient empty tracks are available).

Volume and Fades

When a part is selected you'll see a line running across the centre of it, with a small square 'handle' in the middle and small trianglular 'handles' at either end.

The line represents the Volume of the part; the handles can be used to apply changes.



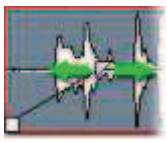
Click on the square handle in the middle of a part and drag upwards. You'll see the waveform 'grow', and the 'Volume' value in the Info Line will increase.

Changes in volume are performed non-destructively; no permanent change is made to the file.

Now when KRISTAL plays the part, its playback volume will be scaled-up by the amount shown (in decibels) in the Info Line.

Just as dragging the volume handle upwards **increases** a part's playback volume, dragging it **downwards** decreases it.

KRISTAL doesn't only allow you to make 'static' changes to a part's volume; you can also apply 'dynamic' fades to a part.



Click on the triangular handle at the far left of the part, and drag it to the right. You'll see a sloping line extend diagonally across the part, and the waveform will be 'scaled' according to this slope.

Fades, like static volume changes, are also applied non-destructively.

Now when KRISTAL plays the part, its playback volume will dynamically 'fade in', over a period of time corresponding with the length of the diagnoal line displayed.

Just as dragging the handle at the far **left** of a part creates a fade **in**, dragging the handle at the far **right** of a part creates a fade **out**.

Track controls

At the far left of each track in the KRISTAL Waver window, you'll find an identical group of Track Controls.

Track Name

A simple text field, where you can enter a descriptive name for the track.

Double-click on the default text (e.g. 'Waver 1') to enter a new name.

Import File button

Clicking the 'Import File...' button allows you to import an existing audio file into the Arrangement.

The 'Open Audio File...' dialog allows you to browse your computer's disks for audio files. You can audition files directly from the dialog, by clicking the 'Play' button.

Audio files in the following different formats can be imported:

- Wave (*.wav)
- AIFF (*.aif, *.aiff)
- FLAC (*.flac)
- Ogg Vorbis (*.ogg)

When an audio file is imported, it is added to the Waver Pool, and a new audio part is created in the Arrangement.

A special 'peak' file (*.peak) is also created for each imported file, containing the 'waveform' data of the audio file.

To import multiple audio files at once to a track, simply drag the files from Windows Explorer to the KRISTAL Waver window.

Mono/Stereo button

The Mono/Stereo button toggles the track's Mono and Stereo modes.

In Mono mode, the track supports mono audio files, while in Stereo mode it supports...stereo files!

When you import an audio file, KRISTAL will automatically choose the appropriate mode for you. If you want to, you can over-ride this choice - although this may have some undesirable side-effects:

- If you set a track containing a stereo part to Mono mode, the part will still play, but you will only hear one of the two channels.

- If you set a track containing a mono part to Stereo mode, the part will still play, but you will only hear it in one channel (i.e. it will appear to be panned 'hard' to one side).

Connect button

When the Connect button is activated, the track's output will be connected to the next available channel in the mixer window, so that you can hear it in the final mix.

Tracks that aren't connected won't be heard.

You can easily tell which track is connected to which mixer channel, as the Track Name will appear in the label field at the bottom of the relevant channel strip.

Tracks are automatically connected when Record is enabled (see below).

Record button

The 'Record' button 'arms' a track, ready to make a new recording.

Recording in KRISTAL is covered in more depth in the Recording tutorial.

The basic procedure is as follows:

1. Select either Stereo or Mono mode for your chosen track, as required.
2. Select an appropriate recording source from the pop-up menu (see below), or
3. activate the track's Record button
4. Activate the 'Monitor' button, if required (see below).
5. Click the Record button on the Transport Panel to begin recording.
6. Click the Stop button (or hit the Space bar) to finish recording.

A new audio part representing your recording will appear on your chosen track.

Audio files created by recording in this way are stored in a 'Media' sub-directory, automatically created in the same folder as the current Project file (*.kristal).

Monitor button

The Monitor button activates 'direct monitoring', allowing you to monitor (i.e. hear) a recording source connected to your computer 'live' via your computer's audio output, during playback and recording.

For example, if you had an electric guitar connected directly to your computer's audio input (see also KRISTAL LiveIn), you'd probably want to be able to hear the guitar sound 'live' while you were rehearsing or recording a take. Direct monitoring makes this possible.

Note: in order to be able to monitor in this way, you'll need to be using an audio card with an ASIO driver. Monitoring via an MME audio device would not be practical, since the 'latency' (the delay between the signal entering the computer's audio input and arriving at its output) would make 'real-time' playing extremely difficult.

