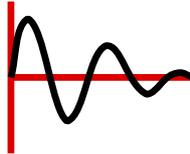


# SampleEd



**Version 0.60 (17-Jul-2007)**

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## Introduction

*SampleEd* allows you to create, edit and play back sound samples.

Main features are:

- Load and save samples in a variety of different formats
- Disk based editing not limited by available memory
- Apply a variety of affects to samples including fades, echoes and loops
- Supports the LADSPA plugin protocol for effects
- Uses Digital Renderer to play back samples
- Samples can have up to 32 channels

## LADSPA

LADSPA stands for Linux Audio developer's Simple Plugin API and provides a mechanism to add new effects or tools to *SampleEd*. These can of course be used by other applications that support the LADSPA protocol. More details can be found at <http://www.ladspa.org>.

## Requirements

*SampleEd* should run on any RISC OS 3+ machine with 4MB of memory. It does require the Toolbox modules so this might push requirements up somewhat. Any processor should do although obviously an ARM2 will be very slow and a StrongARM or above is best.

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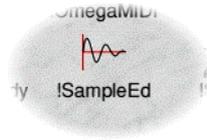
## Getting started

### Loading SampleEd

Before *SampleEd* is loaded the *!LADSPA* application should have been seen by the filer. This is where any effects plugins are stored. The best place for *!LADSPA* is in Resources, where the installation notes will have suggested it is placed.

Note that it is not vital for *!LADSPA* to be installed, but if it is not then *SampleEd* will not be able to make use of any third party plugins.

*SampleEd* is loaded by double clicking on the *SampleEd* icon in the filer display:

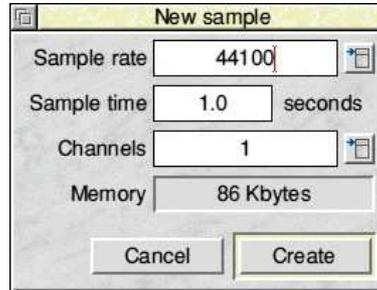


Once loaded the *SampleEd* icon will appear on the iconbar in the standard way.

---

## Creating a new sample

Clicking *Select* on the icon bar icon will cause a small window to appear. This is the *New sample* window. It allows you to specify details about the new sample you want to create:



The image shows a dialog box titled "New sample". It has a close button in the top-left corner. The dialog contains four input fields, each with a label and a value:

- Sample rate: 44100
- Sample time: 1.0 seconds
- Channels: 1
- Memory: 86 Kbytes

At the bottom of the dialog are two buttons: "Cancel" and "Create".

### Sample rate

This is the frequency of the sample. The number specified is in Hertz. In the example shown 44100 Hertz is 44.1 KHz, the same quality as a Compact Disc. The higher the frequency the better quality the sound will be but the more memory it will use.

### Sample time

The *Sample time* is the length of time in seconds that the sample will last for.

### Channels

The number of channels that the sample will have. This can be any number from 1 to 32 but the most common settings will be 1 for mono or 2 for stereo. The size of the sample will increase in proportion to the number of channels chosen.

---

## Memory

This field shows the amount of memory the sample will use, or the size of the file if it is saved as a Wave file. *SampleEd* stores all samples internally as 16 bit samples. The memory required is calculated as follows:

$$\text{Sample rate} \times \text{sample time} \times \text{channels} \times 2$$

In the example shown this becomes:

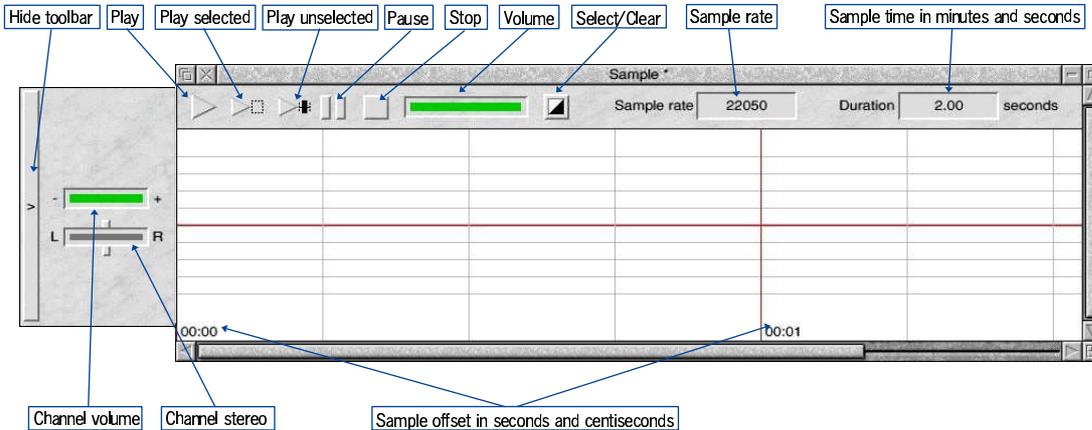
$$44100 \times 1.0 \times 1 \times 2 = 88200 \text{ or } 86\text{K}$$

The final 2 is needed because each 16 bit sample uses two bytes.

Clicking the **Create** button will create the new sample and display the sample window.

## The Sample window

The *Sample window* displays a graphical representation of the sample. When a new sample is created this window is blank:



This window has a number of controls along the top bar.

### Play

Clicking this will play the sample once.

### Play selected

Clicking this will play any area of the sample that is highlighted. If no area is highlighted then the whole sample will be played.

---

**Play unselected**

If you have a highlighted area of the sample, this will play a short period before and after the highlighted area, but not the highlighted area itself. This is use if you are going to remove an area of the sample and want to hear what it will sound like afterwards.

**Pause**

If this is clicked whilst a sample is playing the playback will pause. Clicking *Pause* again will resume playback.

**Stop**

Clicking this while a sample is playing will stop the playback.

**Volume**

This slider controls the volume of the sample being played back.

**Selected/Clear**

If any part of the sample is highlighted then clicking this button will clear the selection. If no part of the sample is highlighted then clicking this button will select all of the sample.

The remaining fields are informational only.

**Sample rate**

The sample rate of the sample measured in Hertz.

**Duration**

The length of the sample in minutes and seconds.

---

There are also a number of controls down the left hand side of the window. These controls are repeated once for each channel.

**Channel volume**

This slider sets the volume level of the channel relative to the main sample volume.

**Channel stereo**

This slider sets the stereo position of the channel.

There is one other control that applies to the whole toolbar:

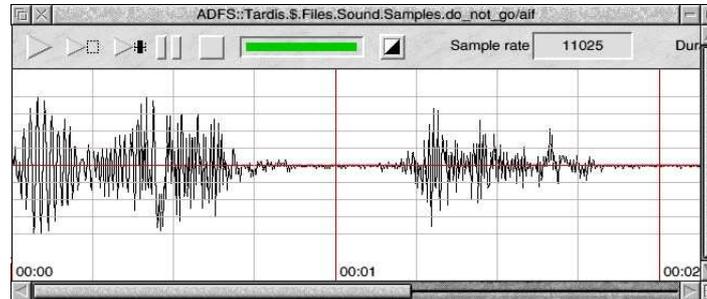
**Hide toolbar**

Clicking this will hide the toolbar, except for this button. Clicking whilst hidden will show the toolbar.

