

---

# Camel Audio



# Cameleon 5000

## Operation Manual

Version 1.5

---

---

## Contents

User License Agreement.....	5
Overview.....	7
Feature highlights.....	8
System requirements.....	9
Why buy?.....	9
Demo Version Restrictions.....	9
Installation.....	10
Quick Tour.....	11
Voice morphing.....	12
Sample resynthesis.....	14
Image importing.....	16
Additive or 'spectral modelling' synthesis.....	17
Using the 'Easy' and 'Effects' pages.....	20
Cameleon 5000 in detail.....	23
The Voice Program pages (A, B, C and D).....	27
Harmonics.....	28
Breakpoint Mode and Overall Mode.....	29
Amp / Detune.....	30
Noise.....	32
Harmonics and Noise Presets.....	33
Load/Save and Copy/Paste.....	34
Other Parameters.....	35
Multi-sampling and Velocity Layers.....	39
Velocity Layers.....	41
The Mod page.....	43

---

---

The Morph page.....	50
The Morph timeline.....	50
The Morph square.....	52
The Easy page.....	56
Timbre.....	56
LFO.....	57
Voices.....	57
Amplitude Envelope.....	58
Output.....	59
Random Easy.....	59
The Effects page.....	60
Formant Filter.....	60
Distortion.....	61
Filter.....	62
Chorus.....	63
Stereo delay.....	63
Reverb.....	64
Random Effects.....	64
Cameleon 5000 file formats.....	65
Cameleon 5000 WAV/AIFF importing guidelines.....	67
Expert tips for improving resynthesised sounds.....	69
Importing images.....	73
Importing images: in theory.....	73
Importing images: in practice.....	74
Choosing and making images: some tips.....	76
Exporting and re-importing images.....	77
More tips.....	79
Cameleon 5000 CPU usage.....	81

---

---

Troubleshooting / FAQ.....	83
Credits.....	87

---

## User License Agreement

This User License Agreement is a legal agreement between you and Camel Audio for the product accompanying this document, which includes software and all associated media ('SOFTWARE').

By installing, copying or using the SOFTWARE, you agree to be bound by the terms of this license. If you do not agree with the terms of this license, you may not use the SOFTWARE.

The SOFTWARE is protected by copyright laws and international copyright treaties. The SOFTWARE is licensed, not sold.

You may not transfer, modify, rent, lease resell, distribute, network or transmit the SOFTWARE. You may not reverse engineer, decompile or disassemble the SOFTWARE. You are not permitted to copy the SOFTWARE.

All title and copyrights in and to the SOFTWARE and any copies of the SOFTWARE are owned by Camel Audio. The SOFTWARE is protected by copyright laws and international treaty provisions.

Unauthorized reproduction or distribution of the SOFTWARE or documentation is subject to civil and criminal penalties.

The SOFTWARE is provided 'as is' and without warranty of any kind. The entire risk arising out of the use of the SOFTWARE remains with the user. Camel Audio disclaims all warranties, either express or implied, including, but not limited to, implied warranties of merchantability and fitness for a particular purpose, with regard to the SOFTWARE.

---

In no event shall Camel Audio be liable for any consequential or other damages whatsoever arising out of the use of or inability to use the SOFTWARE.

'Camel Audio' and 'Cameleon 5000' are trademarks of Camel Audio.

'VST' is a trademark of Steinberg Soft – und Hardware GmbH. All other trademarks are the property of their respective owners. © 2003 Camel Audio. All rights reserved.

---

## Overview

**Cameleon 5000** is an **additive synth**, featuring resynthesis and sound morphing, which has an out-of-this-world sound. At its heart is the **morph square** which allows you to morph between four different instruments at once. You can also use the morph timeline to create rhythmic loops, evolving soundscapes and pads. Uniquely, Cameleon comes with a range of preset morph timelines, to make creating new sounds even easier.

Cameleon can **import sampled sounds** (WAV/AIFF) into any of the four voice slots, or you can choose from the extensive range of built in voices. Cameleon has many unique features: it breaks sounds down into both a harmonic and noise component resulting in much higher quality, and greater flexibility. No other additive synth is able to perform multi-sampling resynthesis, which results in much more realistic and expressive sounds.

Cameleon also allows you to **import image** ('.bmp') files and turn them into sounds. This offers an extremely powerful way to design never heard before sounds, and if you're ever stuck for inspiration, just try loading up any picture - perhaps a picture of your mum!

Once you have imported a sound, you can then edit it in ways which are impossible with a conventional sampler. You have **individual control** over each of the **harmonics** - so you can for example boost all the odd harmonics, or even draw your own harmonic spectra.

Every part of Cameleon's interface has been designed with **ease of use** in mind, and the 'easy' page is just one example. The easy page has simple but powerful controls to quickly shape the sound, including the ability to change the balance of harmonics and noise, add LFOs, or edit the amplitude envelope. You can also use

---

the unique '**stretch**' parameter to time-stretch sounds in real time without the loss in quality associated with other instruments.

Cameleon has a comprehensive set of effects, including a sweepable formant filter, distortion, compression, chorus, delay and reverb. Cameleon is supplied with over **600 presets**, all arranged into categories, such as pads, leads and basses. If you're after instant inspiration, just select the type of sound you require (e.g. rhythmic) and hit the **random** button to get an entirely new random rhythmic loop, which has never been heard before.

## Feature highlights

- Import and morph WAV/AIFF files
- Import any BMP image
- Multi-sampling resynthesis for more realistic and expressive instruments
- One-click 'morphing square', to morph between four sounds at a time
- Separate control of amplitude envelope, harmonics and noise
- Morph timeline with presets, for fast creation of evolving patches
- High quality 'stretch' for increased expression
- Complete control over each harmonic
- 128 band noise generator, 64 detunable partials
- Sweepable formant filter, distortion, compression, chorus, delay, reverb
- 600+ presets arranged in categories - pads, ambiences, leads, basses and more



---

## System requirements

PC Pentium III 1GHz, 128 MB RAM, Windows 98/ME/2000/XP, VSTi host

Mac G4 733 MHz, 128 MB RAM, Mac OS 9/X, VSTi/Audio Units host

(Cameleon 5000 is one of many VST plugins and VSTi instruments adhering to the VST standard developed by Steinberg. The Audio Unit standard was developed by Apple.)