Recording source selector (Track Input)

A simple pop-up menu, in which you can choose which input device you want to record from.

The list of available devices will depend on the hardware and drivers installed in your computer, and the settings you make in the 'Devices' section of the Preferences dialog.

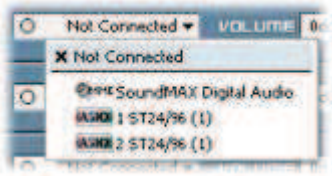
KRISTAL LiveIN

1. What is KRISTAL LiveIN

The KRISTAL LiveIN Plug-In allows you to route any external sound source connected to your computer (for example, a microphone or a guitar) directly into the mixer, where it can be processed in 'real time' via VST effects Plug-Ins and the channel EQs.

The rack allows you to select up to 8 mono or stereo inputs at once. For more live channels, simply load the LiveIN Plug-In twice.

The LED on the left-hand side lights up if the incoming signal exceeds the maximum dynamical range (Clipping).

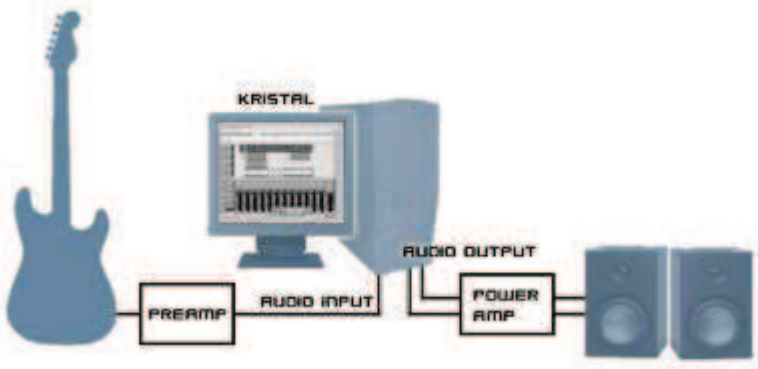


Click on the ∞ icon to toggle between mono and stereo input.

Select the input channel from the popup menu. To differentiate ASIO from MME channels, they are marked with different icons. The inputs of ASIO cards only appear if the driver is selected as Audio Output and if they are activated in Preferences.

The incoming signal can be amplified (or damped) by up to +6dB with the 'Volume' knob.

2. Connection diagram



The above image shows a simple connection diagram example for live performance and/or recording of an analog instrument.

KristalMultiDelay

What is KristalMultiDelay?

KristalMultiDelay is a powerful Delay/Filter Plug-In with 10 individual channels.

Tip: You find some additional presets for this Plug-In in "<KRISTAL Audio Engine>\Presets\KristalMultiDelay".

The Channel

The Channel input

The first parameter of each channel (the little right arrow) is the input port which will feed the channel with audio data. You can choose between the Plug-In inputs or outputs, four internal channels or no input (displayed as '***').

The Delay section

- **Sync** turns on host time syncing.
- **Time** is the delay time in samples - or if synced, in bars.
- **Feedback** determines how much of the delay buffer's output will be fed back into the delay buffer.
- **Volume** controls the signal level.

The Filter section

- **Filter Type**: You can choose between four filter types (or no filter) for the channel. The filter types are: Notch, Low-Pass, High-Pass and Band-Pass.
- **The X-Y Pad**: The horizontal position represents the 'Cut-off' of the filter and the vertical

position represents the 'Resonance'.

The Channel output

The last parameter of each channel is its output port. You can choose between the Plug-In outputs, four internal channels or no output (displayed as '***').

Wet/Dry Mix

This controls the mixing of the input signals and the delay channel signals.

Note about Routing: You can route a channel output to a channel input, but this only works from left to right.

Kristalizer

What is Kristalizer?

Kristalizer is a simple dynamics tool, which can be used as limiter or distortion effect.

Parameters

Gain The incoming signal is amplified by up to +6dB (0dB means no amplification).

Threshold The signal is limited at the specified level, producing a digital distortion effect.

A threshold of 100 per cent means no distortion. The lower the threshold, the earlier a distortion is audible.

Drive The outgoing signal is amplified by up to +9dB.

KristalChorus

What is KristalChorus?

KristalChorus adds some 'thickness' or 'depth' to the sound. It can be used to make an instrument sound like there are actually two instruments being played. This is done by adding a delay to the input signal, where the delay length varies over time.

