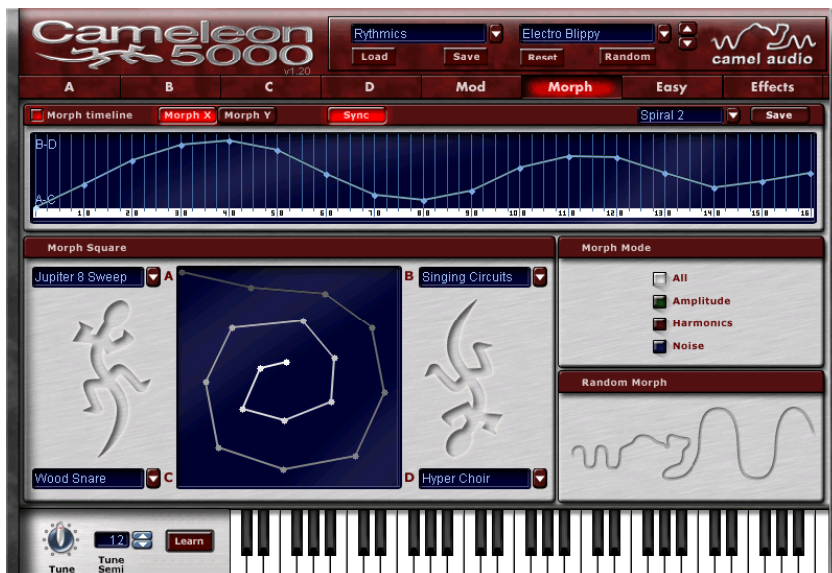

Camel Audio



Cameleon 5000

Operation Manual

Version 1.2

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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 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 single note **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 and by category, from Cameleon 5000's easy-to-use interface.

Features

- Import and morph any WAV or AIFF file.
- Import any BMP image.
- Intuitive morph square allows you to morph between four sources at a time.
- Separate control over the harmonic, noise and amplitude characteristics, for unparalleled sound design opportunities.
- Multisampling for heightened expression.
- Powerful additive synthesizer featuring 128 breakpoint envelopes, and detunable partials.
- 128 band formant filter.
- Easy page allows quick and easy editing of most important parameters.
- High quality portamento, flexible polyphony controls.
- Flexible modulation matrix, and MIDI learn.
- Many effects including filter, distortion and compression from CamelPhat, chorus, delay and reverb.

System Requirements

Cameleon 5000 is available for as a Windows VST and Mac VST and Audio Unit.

Notable VST hosts include *Cubase*, *Nuendo* and *FL Studio*. It may also be used in DirectX hosts such as *Sonar* and *Project5*, through the use of the VST adapter available from Cakewalk. Notable Audio Units hosts include *Logic Audio*. Cameleon may also be used in *ProTools* systems through the use of the VST to *ProTools* adapter available from FXPansion.

PC: Pentium III/600, 128MB RAM, Windows 98/2000/ME/XP, VST compatible host.

Mac: G4/400, 128MB RAM, OS X, VST or Audio Units compatible host.

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.
- Stops outputting sound after 15 minutes.
- Does not require a serial number.

Installation

Installing Cameleon 5000 is a quick and easy process.

Windows

Windows users should unzip the .zip archive and extract the files to their preferred VST plugins folder, e.g.

C:\Program Files\Steinberg\Cubase VST\VST plugins

(Be sure to choose the option to create the appropriate directory structure when unzipping.)

Afterwards, upon starting your host application as normal, Cameleon 5000 will be available in the list of instrument plugins. The first time it opens, a dialog box will appear, into which you **must** enter your registration information.

Mac OS

Mac users can simply run the supplied installation program, and follow the on-screen instructions.

Note for Mac Users: some of Cameleon 5000's features are accessed by right-clicking with the mouse. If you're using a one-button mouse, you can press 'Control' and click to access these functions.

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:

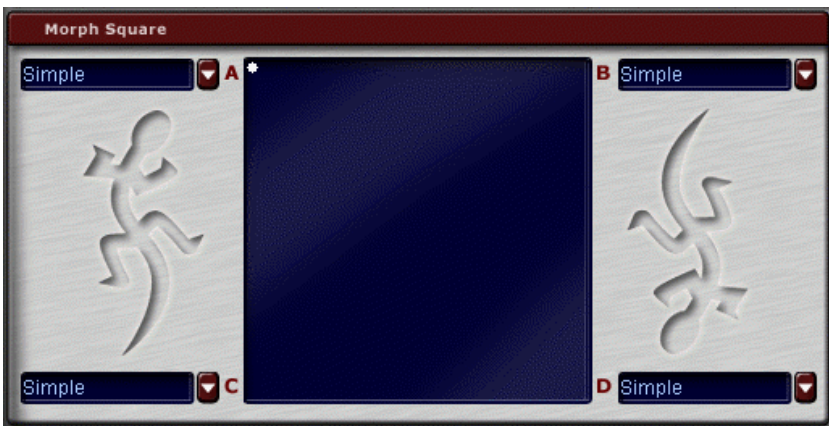
- Preset morphing.
- Sample resynthesis.
- Additive or 'spectral modelling' synthesis.