## Why buy?

When you buy Cameleon 5000, in addition to getting a great synthesizer, you'll also get access to the latest updates, technical support, tutorials and extra presets - as well as discounts on new Camel Audio products!

## 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 fifteen minutes.
- Does not require a serial number.

---

## Installation

For both Windows and Mac OS users, installation is a straightforward and painless procedure. Simply run the supplied installer program (by double-clicking it), and follow the on-screen instructions.

Afterwards, upon starting your plugin host 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.

**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 should 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 four different, equally legitimate ways to approach working with Cameleon 5000:

- Voice morphing.
- Sample resynthesis.

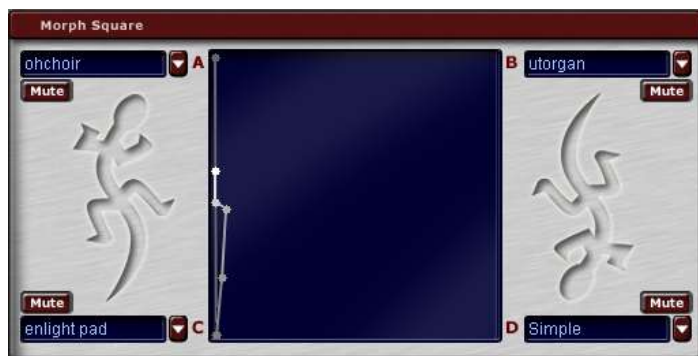
- 
- Image importing.
  - Additive or 'spectral modelling' synthesis.

## Voice 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 we're going to 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 the 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).

**Note:** Before we go on to look at an example, we'll first need to reset Cameleon 5000, by clicking the 'Reset' button (in the top right, immediately above the 'Morph' page tab).

Ready?

OK - let's try an experiment.

- Click on the load button in 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 menu ('B'), move the mouse pointer down to the 'Strings' sub-menu, and from the list that appears choose 'Cello'.
- You'll notice that there's a small white 'dot' in the Morph square. With the mouse, click on this dot, and drag it up into the top left hand corner of the square, (beside 'A'). Play some notes on your MIDI keyboard, and you'll hear 'Celesta'.
- Play some more notes, click on the dot, 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. 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: '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 52. 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:

- 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 (see page 69 for details).



- 
- Once the sample has been imported (it'll take a few moments) you can click the 'Save' button to save a new Voice Program (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 54), or even try manually editing its harmonic and noise content or envelopes (see page 29).

To get the 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 69 for more details. You may also want to consider Multi-sampling and Velocity Layers (page 41) as ways to come up with more responsive, expressive sounds.

## Image importing

From version 1.3 onwards, Cameleon 5000 is capable of importing - and exporting - standard 'Bitmap' (.bmp) image files, which are automatically translated into sounds!

How does this work?

It's a fairly complicated process, but basically Cameleon treats each imported image as a kind of 'graph' of a sound, with the horizontal 'X' axis representing time, and the vertical 'Y' axis representing the harmonic 'index' (so the bottom pixel represents the first harmonic; the second pixel up, the second harmonic and so on). The brightness of a pixel represents the volume of that harmonic at that point in time. Different images thus result in different tones and textures.

Synthesizing sounds from images is an interesting and unusual approach to sound design, and it can yield



---

some surprising results! Turn to page 75 for a detailed 'image-synthesising' tutorial.

## **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 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.

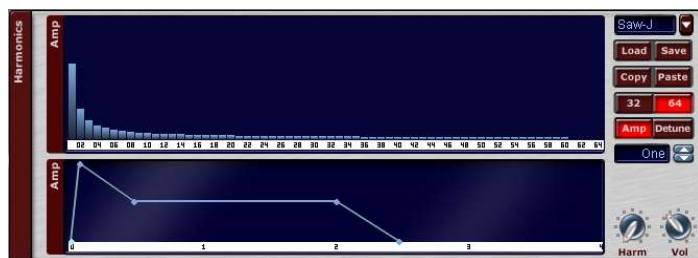
This is perfectly reasonable, and Cameleon 5000 has been designed specifically so that it's not necessary to know - or even care - about the 'nuts and bolts' of the sound generation process in order to get great results!

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 on the 'Reset' button.
- Click on 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-J'.

---

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 loudness of a 'Harmonic'; a frequency contributing to the overall tonal colour of the sound.



When you choose 'Saw-J' from the drop-down menu, Cameleon 5000 recalls a weighted set of harmonics which combine to create a tone 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), 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 of the display, they should read 'H 8 0db'. This indicates that you've increased the volume of the eighth harmonic to 0db. (Note: it's actually possible to drag beyond the upper limit of the display, and increase the volume still further.)

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' of harmonics. You'll notice 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 notice 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 'Vol' (volume) knobs in the bottom right-hand corners of both the Harmonics and Noise sections.



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 31 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 58 onwards. 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 'AcousticSteelString' 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 real guitar any more, 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 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 verb? Maybe add a filter with a touch of resonance?

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

Cameleon 5000 is a complex instrument, and it'll probably take some 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 67.)



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 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 works just as you'd expect.

The 'Tune' knob can be used to fine-tune the master pitch, and the 'Tune Semi' up/down buttons can be used to make adjustments in semi-tone increments.

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 45 for more



---

information about mapping control sources to different parameters).

## Micro-tuning

Beneath and beside the 'Tune' knob is a small, red 'button'. Clicking this button opens a dialog, in which you can choose to load an alternate tuning scheme, in the form of a '.tun' file.

A huge library of .tun files (more than two thousand of them!) is available for free download from the Camel Audio website (<http://www.camelaudio.com>).

If you've ever wanted to experiment with tunings beyond the conventional twelve semi-tone scale most commonly used in Western music, now's your chance!

You can even try creating your own custom tunings, with the help of a free program called *Scala* (<http://www.xs4all.nl/~huygensf/scala>).

**Note:** .tun files don't require any special installation, so you can store them wherever you like. A 'Tunings' sub-directory within the 'Cameleon5000Data' folder would be one possibility.

## The Learn button

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.