Parameters

Delay	Specifies the minimum delay time
LFO Frequency	Controls how rapidly the LFO (Low Frequency Oscillator) changes the delay time.
Width	Controls by wich amount the total delay time changes. The resulting total delay time will range between *Delay* and *Delay + Width*. Example: An LFO Frequency of 2 Hz means that the total delay goes from *Delay* to *Delay + Width* and back in half a second.
Stereo Width	This controls the *phase* between the LFOs for the two stereo channels of the delayed signal, which makes a 'wider' stereo sound for higher values.
Feedback	Controls how much of the delayed signal is routed back to the input of the delay. This is typically used to create a *Flanger* type of effect.
Mix	Controls the balance between input signal and delayed signal.
Volume	Use this to adjust the total output level.

KristalReverb

What is KristalReverb?

KristalReverb simulates a 'room' of various sizes through which the input sound is played.

Parameters

Room Size	Controls the size of the simulated room.
Width	Specifies the length of the reverb time.
Damping	Controls the 'damping' of higher frequencies, which produces a more smooth sound.
Freeze	This button 'freezes' the current reverb signal and repeats it again and again.
Dry	The level of the input signal.
Wet	The level of the reverb signal.

Project Management

KRISTAL stores your musical work in KRISTAL Project files (*.kristal). When starting a new project, you should create an empty folder first (e.g. in "My Documents").

Next select 'File' - 'Save As...' from the main menu bar and type in a name for the new Project file.

Audio files created by recording are stored in a 'Media' sub-directory, automatically created in the same folder as the Project file.

If the project was not saved yet, recorded audio files are stored in "My Documents\KRISTAL Media Files".

(Note: Please do not store your projects in the KRISTAL application folder, because they could be deleted by the Uninstaller!!!)

KRISTAL Project files

A KRISTAL Project file contains:

- Mixer settings (Volume, Pan, EQs, etc. for all channels)
- Sample Rate, Tempo and Time signature settings
- the state of all Plug-Ins in use
- in general, a KRISTAL Waver Arrangement
- the current Window Layout
- and some Meta information (see below).

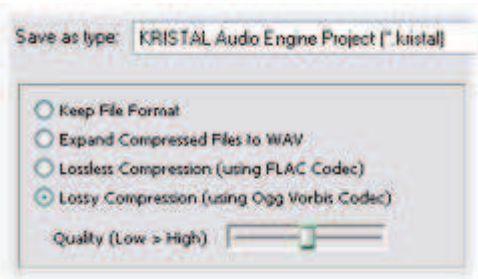
The KRISTAL Waver Plug-In allows to store Arrangement files (*.waver). Please note that Arrangement files only contain settings relevant to the KRISTAL Waver Plug-In (no Mixer and effect settings, etc.).

Moving projects ('Save to New Folder')

To move a complete project (including all recorded audio files) to a new location, use the 'Save to New Folder' feature. It can be accessed via the 'File' menu of the main menu bar.

A dialog appears where you can select the new project location and name.

Additionally, you can choose between four compression options:

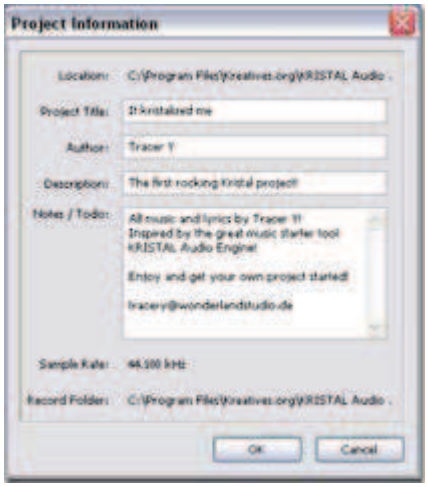


- **Keep File Format**: Audio files are simply copied to the new location "as is".
- **Expand Compressed Files**: FLAC or Ogg Vorbis encoded audio files are decoded to Wave Files (*.wav). This option could be useful e.g. if you received a compressed project (see below).
- **Lossless Compression**: Encodes all audio files using lossess compression (FLAC). The file size shrinks approximately by 2:1. (For more information on FLAC see http://flac.sourceforge.net.)
- **Lossy Compression**: Encodes all audio files using lossy compression (Ogg Vorbis). The file size shrinks

approximately by 20:1. Please note that the audio quality will be reduced during this process, depending on the 'Quality' setting! (Fore more information on Ogg Vorbis see http://www.vorbis.com.)

Compressing a project's audio files could be useful e.g. if you want to send a snapshot to a friend or co-worker via e-mail, or share your project on the web.

Project Meta information



Meta information saved with the Project file comprises

- 'Project Title',
- 'Author',
- 'Description'
- and a short 'ToDo' list.

It can be edited by selection 'File' - 'Project Information...' from the main menu bar.