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.

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 a Voice Program beside it.

You can load a different Voice Program into each of the slots in the four corners of square, by clicking on the load button (marked with a downward-pointing triangle) beside the name field. A drop-down menu will appear, allowing you to browse Cameleon 5000's factory sound library (with sub-menus dividing it into categories).

- As an example, click on the load button in the top left-hand corner of the Morph Square ('A'), move the mouse pointer

down to the 'Chromatics' sub-menu, and from the list that appears choose 'Celesta'.

- Now click on the load button in the top right-hand corner of the square ('B'), move the mouse pointer down to the 'Strings' sub-menu, and from the list that appears choose 'Solo Cello'.
- Play a note on your MIDI keyboard and you'll hear 'Celesta'.
- You'll notice that there's 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 'Celesta'.
- 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 Voice Program B; 'Solo Cello'.

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 42. For now, here are a few quick tips to bear in mind:

- Clicking on the load buttons 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 a given sample 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:

- Click the 'Reset' button to restore Cameleon 5000's initialised settings.
- 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 (ideally a single note from one instrument).



- Once the sample has been imported (it'll take a few moments), you may want to replace the Voice Program name 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 42), or even try manually editing its harmonic and noise content, or envelopes (see page 25).

To get best, most 'realistic' results from the sample import process, it pays to spend some time preparing your samples in advance - see 'WAV/AIFF importing guidelines' on page 55 for more details. You may also want to consider Multi-sampling and Velocity Layers (page 34) as ways to come up with more responsive, expressive sounds.

Additive or 'spectral modelling' synthesis.

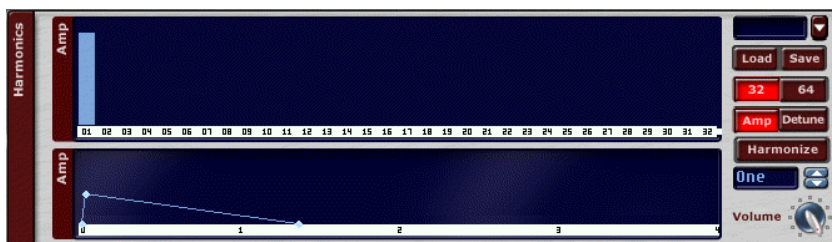
Cameleon 5000's sound generation engine is actually a powerful and flexible, fully-featured additive synthesiser, with a built-in multi-band noise generator. This means you can create sounds not only by analysing and morphing samples, but also by taking hands-on control of the synthesis engine, and programming brand new sounds from scratch!

It has to be said, though, that additive or 'spectral modelling' synthesis is not the easiest sound creation technique in the world - and some users may find that they prefer to work simply by importing samples, and using Cameleon 5000's editing functions to tweak and re-shape them.

This is perfectly reasonable, and Cameleon 5000 has been designed specifically so that it's not necessary to know - or care - about the 'nuts and bolts' of the sound generation process in order to get great results!

Nevertheless, if you're a die-hard sound designer and you want to try your hand at creating new Voice Programs from scratch, here's how you can get started:

- Switch to Voice Program page A, by clicking on the tab labelled 'A' at the top of the Cameleon 5000 editor window.
- Click the 'Reset' button.
- Click the button marked with a downward-pointing triangle, in the top right-hand corner of the 'Harmonics' section of the Voice Program page.



-
- From the drop-down menu that appears, choose 'Saw'.

You'll see that the 'bar graph' display in the Harmonics section changes to display a new series of values. Each of the bars represents the relative volume of a 'harmonic'; a frequency contributing to the overall tonal colour of the sound.

When you choose 'Saw' from the drop-down menu, Cameleon 5000 recalls a weighted set of Harmonics which combine to create a tone very similar to the sawtooth oscillator waveform available in many 'analogue' subtractive synthesisers. Play a note on your keyboard and you can hear what we mean.

- Put the mouse pointer over the eighth bar in the bar graph (labelled '08' in the strip at the bottom of the display), and click and drag upwards as far as you can.

You'll notice that some letters and numbers are displayed in the top right of the Harmonics display while you drag. When you've dragged all the way to the top, they should read 'H 8 V 100'. This indicates that you've increased the volume of the eighth harmonic to 100%.