### **MidiConfig.txt**

A file called 'MidiConfig.txt' can be found inside the 'Cameleon5000Data' folder, in your host application's plugin folder.

Advanced users may want to experiment with opening this file in a text editor (e.g. Notepad), and editing it in order to 'manually' assign MIDI controllers to parameters.

The text file is quite easy to understand: you'll see a list of parameter names, and a number beside each one.

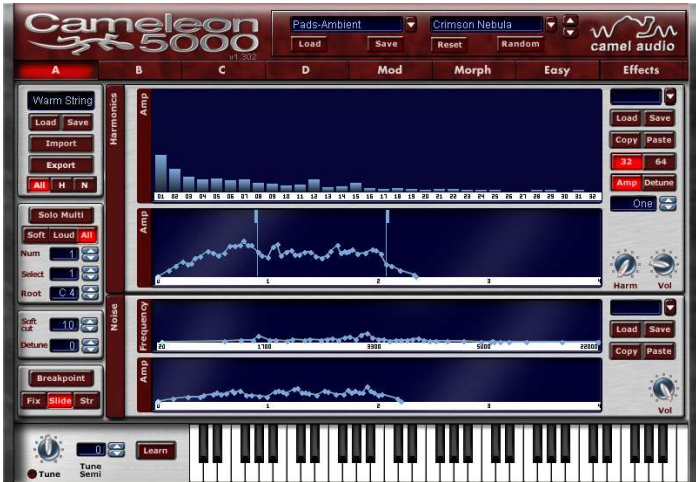
To change the controller assigned to a parameter, simply replace its number with the number of the controller you want to assign (e.g. if you wanted to assign Breath Controller messages to a parameter, you would change the number to '2').

For most parameters, using the 'Learn' button is the simplest and easiest way to assign MIDI controllers.

However, there are a few controls that can't be 'taught' controllers automatically - in particular the Morph square 'dots' (see pages 14 and 54).

To assign MIDI controllers to the Morph square dots look for the parameters named 'MorphHarmX', 'MorphHarmY', 'MorphNoiseX', 'MorphNoiseY', 'MorphAmpX' and 'MorphAmpY'.

## 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').

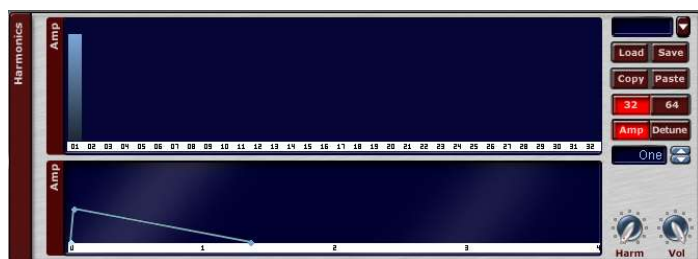
Each of the four Voice Programs has its own independent page (A, B, C or D), and each page duplicates the same set of parameters. Thus whenever we refer to 'the Voice Program page', our comments apply equally to pages A, B, C and D.

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.

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 34).

## 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, 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, 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, and Breakpoint mode is active, 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.

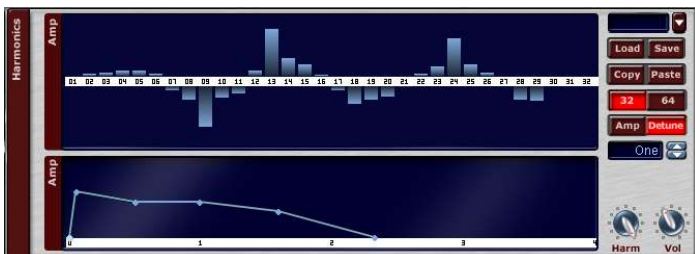
Of course, the partials are fully editable, and so by selecting each of the envelope's breakpoints in turn and making new settings in the Partial display for each one, you can easily 'sculpt' dynamic changes in the harmonic content (and thus the tone) of the sound.

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 relative to its neighbour, by clicking and dragging up or down.

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

Beneath the Amp and Detune 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. 'All' allows you to adjust all harmonics simultaneously, while 'All-Vol' allows you to increase the Volume of already-activated harmonics, without activating any new ones (as 'All' would).

These editing 'rules' are applicable in both the Partial and Detune displays.

---

Two knobs appear in the bottom right hand corner of the Harmonics section, labelled 'Harm' and 'Vol'. 'Vol' is a simple Volume control, which can be used to adjust the relative level of the Harmonic content of the Voice Program in the overall sound. The Noise section (discussed below) features an identical Volume control.

The 'Harm' knob is Cameleon's 'Harmonize' control. This can be used to variably over-ride any settings made in the Detune display. With the Harmonize control turned all the way to the right, Detune settings are completely ignored. Lower settings allow you to gradually adjust the amount of Detuning applied. With the Harmonize control turned all the way to the left, Detuning is applied exactly as per the settings in the Detune display.

## 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 a number of 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 'None', 'Organ', 'Plucked', 'Saw-J' (the 'J' stands for 'Juno'), 'Saw-V' (the 'V' stands for 'Virus'), 'Sine', 'Square-J', 'Square-V', 'Triangle' and 'VocalSrc'.

In the Noise section you can choose from 'BreathH', 'BreathL', 'KeyHitH' (a high frequency attack noise), 'KeyHitL' (a lower frequency attack noise), 'None' (no noise at all) and 'White' (pure white noise).

## Load/Save and Copy/Paste

Both the Harmonics and Noise sections of the Voice Program page feature their own 'Load' and 'Save', and 'Copy' and 'Paste' buttons.

The Load and Save buttons allow you to Load and Save the complete Harmonics or Noise settings for a Voice Program, in a separate file. Harmonics settings are saved as '.c5h' files, while Noise settings are saved as '.c5n' files.

The Copy and Paste buttons are useful tools for editing the 'Amp' envelopes, in both the Harmonics and Noise sections.

Select a single breakpoint on either a Harmonics or a Noise envelope, and click Copy. Then click another breakpoint elsewhere in the same envelope, and click Paste. You'll see that the second breakpoint has the first breakpoint's Amp setting copied to it.