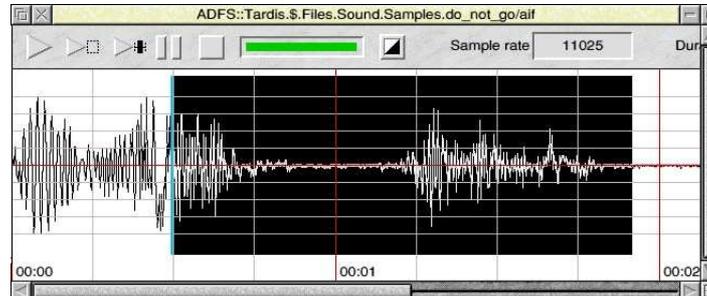
---

## Highlighting an area of a sample

A number of operations require an area of the sample to be highlighted. This is achieved by dragging the mouse pointer over the area to be selected:

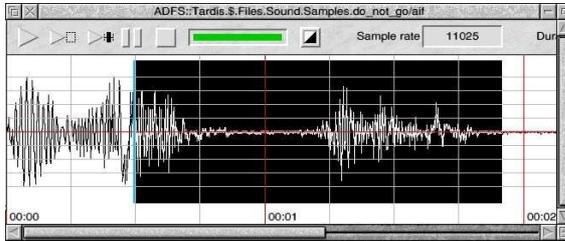


This will then highlight the selected area:

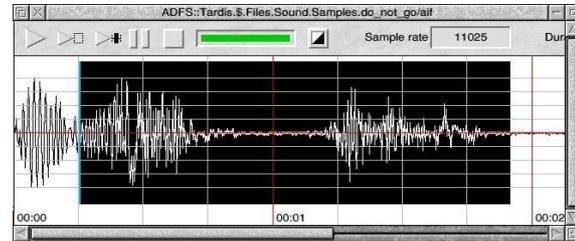


---

The start or end of the area can be changed by clicking with Adjust:



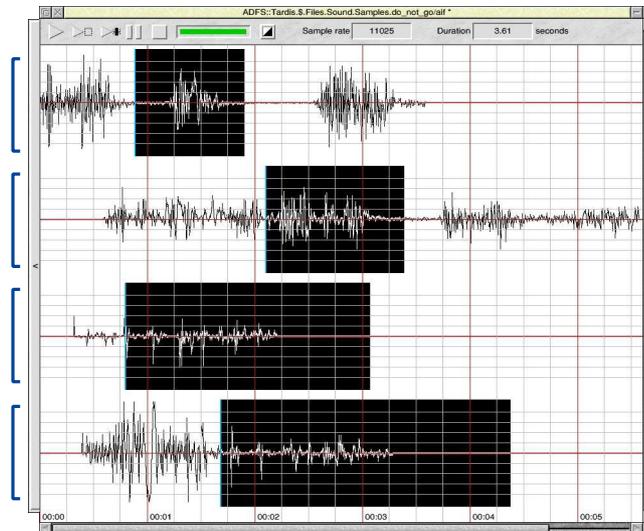
Click here with Adjust



Highlighted area is extended

As already mentioned, samples can have more than one channel. It is possible to highlight different areas of each channel or the same area of all channels. To highlight a different area of a different channel the pointer must be dragged over the channel itself. To highlight all of the channels the same the pointer must be dragged in the gap in between each channel.

Dragging in any of these areas allows the highlighted area of each channel to be set independently.



Dragging in any of these areas sets the highlighted area for all channels to be the same.

## The sample marker

Clicking in the above areas rather than dragging will set a marker which is shown as a blue bar. This marker is used during pasting operations to specify where a block of sample data will be inserted.

## Other ways of highlighting sample data

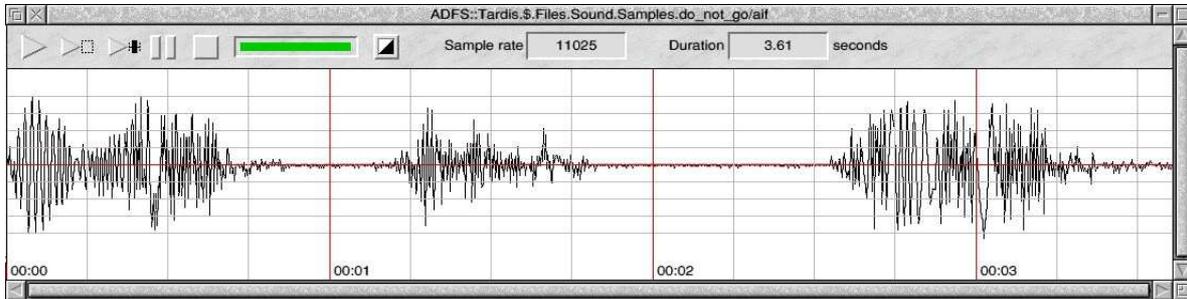
The *Edit* section detailed later covers a number of menu items that can also be used to highlight portions of a sample in different ways.

---

## Loading a sample

To load an existing sample the file is dragged to the *SampleEd* icon on the icon bar. For a list of supported sample formats see Appendix A.

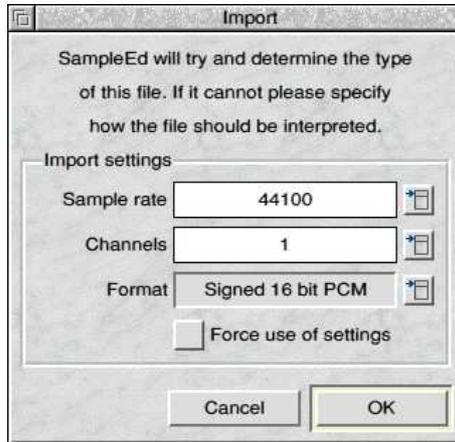
The Sample window is then displayed showing the sample. Note that depending on the length and format of the file being loaded this may take some time, even on the fastest computers.



For a sample to be loaded in this way it must have a file type other than Data. If the sample has a file type of Data then the *Import window* will be displayed:

## Importing unknown sample formats

The *Import window* is displayed if an unknown sample file is dragged to *SampleEd*:



This allows the format for the sample being loaded to be specified in the event that *SampleEd* cannot identify the file from the contents. This also allows raw sample data to be imported. The following settings are available:

### **Sample rate**

This is the frequency of the sample. The number specified is in Hertz. 44100 Hertz is the same quality as a Compact Disc.

### **Channels**

The number of channels that the sample will have. This can be any number from 1 to 32 but the most common settings will be 1 for mono or 2 for stereo.

---

## Format

This is encoding that *SampleEd* will assume is applied to the imported file. Available formats are as follows:

- Unsigned 8 bit PCM
- Signed 8 bit PCM
- Signed 16 bit PCM
- Signed 24 bit PCM
- Signed 32 bit PCM
- 32 bit float
- 64 bit float
- U-Law
- A-Law
- GSM 6.10
- 12 bit DWVV
- 16 bit DWVV
- 24 bit DWVV
- VOX ADPCM

## Force use of settings

*SampleEd* will attempt to determine the format of the sample even if this window is displayed. Switching on this option will tell *SampleEd* to use the specified settings when loading the sample regardless of whether the sample format can be identified.

Clicking the **OK** button will load the sample, **Cancel** will close the window without loading the sample.

---

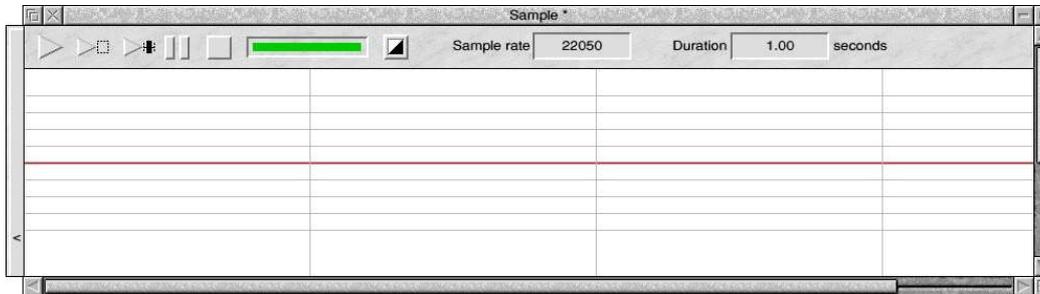
## Importing a sample

*SampleEd* offers the ability to import one sample file into another. This gives the ability amongst other things to join together separate samples, or to merge two mono samples into one stereo sample.

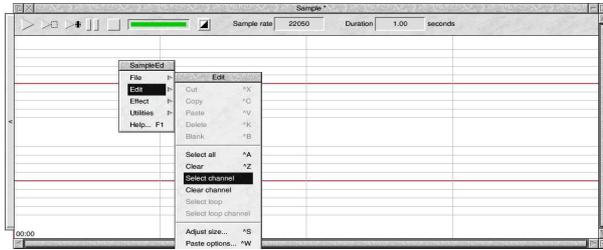
The way in which the sample data is merged together is dependent on the *Paste options* settings, see later for a full explanation. The imported sample can be slotted into the current sample or can overwrite a section of it using these settings. The example below shows how to turn two mono samples into one stereo sample.

