



Cameleon 5000

Operation Manual

Version 0.18 Beta

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Overview

Cameleon 5000 blurs the boundaries between sampling and synthesis in unprecedented ways.

Want a bass sound with the tone of an acoustic, but the punch of an electric? Simply **import samples** of both, and click in the 'Morph Square' to create your own hybrids!

Imagine a patch with the harmonics of a human voice, and the percussive attack of an acoustic piano. Imagine real-time morphing between a vibraphone and a choir, or a flute and a guitar. With Cameleon 5000, anything is possible!

Camel Audio's new **Sonic Blueprint** analysis algorithms and **Hybrid Synthesis** sound warping technology (patents applied for) are the results of several years' painstaking research in the field of digital signal processing. Theory is put into practice with Cameleon 5000: a unique musical instrument, notable both for its exceptional sound quality and intuitive user interface.

At its heart lies a powerful additive synthesiser, with freely detuneable partials and a flexible 128 band noise generator. Any **WAV** or **AIFF** format sampled sound can be imported and 'blueprinted', its key characteristics instantly captured and made available for use in the synthesis engine.

Advanced data reduction techniques allow the complex description of real acoustic sounds to be reduced to a relatively small number of parameters, for easier real-time manipulation. Both velocity and keyboard scaling are possible, allowing you to add heightened expressive 'realism' to even your most outlandish creations.

Cameleon 5000 comes with a comprehensive library of both acoustic and electronic sounds, organised into categories including bass, pads and strings, among others. These sounds can be browsed, by sound or by category, from Cameleon 5000's easy-to-use interface.

The rest of this document explains its key features and functionality, and aims to get you started as quickly as possible.

Features

- Import and morph any WAV or AIFF file.
- 128 band noise generator.
- 64 detuneable partials.
- Amplitude/frequency envelope for each harmonic sophisticated graphic displays (time/amplitude, harmonic/amplitude, harmonic/pitch and more).
- 128 band formant filter.
- Intuitive 'Morph Square', to warp between four sounds at a time.
- Extensive real-time parameter modulation by velocity, LFO and envelopes.
- High-quality portamento allows for realistic note bending.
- Resonant filter and tube distortion (based on popular CamelPhat design).
- Built-in chorus, delay and reverb effects.

System Requirements

Cameleon 5000 is available for both **Windows** PC and Apple **Mac**. It is fully compatible with any application that can host **VST** or **Audio Units** plugins. Notable hosts include applications such as Steinberg's *Cubase* and *Nuendo*, Emagic's *Logic Audio* range, the *Fruity Loops* production system and Apple's *Final Cut Pro 3* digital video editing suite.

Cameleon 5000 can also be used in DirectX hosts such as Cakewalk's Sonar and the full range of Sonic Foundry products via the use of DirectX adapters, such as those available from FXpansion or Spinaudio.

Demo Version Restrictions

The following restrictions apply to the demo version of Cameleon 5000:

- Sound is interrupted by one second of silence every thirty seconds.
- Saving is disabled.
- Only a small selection from the sound library is available.

Installation

Installing Cameleon 5000 is a quick and easy process.

Windows users should unzip the .zip archive and extract the files to the preferred VST plugins folder (e.g. 'C:\Program Files\Steinberg\Cubase VST\VST plugins'). The option to create the appropriate directory structure should be used.

Next the supplied serial number, name and company name should be copied into the file 'CA5000Config.txt', which is found in the same directory as the plugin itself. If you do not have a company name, leave this field blank.

The following is an example file that might be created:

```
012345678-9ABCDEFGF  
Ben Gillett  
CamelAudio
```

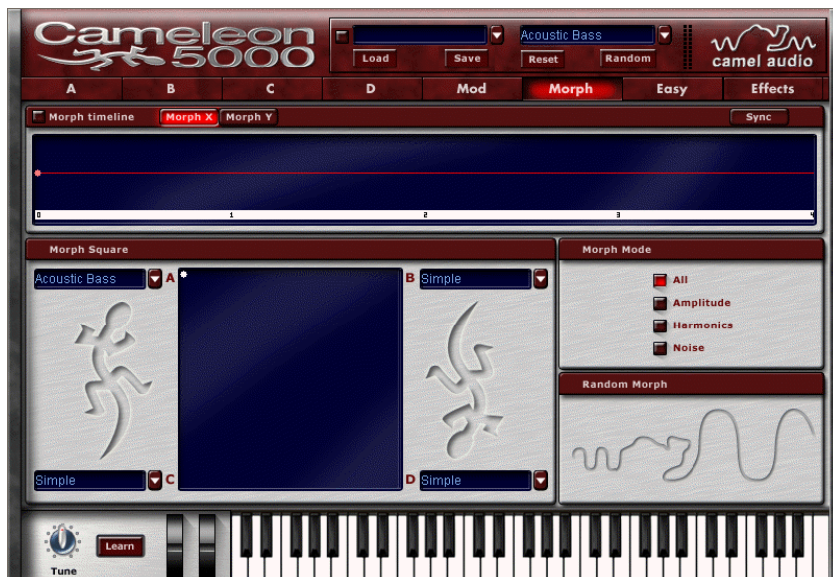
Mac OS X users can simply run the installation program provided.

Afterwards, upon starting your plugin host as normal, Cameleon 5000 will be available in the list of instrument plugins.

Note: the demo version of Cameleon 5000 does not require a serial number.

Quick Tour

Welcome to Cameleon 5000!



The Cameleon 5000 morphing resynthesizer is a uniquely powerful and flexible instrument, utilising a number of complex and innovative technologies.

However, its user interface has been carefully designed to be as straightforward and intuitive as possible.

The finer points of Cameleon 5000 are explained in detail in subsequent sections of this manual. In this section we'll concentrate on getting you familiar with the basics, and (more importantly) making some noise!

We might say that there are three different, equally legitimate ways to approach working with Cameleon 5000:

- Preset morphing.
- Sample resynthesis.
- Additive or 'spectral modelling' synthesis.

Preset morphing

The easiest way to get started with Cameleon 5000 is to take advantage of its comprehensive library of preset 'Voice Programs' and use these as the starting point for your experiments.

By default Cameleon 5000 opens with the Morph page active. Four different Voice Programs (A, B, C and D) are loaded at any one time.

Play a note on your MIDI keyboard and you'll hear whichever preset is loaded as Voice Program A.

You'll see a variety of controls on the Morph page - for now concentrate on the 'Morph Square'.

Notice that the four corners of the Morph Square are labelled 'A', 'B', 'C' and 'D', and that each one has the name of one of the four loaded Voice Programs beside it.