Additionally, the dialog displays the project location on your harddisk and the Sample Rate.

Note: the Sample Rate can be changed in Audio Setup.

How to record with KRISTAL Audio Engine

Here you find a step-per-step guide on how to record audio tracks with KRISTAL Audio Engine.

Before you start recording with KRISTAL, ensure that your instrument or microphone is connected properly to your computer's audio card. Click here for a connection diagram example.

1

First select KRISTAL Waver as 'Audio Input 1' on Mixer window. By default, this is done automatically at startup.

2

(If you want to record from a multi-channel ASIO sound card, ensure that the driver is selected as Audio Output and the input channels are activated in Preferences.)

3

In KRISTAL Waver window, simply click on the 'record' button of track 'Waver 1' or select an input port from the 'Track Input' pop-up menu.

Clicking the record button selects the first free input port, which is usually the first MME device - take note, ASIO users!

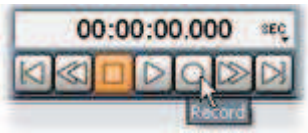
The record button lights up red to indicate that the track is ready for recording. The animated VU meters to the right will start flickering, in accordance to the incoming audio signal.

4

Click the 'monitor' button to pre-listen the incoming audio signal.

Monitoring in KRISTAL is supported for ASIO cards only! MME users may use the Windows Volume Control Panel to monitor 'Mic' or 'Line In'.

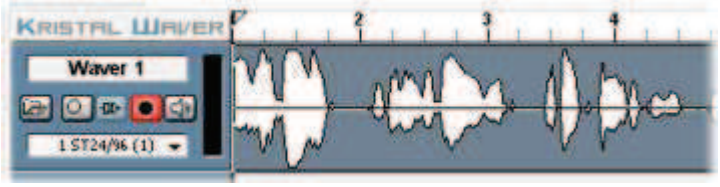
5



Now click the 'record' button in Transport Panel to start the actual recording.

The record button of track 'Waver 1' will start blinking to indicate that a recording is in progress. The Time Display starts counting...

6



Finally, click  stop on Transport Panel to stop recording.
The waveform of the recorded audio data will be displayed on track 'Waver 1'.

Mixdown & Bouncing

Assuming you have already spent endless hours working on your new song, and you have reached the point where you want to burn it on Audio CD, you need to create a 'Mixdown' of your project.

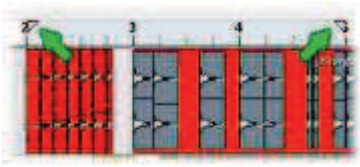
This process combines the audio data of all tracks, including all dynamic modifications like Volume, Pan and effects into a single Stereo (or Mono) audio file.

A Mixdown can also be useful to free up some resources (audio tracks and CPU performance) for further creative working.

To render a single track or parts of a track with their Fade and Volume settings, use the 'Bounce' feature described below.

How to create a Mixdown

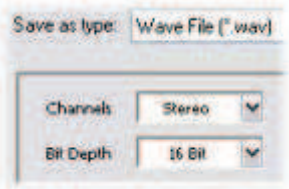
1



First set the Left and Right locator, to mark the start and end position of the Mixdown.

You can set the locators by holding 'Ctrl' and clicking on the timeline ruler in KRISTAL Waver window. Left-clicking sets the position of the Left locator, right-clicking sets the position of the Right locator.

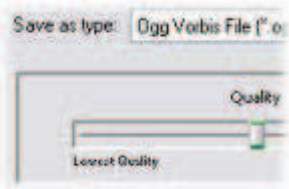
2



Next select 'File' - 'Export Mixdown...' from the main menu bar.

A dialog appears where you can type in a name for the audio file and specify the 'Bit Depth' and whether the file should be Mono or Stereo.

3



By default, a Wave File (*.wav) is created. You can override this by selecting a different file format from the 'Save as type' list.

Please note that some formats may require different settings (e.g. Ogg Vorbis has a 'Quality' slider only).

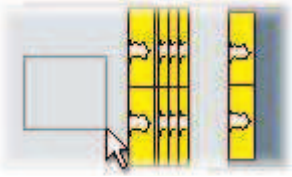
4

Click 'Save' to start the Mixdown. A progress indicator appears... this may take a while.

Bouncing

Contrary to a complete Mixdown of your project, 'Bouncing' only affects a single track - or even just parts of a track.

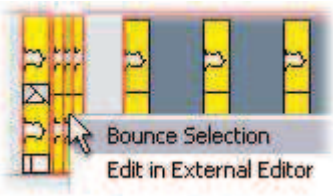
1



First select all audio parts on a track which should be bounced.