This works in both Breakpoint and Overall modes, and can be a useful trick when setting loop points in envelopes (see page 60). It's quite often useful to have a loop begin and end on breakpoints with identical Amp values, and Copy-and-Pasting makes this easy.

---

## 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 69.

From version 1.3 onwards, Cameleon 5000 is also capable of importing standard 'Bitmap' (.bmp) image files, which are automatically translated into sounds. See page 75 for more details.

### **Export**

Allows you to export either the Noise or Harmonic components of a Voice Program as a standard 'bitmap' (.bmp) image.

### **All/H/N**

Allows you to control how image data is imported and exported. When 'All' is selected, both Harmonic and Noise information are extracted from imported images.

---

When 'H' or 'N' is selected, Harmonic or Noise information respectively is extracted from imported images. The same applies when exporting images, except that 'All' is not an option (choosing 'All' will have the same effect as choosing 'H').

## 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 41.

---

## **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 41.

## **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 origin of the selected multi-sample's range. A multi-sample's range extends from its own root note up to the root note of the next multi-sample. Note: this setting does **not** alter the pitch of the 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 39).

## **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 31.

## **Fix/Slide/Str**



---

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

- 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, dragging a breakpoint backward or forward 'stretches' the envelope. If a breakpoint is dragged to the right, the portion of envelope to the left of that breakpoint is stretched, and vice versa.

## 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.

- 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.

## 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 (see page 40). 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.

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, or 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 64) or Formant filter frequency (page 62). Assigning the Mod envelope to any other parameter has no effect.

---

The possible modulation targets are:

- None - (None)
- MorphHarmX - controls movements along the X axis of the Morph square, in Harmonics mode (see page 55).
- MorphHarmY - controls movements along the Y axis of the Morph square, in Harmonics mode (see page 55).
- MorphNoiseX - controls movements along the X axis of the Morph square, in Noise mode (see page 55).
- MorphNoiseY - controls movements along the Y axis of the Morph square, in Noise mode (see page 55).
- MorphAmpX - controls movements along the Y axis of the Morph square, in Amplitude mode (see page 55).
- MorphAmpY - controls movements along the Y axis of the Morph square, in Amplitude mode (see page 55).
- Brightness - points to the 'brightness' knob in the 'Timbre' section of the 'Easy' page (see page 58).
- HarmAmount - points to the 'harmonic' knob in the 'Timbre' section of the 'Easy' page (see page 58).
- NoiseAmount - points to the 'noise' knob in the 'Timbre' section of the 'Easy' page (see page 58).
- LfoRate - points to the 'rate' knob in the 'LFO' section of the 'Easy' page (see page 59).
- LfoPitch - points to the 'pitch' knob in the 'LFO' section of the 'Easy' page (see page 59).
- LfoVibrato - points to the 'amp' knob in the 'LFO' section of the 'Easy' page (see page 59).

- 
- PortamentoRate - points to the 'porto' knob in the 'Voices' section of the 'Easy' page (see page 59).
  - Attack - points to the 'attack' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 60).
  - Stretch - points to the 'stretch' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 60).
  - Release - points to the 'release' knob in the 'Amplitude Envelope' section of the 'Easy' page (see page 60).
  - Volume - points to the 'volume' knob in the 'Output' section of the 'Easy' page (see page 61).
  - StereoWidth - points to the 'stereo width' knob in the 'Output' section of the 'Easy' page (see page 61).
  - Formant Freq - points to the Formant filter on the 'Effects' page (see page 62).
  - Distortion - points to the 'dist' knob in the 'Distortion' section of the 'Effects' page (see page 63).
  - Tube - points to the 'tube' knob in the 'Distortion' section of the 'Effects' page (see page 63).
  - MBass - points to the 'm-bass' knob in the 'Distortion' section of the 'Effects' page (see page 63).
  - Compress - points to the 'comp' knob in the 'Distortion' section of the 'Effects' page (see page 63).
  - FilterCutoff - points to the 'cutoff' knob in the 'Filter' section of the 'Effects' page (see page 64).
  - FilterRes - points to the 'res' knob in the 'Filter' section of the 'Effects' page (see page 64).
  - FilterEnv - points to the 'env' knob in the 'Filter' section of the 'Effects' page (see page 64).

- 
- ChorusMix - points to the 'mix' knob in the 'Chorus' section of the 'Effects' page (see page 65).
  - ChorusDelay - points to the 'delay' knob in the 'Chorus' section of the 'Effects' page (see page 65).
  - ChorusDepth - points to the 'depth' knob in the 'Chorus' section of the 'Effects' page (see page 65).
  - ChorusRate - points to the 'freq' knob in the 'Chorus' section of the 'Effects' page (see page 65).
  - DelayMix - points to the 'mix' knob in the 'Stereo delay' section of the 'Effects' page (see page 65).
  - DelayFeedback - points to the 'feedback' knob in the 'Stereo delay' section of the 'Effects' page (see page 65).
  - DelaySyncL - points to the 'sync L' knob in the 'Stereo delay' section of the 'Effects' page (see page 65).
  - DelaySyncR - points to the 'sync R' knob in the 'Stereo delay' section of the 'Effects' page (see page 65).
  - ReverbMix - points to the 'mix' knob in the 'Reverb' section of the 'Effects' page (see page 66).
  - ReverbSize - points to the 'size' knob in the 'Reverb' section of the 'Effects' page (see page 66).
  - ReverbDecay - points to the 'size' knob in the 'Reverb' section of the 'Effects' page (see page 66).
  - Lfo1Shape - points the waveform shape parameter for 'LFO 1' on the Mod page (see page 49).
  - Lfo1Rate - points to the rate control for 'LFO 1' on the Mod page (see page 49).
  - Lfo2Shape - points the waveform shape parameter for 'LFO 2' on the Mod page (see page 49).

- 
- Lfo2Rate - points to the rate control for 'LFO 1' on the Mod page (see page 49).
  - SustainOn - points to the control to activate sustain.
  - PhatFilter - points to the PhatFilter effect (page 64).
  - 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 a Mod Page LFO, 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 information 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 'tremolo' effect, similar to that produced by some 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, when 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 do's and don't's of modulation routing

As you can see, a huge number of modulation routings are possible. However, some settings can sometimes have undesirable side-effects, occasionally causing glitches or 'clicks' to occur in the sound.