Notice also a small white 'dot' in the top left hand corner of the square, next to 'A'.

Play some notes on your MIDI keyboard, mouse-click on the dot in the Morph Square, and slowly begin dragging it to the right as you continue to play.

You'll hear the sound begin to evolve or 'morph' as you drag, and by the time the dot is about half-way across, what you're hearing will barely be recognisable as Voice Program A.

Keep dragging and the sound keeps morphing. When you've dragged the dot all the way over to 'B' in the top right hand corner, it will have been completely transformed. Now you're hearing whichever preset was loaded as Voice Program B.

Congratulations: you've just learned how to do sound morphing with Cameleon 5000!

By dragging the dot up, down, across or around the Morph Square, you can easily create static hybrids or perform real-time Morphs between the four active Voice Programs.

For a more complete guide to the Morph page, including an explanation of the different morph modes and the timeline,

refer to page 33. For now, here are a few quick tips to bear in mind:

- Clicking on the name fields in the four corners of the Morph Square allows you to load new preset Voice Programs to morph. Voice Programs are stored in the 'Voices' sub-directory of the Cameleon 5000 folder, as .c5v files.
- Most VST and Audio Units host applications will allow you to record or automate Cameleon 5000 parameter changes - including movements in the Morph Square!
- Try clicking on the 'Random Morph' camel (to the right of the Morph Square).

Sample resynthesis

One of Cameleon 5000's unique features is its ability to import standard WAV or AIFF format sampled sounds into Voice Programs.

It's important to understand that Cameleon 5000 does not load and play samples in the same way a conventional sample-based synthesiser would. In fact it doesn't load sample data at all.

Instead it closely examines the contents of your chosen file (using Camel Audio's unique Sonic Blueprint technology) and analyses the sound.

It then automatically creates a whole new Voice Program, with all the Partials, Envelopes and other parameters set in such a way as to imitate that sound.

Once a sampled sound has been imported, you can treat it just as you would any other Voice Program. It can be morphed with the Morph Square, or tweaked and edited just as if you'd programmed it from scratch yourself.

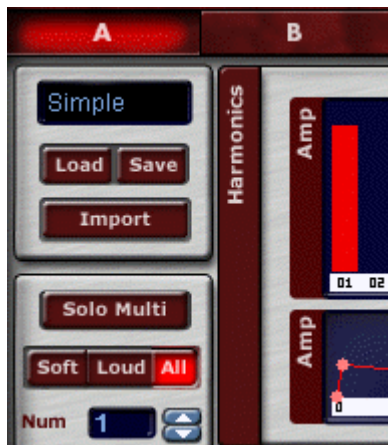
To get the ball rolling, let's quickly walk through the basics of importing samples to create new Voice Programs.

Here's how to create a new Voice Program from just one sample:



The reset button loads an initialised set of parameters.

- Click the 'Reset' button to restore Cameleon 5000's initialised settings.



Samples are imported on the Voice Program edit page.

- Click on the tab labelled 'A' to switch to the edit page for Voice Program A.
- Check that the 'All' button is activated.
- Click the 'Import' button, and choose a WAV or AIFF file from your sample library.
- Once the sample has been imported (it'll take a few moments), you may want to replace the default name ('Simple') with something more descriptive. You can also click the 'Save' button to save the new Voice Program as a .c5v file.

That's it! You can now play your new Voice Program from your MIDI keyboard, morph it into other sounds with the Morph Square (see page 33), or even try manually editing its harmonic and noise content or envelopes (see page 21).

Of course, importing just one sample won't always yield the best results - and there are a couple of tricks you can use to arrive at more 'natural' sounding, expressive Voice Programs.

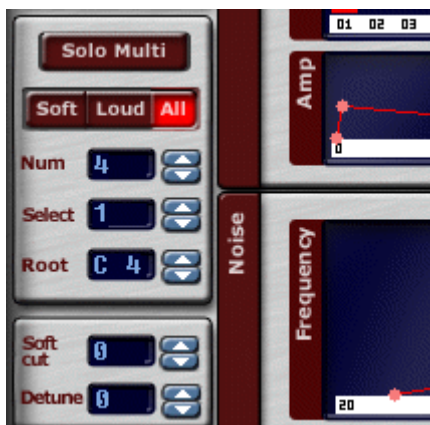
Multi-sampling

The first of these tricks is multi-sampling. If you've ever worked with a conventional sampler, you're probably familiar with multi-sampling. It's where you take several samples of the same instrument at different pitches, and map them across the keyboard. This helps avoid unnatural side effects when a sample is transposed a long way up or down from its original pitch.

Cameleon 5000 allows up to eight different pitched 'multi-samples' to be imported into a Voice Program.

As an example, here's how you could import four different pitched multi-samples into one Voice Program:

- Click the 'Reset' button to restore Cameleon 5000's initialised settings.
- Check that the 'All' button is activated.



-
- Increase the value in the 'Num' field to '4' by clicking on the up arrow. This tells Cameleon 5000 to allow four multi-samples in this Voice Program.
 - Check that the 'Select' field displays '1'. This tells Cameleon 5000 that you're currently working with the first of your four multi-samples.
 - Click 'Import' and choose a WAV or AIFF file from your sample library.

Notice that, once the sample is imported, a new value will appear in the 'Root' field. Cameleon 5000 attempts to automatically detect the pitch of imported samples and place them accordingly.

However, it's not infallible, and it will sometimes guess wrong! If you know that the real root note of the sample is different from Cameleon 5000's guess, you can over-ride it by manually setting the proper root note in the 'Root' field.

- Next, set the 'Select' field to '2'. This tells Cameleon 5000 that you want to work with the second of your four multi-samples.
- Click 'Import' and choose a WAV or AIFF file from your sample library.
- As before, check that Cameleon 5000 has guessed an appropriate root note for the sample. If it hasn't, correct this by adjusting the value in the 'Root' field.
- Set the 'Select' field to '3'. This tells Cameleon 5000 that you want to work with the third of your four multi-samples.
- Import a sample and adjust the root note as required.
- Set the 'Select' field to '4' and repeat the above steps to import the fourth and final multi-sample.

You now have a Voice Program containing four different pitched multi-samples! As before, you may want to enter a name for it, and save it as a .c5v file.

Notice that, as you play up and down the keyboard, Cameleon 5000 automatically 'cross-fades' between the four different multi-samples. This helps prevent disconcerting 'steps' between one sample and the next, and generally helps produce more natural sounding results.

In addition to multi-sampling, you can also achieve more natural or expressive results with Cameleon 5000 by giving some thought to how Voice Programs should respond to note velocity.