Play another note, and you'll hear that the tone of the sound has altered, sounding 'brighter', and perhaps slightly hollower. This is because the relationship between the harmonics is now different, and they no longer combine to create the same sound.

Try adjusting the volume of some of the other harmonics. You might also try clicking and dragging across the Harmonics display, to create 'ramps' or 'curves'. You'll hear that the sound changes differently each time, as the different harmonic relationships result in different overall sounds.

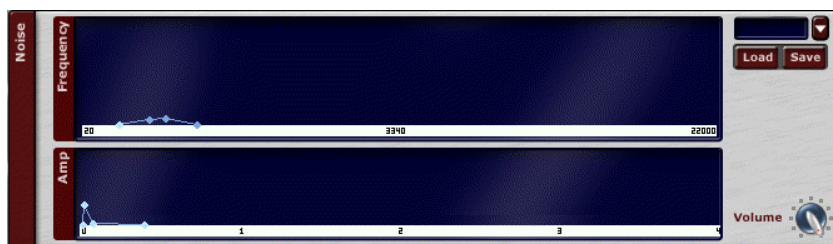
This is **additive synthesis**, at its simplest.

Noise

Beneath the Harmonics section is the 'Noise' section, which controls Cameleon 5000's noise generator, and also offers its own presets. Choose 'KeyHitL', for example, and you'll find

that a short burst of noise is mixed in at the start of the sound, producing a slightly 'percussive' effect.

Try clicking and moving some of the dots or 'breakpoints' in the 'Frequency' display and you'll notice that the frequency content of the noise changes, sometimes becoming 'brighter', sometimes more 'muffled'.



You can control the mixture of harmonic and noise content in the sound by using the 'Volume' knobs in the bottom right-hand corners of both the Harmonics and Noise sections.

Envelopes

Sounds created in this way are all well and good, but they're rather 'static' - they don't change much over time. To overcome this problem, you can use the 'Amp' envelopes in both the Harmonics and Noise sections.

By default, these act much like the envelopes in many conventional synths or samplers, i.e. as a kind of editable 'graph' of volume (amplitude) over time.

Short, spiky 'graphs' result in percussive or 'staccato' sounds; more gentle slopes suit slow, swelling pad sounds, and so on. You can add breakpoints to an envelope by clicking, move them by dragging, and delete them by right-clicking.

However, Cameleon 5000's envelopes also have a few special tricks up their sleeves, which allow you to quickly create complex envelopes that alter not only the volume, but also the harmonic content of the sound of over time.

Refer to page 26 for more information about 'Breakpoint' and 'Overall' envelope modes, and for explanations of the remaining parameters on the Voice Program pages.

Using the 'Easy' and 'Effects' pages

Whether you're working with presets from the factory library, importing samples, or programming tones and textures from scratch, you won't want to over-look the straightforward and easy-to-use sound-shaping tools available on the 'Easy' and 'Effects' pages.

The Easy page parameters are explained in full from page 46. For now let's just have a quick look at what you can do with a couple of them.

- As an example, load up 'AcousticSteelString' from the 'Guitars' section of the factory library. You can do this by selecting 'Guitars' from the category drop-down menu at the top of the editor window, and then selecting 'Steel 6 Str Gtr' from the Voice Program drop-down menu beside it.
- Play a few notes, and you should hear a guitar sound.
- Switch to the Easy page, by clicking on the 'Easy' tab in the top right of the editor window.
- In the 'Amplitude Envelope' section locate the 'stretch' control, which by default is set to '100' (per cent). Turn the knob all the way to the left, so that '20' is displayed.



-
- Play some more notes and you'll hear that the envelope of the sound has literally been 'shrunk' to 20 per cent of its original length, resulting in a kind of muted, staccato effect.
 - Now turn the knob all the way to the right, so that '500' is displayed. Can you guess what this does?
 - Play a few notes and...that's right: the sound has literally been 'stretched' to 500% of its original length!

Of course, after a 500% stretch it doesn't sound quite so much like a natural guitar anymore, but that's OK: you can turn it into something else!

On either side of the stretch knob you'll see the 'attack' and 'release' knobs.

- Set attack to '2.0' and release to '3.0'.

Now play a few chords, and you can hear that the original envelope of the sound has been over-ridden - and that the 'stretched guitar' sound you had a moment ago seems to have become some kind of strange, slightly-metallic string pad.

Next find the 'brightness' knob in the 'Timbre' section, and try setting it higher or lower. You'll hear that the sound becomes brighter and more 'lively' at higher settings, and 'warmer' and more muffled at lower settings.

With brightness set to '100', the metallic tone of the sound is nicely emphasised.