The only modulation targets guaranteed **not** to cause problems are: morphHarmX, morphHarmY, morphNoiseX, morphNoiseY, morphAmpX, morphAmpY, attack, release, formantFreq, filterCutoff, filterRes, sustainOn.

If Formant Filter frequency (page 62) is modulated, the filter envelope should not contain any **vertical** sections. Replace them with steep but non-vertical lines instead.

If your Voice Program still suffers from clicks, try removing different modulation routings one at a time until the problem is resolved.

Also, you might be able to replace some problematic routings with alternatives - for example, 'Brightness' might be replaced with 'FilterCutoff' as a target, provided that the filter is not already used in the patch.

When using the filter in this manner, the 'env' and 'res' parameters should be set to zero, and LP filter mode should be engaged. Adjust the Low and High



---

parameters on the modulation page to achieve the desired effect.

---

## The Morph page

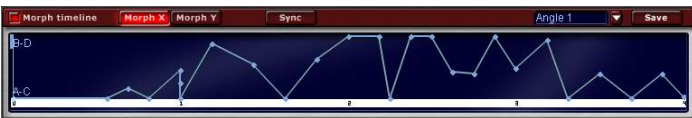


The Morph page is active by default when Cameleon 5000 opens. It allows you to morph between the four active Voice Programs.

We've already had a quick look at the Morph square (see page 14). Now we'll look at it in a little more detail - and in particular at its relationship with the powerful 'Morph timeline'.

## The Morph timeline

The Morph timeline is active by default, and can be deactivated and reactivated by clicking on the red LED in the top left-hand corner of its display.



---

When the Morph timeline is activated, the 'Morph Mode' is fixed to 'All' (we'll look at the other Morph modes later in this section).

The Morph timeline provides an easy but powerful way to automate complex real-time morphs, which would be impossible to perform in any other way.

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 to create different 'morph charts' for both the X and Y axis.

## **Morph presets**

The Morph timeline has its own drop-down menu, from which various preset 'envelopes' can be selected and recalled.

You can create your own Morph presets by editing the Morph timeline to achieve the effect you want, then clicking the 'Save' button beside the menu.

---

Morph preset files are saved with a .c5m extension.

## Timeline 'sync'

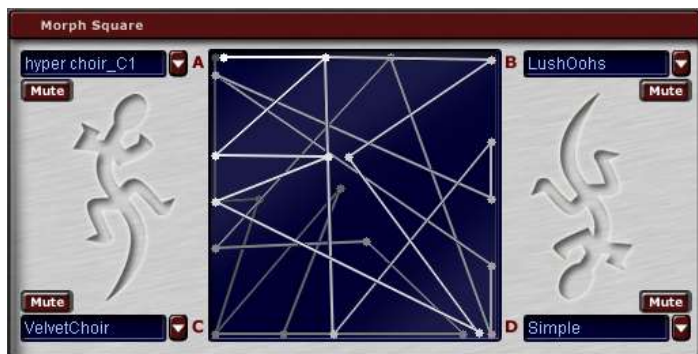


The ruler along the bottom of the Morph timeline display is usually calibrated in seconds. Clicking on the 'Sync' button displays a grid, and recalibrates the ruler to eighth notes (based on the tempo information provided by your host application).

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

## The Morph square

You'll notice that when 'Morph timeline' is activated, a series of 'joined-up dots' appears in the Morph square.



---

The line joining these dots illustrates how the sound morphs between the four active Voice Programs (the four corners of the square) over time, and is a reflection of the settings in the Morph timeline display.

Each note begins at the point on the line which is darkest grey in colour. As the sound morphs over time, the grey of the line gets progressively lighter.

If you load the 'Pad ABDC' preset from the Morph timeline's drop-down menu, you'll see that the line starts at 'A' as dark grey, and gets lighter and lighter as it goes to 'B', then 'D', then 'C'.

Morph timeline settings can be changed directly from the Morph square. Simply grab a dot in the morph square, drag it around a bit, and you'll see the Morph timeline display update to reflect your changes.

Try loading up the 'Spiral' and 'Circle' Morph presets and have a go moving the dots into a new pattern. You'll find it's much easier than working it all out on the timeline!

That said, the two different approaches should be considered complementary, rather than exclusive.

For 'rhythmic' programming, the Morph timeline (with its 'sync' feature) is much more useful than the Morph square. For slow, evolving pad sounds, the reverse is often true.

## **Morph Modes and the Morph square**

So far we've been looking at how the Morph square works when the Morph timeline is activated.

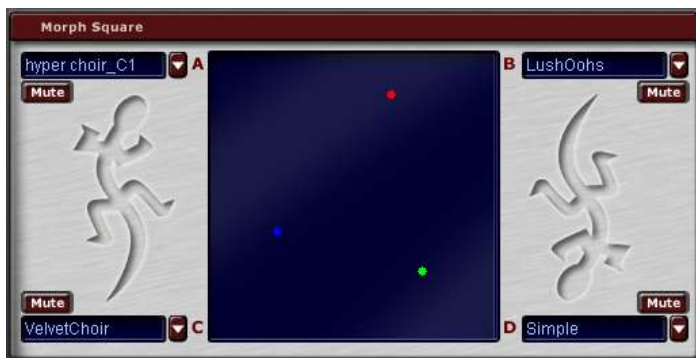
With the Morph timeline switched **off**, however, the Morph square behaves quite differently, and a range of different effects can be achieved by exploiting Cameleon's different 'Morph Modes'

---

The four 'Morph Mode' buttons (to the right of the Morph square) allow you to choose which of the four modes you want to use: 'All' (the default), 'Amplitude', 'Harmonics', or 'Noise'.

As we've seen, with 'All' 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.

When any other Morph Mode is selected, the single white 'dot' in the Morph square is replaced by three different coloured dots, allowing you independent control of 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, creating a new hybrid. The Morph mode is also randomised (although the randomisation tends to favour 'All' mode, since this most often produces the most interesting results).

### **Mute buttons**

The 'Mute' buttons in each corner of the Morph square work just as you'd expect. Clicking the Mute button in the 'A' corner mutes the output of Voice Program A - and so on for Voice Programs B, C, and D.