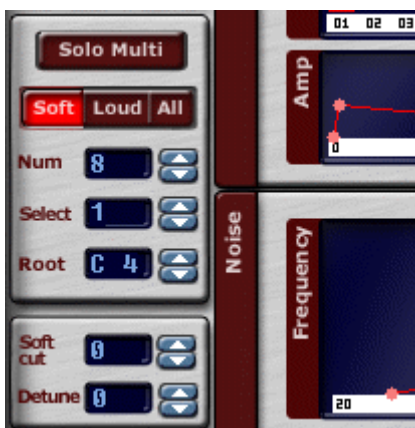
Most musical instruments sound qualitatively different when played softly than they do when played loud. Typically, loud notes sound 'brighter' than soft notes. There are two different ways in which you can mimic this effect with Cameleon 5000:

- By using the 'Soft cut' feature. This applies a gentle low pass filter to softer notes, removing some of the high-frequency brightness. Soft cut is only available when 'All' is activated, and is the best solution if you don't have 'velocity layered' sample sets to use.
- By using velocity layers. Much like a conventional sampler, Cameleon 5000 allows you to import different samples into different velocity layers, so that softer notes trigger one set of samples, while louder notes trigger another.

Velocity Layers

Here's how you can import velocity layered samples into a Voice Program:

- Click the 'Reset' button to restore Cameleon 5000's initialised settings.



-
- Click on the 'Soft' button. This tells Cameleon 5000 that you're currently working with the 'Soft' velocity layer.
 - Import a sample and adjust the root note as required.
 - Click on the 'Loud' button. This tells Cameleon 5000 that you're now working with the 'Loud' velocity layer.
 - Import a sample and adjust the root note as required.

That's it! You now have a multi-sample with two velocity layers. Cameleon 5000 will cross-fade between the two layers according to the MIDI velocity of the notes it receives (see page 26 for more details).

You can repeat the steps above to create more velocity layered multi-samples as required. Note that if you use two velocity layers for one multi-sample in a Voice Program, Cameleon 5000 will expect you to use two velocity layers for every multi-sample in the Voice Program.

To get the best, most 'realistic' results from the Import process, it pays to spend a little time preparing your WAV or AIFF files prior to importing. See 'Cameleon 5000 WAV/AIFF Importing Guidelines' (page 44) for more details.

Of course, you should also feel free to try importing a few samples at random - you can't break anything! Some files may yield good results immediately, others will not. A few may result in some quite surprising and unexpected noises!

If you stumble across something you like, don't forget to click 'Save' and write it to a new Voice Program file.

Additive or 'spectral modelling' synthesis

Every single parameter in a Voice Program can be edited manually, allowing you complete hands-on control over the Cameleon 5000 synthesis engine.

While sample resynthesis provides a quick and easy way to create good, playable Voice Programs, occasionally you may prefer to start with a completely 'blank canvas' and design your own sounds from scratch.

The heart of Cameleon 5000 is a powerful additive synthesis engine, coupled with a flexible multi-band noise generator.

This combination of additive synthesis and noise is sometimes called 'spectral modelling synthesis', and Cameleon 5000 is the perfect tool with which to explore the technique.

If you've programmed an additive synthesiser before, you shouldn't have too much difficulty getting started. The following section ('Cameleon 5000 in detail', page 17) begins a complete guide to the different edit pages, and should provide experienced patch programmers with most of the information they need to start creating their own Voice Programs.

'Easy' and 'Effects'

Whether you decide use presets, import samples or program your own sounds from scratch, you'll no doubt also want to take advantage of the extra features available on the Easy and Effects pages.

The **Easy** page (accessed by clicking on the 'Easy' tab in the top right-hand corner of the window) provides a variety of simple-but-effective controls which can be used to make quick and easy adjustments to Cameleon 5000's sound.

The Easy page is explained in more detail on page 36.

The **Effects** page (accessed by clicking on the 'Effects' tab) offers a selection of high quality digital effects processors, which can be used to add a final, professional polish to a sound, or as creative sound design tools in their own right.

The Effects page is explained in more detail on page 40.

Both the Effects and Easy pages feature their own 'random camel'. Clicking on the random camel causes random values to be assigned to the parameters on the page - a great way to come up with unexpected variations on a sound!

Cameleon 5000 in detail



If you've used VST or Audio Units instruments before, the Cameleon 5000 editor window shouldn't look too alien, even if some of the features aren't immediately self-explanatory.

As we've seen, the Morph page is active when Cameleon 5000 first opens.

Clicking on the tabs along the top of the editor window (A, B, C, D, Mod, Morph, Easy, Effects) allows you to switch between the other edit pages, which you can use to access all of the instrument's parameters.

Also at the top of the editor window are the Category and Instrument fields, which allow you to browse Cameleon 5000's library of preset Instruments by Category (e.g. 'Keyboard') and Instrument name (e.g. 'Organ' or 'Piano').

The 'Load' and 'Save' buttons (unsurprisingly) allow you to load and save Instruments as, .c5i files. (The different file formats used by Cameleon 5000 are explained on page 43.)



The Load, Save, Reset and Random buttons.

The 'Random' button allows you to create entirely new sounds at the click of a mouse. When Random is clicked, Cameleon 5000 loads four different Instruments at random from the currently active Category (e.g. if 'Bass' is the active category, four different Bass sounds will be loaded).

It also randomises a random selection of parameters on the edit pages, including various morphing parameters. The net effect is that a unique hybrid is instantly created each time the button is clicked!

The 'Reset' button tells Cameleon 5000 to load the 'Reset.c5i' file from its home directory. This contains a set of initialized Voice Programs - which may provide a useful starting point for programming your own sounds from scratch.



The virtual keyboard, Learn button, etc.

The virtual keyboard, pitch-bend and assignable modulation wheels work as you'd expect, while the 'Tune' knob can be used to fine-tune the master pitch.

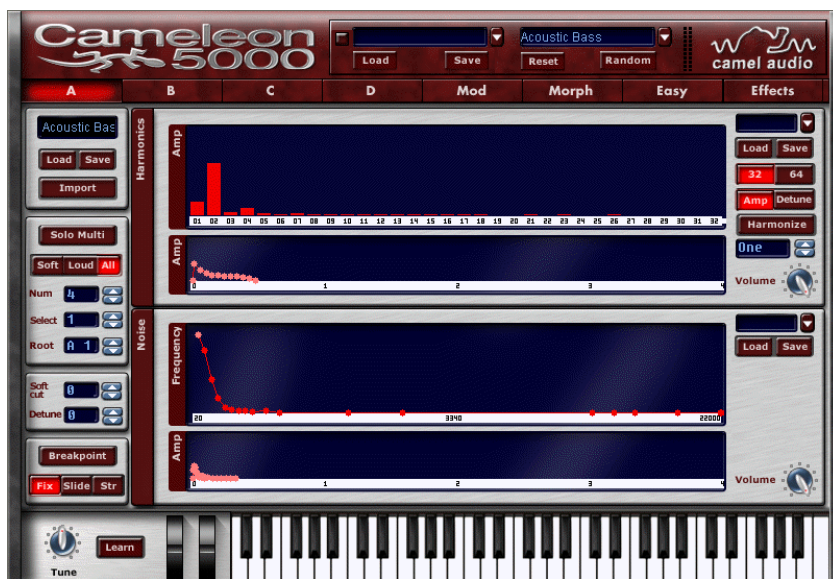
Finally, the 'Learn' button provides an easy way to map MIDI controllers to Cameleon 5000 parameters.