Perhaps now you could hop over to the 'Effects' page and switch 'Chorus' on, or turn up the reverb? Maybe add a filter with a touch of resonance?

Or maybe you'd prefer to import a new sample, and try stretching or shrinking that?

Cameleon 5000 is a complex instrument, and it'll probably take a little time for you to really learn your way around.

However, in the meantime we strongly encourage you just to experiment and have a bit of fun with it - you can't break anything!

Cameleon 5000 in detail



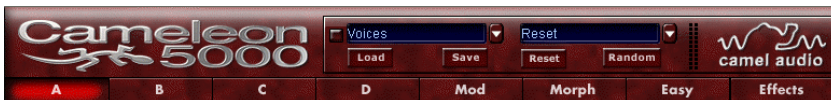
If you've used VST or Audio Units instruments before, the Cameleon 5000 editor window shouldn't look too alien, even if some of the features aren't immediately self-explanatory.

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 54.)



The 'Random' button allows you to create entirely new sounds at the click of a mouse. When Random is clicked, a new Voice Program is created based on a random selection of parameter settings taken from other Voice Programs in the currently active category.

So, if the active category is 'Basses', a new hybrid bass sound will be created, based on a random sampling of different parameter settings from the Voice Programs in the Basses category.

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

You'll notice that many of the factory Voice Programs make creative use of the modulation wheel to allow for more 'expressive' playing.

Vibrato, Brightness, Stretch, Filter cutoff and even morphing are all things that can be controlled in this way (see page 38 for more information about mapping control sources to different parameters).

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

Click the Learn 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').

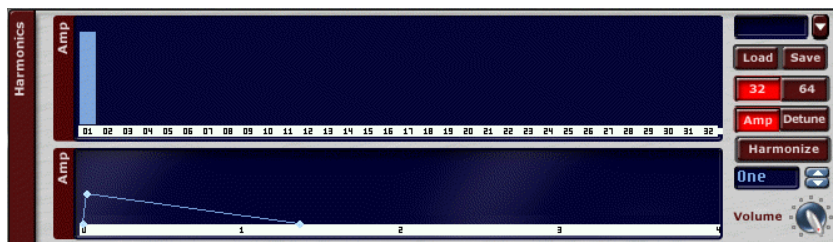
Each of the four Voice Programs has its own independent page (A, B, C or D), and each page duplicates the same set of parameters. Thus whenever we refer to 'the Voice Program page', our comments apply equally to pages A, B, C and D.

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' (i.e. 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 breakpoints 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.

You can 'zoom' the envelope view in or out by clicking on the ruler strip at the bottom of the display and dragging up or down. This is also true of the Amp envelope in the Noise section (see page 28).

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

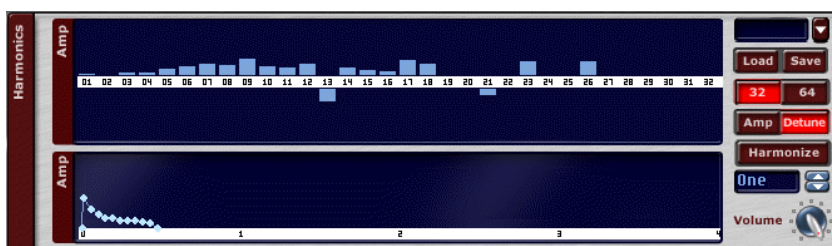
next, it's possible to see how the harmonic content of the sound changes and evolves over time.

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.

Amp / 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' knob allows you to over-ride any settings made in the Detune display, effectively fixing the partials in a Voice Program to a strict, integer harmonic series. Deactivating it reinstates the settings in the Detune display.

Beneath the Harmonize knob, you'll see a small field with up/down buttons 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.

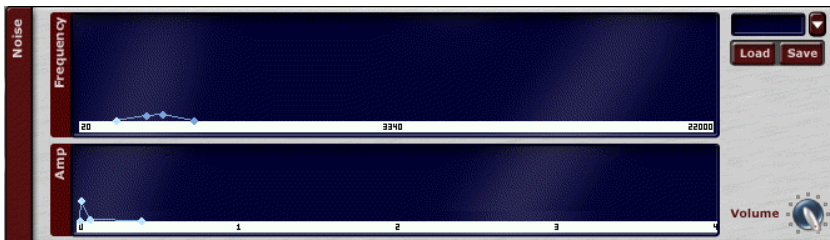
Finally 'All' allows you to adjust all harmonics simultaneously.

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.

Harmonics and Noise Presets

Both the Harmonics and Noise sections of the Voice Program page feature drop-down menus from which several presets can be recalled. These allow you to instantly call up basic tones and textures to use as easy starting points for programming new sounds from scratch.