For this example we assume that there are two mono samples available and that the default *Paste options* of *Insert* are being used.

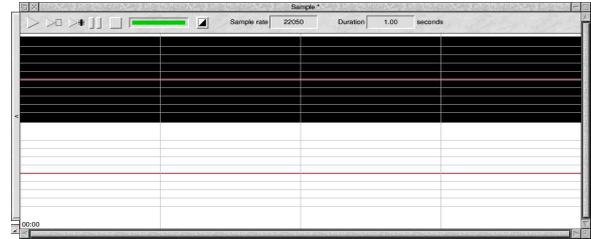
Creating a new blank stereo sample gives us the following window:



We will now highlight all of channel one. The easiest way of doing this is to open the main menu over channel one and choose *Select channel* from the *Edit* menu.

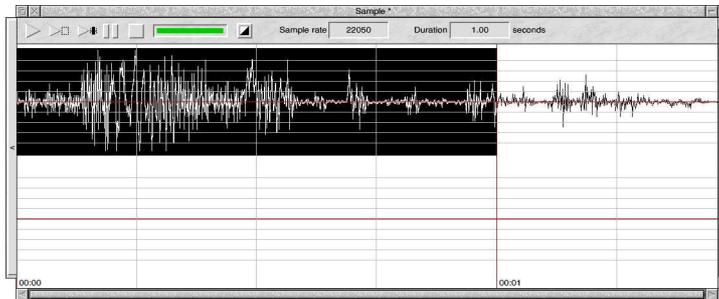


Choosing *Select channel*...



...highlights the channel the menu is over

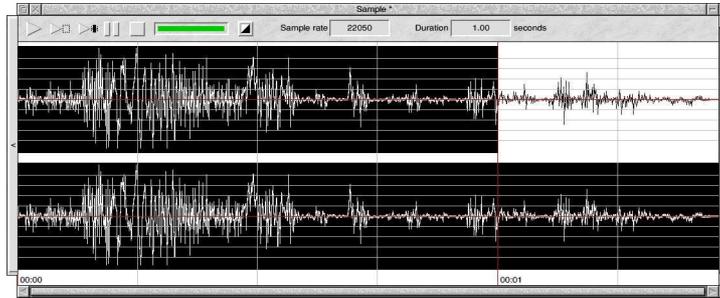
Dragging the first file to this channel will now import the sample. It is important to drag the file to the channel where the data is to be imported to and not just to the *Sample* window.



The sample is imported with the highlighted section of the first channel being replaced with the new sample data, and the sample as a whole being made bigger to accommodate all of the new data. If none of the channel had been highlighted the new data would have been imported at the beginning of the channel and the existing channel data would have been added to the end.

---

Repeating the same process for the second channel gives us the new stereo sample:



This time the second channel was highlighted and the second sample file dragged to this channel.

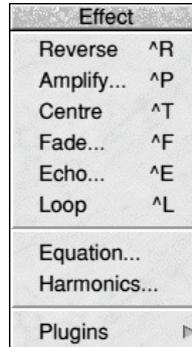
If the file being imported has more than one channel then the first channel will be imported to the channel the file is dragged to in the *Sample* window and the next to the next channel in the *Sample* window until all channels have been imported. If there are any further channels to be imported after the last channel in the *Sample* window has been used then the import will wrap to the first channel in the *Sample* window.

When importing a file like this each channel is handled independently of the others so it is important to highlight the required areas of all the channels before the file is imported.

---

## Applying effects to samples

Moving the pointer over the *Effect* entry on the main menu displays the *Effect* menu:



This gives access to a number of effects that can be applied to a sample. In order for any effects to be applied an area of the sample must be highlighted.

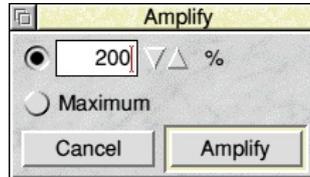
### Reverse

Choosing this will reverse the highlighted area of the sample so when it is played it will play backwards.

---

## Amplify

Choosing this will display the *Amplify* window:



Amplification changes the volume of the sample. Too much amplification will cause the sample to sound distorted when it is played.

### Percentage

The percentage amplification to apply to the sample.

### Maximum

If this is selected *SampleEd* will attempt to calculate the maximum amplification it can apply to a sample without it becoming distorted.

Clicking **Amplify** will apply the amplification factor to the sample, **Cancel** will close the window without making any changes.

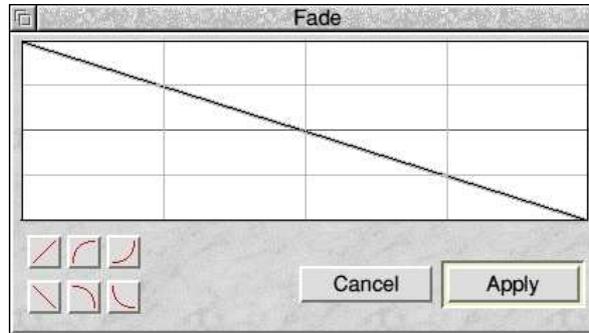
### Centre

This item tries to balance the sample so it falls evenly over the central red line in the sample window.

---

## Fade

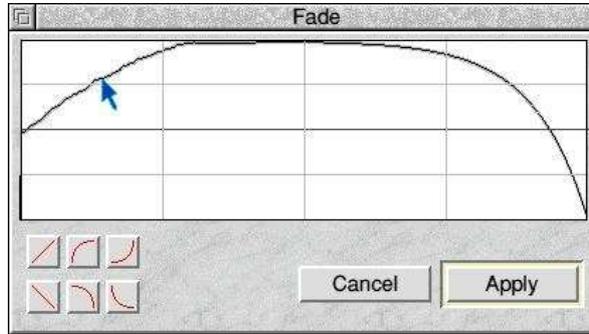
This will display the *Fade* window:



This window allows the sample to be gradually faded in or out. There are six preset fades in the corner of the window and clicking any of these will change the main display.

---

Alternatively, the line in the main display can be dragged into any shape:

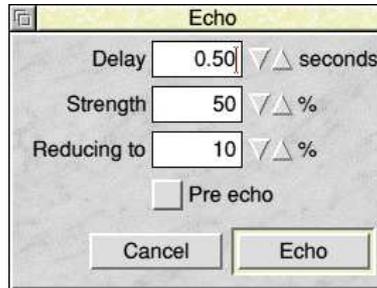


Clicking **Apply** will fade the sample according to the specified curve, **Cancel** will close the window without making any changes.

---

## Echo

Choosing this will display the *Echo* window:



This allows an echo to be applied to the sample.

### Delay

The delay in seconds before the echo sounds. This determines how cavernous the echo sounds.

### Strength

The strength of the echo compared to the original sample. This will determine how loud the echo is.

### Reducing to

The strength or loudness that the echo should drop to by the time it finishes compared with the original sample.

### Pre echo

Normally an echo sounds after the original sound. Selecting this will cause the echo to start before the original sound.

---

Clicking **Echo** will apply the echo, **Cancel** will close the window without making any changes.

When the echo is applied it may affect the size of the sample to ensure that the full echo is heard.

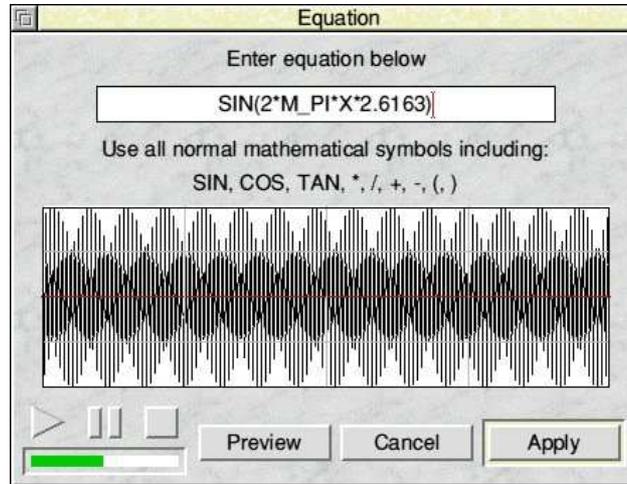
## **Loop**

Choosing this item will apply a loop to the highlighted area of the sample. This means that when the sample is played back the looped area of the sample will play several times before the sample finishes playing. Note that not all output formats support looped samples so this information may be lost when the sample is saved.