Click the button, and it illuminates. Click a suitable control on one of Cameleon 5000's edit pages (for example, the Filter cutoff knob on the Effects page) then send a MIDI controller message (by moving your controller keyboard's Modulation wheel, for example).

When the controller message is received, the Learn button is extinguished, and Cameleon 5000 automatically maps the controller number to your chosen parameter.

Every knob and almost every numeric parameter in the Cameleon 5000 user interface can be 'taught' a MIDI controller (although only one parameter can be assigned per controller number).

The Voice Program pages (A, B, C and D)



As we know, Cameleon 5000 can store up to four different 'Voice Programs' simultaneously. A Voice Program is just like a 'Patch' in a conventional synth, or a 'Program' in a sampler. In other words, it's a record of all the parameter settings required to produce a particular instrument sound (e.g. 'Organ' or 'Dream Pad').

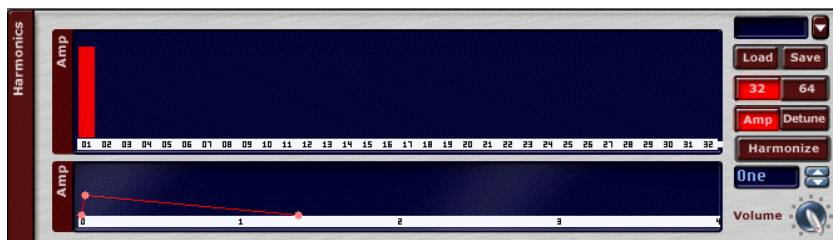
Each of the four Voice Programs has its own independent page (A, B, C or D), and each page duplicates the same set of parameters. Thus whenever we refer to 'the Voice Program page', our comments apply equally to pages A, B, C and D.

The larger, right-hand half of the Voice Program page is divided into two halves; the upper half labelled 'Harmonics' and the lower half labelled 'Noise'.

The Harmonics section allows you to control a powerful additive synthesiser, which generates the harmonic content of a Voice Program. The Noise section offers a flexible multi-band noise generator, which generates the noise content of a Voice

Program (most interesting musical sounds have both harmonic and noise components; Cameleon 5000 allows you full control over both).

Harmonics



Let's look first at the Harmonics section. The top half (labelled 'Amp') is the Partial display, which shows a kind of bar graph of 32 columns. Each of these columns corresponds with a 'partial'; a harmonic frequency that contributes to the tonal 'colour' of the sound. You can adjust the amplitude (or volume) of each partial by clicking and dragging up or down.

To the right of the bar graph you'll see a pair of buttons labelled 32 and 64. Clicking 64 allows you to 'zoom out' and view an expanded bar graph displaying the full 64 editable partials in a Voice Program. Clicking 32 allows you to return to the default view.

Beneath the bar graph display (and also labelled 'Amp') you'll see a breakpoint envelope display. This is the familiar time/amplitude graph most synthesisers and samplers use to shape their sounds. New breakpoints can be added by left-clicking in the envelope display (a total of 128 may be used). Existing break points can be edited by simply clicking and dragging.

Dragging a breakpoint to the left or right moves it backwards or forwards in time. Dragging a breakpoint up or down increases or decreases the volume of the sound at that point in time. A breakpoint can be deleted by right-clicking on it.

Breakpoint Mode and Overall Mode

Before we move on, it's important to understand that there are two distinct editing modes in which the Voice Program page operates. The first of these we'll call 'Breakpoint mode', while the second is called 'Overall mode'.

Overall mode is active by default, and is quite easy to understand. In Overall mode, all the breakpoints in the envelope display are simultaneously selected, so that what you see in the Partial display is a summary of the overall harmonic content of the sound.

Note that, even when Overall mode is active and all breakpoints are selected, it's still possible to adjust the time and amplitude of individual breakpoints.

Breakpoint mode (activated by clicking the 'Breakpoint' button in the lower left-hand side of the window) is a little more complicated, but a lot more powerful.

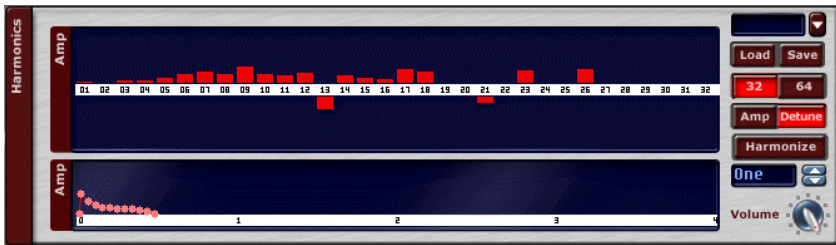
When a single breakpoint is selected (highlighted) in the envelope display, the Partial display will show the harmonic content of the sound at that moment in time.

Each time you select a new breakpoint, the Partial display updates to show the harmonic content of the sound at the corresponding moment in time. Thus by selecting one breakpoint in the envelope, and then the next, and then the next, it's possible to see how the harmonic content of the sound changes and evolves over time.

Of course, the partials are fully editable, and so by selecting each of the envelope's breakpoints in turn and making new settings in the Partial display for each one, you can easily 'sculpt' dynamic changes in the harmonic content (and thus the tone) of the sound.

You'll notice that there is a two-way relationship between the Partial and envelope displays, i.e. changes made in one will be reflected by changes occurring in the other. This is simply because both displays are representing the same sound in different ways. Thus, any edit which results in a change in the sound must inevitably be reflected in both displays.

Pitch / Detune



To the right of the Partial display is a pair of buttons labelled 'Amp' and 'Detune'. By default Amp is active. Clicking on the Detune button causes the Partial display to be replaced by the 'Detune' display.

The Detune display shows information about the same 32 (or 64, if you're zoomed out) harmonics as the Partial display. However, while the Partial display allows you to set the amplitude (or volume) of each harmonic, the Detune display allows you to adjust the frequency (or pitch) of each harmonic.