This could be done e.g. by clicking somewhere in the empty space of the track and dragging the appearing 'rubber' rectangle.

2



Right-click and select 'Bounce Selection' from context menu.

3

A new audio file is created in the 'Media' sub-directory of the current project, containing the rendered section of the track.

You can 'Undo' the bounce action just like any other edit.

'Edit in External Editor'

KRISTAL Waver provides several tools for **non-destructive** audio editing on Arrangement level. However, to edit audio files directly, an external Audio Editor is required.

You can configure KRISTAL to switch easily from its Arrangement window to the external application:

- Nominate your prefered Audio Editor in Preferences dialog.
- In KRISTAL Waver window, select any audio part, pointing to the audio file you want to edit.
- Right-click and choose 'Edit in External Editor' from context menu.
- The audio file will be released by KRISTAL and automatically open in the Audio Editor.
- When you have finished editing, close the Audio Editor and select '**Unlock and Refresh**' from context menu in KRISTAL Waver.
- All permanent changes made to the audio file will be reflected in the Arrangement.

Please note that during editing with external applications, all audio parts pointing to the edited audio file(s) will be 'muted' in KRISTAL!

Using VST Effects

KRISTAL supports VST effects Plug-Ins to be used as 'inserts' in each audio channel and in the master section of KRISTAL mixer.

Effects can be used to influence the sound of the recorded audio material in a song. Typical effects include e.g. Reverb, Chorus, Flanger, Distortion,... etc.

VST (Virtual Studio Technology) is a proprietary 'industry standard' for audio effects Plug-Ins, developed by Steinberg Media Technologies GmbH. There are hundreds of compatible Plug-Ins (free and commercial) available on the web. A good place to look for is e.g. http://www.kvr-vst.com.

The following VST effects Plug-Ins are installed automatically with KRISTAL Audio Engine:

- KristalMultiDelay, a powerful Delay/Filter Plug-In
- Kristalizer, a simple dynamics tool
- KristalChorus, a Chorus/Flanger Plug-In
- KristalReverb, a Reverb Plug-In

Installing VST Effects

To use a VST Effect with KRISTAL, it must be installed in one of the following locations:

- the 'global VST Folder', shared by multiple host applications (e.g. "C:\Program Files\Vstplugins")
- the 'Plugins' folder in KRISTAL application directory
- one of three freely assignable locations, which can be nominated in Preferences dialog

How to use insert and master effects

Each Channel Strip in KRISTAL Mixer window contains its own independent effect section.

1

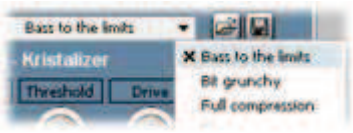
Click the 'No FX' field and select an effect from the list.

2

An editor window appears, providing controls to manipulate the effect parameters, and the effect will be activated (see below).

Some VST effects Plug-Ins provide their own 'custom' editor window. For others, KRISTAL creates a so called 'generic' editor window.

3



At the top of the editor window is a pop-up menu from which you can recall several effect 'programs'.

The number of programs and their settings depend on the effect you are using.

- Clicking the 'edit' button opens (or closes) the effect editor window, where you can access the effect parameters.
- Each effect can be toggled on or off by clicking the 'activate' button.
- Click the and buttons to navigate through the effect programs.
- The 'load' and 'save' buttons beside the preset menu allow you to save and re-load your own effect presets. You can save individual presets as *.fxp files, or whole banks of presets as *.fxb files.

ASIO vs. MME

The performance you get from KRISTAL will depend to a large extent on your audio hardware and its drivers.

Generally, audio devices can be divided into two categories: those that support 'ASIO', and those that don't.

ASIO

ASIO (Audio Streaming Input Output) is a proprietary 'industry standard' for music applications, developed by Steinberg Media Technologies GmbH. It provides multi-channel audio I/O (input and output) at very low latencies and high sample rates.

In order to take advantage of ASIO, you need specially-written ASIO driver software for your audio hardware. This should be supplied by the manufacturer - if in doubt, check their website for updates.

Note: the I/O ports of ASIO devices can be accessed via MME (see below) as well, meaning that they appear twice in the KRISTAL Audio Engine menus. However, ASIO and MME devices used together in a project will not be 'in sync'!

How to disable ASIO/MME devices

MME

MME (Windows Multimedia Extension) is the standard built-in audio driver architecture of the Windows Operating System.

Any audio device can be used with MME: no special driver software is required.

Because of its limitation to two-channel stereo audio, and high input-to-output latency, MME is not really the best choice for music applications.