---

## Equation

The equation window allows a mathematical equation to be written to specify the sample waveform:



Any normal mathematical symbols and functions can be used including:

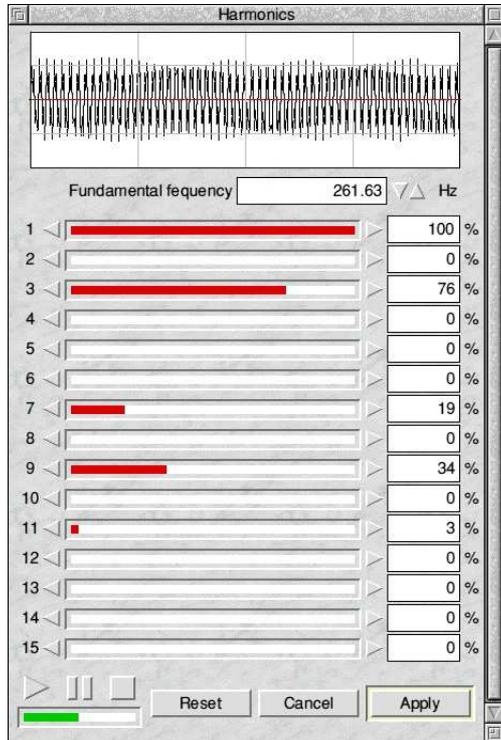
( ) + - \* / SIN COS TAN

The example shown will produce a tone at middle C.

Appendix B shows a full list of the functions and constants available.

## Preview

Clicking this button will display a preview of the calculated waveform in the window.



Clicking **Apply** will store the calculated equation in the sample, **Cancel** will close the window without making any changes.

This window has playback controls similar to the main sample window. This allows the previewed equation to be heard before it is applied to the main sample.

---

## Harmonics

This window allows the waveform to be 'drawn' using fifteen different sliders, each representing a different frequency.

### Fundamental frequency

This is the frequency applied by dragging slider 1. In the example shown the frequency is equivalent to middle C.

### Sliders

Each slider represents a different frequency, with slider 1 being the fundamental frequency, slider 2 the fundamental frequency times 2, slider 3 the fundamental frequency times 3, up to slider 15.

The sliders have represent 0% to 100% of the amplitude of the selected frequency.

When the sliders are dragged the waveform which will be updated in real time.

### Reset

Clicking this button will zero all the sliders.

Clicking **Apply** will store the harmonic in the sample, **Cancel** will close the window without making any changes.

This window has playback controls similar to the main sample window. This allows the waveform to be heard before it is applied to the main sample.

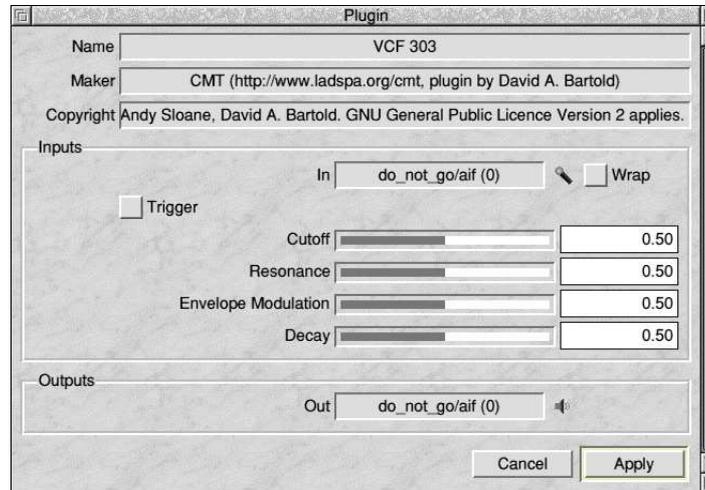
---

## Plugins

*SampleEd* supports the LADSPA plugin mechanism. This was originally written for Linux but supporting it in *SampleEd* gives access to a wide range of different filters and effects. The exact effects available will depend on what is installed on your system.

This menu item will display a list of the different plugins that are installed, each of these have a menu listing the effects supplied by that plugin.

Choosing an effect will display the *Plugin* window. The contents of this window will vary greatly depending on the plugin selected. The following example tries to explain all common field types that may be displayed:



---

**Name**

The name of the plugin.

**Maker**

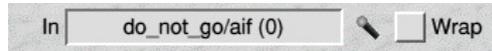
The author or company or wrote the plugin.

**Copyright**

Any copyright or licensing notices.

**Inputs**

Plugins can have 0 or more inputs. The number will vary depending on what the plugin does. In this example we have a single input which defaults to the first channel of the sample to which the plugin will be applied. This is shown as follows in the window:

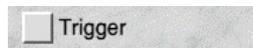


The *In* label shows this is an input port. The field shows that the input data will be coming from channel 0 of the sample *do\_not\_go/aif*. The microphone icon allows us to change where the input is coming from. This can be dragged to any sample windows, including the *Harmonics* and *Equation* windows. The field will change to show where the input is coming from.

The *Wrap* option button is provided in case the input sample data selected is not of a sufficient duration to fill the corresponding output area. If this is selected then the input sample data will be repeated as many times as necessary to fill the output area. If not, once the input sample data has been exhausted any further input data required will be treated as silence.

**Option buttons**

Some plugins require simple on/off type settings. These settings are shown as an option button.



---

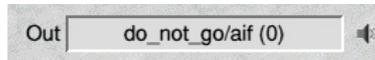
## Sliders

Some inputs require a numerical value. These are shown as slider bars with a numerical field next to them. The values that can be entered into these fields will be limited by the plugin.



## Outputs

In the same way we have inputs, we also have outputs. Normally 1 or more. The first output will default to channel 0 of the sample to which the plugin is being applied.



As with inputs, the output data can be redirected to another channel or another sample.

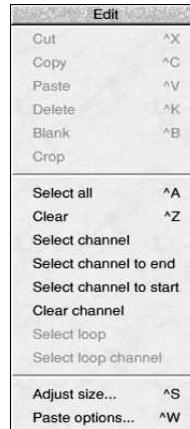
The area where the output data will be placed must be highlighted in the target sample.

Clicking **Apply** will run the plugin, **Cancel** will close the window without making any changes.

---

## Editing a sample

Moving the pointer over the *Edit* item on the main menu shows the *Edit* menu:



This allows areas of a sample to be copied, moved or deleted. As mentioned in the section on the *Sample window*, areas of a sample can be highlighted. The top group of items on this menu will not be available if any area of sample is not highlighted.

### Cut

This will remove the highlighted area of the sample. The sample that falls directly after the highlighted are will be moved to replace the highlighted are and silence will be added to the end of the sample to fill the gap left. The sample data that has been removed will be placed into the clipboard so it may be pasted back elsewhere.

---

**Copy**

This will copy the highlighted area of the sample into the clipboard so it may be pasted back elsewhere. The original sample will be unaffected.

**Paste**

If an area of sample has been cut or copied to the clipboard it can be pasted back elsewhere using this item. The area where the sample is to be pasted must be highlighted or marked before first. The exact way in which the data is pasted depends on the *Paste options* cover later.

Clicking this will cause the mouse pointer to turn to cross hairs. Click on the channel where the sample data should be pasted. If the clipboard contains multiple channels then this will be the first channel to be pasted.

**Delete**

This will delete the highlighted area of the sample. This is the same as the *Cut* item but does not place the highlighted area onto the clipboard. Note that the overall size of the sample will not be affected. If you wish to reduce the size of the sample then use the *Adjust size* window covered below.

**Blank**

This will silence the highlighted area of the sample.

**Crop**

Similar to *Blank*, this will silence an area of the sample. However, instead of silencing the highlighted area it will silence everything except the highlighted area.

**Select all**

This will highlight all of the sample.

---

**Clear**

Unhighlights any highlighted areas of the sample.