By default, the 64 partials in a Voice Program are fixed to an integer (whole number) harmonic series. The Detune display allows you to tune each one up or down by 50% of the interval between it and its neighbour, by clicking and dragging up or down.

Freely detuneable partials are essential for effectively emulating the sounds produced by real acoustic instruments.

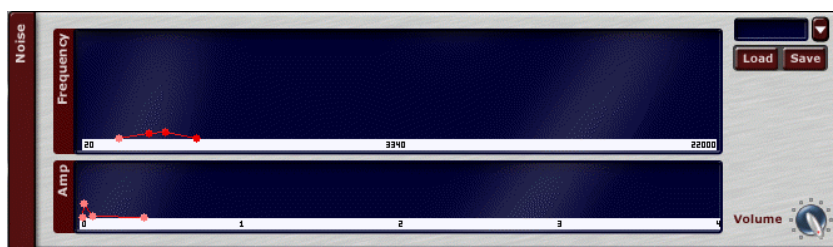
The 'Harmonize' button allows you to over-ride any settings made in the Detune display. Activating the Harmonize button effectively fixes the partials in a Voice Program to a strict, integer harmonic series. Deactivating it reinstates the settings in the Detune display.

Beneath the Amp/Detune buttons and 32/64 buttons, you'll see a small field with up/down arrows beside it. Here you can choose from a variety of editing 'rules', which make it easier to quickly adjust groups of partials in a Voice Program.

The default value is 'One', which allows you to adjust a single partial at a time. 'Odd' allows you to adjust all the odd-numbered harmonics at once by clicking and dragging, while 'Even' allows you to adjust all the even-numbered harmonics. 'Fifths' and 'Octaves' allow you to select fifths and octaves respectively, while 'Bright' and 'Dark' allow you to create harmonic 'ramps' which brighten or darken the sound.

Finally 'All' allows you to adjust all harmonics simultaneously. These editing 'rules' are applicable in both the Partial and Detune displays.

Noise



The Noise section of the Voice Program page works in quite a similar way to the Harmonics section, although with one or two differences.

The upper half of the noise section (labelled 'Frequency') contains the Frequency Envelope.

While it may look and work much like the other envelopes on the Voice Program page (up to 128 breakpoints can be added and edited in just the same way), it's perhaps more helpful to think of the Frequency Envelope as a powerful graphic equaliser, which you can use to carefully shape the frequency content of the noise generator's output.

Noise in its purest form (so-called 'white noise') is evenly distributed across the frequency spectrum. In other words, there's no more and less noise to be found in any one frequency band than in any other. The Frequency Envelope allows you to filter this raw noise selectively, emphasising or rejecting particular frequencies as required.

Beneath the Frequency Envelope (labelled 'Amp') is another breakpoint envelope display. This works just like the 'Amp' envelope display in the Harmonics section, and its relationship with the Frequency Envelope is much like the relationship between the Partial display and its corresponding envelope.

Thus in Breakpoint mode, selecting any breakpoint in the Amp envelope causes the Frequency Envelope to update and show how the noise is being filtered at that moment in time. Successively selecting one breakpoint after another allows you to see how the noise is dynamically shaped over time (imagine the sliders on the 'graphic equaliser' moving freely up and down as a note progresses from attack, through decay and sustain, to release).

Breakpoint and Overall modes affect the Noise section in just the same way as the Harmonics section. So when Overall is active, the Frequency Envelope displays a summary of the overall frequency content of the noise components of the Voice Program. As with the Harmonics section, it's still possible to edit individual breakpoints in Overall mode.

Other Parameters

Both the Harmonics and Noise sections of the Voice Program page feature a 'Volume' knob in their lower right-hand corners. These can be used to adjust the relative levels of the harmonic and noise components of a Voice Program.

The narrower, left-hand column of the Voice Program page displays a number of parameters. From top to bottom, these are:

Load

Loads a Voice Program file (*.c5v).

Save

Saves a Voice Program file (*.c5v).

Import

Imports a standard WAV or AIFF format sound file into a Voice Program. Any file can be used - but for best results please refer to 'Cameleon 5000 WAV/AIFF Importing Guidelines' on page 44.

Solo Multi

Cameleon 5000 allows you to define between one and eight different 'multi-samples' within a Voice Program. These may have been created by importing a sample file, or programmed from scratch; it makes no difference.

A multi-sample in Cameleon 5000 is really a kind of sub-program; a Voice Program within a Voice Program. Each one has its own Harmonics and Noise settings, which can be tweaked and edited independently.

Cameleon 5000 allows multi-samples to be spanned across the keyboard, so that Voice Programs can be created which respond differently when played at different pitches (as many musical instruments do).

When editing a Voice Program, it's often useful to be able to hear only one multi-sample at a time. Activating 'Solo Multi' allows you to hear only the active multi-sample.

Soft/Loud/All

Just as multi-samples can be defined for different pitch ranges in a Voice Program, it's also possible to import or program two different Soft/Loud variations ('velocity layers') for each multi-sample.

Cameleon 5000 cross-fades between these according to the velocity values of the MIDI notes it receives ('Loud' is 127, 'Soft' is 32, values in between are cross-faded). Activating either the 'Soft' or 'Loud' button allows you to view and edit the different Harmonics and Noise settings for each of the variations.

When 'All' is selected, both the velocity layers are 'linked', so that edits made in one layer automatically affect both layers. This can be helpful when programming sounds from scratch, since it enables to program the basic sound with 'All' mode, and then switch to 'Soft' or 'Loud' in order to program subtle dynamic variations.

The Soft, Loud and All buttons also affect how samples are imported. When Soft is activated, imported samples will be placed in the Soft Velocity layer. When Loud is activated,

imported samples will be placed in the Loud velocity layer. When All is activated, imported samples will be copied to both velocity layers.

Num

Allows you to set the number of different multi-samples (from 1 to 8) to be used in the active Voice Program.

Select

Switches between the multi-samples in the active Voice Program, updating the Harmonics and Noise section displays accordingly. For example, when the 'Select.' field shows '6', any edits made will affect the sixth multi-sample in the Voice Program.

Root

Sets the root note for the selected multi-sample. A multi-sample's range extends from its own root note up to the root note of the next multi-sample.

Soft cut

Gradually applies a gentle low-pass filter to the sound when notes with 'Soft' velocities are received. This is useful when working with sets of samples that have only one velocity layer, since it provides an easy way to mimic the natural reduction in brightness that typically occurs when musical instruments are played softly. Soft cut is only available when 'All' mode is activated (see page 26).

