



About the *Soundshaper* GUI by Robert Fraser

***Soundshaper* is a Windows™ 'front-end' for the CDP software, with an emphasis on practicality and ease of use.**

The Main Page

Soundshaper's Main Page is built around a multi-process Patch Grid. The grid consists of up to 16 rows of 12 cells, each of which is the outcome of a CDP process. A cell's file can be played in the built-in player, if appropriate (some CDP file types are not playable), viewed in an editor, saved to a permanent file – *Soundshaper* uses temporary files for processing – copied to another cell, or you can get information about it using one of the many CDP Info functions.

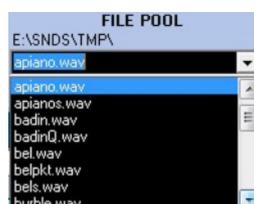


Each row in the grid represents a separate chain of processes, usually with its own source sound. The normal progression is from left to right, e.g.

A_0 (source) – A_1 (1st process) – A_2 (2nd process) etc.

A row can also represent one channel of a multi-channel sequence and rows can be linked in various ways, such as being combined in a mix (as shown above).

The basic operation of CDP is to choose a source sound, alter it through a process and audition the result. Sources can be selected via conventional file menus, by drag+drop from an open folder, from a 'Recent Files' list or from the File Pool – a drop-down list of project soundfiles. A default Pool file is always loaded on startup, if it exists. Pool files are simply text lists, so there is no limit to the number of these you can have.

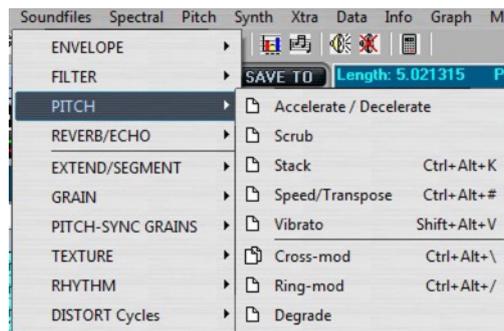


Selecting a Process

Processes are most easily selected via the menus. These are based on CDP's division of functions into Time-Domain (operating on soundfiles) and Frequency-Domain (operating on sound spectra). Time-domain processes are split into separate Edit/Mix, Soundfile and Synth menus, while Frequency-Domain processes are divided between the Spectral menu and the Pitch menu, which is for operations on pitch data files extracted from spectral files.

Information functions appear on the Info menu. These do not produce an output sound, but either produce text which is displayed automatically, or a textfile report, which can also be displayed.

Menu for CDP Soundfile Pitch functions



The menus do not always follow the CDP classification exactly, but aim to present the huge range of processes in a logical structure, by grouping related functions together. The CDP name is displayed on the page, with links to the documentation.

An alternative selection method is via the Process Grids, where functions are laid out in a table:

PITCH	1	2	3	4	5	6	7	8
CONVERT	GETPITCH	GETPITCHBRK	PCHGEN	MAKESPEC	HEAR	VOWELS	SYNTH	PCHTOBRK
PROCESS	APPROX	CUT	EXAGG	FIX	INVERT	INTERPOLATE	QUANTIZE	RANDOM
----- ctd -----	SHIFT	SMOOTH	VIBRATO	INSERTSIL	UNPITCH	NOISETOSIL	PITCHDOTSIL	
COMBINE	PCH+PCH>TR	PCH+PCHB>TR	PCH+TR>PCH	PCH+TRB>PCH	TRTR>TR	TR+TRB>TR		
COMBINEBRK	PCH+PCH>TRB	PCH+PCHB>TRB	PCH+TR>PCHB	PCH+TRB>PCHB	TR+TR>TRB	TR+TRB>TRB		
PITCHINFO	INFO	ZEROS	PCHTOTXT	PCHSEE	TRANSEE			

There is also a drop-down list of favourite processes, corresponding to the File Pool – again, any number of lists can be imported.