In the Harmonics section you can choose from 'Saw', 'Sine', 'Square' and 'Triangle'; simple emulations of the basic waveforms offered by many classic 'analogue' subtractive synthesizers. In the Noise section you can choose from 'Breath', 'KeyHitH' (a high frequency attack noise), 'KeyHitL' (a lower frequency attack noise) and 'None' (no noise at all).

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 55.

From version 1.3 onwards, Cameleon is also capable of importing standard 'Bitmap' (*.bmp) image files, which are automatically translated into sounds.

An explanation of the finer points of this conversion process is beyond the scope of this manual. Briefly, imported images are treated as a kind of 'graph' of a sound, with the horizontal X axis representing time, and the vertical Y axis representing harmonic content.

Different images result in a range of different tones and textures.



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.

For more details see 'Multi-sampling and Velocity Layers' on page 34.

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.

For more details see 'Multi-sampling and Velocity Layers' on page 34.

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 32).

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 26.



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.

Multi-sampling and Velocity Layers

If you've ever worked with a conventional sampler, you're probably familiar with multi-sampling and velocity layers.

Both are tricks you can use to come up with Voice Programs that respond more naturally or sound more interesting when played from a MIDI keyboard.

Multi-sampling

Multi-sampling is 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.

- 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.

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- 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.

Velocity Layers

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.

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 36 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.

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.

Camelion 5000 offers a comprehensive selection of modulation sources. You can choose from any of the standard MIDI continuous controllers, Velocity, Aftertouch, Key Position, either of the two independent Mod page LFOs.

There's also a dedicated Mod envelope, which can be used to modulate Filter cutoff or resonance (see Effects, page 50) or Formant filter frequency (page 50). Assigning the Mod envelope to any other parameters has no effect.

The possible modulation targets are:

- None - (None)

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- MorphHarmX - controls movements along the X axis of the Morph square, in Harmonics mode (see page 42).
 - MorphHarmY - controls movements along the Y axis of the Morph square, in Harmonics mode (see page 42).
 - MorphNoiseX - controls movements along the X axis of the Morph square, in Noise mode (see page 42).
 - MorphNoiseY - controls movements along the Y axis of the Morph square, in Noise mode (see page 42).
 - MorphAmpX - controls movements along the Y axis of the Morph square, in Amplitude mode (see page 42).
 - MorphAmpY - controls movements along the Y axis of the Morph square, in Amplitude mode (see page 42).
 - Brightness - points to the 'brightness' knob in the 'Timbre' section of the 'Easy' page (see page 46).
 - HarmAmount - points to the 'harmonic' knob in the 'Timbre' section of the 'Easy' page (see page 46).
 - NoiseAmount - points to the 'noise' knob in the 'Timbre' section of the 'Easy' page (see page 46).
 - LfoRate - points to the 'rate' knob in the 'LFO' section of the 'Easy' page (see page 47).
 - LfoPitch - points to the 'pitch' knob in the 'LFO' section of the 'Easy' page (see page 47).
 - LfoVibrato - points to the 'amp' knob in the 'LFO' section of the 'Easy' page (see page 47).
 - PortamentoRate - points to the 'porto' knob in the 'Voices' section of the 'Easy' page (see page 47).
 - Attack - points to the 'attack' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 48).
 - Stretch - points to the 'stretch' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 48).
 - Release - points to the 'release' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 48).
 - Volume - points to the 'volume' knob in the 'Output' section of the 'Easy' page (see page 48).
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- StereoWidth - points to the 'width' knob in the 'Output' section of the 'Easy' page (see page 48).
 - Formant Freq - points to the Formant filter on the 'Effects' page (see page 50).
 - Distortion - points to the 'dist' knob in the 'Distortion' section of the 'Effects' page (see page 51).
 - Tube - points to the 'tube' knob in the 'Distortion' section of the 'Effects' page (see page 51).
 - MBass - points to the 'm-bass' knob in the 'Distortion' section of the 'Effects' page (see page 51).
 - Compress - points to the 'comp' knob in the 'Distortion' section of the 'Effects' page (see page 51).
 - FilterCutoff - points to the 'cutoff' knob in the 'Filter' section of the 'Effects' page (see page 51).
 - FilterRes - points to the 'res' knob in the 'Filter' section of the 'Effects' page (see page 51).
 - FilterEnv - points to the 'env' knob in the 'Filter' section of the 'Effects' page (see page 51).
 - ChorusMix - points to the 'mix' knob in the 'Chorus' section of the 'Effects' page (see page 52).
 - ChorusDelay - points to the 'delay' knob in the 'Chorus' section of the 'Effects' page (see page 52).
 - ChorusDepth - points to the 'depth' knob in the 'Chorus' section of the 'Effects' page (see page 52).
 - ChorusRate - points to the 'freq' knob in the 'Chorus' section of the 'Effects' page (see page 52).
 - DelayMix - points to the 'mix' knob in the 'Stereo delay' section of the 'Effects' page (see page 53).
 - DelayFeedback - points to the 'feedback' knob in the 'Stereo delay' section of the 'Effects' page (see page 53).
 - DelaySyncL - points to the 'sync L' knob in the 'Stereo delay' section of the 'Effects' page (see page 53).
 - DelaySyncR - points to the 'sync R' knob in the 'Stereo delay' section of the 'Effects' page (see page 53).
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- ReverbMix - points to the 'mix' knob in the 'Reverb' section of the 'Effects' page (see page 53).
 - ReverbSize - points to the 'size' knob in the 'Reverb' section of the 'Effects' page (see page 53).
 - ReverbDecay - points to the 'size' knob in the 'Reverb' section of the 'Effects' page (see page 53).
 - Lfo1Shape - points the waveform shape parameter for 'LFO 1' on the Mod page (see page 38).
 - Lfo1Rate - points to the rate control for 'LFO 1' on the Mod page (see page 38).
 - Lfo2Shape - points the waveform shape parameter for 'LFO 2' on the Mod page (see page 38).
 - Lfo2Rate - points to the rate control for 'LFO 1' on the Mod page (see page 38).
 - Sustain On - points to the control to activate sustain.
 - PhatFilter - points to the PhatFilter effect.
 - MasterDetuneSemi - points to the incremental (semi-tone) Detune control.
 - Pan - controls stereo panning.