Detune

Allows you to fine-tune (raise or lower) the relative pitch of the current Voice Program.

Breakpoint

Activates Breakpoint mode for envelope editing (as opposed to Overall mode, which is the default). The differences between Breakpoint and Overall mode are explained on page 22.

Fix/Slide/Str

Controls the behaviour of envelope breakpoints, in both the Harmonics and Noise section (regardless of whether Breakpoint or Overall mode is activate).

- When 'Fix' is activated, only one breakpoint at a time may be

moved; all the others remain fixed.

- When 'Slide' is activated, moving a breakpoint backward or forward in time causes all subsequent breakpoints in the envelope to slide backward or forward by the same amount.
- When 'Str' is activated, moving a breakpoint backward or forward in time causes the entire envelope to stretched or shrunk by a corresponding amount.

The Mod page



The Mod page allows you to map a range of control sources to various modulation targets (i.e. Voice Program parameters).

Control sources can be selected in the eight fields that make up the 'Source' column, while modulation targets are chosen in the corresponding fields in the adjacent 'Target' column.

A control source can be any one of the 128 standard MIDI controllers available, either of the two LFOs on the Mod page, Velocity, Aftertouch or Key Position. The possible modulation targets are:

- None - (None)
- MorphHarmX - controls movements along the X axis of the Morph square, in Harmonics mode (see page 33).
- MorphHarmY - controls movements along the Y axis of the Morph square, in Harmonics mode (see page 33).
- MorphNoiseX - controls movements along the X axis of the

Morph square, in Noise mode (see page 33).

- MorphNoiseY - controls movements along the Y axis of the Morph square, in Noise mode (see page 33).
- MorphAmpX - controls movements along the Y axis of the Morph square, in Amplitude mode (see page 33).
- MorphAmpY - controls movements along the Y axis of the Morph square, in Amplitude mode (see page 33).
- Brightness - points to the 'brightness' knob in the 'Timbre' section of the 'Easy' page (see page 36).
- HarmAmount - points to the 'harmonic' knob in the 'Timbre' section of the 'Easy' page (see page 36).
- NoiseAmount - points to the 'noise' knob in the 'Timbre' section of the 'Easy' page (see page 36).
- LfoRate - points to the 'rate' knob in the 'LFO' section of the 'Easy' page (see page 36).
- LfoPitch - points to the 'pitch' knob in the 'LFO' section of the 'Easy' page (see page 36).
- LfoVibrato - points to the 'amp' knob in the 'LFO' section of the 'Easy' page (see page 36).
- PortamentoRate - points to the 'time' knob in the 'Portamento' section of the 'Easy' page (see page 36).
- Attack - points to the 'attack' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 36).
- Stretch - points to the 'stretch' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 36).
- Release - points to the 'release' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 36).
- Volume - points to the 'volume' knob in the 'Output' section of the 'Easy' page (see page 36).
- StereoWidth - points to the 'width' knob in the 'Output' section of the 'Easy' page (see page 36).

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- Formant Freq - points to the Formant filter on the 'Effects' page (see page 39).
 - Distortion - points to the 'dist' knob in the 'Distortion' section of the 'Effects' page (see page 39).
 - Tube - points to the 'tube' knob in the 'Distortion' section of the 'Effects' page (see page 39).
 - MBass - points to the 'm-bass' knob in the 'Distortion' section of the 'Effects' page (see page 39).
 - Compress - points to the 'comp' knob in the 'Distortion' section of the 'Effects' page (see page 39).
 - FilterCutoff - points to the 'cutoff' knob in the 'Filter' section of the 'Effects' page (see page 39).
 - FilterRes - points to the 'res' knob in the 'Filter' section of the 'Effects' page (see page 39).
 - FilterEnv - points to the 'env' knob in the 'Filter' section of the 'Effects' page (see page 39).
 - ChorusMix - points to the 'mix' knob in the 'Chorus' section of the 'Effects' page (see page 39).
 - ChorusDelay - points to the 'delay' knob in the 'Chorus' section of the 'Effects' page (see page 39).
 - ChorusDepth - points to the 'depth' knob in the 'Chorus' section of the 'Effects' page (see page 39).
 - ChorusRate - points to the 'freq' knob in the 'Chorus' section of the 'Effects' page (see page 39).
 - DelayMix - points to the 'mix' knob in the 'Stereo delay' section of the 'Effects' page (see page 39).
 - DelayFeedback - points to the 'feedback' knob in the 'Stereo delay' section of the 'Effects' page (see page 39).
 - DelaySyncL - points to the 'sync L' knob in the 'Stereo delay' section of the 'Effects' page (see page 39).
 - DelaySyncR - points to the 'sync R' knob in the 'Stereo delay' section of the 'Effects' page (see page 39).
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section of the 'Effects' page (see page 39).

- ReverbMix - points to the 'mix' knob in the 'Reverb' section of the 'Effects' page (see page 39).
- ReverbSize - points to the 'size' knob in the 'Reverb' section of the 'Effects' page (see page 39).
- ReverbDecay - points to the 'size' knob in the 'Reverb' section of the 'Effects' page (see page 39).
- Lfo1Shape - points the waveform shape parameter for 'LFO 1' on the Mod page (see page 29).
- Lfo1Rate - points to the rate control for 'LFO 1' on the Mod page (see page 29).
- Lfo2Shape - points the waveform shape parameter for 'LFO 2' on the Mod page (see page 29).
- Lfo2Rate - points to the rate control for 'LFO 1' on the Mod page (see page 29).

The 'Low' and 'High' sliders are used to set the effective range of a control source on its target.

For example, if the Low slider is set to 25% and the High slider to 90%, then sweeping the assigned control source from its lowest possible value to its highest possible value causes the target parameter to sweep from 25% to 90% of its full range.

The Morph page



The Morph page is active by default when Cameleon 5000 opens, and allows you to morph between the four active Voice Programs. The four 'Morph Mode' buttons allow you to choose what effect movements in the Morph Square will have. 'All' is active by default.

When 'All' is selected, Cameleon 5000 morphs all Voice Program parameters simultaneously, so that the sound is completely transformed. Thus dragging the white 'dot' from the top left-hand corner of the Morph Square to the top right-hand corner will cause Voice Program A to be completely transformed into Voice Program B.

Note that when All is selected, there is only one white 'dot' visible in the morph square. When any other mode is selected, three different coloured dots appear in the morph square, enabling you to independently morph three different characteristics of the loaded Voice Programs.

When 'Amplitude' is selected, Cameleon 5000 morphs the amplitude characteristics of the loaded Voice Programs. Thus

if Voice Program B was a pad sound with a slow attack and long decay, dragging the green dot to the top right-hand corner of the Morph Square would result in a hybrid sound with the same kind of slow attack and long decay as Voice Program B.