Automatic File Conversion

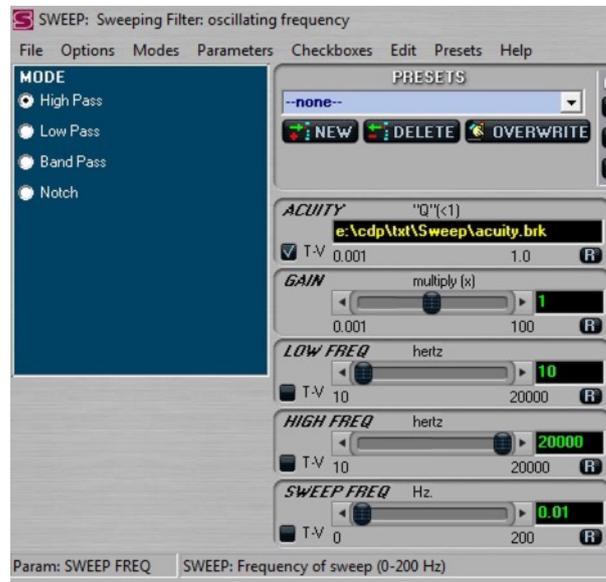
An important feature of *Soundshaper* is automatic file conversion. CDP employs a rather wide range of input file types: in addition to soundfiles, there are frequency analysis (spectral) files, formant, pitch data, transposition and envelope files; the last three of these have binary and text versions. Other possible inputs include text mixfiles.

As far as possible, *Soundshaper* allows you simply to select the next process, while it performs any necessary file conversions behind the scenes, using default values which can be changed at any time. Similarly, when the process requires a secondary input file, it is usually possible just to click on the required cell, and *Soundshaper* will convert the file-type if necessary. If this is not possible, a warning message is given. The native file type is also shown in the menus, by colour-coding.

Parameter Pages

Selecting a process normally leads to a parameter page, where parameter values are chosen. *Soundshaper* knows the requirements of the process and sets up the page accordingly: the CDP mode (where applicable) is selected on the left and this causes only the relevant parameters to be displayed with appropriate value-ranges. A default value is normally given as a starting point.

Parameter Page (part)



The '**R**' button in the screenshot refers to randomising values: you can set a range of values for the parameter before clicking the button.

Parameters are the key to what you can do with a process and are well worth studying in the documentation. As the mouse hovers over the mode or parameter, a quick resumé is given at the bottom of the page, and a fuller description can easily be displayed. There are also quick links to both the CDP and *Soundshaper* documentation files.

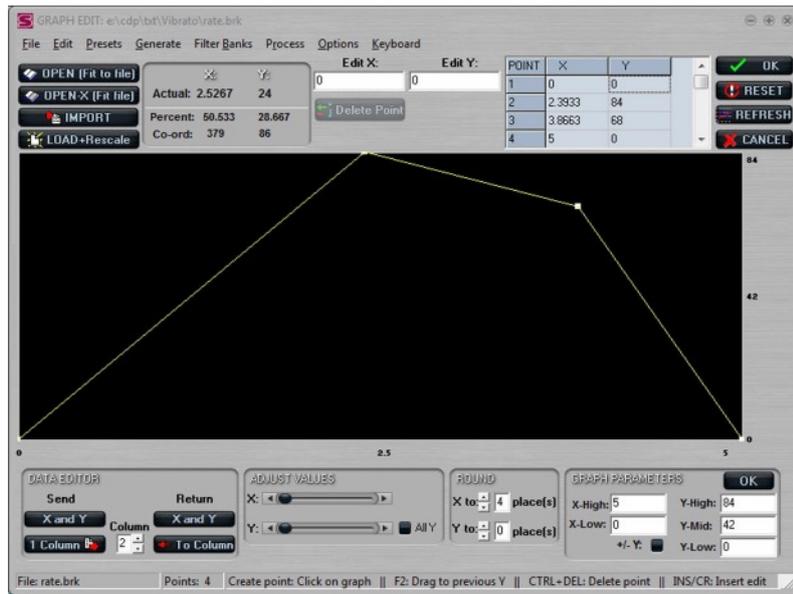
Time-varying values

Many CDP parameter values can vary over time, usually over the length of the input file. The single value is replaced by the name of a text file, usually a 'breakpoint' file of *time value* pairs. Ticking the **T-V** checkbox brings up a default data file (if one is available) in an edit box, with any time-values automatically scaled to fit the file. This data can be edited manually in the edit box, or sent to *Soundshaper's* Graph-Edit page.

Data Edit Panel



Graph-Edit Page



The Graph-Edit page shows the data as a breakpoint (straight-line) graph as well as in a table. New points are created by clicking on the graph area; points can be dragged around; and there are various possibilities for creating new graphs from scratch, such as an envelope shape that can be imposed on a sound.

Snapshots, Presets and Multiple Parameter Sets

On the Parameter Page, sets of parameters can be saved temporarily by clicking on one of the **Snapshot** buttons. The first eight of these are also used to store multiple parameter sets, if this option is available and selected. This enables a multi-channel file to have a different set of parameter values for each channel.