**Select channel**

This is the same as *Select all* except that it will only highlight all of the channel that is under the menu when it is opened.

**Select channel to end**

Choosing this over a channel that has a highlighted area will cause the channel to be highlighted from the start of the currently highlighted area to the end of the sample.

**Select channel to start**

Choosing this over a channel that has a highlighted area will cause the channel to be highlighted from the start of the sample to the end of the currently highlighted area.

**Clear channel**

This will unhighlight any section of the channel the menu was opened over.

**Select loop**

Highlights the area of the sample that is currently marked as being looped. If no area of the sample is looped this item will not be available. This allows the looped area of the sample to be easily amended without having to reselect it by hand.

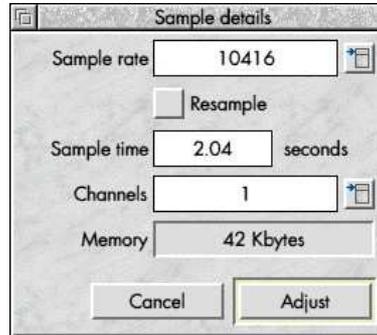
**Select loop channel**

Similar to the above item but only applies to the channel the menu was opened over.

---

## Adjust size

The number of channels, sample rate and duration of a sample are set when it is created. Using the *Adjust size* window these details can be changed for an existing sample:



The meanings of the fields are the same as the *New sample* window:

### Sample rate

This is the frequency of the sample. The number specified is in Hertz. In the example shown 41666 Hertz is 41.6 KHz, the same quality as a Compact Disc. The higher the frequency the better quality the sound will be but the more memory it will use.

### Resample

If this is switched off then when the sample rate is changed the pitch at which the sample is played back will be changed. Increasing the sample rate will make the sample sound higher pitched and decreasing the sample rate will make it sound lower pitched.

Switching this on will counter this affect and make the pitch of the sample sound the sample.

---

---

### Sample time

The *Sample time* is the length of time in seconds that the sample will last for.

### Channels

The number of channels that the sample will have. This can be any number from 1 to 32 but the most common settings will be 1 for mono or 2 for stereo. The size of the sample will increase in proportion to the number of channels chosen.

### Memory

This field shows the amount of memory the sample will use, or the size of the file if it is saved as a *Wave* file. *SampleEd* stores all samples internally as 16 bit samples. The memory required is calculated as follows:

$$\text{Sample rate} \times \text{sample time} \times \text{channels} \times 2$$

In the example shown this becomes:

$$11025 \times 3.61 \times 4 \times 2 = 318402 \text{ or } 311\text{K}$$

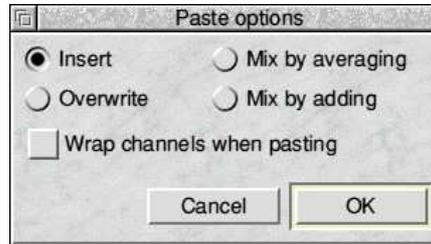
The final 2 is needed because each 16 bit sample uses two bytes.

Clicking the **Adjust** button will change the sample, **Cancel** will close the window without making any changes.

---

## Paste options

The *Paste options* window controls the way in which the contents of the clipboard are pasted into the target sample:



The way in which this setting affects the paste operation varies slightly according to whether the data is being pasted at the sample marker or over a highlighted area.

### Overwrite

When pasting at the sample marker this will cause any data after the marker to be overwritten by the pasted data.

Pasting over a highlighted block will replace the highlighted block and shift the remaining sample to make room if the data being pasted is bigger than the highlighted block.

### Insert

When pasting at the sample marker this will cause any data after the marker to be shifted to make room for the pasted data.

Pasting over a highlighted block will replace the highlighted block and shift the remaining sample to make room if the data being pasted is bigger than the highlighted block.

---

### **Mix by averaging**

When pasting at the sample marker this will cause any data after the marker to be merged with the pasted data by averaging the two samples together.

Pasting over a highlighted block will merge the data contained in highlighted block with the data being pasted by averaging the two samples. Data after the highlighted block will be shifted to make room if the data being pasted is bigger.

### **Mix by adding**

When pasting at the sample marker this will cause any data after the marker to be merged with the pasted data by adding the two samples together.

Pasting over a highlighted block will merge the data contained in highlighted block with the data being pasted by adding the two samples. Data after the highlighted block will be shifted to make room if the data being pasted is bigger.

### **Wrap channels when pasting**

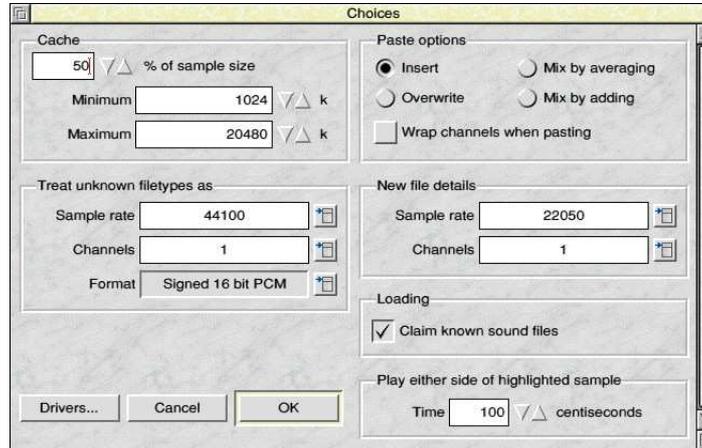
Sometimes it is useful to copy data from one channel in a sample and paste it back to more than one at the same time. Usually when pasting the contents of the clipboard *SampleEd* will only paste to as many target channels in the sample as exist on the clipboard. Setting this option causes the clipboard contents to wrap when all channels have been pasted so that all channels in the target sample will have data pasted to them.

Clicking **OK** will accept the setting, **Cancel** will close the window without making any changes.

---

## Choices

The icon bar menu allows access to a *Choices* window which allows the following choices to be set:



### Cache

As has been mentioned elsewhere, *SampleEd* does not restrict the size of the samples that it can edit to the amount of available memory. Instead a fixed amount of memory is used into which the sample is loaded in blocks when being processed. This section controls the amount of memory allocated as that fixed block. This is called the sample cache.

### Percentage

This field specifies how much memory to allocate according to the size of the sample. For example, if this field is set to 20% and a 100k sample is loaded then 20k will be allocated as the cache memory, subject to the limits of the following two fields.

---

### **Minimum**

This is the minimum amount of memory that will be allocated as cache, regardless of the size of the sample. A sensible minimum is 128k.

### **Maximum**

The maximum amount of memory that will be allocated as cache. This will depend on how much memory is in your computer but anything from 1MB to 10MB is sensible.

It should be remembered that this cache is allocated on a per sample basis, not shared between all currently loaded samples.

### **Paste options**

The Paste options section specifies the default way in which the contents of the clipboard are pasted into the target sample.

The way in which this setting affects the paste operation varies slightly according to whether the data is being pasted at the sample marker or over a highlighted area.

### **Overwrite**

When pasting at the sample marker this will cause any data after the marker to be overwritten by the pasted data.

Pasting over a highlighted block will replace the highlighted block and shift the remaining sample to make room if the data being pasted is bigger than the highlighted block.

### **Insert**

When pasting at the sample marker this will cause any data after the marker to be shifted to make room for the pasted data.

Pasting over a highlighted block will replace the highlighted block and shift the remaining sample to make room if the data being pasted is bigger than the highlighted block.

---

### **Mix by averaging**

When pasting at the sample marker this will cause any data after the marker to be merged with the pasted data by averaging the two samples together.

Pasting over a highlighted block will merge the data contained in highlighted block with the data being pasted by averaging the two samples. Data after the highlighted block will be shifted to make room if the data being pasted is bigger.

### **Mix by adding**

When pasting at the sample marker this will cause any data after the marker to be merged with the pasted data by adding the two samples together.

Pasting over a highlighted block will merge the data contained in highlighted block with the data being pasted by adding the two samples. Data after the highlighted block will be shifted to make room if the data being pasted is bigger.