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 Mod Page LFOs

The Mod Page provides two independent LFOs (Low Frequency Oscillators), which can be used as modulation sources for any of Cameleon 5000's modulatable parameters. To use one of the Mod Page LFOs, first select either 'LFO 1' or 'LFO 2' in one of the 'Source' slots, then choose the desired parameter in the corresponding 'Target' slot.

Next choose a waveform for the LFO (Sine, Sawtooth and Square waveforms are available), and set the desired frequency or rate (the LFO rate knobs are calibrated in terms of the tempo provided by your host application, e.g. 1/4 equals one quarter note).

As an example, you might choose 'LFO 1' as a Source and 'Volume' as its Target, then select the Sine waveform and set the rate knob to '3/8'. This creates a nice, fluttering 'tremelo' effect, similar to that provided by classic guitar amplifiers.

Pitch Bend Range

One final control on the Mod Page is the 'Pitch Bend Range' knob. Very simply, this controls how much the pitch of notes is affected by incoming MIDI Pitch Bend messages. The default setting is '2', which means that notes can be bent up or down by as much as two semi-tones.

Thus, if Pitch Bend Range is set to '12', notes can be bent by as much as an octave in either direction (since there are twelve semi-tones to an octave).

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, you can morph 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.

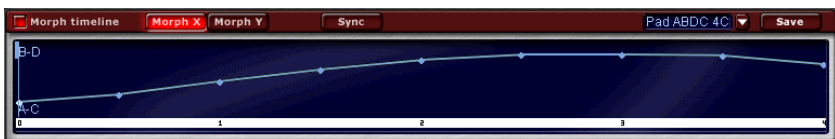
Note that when All is selected, there is only one white 'dot' visible in the morph square. When any other mode is selected, three different coloured dots appear in the morph square, enabling you to independently morph three different characteristics of the loaded Voice Programs.

- When 'Amplitude' is selected, you can morph 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, you can morph 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, you can morph 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.

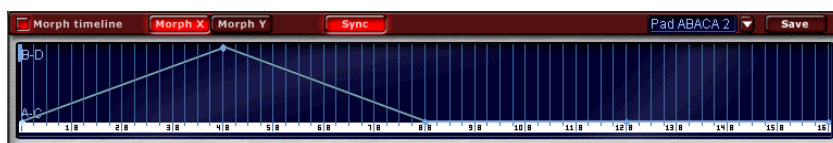
So, with the 'Morph X' button activated, the top of the Morph timeline display is equivalent to the right-hand edge of the Morph Square, while the bottom of the Morph timeline display is equivalent to the left hand edge

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!)

The Morph time-line has its own drop-down menu from which various preset 'Morph Envelopes' (records of Morph timeline settings) can be selected. You can create your own Morph Envelopes by editing the Morph timeline to achieve the effect you want, then clicking the 'Save' button beside the menu. (Morph Envelope files are saved with a .c5m extension.)

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.

It 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).

- '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.