---

## 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 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. When the 'porto' control is set to anything other than 'OFF', Cameleon 5000 becomes monophonic, and the 'polyphony' setting is ignored.

## 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 30), 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 34). 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'.

You can save your own custom presets by clicking the 'Save' button in the top right of the Formant Filter display. (Formant Filter presets are saved with a '.c5f' extension.)

A number of presets 'shapes' are available, which can be selected from the drop-down menu beside the Save button. These range from the fairly utilitarian ('High Cut', 'Low Boost') to the more outlandish and 'creative' ('Shark Teeth II', 'Vocal A', 'Vocal-E', 'Vocal-O').

Any of the available control sources on the 'Mod' page (page 45) 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-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 above 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

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

### **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 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 very complex) settings made in the Morph timeline and Formant Filter displays.

## **Microtuning presets (.tun)**

In addition to the six formats above, Cameleon 5000 can also read (but not write) .tun files. These can be used to load alternative tuning schemes (see page 27).

---

## **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 41 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.

Filename can also be used to let Cameleon know a sample's correct pitch.

Simply add 'NN0\_' to the end of the filename, where 'NN' is a two-character representation of the note name (e.g. 'A\_' or 'C#'), and '0' is the octave number.

- A file named 'bassC\_4\_.wav' would be imported as a 'C' at octave 4 (middle C).
- A file named 'twang\_F#2\_.wav' would be imported as an F# at octave 2.

## Expert tips for improving resynthesised sounds

### Tuning

When a sample is resynthesised, the resulting Voice Program may occasionally be out of tune by a semitone or so. This easiest way to check this is to play a note, turn 'Harmonize' knob on the Voice Program page all the way to the right, and then play the same note again.

The Harmonize function progressively over-rides any de-tuning of the partials in a Voice Program, and thus forces it to be perfectly 'in tune'. You can compare the strictly 'Harmonized' sound with the imported sound to check for any discrepancies.

Be aware, however, that activating the Harmonize function will have a detrimental effect on some Voice Programs, adversely altering the 'character' of the sound. So long as the imported sound does not seem

---

to be uncomfortably out of tune, you may often prefer not to use the Harmonize function. Let your ears be the judge!

### **Volume levels**

To avoid distortion or 'clipping' when playing, you need to set the volume of the instrument so it does not exceed '0 db'. With Cameleon's mixer channel set to your host application's default volume (e.g. 78% in *FL Studio*), you should check that the host's db meter doesn't peak above '0 db' when a full velocity note is played.

Remember also to take maximum polyphony into account. For example, if you've set Cameleon 5000's maximum polyphony to '6', you should hit six notes together at full velocity, and adjust the Volume control on the Easy page until the peak is just up to '0 db', and not over.

### **Fixing stray harmonics**

Sometimes resynthesised sounds may have a few undesirable stray harmonics, which can result in a slightly tinny or whiny 'twang' when certain notes are played. These stray harmonics can be edited out to produce more natural-sounding results.

The quickest and easiest solution is simply to reduce the 'num partials' setting on the Easy Page, while playing some notes. You may find that the rogue harmonics can be removed by slightly reducing the number of partials used, with little or no perceptible reduction in sound quality.

If this doesn't work, you may need to look a little more closely. Go to the relevant Voice Program page, click the 'Solo Multi' button and, using the 'select' buttons, select the number of the imported sample that seems to be causing the problem.

---

Then go back to the Easy page, play a note that exhibits a stray harmonic, and gradually reduce 'num partials' while repeatedly playing the note. At some point you will hear the stray harmonic disappear.

Make a note of the partial number at which this occurs: this is your stray harmonic. If the problem seems to affect more than one partial, just keep reducing the number of partials until all the strays have been eradicated, and make a note of each of the partials that were at fault.

Next, return 'num partials' to its original value, and go back to the Voice Program page. In the Harmonics display, locate each of the 'problem' partials you found above, and reduce their levels by pulling down the appropriate bar, until the stray harmonics can no longer be heard.

Click again on the 'Solo Multi' and check your newly-edited sound. If you're happy with the result, don't forget to save it!

### **'Harsh' sounds**

Some analysed sounds may seem excessively harsh or bright-sounding. Try reducing 'num partials' on the Easy page. You'll often be able to reduce the harshness without any serious detrimental side-effects.

Another approach would be to go to the relevant Voice Program page and reduce the level of the upper harmonics in the sound, by selecting the 'Bright' editing rule in the field beneath the Harmonize button, and gradually 'ramping' the levels down.

You could also try editing partials individually. Feel free to experiment, and remember to save your changes!

---

## Other edits

Some resynthesized sounds may have excessive noise content, which can detract from the quality of the sound.

You can reduce the level of the noise component of a Voice Program either by using the volume knob in the Noise section of the relevant Voice Program Page, or with the global 'Noise' knob in the 'Timbre' section of the Easy page. (The 'Brightness' and 'Harmonic' knobs can be used for further adjustments.)

The Effects page provides several tools that can be used to brush up the sound of a newly-imported instrument. A small amount of reverb, for example, is often a useful addition to acoustic instruments, providing more 'space' and greater realism.

On the Easy page, subtle LFO modulation of 'pitch' or 'amp' can help bring alive wind instruments, vocal or 'choir' sounds.



---

## Importing images

The image import function in Cameleon opens up a huge potential sound design resource, allowing you to use existing images, or your own custom bitmaps to create new and unique sounds.

This tutorial by Jim Hunter explains the principles of image import, and offers some tips for achieving the best results.

### Importing images: in theory

Cameleon 5000 can turn images into the Harmonic and the Noise components of a sound.

#### Harmonics

Cameleon analyses 'bitmap' images (.bmp) and transforms them into sound by interpreting the **brightness** of each pixel as the **amplitude** of a certain harmonic, at a certain time.

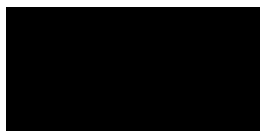
Images are interpreted as having harmonics going up the vertical 'Y' axis - so the bottom pixel corresponds to the first harmonic, the next pixel up, the second harmonic, and so on up to 64.