### **Wrap channels when pasting**

Sometimes it is useful to copy data from one channel in a sample and paste it back to more than one at the same time. Usually when pasting the contents of the clipboard *SampleEd* will only paste to as many target channels in the sample as exist on the clipboard. Setting this option causes the clipboard contents to wrap when all channels have been pasted so that all channels in the target sample will have data pasted to them.

### **Unknown filetypes**

*SampleEd* is able to load a wide range of formats. These are initially identified by filetype but if this fails they will be identified by file content. Some formats will however remain unrecognized. *SampleEd* will still load these files but must be told what format they are. This section allows the defaults for this identification to be set.

### **Sample rate**

This is the frequency of the sample. The number specified is in Hertz. 41666 Hertz is the same quality as a Compact Disc.

---

## Channels

The number of channels that the sample will have. This can be any number from 1 to 32 but the most common settings will be 1 for mono or 2 for stereo.

## Format

This is encoding that *SampleEd* will assume is applied to the imported file. Available formats are as follows:

- Unsigned 8 bit PCM
- Signed 8 bit PCM
- Signed 16 bit PCM
- Signed 24 bit PCM
- Signed 32 bit PCM
- 32 bit float
- 64 bit float
- U-Law
- A-Law
- GSM 6.10
- 12 bit DWVV
- 16 bit DWVV
- 24 bit DWVV
- VOX ADPCM

---

## New file details

This section allows the defaults used when a new sample is created to be set.

### Sample rate

This is the frequency of the sample. The number specified is in Hertz. 44100 Hertz is the same quality as a Compact Disc. The higher the frequency the better quality the sound will be but the more memory it will use.

### Channels

The number of channels that the sample will have. This can be any number from 1 to 32 but the most common settings will be 1 for mono or 2 for stereo. The size of the sample will increase in proportion to the number of channels chosen.

The *Drivers* button will open the *Installed drivers* window which allows the drivers that are installed to be removed or new drivers added. This is covered in the next section.

## Loading

### Claim known sound files

When this is ticked, double clicking on a file with a type that *SampleEd* has a driver for will cause it to be loaded. If not ticked then the file will have to be dragged to *SampleEd*.

## Play either side of highlighted sample

### Time

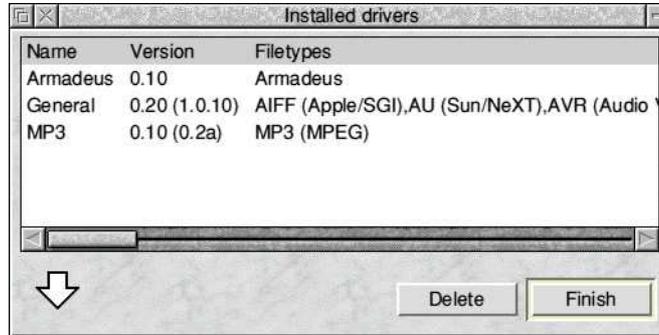
This allows the amount of time, specified in centiseconds, to be set when playing around the highlighted sample area.

Once the choices have been set click *OK* to save them or *Cancel* to close the window without saving them.

---

## Installed drivers

Clicking the *Drivers* button in the *Choices* window will display the *Installed drivers* window:



This window allows the installed drivers that are used to load and save different types of files in *SampleEd* to be removed or new drivers added. The list displays the following information:

### Name

The name of the driver.

### Version

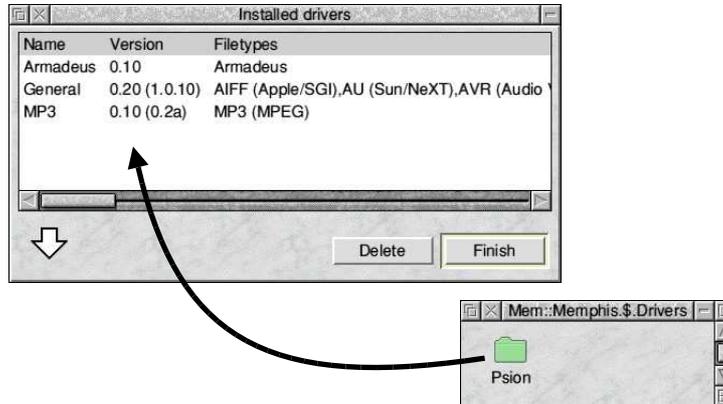
The version number of the driver. Some drivers make use of third party libraries. If a version number appears in brackets it refers to the version of the third party library the driver uses.

### Filetypes

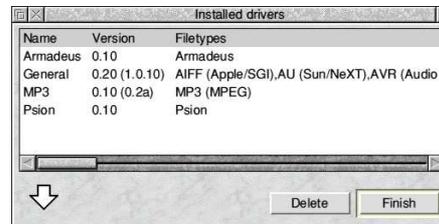
A list of different types of file that the driver can load and possibly save. Each type might include several sub types which will not be listed.

## Installing new drivers

New drivers are installed by dragging a driver directory to the *Installed drivers* window:



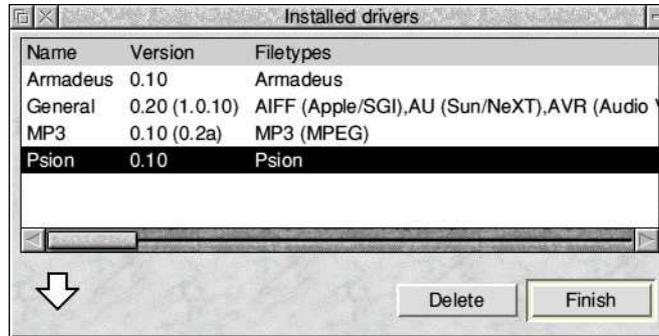
The new driver will then appear in the window:



---

## Removing drivers

A driver is removed by highlighting it in the list and clicking on *Delete*:

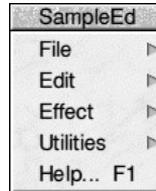


A confirmation prompt will appear and clicking OK will remove the driver. Note that this operation cannot be undone, unless the driver is reinstalled, so you should be sure you want to remove the driver before taking this action.

---

## The main menu

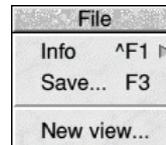
The main menu is displayed by clicking *Menu* over a window:



The following options are available:

### File

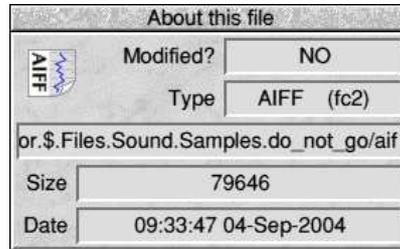
Moving the pointer over this item shows the *File* menu:



---

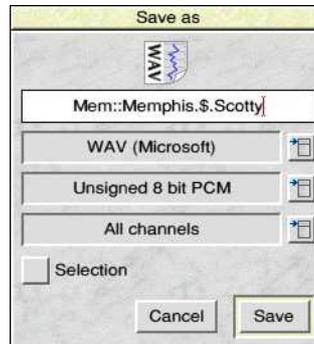
## Info

Displays information about the sample including when it was last modified, the name and size:



## Save

Displays a save dialog box. The sample can be saved by dragging the icon to a filer window or entering a name and clicking Save:



---

The dialog box displayed is not the standard save dialog box, there are three extra fields.

The first two of these allow the format of the sample being saved to be specified. For a full list of sample formats refer to Appendix A.

The third field controls the way samples with more than one channel are saved. It has the following choices:

*All channels*

If this chosen then all of the channels are saved independently within the file (format permitting).

*Mono*

Choosing this will downmix all of the channels to produce a single channel sample. The channel volume settings are honoured when the channels are downmixed.

*Stereo*

When chosen this will downmix the channels to produce a stereo sample. The channel volume and stereo settings are honoured when the channels are downmixed.

*Selection*

If this is switched on then only the currently highlighted section of the sample will be saved. If no area of the sample is highlighted then this will be greyed out.

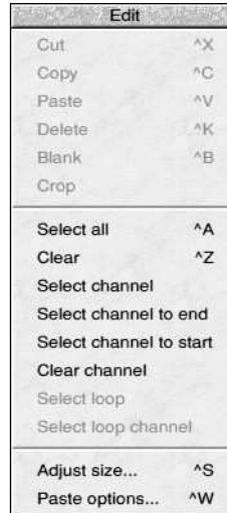
**New view...**

Choosing this item displays another window containing the same fade. This can be useful when copying or moving pictures from one section of a large sequence to another.