Voices

The Voices section houses three controls:

- 'polyphony' sets an upper limit of the number of simultaneous notes Cameleon 5000 can play. '12' is the maximum setting, and the default. Reducing the polyphony will reduce the load Cameleon 5000 places on your CPU.
- 'num partials' allows you to reduce the number of 'partial' frequencies Cameleon 5000 generates. The higher partials in a sound are sometimes only barely noticeable, and it may sometimes be a worthwhile trade-off to remove some of these from the sound in order to free up some CPU time.
- 'porto' activates Cameleon 5000's high quality portamento effect, which can be used to 'slur' or 'slide' expressively

between notes, without re-triggering the 'attack' part of the sound. Altering the value affects how quickly the slide between one note and the next will happen. Portamento tends to be most effective on monophonic Voice Programs, like solo lead instruments or bass lines, and best suits a 'Legato' playing style (where each note flows smoothly into the next, with no silence between, producing a continuous sound with variations in pitch only).

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 blue markers appear in the envelope display in the Harmonics section of the Voice Program page (see page 25), 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 volume 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 28). It can be thought of as a powerful multi-band graphic equalizer, which can be used to shape Cameleon 5000's output. As with the Frequency Envelope, up to 128 breakpoints can be added.

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'.

A number of Formant Filter presets are available from the drop-down menu in the top-right of the display. These serve as a good demonstration of what kinds of things are possible with the Formant Filter, and allow you to apply very complex filtering with a single mouse click.

You can save your own Formant Filter presets by first creating a Frequency Envelope, then clicking the 'Save' button beside the menu. (Formant Filter presets are saved as files with a .c5f extension.)

Any of the available control sources on the 'Mod' page (page 38) may be assigned to modulate Formant Filter 'frequency'. This has the effect of 'sliding' the frequencies of all breakpoints in the envelope up or down by an equal amount (imagine the whole envelope sliding to the left or right in the Formant Filter display).

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 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.

The red button immediately above the res knob allows you to active 'phat mode' for the filter. In phat mode, the filter produces a thicker, warmer fuller sound, with a hint of harmonic distortion.

'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

Voice Program files (.c5v)

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 (.c5i)

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 Cameleon 5000 editor window (beneath the Category and Instrument fields).

Harmonics files (.c5h)

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 (.c5n)

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.

Morph Envelope and Formant Filter presets (.c5m and .c5f)

These provide an easy way to store and recall (often complex) settings made in the Morph Timeline and Formant Filter graphic displays.

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 override 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.

Filenames can also be used as a way to let Cameleon know a sounds correct pitch. Simply add 'NNO_' to end of the filename, where 'NN' is the note, (e.g. A_ or C#) and 'O' is the octave.

For example 'bass_C_4_.wav' would be interpreted as being a 'C' at octave 4 (i.e. middle C).

Expert tips for improving resynthesised sounds

Tuning

When a sample is resynthesised the resulting voice file may occasionally be out of tune by a semitone or so. The easiest way to check this is to play a note, then click the 'Harmonize' button on the Voice page and play the same note again. The 'Harmonize' function will ensure the note being played is in tune, so you can then determine how 'in tune' your original Voice file is.

However with some sounds using the Harmonize setting can affect the nature of the sound; slightly changing or losing a characteristic of the sound. If once you have checked the tuning of your Voice file you find it was originally in tune anyway, then you may find you prefer the sound obtained by removing the Harmonize function again. It depends on your ear and the nature of the sound!

Volume levels

To avoid distortion when playing an instrument you need to set the volume of the Instrument so it does not exceed 0dB. With Cameleon's channel in your sequencer running at default channel volume (e.g. 78% in FruityLoops), using the dB meter in your sequencer ensure that a full velocity hit won't go over 0dB, taking into account maximum polyphony. So for an instrument such as a piano where you may have set maximum polyphony to be 6, hit 6 notes at full velocity and change the volume on the 'Easy' page until the peak is just up to 0dB and not over, before re-saving the instrument file.

For an instrument with a polyphony of 1, again set the volume so that one full velocity hit doesn't exceed 0dB. It's also worth bearing in mind the relative volume of the instrument in relation to those of greater polyphony; as there are fewer notes being played it is easy to set the volume of a low polyphony instrument higher than that of a high polyphony instrument, with the result that when comparing the two one will seem louder than the other with a single note.

The nature of sounds can also be worth bearing in mind when setting volumes. Very bright harsh sounds can come across louder to the ear than softer sounds of the same dB value, so if desired volume levels can be adjusted to take this into account.

Stray harmonics

Sometimes resynthesised sounds may have undesired stray harmonics, which can result in a tinny or whiney 'twang' to certain notes when played. These stray harmonics can be removed to produce an authentic sounding resynthesised sample.