The horizontal 'X' axis represents time. The brightness of a pixel corresponds to how loud a harmonic is at that moment in time.

The standard image size used is 128 pixels (horizontally) by 64 pixels (vertically).

A black pixel is interpreted as silence, while a white pixel represents full volume.

So, a sine wave, simply playing the first 'partial' on its own, looks like this; there is just one white line along the bottom row of pixels:



The 'Drawbar Dreams' preset in the 'Organs' directory can be created from this bitmap:



Here you can see that the first, second, fourth, eighth, sixteenth, thirty-second and sixty-fourth partials are being activated, with some slight variation over time.

## Noise

The noise component of a sound can also be created by importing a bitmap into Cameleon.

This works in a very similar way to harmonics; the X axis represents time, and the Y axis controls the frequency content of the noise.

However, a bitmap of **any** size can be imported to create noise components. Cameleon will not just take the bottom 64 pixels, but will use the whole range of the Y axis.

On the Y axis, the bottom row of pixels corresponds to 20Hz, the mid point of the image to 6.5kHz, and the top row of pixels to 22kHz.

## Importing images: in practice

In order for an image to be imported into Cameleon, it must be saved in bitmap (.bmp) format.

---

Images narrower than the standard 128 x 64 size will have their width automatically stretched to fit. When importing Harmonics (as opposed to Noise), taller images will have only the bottom 64 pixels imported.

If an image is less than 64 pixels high, this will limit the number of partials used in the resulting Voice Program.

Images may be black and white or colour - although colour ones will be interpreted by Cameleon as black and white.

I prefer to make or shrink my bitmaps to 64 pixels high before importing into Cameleon, as this enables me to see how the sound will evolve and sound over time more accurately. I use a freeware graphics application called *Pixia* (<http://park18.wakwak.com/~pixia>) for these kinds of manipulations.

To import an image, press the 'Reset' button near the top of the GUI, then go to the Voice Program page (A,B etc.) you wish to import the image to.

Decide if you'd like to import the image to create Harmonics (press the 'H' button in the top left of the voice page), Noise (click the 'N' button) or both Harmonics and Noise (click the All) button.



You can then select your directory, and after selecting the 'bmp' file type, choose the image file you want to

---

import. The import process may take a few moments to complete.

Now when you play a key you should hear the raw sound of your bitmap image!

There are many things you can do to your raw image sound, from morphing with other sounds to using effects and so on. We'll look at some examples in a moment.

## Choosing and making images: some tips

The best-sounding bitmaps usually, but not always, have a lot of black in the picture. If the picture is very 'busy' and bright, with little black space, the resulting sound is usually metallic, harsh and gritty, since so many of the partials are playing at high amplitude levels.

You can create a negative of an image if you feel it is too bright, and try using that. I usually use pictures that are essentially black backgrounds with sweeping lines or patterns, as these activate particular partials over time and can give great sweeping squelchy rising tones, or weird spacey sounds.

Google Image Search (<http://images.google.com/>) is a good place to find images to experiment with (bear in mind that many of the files you find will need to be converted to bitmaps from the 'jpg', 'gif' and 'png' formats more commonly used on the web).

Of course, you can create a bitmap from scratch, specifically to be musically interesting. For example, the 'drawbar dreams' picture and patch described at the start of the tutorial was created by Glen Berry, using additive synthesis theory to model the sound of a real organ.

---

Essentially organs are primitive additive synthesisers - which is one of the reasons why Cameleon is so good at creating organ sounds!

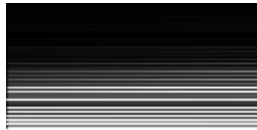
## Exporting and re-importing images

Try exporting bitmaps from a Voice Programs you like the sound of, and see how the image is constructed from the partials in the sound. You can then alter this bitmap, or create a new, similar one. This provides a good 'visual' way to explore the principles of additive synthesis.

For example, exporting the harmonics from 'Bell Juno' in 'Chromatics', gives this image - which clearly shows how the partials behave over time:



'Cathedral' in 'Organs' looks like this:



And the resynthesised speech in 'TalkingCameleon' in 'Voices' looks like this:



---

To **export** a bitmap, select whether you want to export the Harmonic or Noise components by clicking on 'H' or 'N' underneath the 'export' button, and enter the filename you wish to use.

If you export a sound as a bitmap, then re-import it again, you may find that it sounds very slightly different. This is because partial detuning information is lost during the export process. Different sounds will suffer from this to differing extents - with some sounds, it may not matter at all.

You can use a graphics or image-editing package to mess around with images a bit, and make them sound a bit more unusual.

Here I've taken the harmonics from 'Flute Mystery', in Brass-Winds:



And now I've smudged some of the white up in long streaks, to activate some higher partials:



It sounds quite different when re-imported; sort of like a robotic flute. This change is due to the newly-added harmonic 'streaks'.

---

## More tips

Here are a few points to bear in mind when exporting and re-importing bitmaps:

- If you have both a Noise and Harmonic component, you will need to export/import each separately.
- When exporting the Harmonic part, the detuning information will be lost. (This is equivalent to setting 'Harmonize' to fully on). There is no way around this.
- The original length of a sound will be lost. You can either correct this using the 'Stretch' knob on the Easy page, or you can put the envelope editor in 'str' mode, grab the last point and move it to the correct length.
- The original sound may be multi-sampled. In this case you will either need to export each multi-sample, or just choose the most representative one, and take care to set the 'Num' counter to 1.

### **Creating a more interesting sound once the image has been imported**

Depending on the nature of the bitmap, I sometimes transpose down by an octave or two to start with. If the activity is mostly in the middle to top of the image the sounds will be very high.

Remember: to keep your image 'in tune', you should usually transpose in multiples of twelve (octaves).

I usually use quite a lot of slow chorus on bitmap-sourced voices, as this takes some of the edge off the brightness, and adds more depth and movement to the sound. A bit of reverb and delay are also often worth trying, depending on the kind of sound you're trying to create.

---

Use the Stretch knob on the Easy page to try stretching out or squashing up the sound.