---

## Edit

Moving the pointer over this item shows the *Edit* menu.:

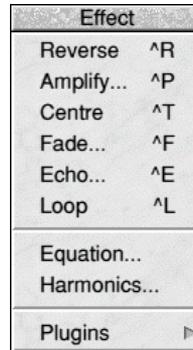


This is covered in detail in the section entitled *Editing a sample*.

---

## Effect

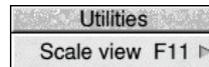
Moving the pointer over this item shows the *Effect* menu:



This is covered in detail in the section entitled *Applying effects to samples*.

## Utilities

Moving the pointer over this item shows the *Utilities* menu:

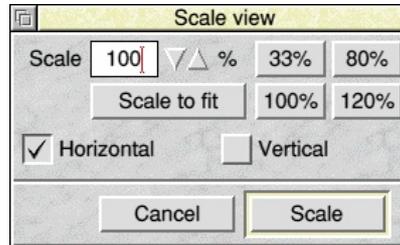


This has a single entry which allows the magnification factor of the displayed sample to be set. This will have no effect on the underlying sample, only the way it is displayed.

---

## Scale

Moving the pointer over the *Scale view* entry or pressing F11 will display the *Scale* dialog:



### Scale

This is the percentage at which the sample will be displayed. 100% is the normal size.

### 33%, 80%, 100%, 120%

These buttons provide predefined scale factors as marked.

### Scale to fit

Clicking this button will try to scale the sample to best fit on the screen.

### Horizontal

If this is ticked the scaling will apply horizontally to the sample.

### Vertical

If this is ticked the scaling will apply vertically to the sample.

Once the percentage has been set click *Scale* to scale the display or *Cancel* to close the window without making any changes.

---

## Help

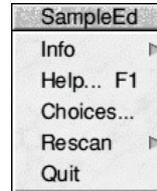
This item will display the help supplied with the application.

---

## The iconbar menu

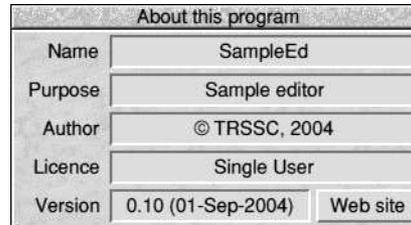
Clicking Menu over the *Fade* icon on the iconbar will display this menu:

The following items are available:



### Info

Moving the mouse pointer over this item displays the *About this program* window which displays version information about *SampleEd*.



### Help

This item will display the help supplied with the application.

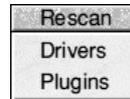
---

**Choices...**

Displays the *Choices* window which allows preferences for the application to be set. This is covered in detail elsewhere.

**Rescan**

This displays two further items:

***Drivers***

This will cause the drivers used to load and save different file formats to be rescanned in case any have been added.

***Plugins***

This performs the same operation for plugins in case any have been added.

**Quit**

Choosing this item will cause *SampleEd* to exit.

## Appendix A

The sample formats that *SampleEd* can load and save are governed by what drivers are installed in the *SampleEd* application. The following basic and sub formats are supported by default. Not all sub formats for each basic format are supported. In particular, Wave files have tens of sub formats of which only a handful are supported.

Format	Sub format	Description	Import	Export	Notes
AIFF	Unsigned 8 bit PCM	Apple/SGI	✓	✓	Support provided by libsndfile
	Signed 8 bit PCM		✓	✓	
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	64 bit float		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	
	GSM 6.10		✓	✓	
	12 bit DWVV		✓	✓	
	16 bit DWVV		✓	✓	
	24 bit DWVV		✓	✓	
	AU		Signed 8 bit PCM	Sun/NeXT	
Signed 16 bit PCM		✓	✓		
Signed 24 bit PCM		✓	✓		
Signed 32 bit PCM		✓	✓		
32 bit float		✓	✓		
64 bit float		✓	✓		
U-Law		✓	✓		
A-Law		✓	✓		
32kbs G721 ADPCM		✓	✓		
24kbs G723 ADPCM		✓	✓		
40kbs G723 ADPCM		✓	✓		

Format	Sub format	Description	Import	Export	Notes
AVR	AVR	Audio Visual Research	✓	✓	Support provided by libsndfile
Armadeus	Armadeus	Armadeus	✓	✓	
CDTrack	CDTrack	AudioFS	✓	✓	Support provided by libsndfile
HTK	Signed 16 bit PCM	HMM Tool Kit	✓	✓	Support provided by libsndfile
IFF	Signed 8 bit PCM	Amiga IFF/SVX8/SV16	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
MAT4	Signed 16 bit PCM	GNU Octave/Matlab 4.2	✓	✓	Support provided by libsndfile
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	64 bit float		✓	✓	
MAT5	Unsigned 8 bit PCM	GNU Octvae 2.1/ Matlab 5.0	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	64 bit float		✓	✓	
MP3	MPEG	MP3 layer I, II and III	✓	✓	Support by provided by LAME
PAF	Signed 8 bit PCM	Ensoniq PARIS	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	
PVF	Signed 8 bit PCM	Portable Voice Format	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	

Format	Sub format	Description	Import	Export	Notes
RAW	Unsigned 8 bit PCM	Header less data	✓	✓	Support provided by libsndfile
	Signed 8 bit PCM		✓	✓	
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	64 bit float		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	
	GSM 6.10		✓	✓	
	12 bit DWVW		✓	✓	
	16 bit DWVW		✓	✓	
	24 bit DWVW		✓	✓	
	VOX ADPCM		✓	✓	
SDS	SDS	MIDI Sample Dump	✓	✓	Support provided by libsndfile
SF	Signed 16 bit PCM	Berkeley/IRCAM/CARL	✓	✓	Support provided by libsndfile
	Signed 24 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	
VOC	Unsigned 8 bit PCM	Creative Labs	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	

Format	Sub format	Description	Import	Export	Notes
W64	Unsigned 8 bit PCM	SoundFoundry WAVE 64	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	64 bit float		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	
	GSM 6.10		✓	✓	
	IMA ADPCM		✓	✓	
	Microsoft ADPCM		✓	✓	
WAV	Unsigned 8 bit PCM	Microsoft Wave	✓	✓	Support provided by libsndfile and LAME
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	32 bit float		✓	✓	
	64 bit float		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	
	GSM 6.10		✓	✓	
	IMA ADPCM		✓	✓	
	Microsoft ADPCM		✓	✓	
WAV	Signed 8 bit PCM	NIST Sphere	✓	✓	Support provided by libsndfile
	Signed 16 bit PCM		✓	✓	
	Signed 24 bit PCM		✓	✓	
	Signed 32 bit PCM		✓	✓	
	U-Law		✓	✓	
	A-Law		✓	✓	

---

<b>Format</b>	<b>Sub format</b>	<b>Description</b>	<b>Import</b>	<b>Export</b>	<b>Notes</b>
XI	8 bit DPCM	FastTracker 2	✓	✓	Support provided by libsndfile
	16 bit DPCM		✓	✓	

---

## Appendix B

This appendix lists all the functions and constants that can be included in an equation. Note that this information is taken from the documentation that comes with the ExprEval library.