When 'Harmonics' is selected, Cameleon 5000 morphs the harmonic content of the loaded Voice Programs. Thus if Voice Program C was a bright, tuned percussion sound, dragging the red dot to the bottom left-hand corner of the Morph Square would result in a hybrid sound with the same kind of ringing, high-frequency harmonic content as Voice Program C.

When 'Noise' is selected, Cameleon 5000 morphs the noise content of the loaded Voice Programs. Thus if Voice Program D was a hammered percussion sound with a sharp attack, dragging the blue dot to the bottom right-hand corner of the Morph Square would result in a hybrid sound with prominent, sharp noise content in its attack phase, much like Voice Program D.

Clicking on the 'Random Morph' camel automatically moves each of the three coloured dots to random positions, automatically creating a new morphed hybrid. The Morph mode is also randomised (although the randomisation tends to favour either 'All' or 'Harmonics' modes, since these most often produce the most interesting results).

The Morph timeline



At the top of the Morph page you'll find the Morph timeline display. The Morph timeline can be activated or deactivated by clicking on the red LED in the top left-hand corner of its display. It provides a powerful but easy way to automate complex real-time morphs that would be impossible to perform with the mouse or a conventional MIDI controller.

Morphs can be set up on the timeline in much the same way as envelopes are created on the Voice Program page; by clicking to add breakpoints, and right clicking to remove them.

When the 'Morph X' button is activated, the timeline display shows a kind of 'chart' of the morph, expressed in terms of the X (horizontal) axis of the Morph Square.

So, with the 'Morph X' button activated, the top of the Morph timeline display is equivalent to the right-hand edge of the Morph Square, while the bottom of the Morph timeline display is equivalent to the left hand edge

Similarly, with the 'Morph Y' button activated, the top of the Morph timeline display is equivalent to the top edge of the Morph Square, while the bottom of the Morph timeline display is equivalent to the bottom edge.

Toggling between the 'Morph X' and 'Morph Y' buttons causes the Morph timeline display to update, and allows you create different 'morph charts' for both the X and Y axis. In this way it's possible to create complex morphs that effectively propel the Morph square 'dots' around all four corners of the square in the course of a single note! (You won't actually see the dots move - but you'll definitely hear the effect!)

As with manual morphing, you can choose to have the Morph timeline affect all or only some of the characteristics of the sound, by choosing from 'All', 'Amplitude', 'Harmonics' and 'Noise' in the 'Morph Mode' section.

Sync

The ruler along the bottom of the timeline is calibrated in seconds by default. Clicking on the 'Sync' button displays a grid, and recalibrates the ruler to eighth notes, based on the tempo provided by your VST or Audio Units host application.

When Sync is active and the grid is displayed, all breakpoints on the timeline will 'snap' to the nearest line in the grid when moved, making it easy to set up precisely-timed morphs - or even create strange rhythmic patterns!

The Easy page



The Easy page provides a selection of tools for making quick and easy adjustments to Cameleon 5000's sound.

The Easy page can be thought of as like a kind of processing module, which appears in the signal path after the sound has been generated on the preceding pages.

Settings made on the Easy page do not alter any settings made on any of the Voice Program pages.

Timbre

The 'Timbre' section offers three controls:

- 'brightness' allows you to boost or attenuate the overall high frequency content of the sound.
- 'harmonic' allows you to boost or attenuate the harmonic content of the sound, independent of the noise content (i.e. with 'harmonic' turned all the way to the left, you only hear output from the Noise section of the Voice Program).

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- 'noise' allows you to boost or attenuate the harmonic content of the sound, independent of the noise content (i.e. with 'noise' turned all the way to the left, you only hear output from the Harmonics section of the Voice Program).

LFO

The 'LFO' section features two different effects (activated by clicking the red LED), both controlled by a Low Frequency Oscillator.

- 'rate' sets the rate or speed of the Low Frequency Oscillator. The control is calibrated in sixteenth notes (e.g. 1/16), based on tempo information provided by your VST or Audio Units host application (most hosts do this automatically).
- 'pitch' allows to control the extent to which the pitch of the sound is affected by the LFO.
- 'amp' allows you to control the extent to which the volume of the sound is affected by the LFO.

Portamento

The 'Portamento' section is home to Cameleon 5000's high quality portamento effect (activated by clicking the red LED), which can be used to 'slur' or 'slide' expressively between notes.

The 'time' control affects how quickly the slide between one note and the next should happen.

Portamento is most effective on monophonic Voice Programs, like solo lead instruments, or bass lines.

Amplitude Envelope

The 'attack', 'stretch' and 'release' controls can be used to set an overall amplitude envelope for Cameleon 5000. This envelope is wholly independent of the envelope settings on the Voice Program pages.

Attack and release work just as you'd expect on a conventional synth; stretch is rather different.

When set to its default value of 100 (percent), stretch has no effect. Reducing or increasing the value literally 'shrinks' or

'stretches' the sound, in real-time. The effect is hard to describe - just try it and you'll hear what we mean!

The 'loop' button activates a sustain loop in the amplitude envelope. Two red markers appear in the envelope display in the Harmonics section of the Voice Program page (see page 20), allowing you to set the start and end points of the loop.

The looped section will repeat for as long as a note is held. Note that the loop markers may be set side-by-side with no space in between, in order to create static, 'frozen' sustain loops.

Output

- 'volume' is a simple master volume control for adjusting the level of Cameleon 5000's output.
- 'stereo width' affects the perceived 'width' of Cameleon 5000's output in the stereo field. With the knob turned all the way to the left, the output is (two channel) mono.
- 'velocity sensitivity' controls the extent to which MIDI note velocity affects the level of Cameleon 5000s output.

Random Easy

Clicking on the 'camel' in the 'Random Easy' section automatically assigns random values to (most of) the parameters on the Easy page, as a quick and easy way to come up with new variations on the sound.

The Effects page



Last in the signal path, the Effects page provides a selection of high quality effects that you can use to process Cameleon 5000's output.

Each of the six effects 'modules' can be activated or deactivated independently by clicking their red LEDs.

Formant Filter

The Formant Filter is very similar to the Frequency Envelope in the Noise section of the Voice Program page (see page 24). It As with the Frequency Envelope, up to 128 breakpoints can be The bottom of the Formant Filter display is calibrated from 20 Hz at the far left to 22000 Hz at the far right - the full audible frequency range, with a little to spare.

So, for example, to boost the low frequencies in a sound you might click in the left hand end of the display, and drag a breakpoint up until the desired amount of boost is achieved. To fine-tune the boosted frequency, drag the breakpoint left or right as required.