The formant filter is great for sculpting the sound and highlighting particular frequencies that you like. Try modulating it with a slow LFO, using the 'Shark Teeth' or comb filter envelope presets, to create really unusual moving sounds. Similarly, automating the filter cutoff with an envelope or LFO on the mod page can have awesome effects.

Often a bitmap you import will have quite a thin sound and little or no bass presence. This is usually because the first partial or two are at a low amplitude. Try 'dragging up' these partials in the Harmonics window on the Voice Program page.

It's usually best to just experiment, and trust your ears to judge what sounds best.

It's worth mentioning that if you're using an image that activates all 64 partials, and using lots of effects with it, the CPU load can get quite high, especially on complex chords. Try reducing the number of partials or polyphony if this becomes a problem.



---

## **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 59) 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 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 59). 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 which 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 5000s internal reverb and process the dry sound via this bus instead. The same might also apply to Delay or Chorus effects.

---

## Troubleshooting / FAQ

The following are solutions to some common problems:

### **I have been experiencing pops/crackles/audio drop-outs/crashes - how can I fix this?**

Due to the advanced nature of what Cameleon does, it can consume a fair amount of CPU.

Cameleon requires a particularly large amount of CPU to run at very low latencies. Try increasing your audio buffer sizes to 2048, 1024, 512 and 256 samples, and select the option which gives you the best compromise between hearing no 'pops' and 'clicks' and having low-latency.

You can set the audio buffer size within your host - see your host's manual for details. If your host supports a 'freeze' option, this can be used to good effect.

Upgrading your computer will allow you to run more instances with lower latency. For further tips on reducing Cameleon's CPU usage, see page 83.

### **Digital Performer users:**

In the 'Setup-InterapplicationMIDI' menu, the 'software synthesizer' box at the bottom must be unchecked.

### **Pro-Tools users:**

if running Cameleon via the FXpansion RTAS wrapper, please ensure that the Cameleon files are placed within a folder named 'BUFFERED'.

You should set your CPU usage limit to 80% or more (95% on dual-CPU systems). You should also set your hardware I/O Buffer Size in *Pro Tools* to 256 samples or higher, as detailed above.

---

## **How do I get bank/program changes to work?**

Program changes are exactly like those for any other synth. Program change messages will change the preset within the current bank (e.g. basses, pads-ambient, etc.).

Bank changes should be transmitted **before** program changes, and the on-screen bank will not be updated until the following program change is transmitted.

The format of the bank change is a MIDI controller 0 message (bank change), with the coarse bank adjust value being the number of the bank you wish to select, starting from zero.

## **I've tried to import a WAV/AIFF sound, but the result doesn't sound right - what's going on?**

Cameleon is designed to work well with single source, single note samples. The sounds should also be as dry as possible (no reverb or effects).

If you try to import things like drum loops, melodies, orchestral hits or synth sounds with detuned oscillators, the resynthesized results are unlikely to sound like the original. That said, even when the process does not work 'correctly', you can still get some 'interesting' results! See page 69 further tips and tricks.

## **Why do I get a break in sound when changing preset?**

If you change patch, there is an additional CPU load. Depending on the way the host handles it, and on how powerful your machine is, this may lead to a break in output from your host. This is because your computer is busy loading the patch, and therefore doesn't have enough CPU to keep outputting sound.

---

If you are in a situation where breaks in sound are unacceptable (e.g. playing live), run multiple instances of Cameleon and set each one up with a different patch. Then, rather than changing patches, change instance - this should not cause a break in output.

**I'm having problems with bitmap export. I tried exporting a bitmap and then re-imported it directly, but the imported sound is very different from the original one.**

There are several factors to consider.

- If you have both a Noise and Harmonic component, you will need to export/import each separately.
- When exporting the Harmonic part, the detuning information will be lost. (This equivalent to setting 'Harmonize' to fully on). There is no way around this.
- The length of the sound will be lost. You can either correct this using the Stretch knob on the Easy page, or you can put the envelope editor in stretch (str) mode, grab the last point and move it to the correct length.
- The original sound may be multi-sampled. In this case you will either need to export each multi-sample, or just choose the most representative one, and take care to set the 'Num' counter to 1.

**I've downloaded some extra presets from the website. Where should I put them?**

Typically, the files you will have downloaded are whole instrument preset (\*.c5i) files. These should be placed in a new folder within your Instruments-Factory folder:

```
Cameleon5000Data/Instruments-  
Factory/MyNewPresets/mypreset.c5i
```

**Where are all the files installed to?**

---

The installer will take care of placing all the files in the correct place, so you don't need to worry. However, some people prefer to know exactly what's going on - so here goes!

**Windows:** The following files will be placed in your chosen installation directory:

```
Cameleon5000.dll
Cameleon_5000_Manual.pdf
Reset.c5i
Cameleon5000Data/MidiConfig.txt
Cameleon5000Data/Bitmaps/*.bmp
Cameleon5000Data/Instruments-
Factory/Basses/*.c5i
Cameleon5000Data/Presets-
FormantFilter/*.c5f
Cameleon5000Data/Presets-Harmonics/*.c5h
Cameleon5000Data/Presets-Noise/*.c5n
Cameleon5000Data/Presets-
MorphEnvelope/*.c5m
Cameleon5000Data/Voices/Basses/*.c5v
```

**Mac OSX:** The same files and directories listed above exist in the Mac installation, and can be found in:

```
/Library/ApplicationSupport/Camel Audio
```

Note: 'Cameleon5000.dll' (the Cameleon plugin itself) is not included in the Mac installation, since it is a Windows-only file.

Instead, on the start-up volume you'll find:

```
/Library/Audio/Plug-
Ins/Components/CA5000.component
/Library/Audio/Plug-Ins/VST/CA5000.vst
```

These are the Audio Unit and VST plugins respectively.

---

## Credits

### **Concept, design and programming**

Ben Gillett

### **Additional programming**

Rob Martino

### **Graphic design**

Ian Legge

### **Sample content**

Sonic Reality

### **Sound Design**

Glen Berry

Tim Conrardy

Rene Ebenhan

Kolin Fraser

Markleford Friedman

David Goodwin

Marc Hoppe

James Hunter

Daniel Maurer

Jamie Newman

Peter Schelfhout

Scot Solida

### **User manual**

Paul Sellars