### Functions

Function	Min. Args	Max. Args	Result/Comment
abs(v)	1	1	Absolute value of v. abs(-4.3) returns 4.3
mod(v,d)	2	2	Remainder of v/d. mod(5.2,2.5) return 0.2
ipart(v)	1	1	The integer part of v. ipart(3.2) returns 3
fpart(v)	1	1	The fractional part of v. fpart(3.2) returns 0.2
min(v,...)	1	None	The minimum number passed. min(3,2,-5,-2,7) returns -5
max(v,...)	1	None	The maximum number passed. max(3,2,-5,-2,7) returns 7
pow(a,b)	2	2	The value a raised to the power b. pow(3.2,1.7) returns 3.2 <sup>1.7</sup>
sqrt(a)	1	1	The square root of a. sqrt(16) returns 4

Function	Min. Args	Max. Args	Result/Comment
sin(a)	1	1	The sine of a radians. sin(1.5) returns around 0.997
sinh(a)	1	1	The hyperbolic sine of a. sinh(1.5) returns around 2.129
asin(a)	1	1	The arc-sine of a in radians. asin(0.5) returns around 0.524
cos(a)	1	1	The cosine of a radians. cos(1.5) returns around 0.0707
cosh(a)	1	1	The hyperbolic cosine of a. cosh(1.5) returns around 2.352
acos(a)	1	1	The arc-cosine of a in radians. acos(0.5) returns around 1.047
tan(a)	1	1	The tangent of a radians. tan(1.5) returns around 14.101
tanh(a)	1	1	The hyperbolic tangent of a. tanh(1.5) returns around 0.905
atan(a)	1	1	The arc-tangent of a in radians. atan(0.3) returns about 0.291
atan2(y,x)	2	2	The arc-tangent of y/x, with quadrant correction. atan2(4,3) returns about 0.927

---

Function	Min. Args	Max. Args	Result/Comment
log(a)	1	1	The base 10 logarithm of a. log(100) returns 2
pow10(a)	1	1	10 raised to the power of a. pow10(2) returns 100
ln(a)	1	1	The base e logarithm of a. ln(2.8) returns around 1.030
exp(a)	1	1	e raised to the power of a. exp(2) returns around 7.389
logn(a,b)	2	2	The base b logarithm of a. logn(16,2) returns 4
ceil(a)	1	1	Rounds a up to the nearest integer. ceil(3.2) returns 4
floor(a)	1	1	Rounds a down to the nearest integer. floor(3.2) returns 3
rand()	0	0	Returns a number between 0 up to but not including 1.
random(a,b)	2	2	Returns a number between a up to and including b.
srand(a)	1	1	Seeds the random number generator with a value. Return value is unknown

---

---

Function	Min. Args	Max. Args	Result/Comment
randomize()	0	0	Seed the random number generator with a value based on the current time. Return value is unknown
deg(a)	1	1	Returns a radians converted to degrees. deg(3.14) returns around 179.909
rad(a)	1	1	Returns a degrees converted to radians. rad(180) returns around 3.142
recttopolr(x,y)	2	2	Returns the polar radius of the rectangular co-ordinates. recttopolr(2,3) returns around 3.606
recttopola(x,y)	2	2	Returns the polar angle (0...2PI) in radians of the rectangular co-ordinates. recttopola(2,3) returns around 0.588
poltorectx(r,a)	2	2	Returns the x rectangular co-ordinate of the polar co-ordinates. poltorectx(3,1.5) returns around 0.212
poltorecty(r,a)	2	2	Returns the y rectangular co-ordinate of the polar co-ordinates. poltorecty(3,1.5) returns around 2.992
if(c,t,f)	3	3	Evaluates and returns t if c is not 0.0. Else evaluates and returns f. if(0.1,2.1,3.9) returns 2.1
select(c,n,z[,p])	3	4	Returns n if c is less than 0.0. Returns z if c is 0.0. If c is greater than 0.0 and only three arguments were passed, returns z. If c is greater than 0.0 and four arguments were passed, return p. select(3,1,4,5) returns 5

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Function	Min. Args	Max. Args	Result/Comment
equal(a,b)	2	2	Returns 1.0 if a is equal to b. Else returns 0.0 equal(3,2) returns 0.0
above(a,b)	2	2	Returns 1.0 if a is above b. Else returns 0.0 above(3,2) returns 1.0
below(a,b)	2	2	Returns 1.0 if a is below b. Else returns 0.0 below(3,2) returns 0.0
avg(a,...)	1	None	Returns the average of the values passed. avg(3,3,6) returns 4
clip(v,min,max)	3	3	Clips v to the range from min to max. If v is less than min, it returns min. If v is greater than max it returns max. Otherwise it returns v. clip(3,1,2) returns 2
clamp(v,min,max)	3	3	Clamps v to the range from min to max, looping if needed. clamp(8,2,1.3,4.7) returns 1.4
pntchange(side1old, side2old, side1new, side2new, oldpnt)	5	5	This is used to translate points from different scale. Works no matter the orientation as long as the sides are lined up correctly. pntchange(-1,1,0,480,-0.5) returns 120 (x example) pntchange(-1,1,480,0,-0.5) returns 360 (y example)
poly(x,c1,...)	2	None	This function calculates the polynomial. x is the value to use in the polynomial. c1 and on are the coefficients. poly(4,6,9,3,1,4) returns 2168 same as $6 \cdot 4^4 + 9 \cdot 4^3 + 3 \cdot 4^2 + 1 \cdot 4^1 + 4 \cdot 4^0$

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Function	Min. Args	Max. Args	Result/Comment
and(a,b)	2	2	Returns 0.0 if either a or b are 0.0 Else returns 1.0 and(2.1,0.0) returns 0.0
or(a,b)	2	2	Returns 0.0 if both a and b are 0.0 Else returns 1.0 or(2.1,0.0) returns 1.0
not(a)	1	1	Returns 1.0 if a is 0.0 Else returns 0.0 not(0.3) returns 0.0
for(init,test,inc,a1,...)	4	None	This function acts like a for loop in C. First init is evaluated. Then test is evaluated. As long as the test is not 0.0, the action statements (a1 to an) are evaluated, the inc statement is evaluated, and the test is evaluated again. The result is the result of the final action statement. for(x=0,below(x,11),x=x+1,y=y+x) returns 55.0 (if y was initially 0.0)
many(expr,...)	1	None	This function treats many subexpressions as a single object (function). It is mainly for the 'for' function. for(many(j=5,k=1),above(j*k,0.001),many(j=j+5,k=k/2),0)

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## Constants

Constant	Math Form	Value
M_E	e	2.7182818284590452354
M_LOG2E	$\log_2(e)$	1.4426950408889634074
M_LOG10E	$\log_{10}(e)$	0.43429448190325182765
M_LN2	$\ln(2)$	0.69314718055994530942
M_LN10	$\ln(10)$	2.30258509299404568402
M_PI	$\Pi$	3.14159265358979323846
M_PI_2	$\Pi/2$	1.57079632679489661923
M_PI_4	$\Pi/4$	0.78539816339744830962
M_1_PI	$1/\Pi$	0.31830988618379067154
M_2_PI	$2/\Pi$	0.63661977236758134308
M_1_SQRTPI	$1/\sqrt{\Pi}$	0.56418958354776
M_2_SQRTPI	$2/\sqrt{\Pi}$	1.12837916709551257390
M_SQRT2	$\sqrt{2}$	1.41421356237309504880
M_1_SQRT2	$1/\sqrt{2}$	0.70710678118654752440

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## Acknowledgements

Although the core functionality provided by *SampleEd* has been written from scratch, a number of the features that are supported owe their existence to a number of Open Source libraries that have been released under the LGPL and other projects that have been made available for use by third party developers such as myself.

To the best of the my knowledge all of the requirements of the licenses for each of these libraries has been met. Any modified source code is available on the *SampleEd* site at <http://www.reallysmall.co.uk> and all of these libraries are dynamically loaded using rink so that they can be replaced with newer versions when they become available (with the exception of Digital Renderer which is a module anyway).

So, to all the people who are involved in the following projects,

### Thanks very much!

Project	Address and functionality
libsndfile	<a href="http://www.mega-nerd.com/libsndfile">http://www.mega-nerd.com/libsndfile</a> Loading and saving of a large number of sample formats
LAME	<a href="http://cerberus.archifisal.co.uk/software/riscos/lame.html">http://cerberus.archifisal.co.uk/software/riscos/lame.html</a> Decoding and encoding of MP3 files
LADSPA	<a href="http://www.ladspa.org">http://www.ladspa.org</a> Plugin protocol specification and sample implementation
Digital Renderer	<a href="http://www.zarquon.homepage.t-online.de/Software.html#drender">http://www.zarquon.homepage.t-online.de/Software.html#drender</a> Sample playback
expreval	<a href="http://www.codeproject.com/library/expreval.asp">http://www.codeproject.com/library/expreval.asp</a> Expression evaluation