Presets and Snapshots



A parameter set can be saved permanently in two ways: as a simple text file (File: 'Save Snapshot') or by adding it to a collection of **Presets**. The former can be quickly re-loaded by drag+drop from a folder. Preset files are stored by default in a dedicated folder for each CDP function and each can contain up to 100 presets, with no limit to the number of possible files. While only the default file is loaded automatically, an alternative preset file can be substituted quickly by drag+drop.

It is also possible to have a global preset file, which can have presets from any function; if this option is selected, only the presets applicable to a particular function are displayed on its parameter page.

There are *Soundshaper* presets for all the examples in the TEXTURE HTML Reference Manual, supplied as standard with CDP systems. Presets are especially useful with the Texture Set because there are so many parameters.

Finally, parameter settings can be saved as a text file ('Save Settings to Text'), for record-keeping purposes. Parameter values are also added to the History file (see below).

After Processing

When any parameter values have been set and the OK button is clicked, *Soundshaper* runs the CDP process and returns to the Main Page, where the result is displayed in the next cell, ready to be played or viewed.

If the result is unsuitable, double-clicking on the cell re-opens the Parameter Page, where the previous settings can be adjusted and re-run. Another option is to replace the process with a different one (see the **REPLACE** button.) Alternatively, either **UNDO** or the **DELETE** key will clear the cell.

Although *Soundshaper* has no built-in soundfile editor, many free editors are available and the main window is compact enough to enable another application to be placed on screen at the same time. Up to ten external applications can be launched from *Soundshaper*. An editor of choice is normally selected during the initial setup; a soundfile in the current cell can then be sent to the editor by a single click or keystroke. CDP's *ViewSF* can also be used to display a soundfile, or a spectral file.

ViewSF and some editors (e.g. *Audacity*) can export markers (cue points) which *Soundshaper* can pick up: *Soundshaper* supports up to 30 Markers, which are also used to play sections of a file, make a quick cut, process a portion of a file and send times to various function parameters.

Patches

The sequence of processes displayed on the patch grid is collectively called a **Patch**. Patches are easily saved and re-loaded. This is a powerful and convenient way of saving your work, as a re-loaded patch is fully editable and can be run with different source sounds.

While it is possible to save a cell's temporary file to a permanent file at any time, constantly naming files and keeping written records about the processes run is time-consuming. Saving patches is both quick and accurate. A saved patch can be loaded and run by simply dragging+dropping the patch file onto the Main Page. A Patches drop-down list for favourite patches (like the Pool) is also available.

Patch Controls



Various patch controls in the centre of the Main Page make saving and loading patches a flexible operation. The 'Include sources' checkbox is ticked by default, but if not selected, the source files are not saved with the patch (to save disk space). In this case, when the patch is re-loaded, if the source file is still available (its full path is saved with the patch), it is loaded. If not, the user is prompted to supply source files for certain rows. The **RUN** button is then used to re-run the patch.

The 'Preview' checkbox can be selected on loading, to see what's in the patch before running it. Finally, the 'Save All Files' checkbox saves all output files associated with the patch. (Surprisingly, re-loading all of these is not always quicker than just running the patch from one source.)

Replacing Sources

Perhaps the most important principle behind the patch system is that a chain of CDP processes should be able to be run with different sources. Many CDP functions are quite low-level and more interesting results can be obtained by combining them into higher units.

For this to be achieved, it is essential that the patch can be run with mono, stereo or multi-channel files. Unfortunately, not all CDP functions have this flexibility. Many time-domain processes do support multi-channel input, but many more remain mono-only. The whole of the spectral suite and its pitch and formant derivatives are also natively mono-only.

From the beginning, *Soundshaper* has catered for stereo input, and from version 4.4 almost 100% of processes are channel-neutral, supporting up to 8 channels.

For each CDP function, *Soundshaper* constructs a suitable script that can cater for more than one channel. Often it splits the input file into constituent channels and processes each separately before interleaving the individual outfiles. In some cases, it first mixes the channels down to mono. Where this happens (or conversely if a mono source has to be converted to stereo or multi-channel), the original file is saved temporarily and then copied back to its original name after processing.

Multiple Outputs

A growing number of CDP processes have multiple outputs. The patch grid is ideal for these as they can be placed on separate rows, ready for individual processing.