To narrow the range of boosted frequencies and 'sharpen' the EQ 'curve', add new breakpoints on either side of the original, and drag down to create a 'spike'.

Distortion

The distortion module can produce a wide range of overdrive and distortion effects, ranging from warm, gritty analogue emulations to bright, metallic, digital fuzz. Its algorithms are based on the popular CamelPhat effects plugin, and it can produce many of the same characteristic tones and textures.

- 'dist' controls the amount of distortion added to the signal.
- 'tube' controls the amount of emulated valve overdrive added to the signal.
- 'm-bass' activates a special low frequency enhancer, which 'fattens' or 'thickens' the sound.
- 'comp' controls a simple but effective compressor, which can be used to enhance the perceived 'loudness' of a sound, without clipping.

Filter

Also based on the popular CamelPhat design, the Filter section offers a powerful multi-mode resonant filter, with a warm analogue-style sound.

- 'HP' sets the filter to High Pass mode. Frequencies below the cutoff point are attenuated.
- 'BP' sets the filter to Band Pass mode. Frequencies above and below a narrow band surrounding the cutoff point are attenuated.
- 'LP' sets the filter to Low Pass mode. Frequencies below the cutoff point are attenuated.
- 'cutoff' sets the filter cutoff point.
- 'res' controls the 'resonance' of the filter. With res turned up, frequencies surrounding the cutoff point are boosted. Resonance is particularly noticeable when the cutoff point is altered dynamically. Analogue-style synths depend on filter

resonance for their characteristic, 'animated' sounds. Cameleon 5000's filter allows you to emulate these.

- 'env' activates and adjusts the sensitivity of an 'envelope follower' modulating filter cutoff. This causes the filter to respond dynamically to changes in the level of the sound.

Chorus

The Chorus module provides a warm, analogue-style chorus effect.

- 'mix' allows you to control the balance between the 'wet' (processed) and dry signals.
- 'freq' allows you to set the frequency or rate of the chorus effect.
- 'delay' allows you to set the length of the delay used to create the chorus effect.
- 'depth' allows you to control the depth of the chorus effect.

Stereo delay

The Stereo delay module can be used to create tempo-synchronised delay or 'echo' effects.

- 'mix' allows you to control the balance between the 'wet' (processed) and dry signals.
- 'feedback' controls the extent to which the delayed signal is fed back into the effect. Higher feedback settings result in more echoes.
- 'sync L' and 'sync R' are used to set the length of the delay between echoes, independently for the left and right stereo channels. The controls are calibrated in sixteenth notes (e.g. 1/16), based on tempo information provided by your VST or Audio Units host application.

Reverb

The Reverb module can be used to create a range of reverberation effects, to add a natural-sounding 'depth' or 'space' to the sound.

- 'mix' allows you to control the balance between the 'wet'

(processed) and dry signals.

- 'size' allows you to adjust the size of the perceived 'space'. For instance, lower settings produce results more reminiscent of rehearsal rooms, while higher settings tend to sound more like concert halls.
- 'decay' controls the length of time required for the reverberation effect to fade away.

Random Effects

Clicking on the 'camel' in the 'Random Effects' section automatically assigns random values to the parameters on the Effects page, as a quick and easy way to come up with new variations on the sound.

Cameleon 5000 file formats

Cameleon 5000 uses four different proprietary file formats to load and save data.

- Voice Program files have a .c5v extension, and store all the required data for a single Voice Program: all the parameter settings in the Harmonics and Noise sections, including all multi-samples and Soft/Hard variations. Voice Program files can be loaded and saved on the Voice Program page, or loaded from the Morph Square on the Morph page.
- Instrument files have a .c5i extension. An Instrument file stores a group of four Voice Programs, along with a record of every setting on the Mod, Morph, Easy and Effects pages. Instrument files can be loaded and saved using the Load and Save buttons at the top of the editor window (beneath the Category and Instrument fields).
- Harmonics files have a .c5h extension, and store the Harmonics section settings for a single multi-sample or Soft/Hard variation only. Harmonics files can be loaded or saved in the Harmonics section of the Voice Program page.
- Noise files have a .c5n extension, and store the Noise section settings for a single multi-sample or Soft/Hard variation only. Noise files can be loaded or saved in the Noise section of the Voice Program page.

Cameleon 5000 WAV/AIFF importing guidelines

Cameleon 5000 is capable of importing and analysing any WAV or AIFF format sampled sound - literally any sound you can hear.

However, in order to take full advantage of its unique ability to convincingly mimic and morph between real instrument sounds, it's recommended that you follow the guidelines below.

Recording and Selection of Instruments

For best results, instruments should be recorded playing monophonically, i.e. only one note at a time. There should ideally be only one sound source, e.g. one voice; not a choir. Instruments should be recorded with no added effects, and as little natural reverb as possible.

Tuning

Instruments should be tuned so that A above middle C (A4) is 440Hz.

Pitch multi-samples

For any given instrument, samples may be imported at up to 8 different pitches. These are called 'multi-samples' (see page 12 for more details).

Velocity layers

If two velocity layers are specified for one multi-sample, they must be specified for all multi-samples.

When recording an instrument, don't record the absolute loudest sound that the instrument can produce; instead aim for the loudest sound it would normally produce.

For example, when recording a piano, don't record the loudest note it's physically possible to hit, but the loudest note that would be hit in the normal course of playing.

Similarly, when recording a soft note, don't record the

absolute quietest note, but a note approximately one quarter as loud as the loudest note (in MIDI terms, a note with a velocity of around 40 compared to 127).

Cropping

Samples should be cropped so that the note begins at the start of the file, just as for a conventional sampler.

Samples should have any extraneous noise removed from their ends - although enough of a tail should be left for the sound to decay into the 'noise floor'. As an example, the key-up click from piano notes should be removed, unless specifically required.

Format

Samples should always be provided in 16-bit, Mono, WAV or AIFF format at a sampling rate of 44.1 kHz. Samples should always peak at zero dB - even samples intended for 'Soft' velocity layers.

Specifying pitch

Normally when a sample is imported and analysed, Cameleon 5000 attempts to detect the pitch of the file automatically. This works well for the majority of sounds - however, you may sometimes find it useful to over-ride the automatic pitch detection, and explicitly supply the information yourself.

An easy way to do this is to take advantage of a feature offered by most popular audio editors (e.g. *Sound Forge*, *Wavelab*, *Spark*) which allows you to specify the pitch of a sample as a MIDI note (e.g. 'C3'). This information will be stored in the WAV or AIFF file when it is saved, allowing Cameleon 5000 to read it directly on import.