A potentially very quick solution is to reduce the number of partials on the Easy page whilst playing a note. You may find that the whine is taken out as you reduce the number of partials with no real loss in sound quality, but it is likely you may need to have a closer look at the problem.

The easiest way to do this is to find the problematic notes, go to the correct voice page, click the SoloMulti button to illuminate it, and select the sample number, using the Select buttons, that has the stray harmonics. Then go to the 'Easy' page, play a note that contains stray harmonics, and gradually decrease the number of partials whilst playing the note. As you decrease the number of partials you will at some point begin to hear the stray harmonic noise disappear.

Take note of which partial numbers this occurs at - these are your stray harmonics. It may be one partial or it could be a few. Return the number of partials to the original value. Now

go to the correct Voice page, and in the Harmonics window gradually and carefully reduce the level of the harmonic numbers you noted down by pulling down the appropriate bar and playing the note until the sound is as you desire it. Click again on the SoloMulti button and if you are happy with the new sound remember to save it.

Harsh sounds

Some sounds may seem excessively bright and harsh sounding. Try decreasing the number of partials on the Easy page whilst playing a note, and you should be able to reduce the harshness without losing any sound characteristics.

If this does not work as desired, go to the appropriate Voice page and reduce the level of the upper Harmonics amplitude by selecting 'Bright' from the window below the Harmonize button, and then carefully reducing the level of all the upper harmonics until the right sound is achieved, or by slightly pulling down the bars individually. Experiment and remember to save any good changes.

Other changes

Some resynthesised sounds may have an excessive noise component which you may find detracts from the quality of the sound. Try turning down the noise using the Noise volume knob on the Voice pages or the global Noise knob on the Timbre section of the Easy page until the sound is more to your taste.

The Brightness and Harmonic knobs on the Timbre section can also be used to alter a sound to your taste.

The Effects page is also useful to brush up new instruments. A small amount of reverb is often a useful addition to give acoustic sounds more realism, whilst on the Easy page a small amount of LFO pitch or amp can bring alive wind instruments or vocals, and the other effects can also be used to finalise the sound of a new instrument.

Cameleon 5000 CPU usage

Cameleon 5000 has been carefully optimised to make the best and most efficient use of your computer's processor.

Nevertheless, you'll almost inevitably find yourself pushing the CPU meter 'into the red' once in a while, and you may need to free up some processor time for other tasks.

There are several things you can do to make sure Cameleon 5000 isn't an unnecessary drain on system resources:

Reducing the polyphony

If, for example, you happen to be using Cameleon 5000 just as a monophonic lead instrument, or to play a bassline, you may be able to get away with reducing the Polyphony setting on the Easy page (page 47) to '1'.

If the phrasing of part requires notes to overlap, increase the setting to '2'. Unless you need to play chords or harmonies, there's really no need to set polyphony any higher, and you'll save CPU by keeping the setting low.

Turning the noise generator off

In the 'Timbre' section on the Easy page, turn the 'noise' knob down to 'OFF'.

While some Voice Programs depend on the noise generator to sound 'right', others may sound quite acceptable without it.

There are no hard and fast rules here, so feel free to experiment.

Using fewer partials

Try reducing the number of partials, using the 'num partials' control in the 'Voices' section of the Easy page (see page 47). Keep lowering the value until you can hear a noticeable reduction in sound quality.

Often the higher partials in a sound are so quiet that they can barely be heard, and you maybe able to manage without them.

Also, if low-pass filtering is applied elsewhere in the signal path (e.g. in the 'Filter' section of the 'Effects' page), then it may be pointless generating some of the higher partials in the first place!

Setting unused Voice Programs to 'Simple'

If you're not doing any morphing, and only one of the four Voice Programs will be heard, then you can set the other 3 Voice Program slots to use the built-in 'Simple' preset. This will help reduce CPU usage, and also the size of your preset files.

Switching off effects

Each of the modules on the Effects page can toggled on or off by clicking their red LEDs. You should switch off any modules that don't make a significant contribution to the sound.

Also avoid 'duplicating' effects.

For instance, if you already have a reverb plugin patched into one of your host application's effects buses, it might be wise to switch off Cameleon 5000's internal reverb and process the dry sound via this bus instead. The same might also apply to Delay or Chorus effects.

Credits

Concept, Design and Programming

Ben Gillett

Additional Programming

Rob Martino

Graphic Design

Ian Legge

Sample Content

Sonic Reality

Sound Design

Tim Conrardy
Rene Ebenhan
Kolin Fraser
Markleford Friedman
David Goodwin
Marc Hoppe
James Hunter
Daniel Maurer
Jaime Newman
Peter Schelfout
Scot Solida

User Manual

Paul Sellars