The SLICE function illustrates this well: the spectrum is split into separate slices which can be processed differently and then remixed:

Spectral slicing

0	1	2	< 3 >
A >>	Slice	Shift	MixMany
B	Slice2	Shift	
C	Slice3	Shift	
D	Slice4	Shift	

This a simple way of creating a pseudo-stereo effect from a mono source. Similarly, a multi-channel file can be split into individual channels, each on its own row and each given a different treatment.

Copying cells, rows and Bulk Processing

Cells may be copied, especially onto another row — this is another means of creating a separate process stream. Cells may be inserted or deleted; initially, an inserted cell is a NULL process, with the prospect of being replaced by an actual function, or perhaps the output from an external application. Whole rows or parts of rows may also be copied to another row and if the new row has a source file, it is automatically re-run.

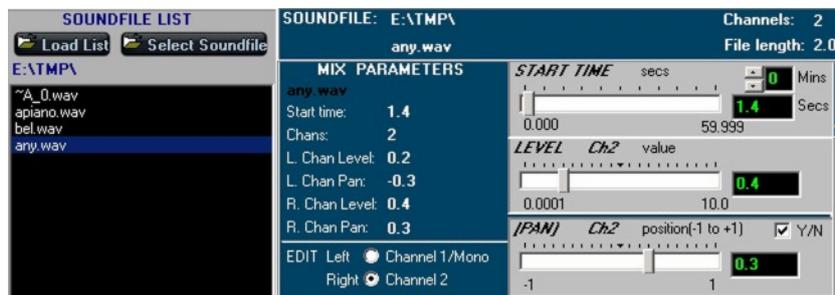
Bulk processing in *Soundshaper* (from version 4.4) is a variant of row copying. A single-row process is run; a pool file of sources is loaded and a button-push populates a number of empty rows with new sources from the list. The first row is then copied with the 'Bulk Process' checkbox ticked and the process is duly duplicated in each of the new sources' rows.

Mix Page

CDP mixing uses text **mixfiles**, which list sounds with a start-time, level and pan position (or channel destination in multi-channel mixfiles). Thus it is not track-based, as in audio sequencers, and the overlapping or repetition of sources is simply a matter of giving them a different start-time.

Soundshaper has a dedicated Mix Page. Soundfiles can be selected on the main page and sent to the Mix Page, or they can be selected on the Mix page. Each listed source is associated with a set of start-time, level and pan values. If the source is not repeated, the user can simply set these values and click OK, leaving *Soundshaper* to write and run the specialist mixfile.

Mix Page (part)



Soundfile list and Mix parameters

Alternatively, the mix list can be displayed and added to or edited on the page, as shown in the screenshot below:

Soundfile	Time	Chans	Level (1)	Pan (1)	Level (2)	Pan (2)
E:\TMP\apiano.wav	0.000	1	0.5	-0.27		
E:\TMP\bel.wav	0.000	1	0.5	0.27		
E:\TMP\any.wav	1.000	2	0.6	-0.75	0.6	0.75
E:\TMP\any.wav	1.200	2	0.4	-0.6	0.4	0.6
E:\TMP\any.wav	1.400	2	0.2	-0.3	0.4	0.3

The Mix list shown as editable text

CDP also has a number of functions which operate on mixfiles (shuffling lines, altering time and spatial positions etc.). These can be invoked from the Main Page or processed on the Mix page, where the altered mixfile is displayed, ready to be run or edited further.

Data Editor

CDP's COLUMNS program is implemented in a dedicated Data Editor page.

COLUMNS processes or generates text data files, transforming these in up to 100 different ways. A data file can be sent to the Editor from the Graph-Edit page, for instance, altered and sent back. Or a file can be opened on the page and processed there, with the altered data displayed in an edit box, which can also be manipulated manually.

History

Soundshaper maintains a History of processes in text form and prompts to save this at the end of a session. The History formerly stored CDP command lines, but this is no longer practical, as the commands *Soundshaper* now assembles use variables that look a bit like hieroglyphics, e.g.:

```
modify speed 6 %2_%3.wav %n%_%o%.wav 6.49 2.59
```

The History file saves this command in a more readable form:

```
Cell      : A_1
Process   : VIBRATO
File In   : ~A_0.wav
File Out  : ~A_1.wav
Length    : 3.678209
Channels  : 1
CDP Prog  : modify speed 6
Params    : 6.49 2.59
RATE:     6.49
WIDTH:    2.59
```

Re-assembling a command line to compose a batchfile script is then a simple matter of copying text. The CDP documentation gives guidance on the exact format of any command line.

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