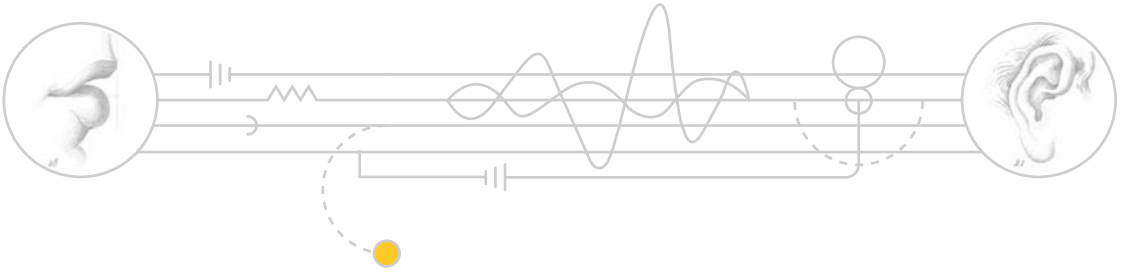
ANTARES

kantos 1.0

AUDIO CONTROLLED SYNTHESIZER



Owner's Manual

Antares Audio Technologies
231 Technology Circle
Scotts Valley, California 95066 USA

voice: (831) 461 7800
fax: (831) 461 7801
email: info@antarestech.com
web: www.antarestech.com

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Whew! Now that that's over, let's get on to the good stuff.

Contents

Welcome!

We at Antares Audio Technologies offer both our thanks and congratulations on your decision to purchase kantos 1.0, the world's first audio controlled synthesizer.

Before proceeding, please register and authorize your copy of kantos 1.0. (You can skip ahead a few pages to the Authorization and Installation instructions. We'll wait.) Also, if you plan to discard that lovely kantos 1.0 box, write down the serial number that appears on the bottom of the box for future reference. (The inside cover of this manual would be a good place, or if you're getting a tattoo any time in the near future, that's another option.)

As a registered kantos 1.0 owner, you'll receive notification of any software upgrades, technical support, and advance announcements of upcoming products. But we can't send you stuff unless we know who and where you are. So please, register. Note that we do not share this information with people who will pester you.

At Antares, we are committed to excellence in quality, customer service, and technological innovation. With your purchase of kantos 1.0, you have created a relationship with Antares which we hope will be long and gratifying. Let us know what you think. You can count on us to listen.

Again, thanks.

The Whole Antares Crew

Technical Support

In the unlikely event that you experience a problem using kantos 1.0, try the following:

1. Make another quick scan through this manual. Who knows? You may have stumbled onto some feature that you didn't notice the first time through.
2. Check our web page for tips, techniques, or any late-breaking information: http://www.antarestech.com
3. Call your local Antares dealer.
4. Email our tech support department by pointing your web browser to: http://www.antarestech.com/support/etech.shtml and filling in the form there.
5. Call us at (831) 461-7814 Monday through Friday between 10:00 am and 5:00 pm USA Pacific Standard Time (or leave a message any time and we'll get back to you).

For options 3, 4, or 5, please be prepared to provide the Registration Code of your copy of kantos 1.0.

Chapter 1: How To Use This Manual

ead the words, look at the pictures. Upon completing a page, flip to the next one.

Okay, there's a little more to it than that. We know you hate to read manuals. Therefore, we've inserted learn-by-doing tutorials along with some brief explanatory text. Hey, why should we force you read to hundreds of words on what a filter sounds like when you can just twiddle some parameters and hear for yourself?

The next chapter has all the boring, but necessary, installation and registration information. After that comes the payoff: set aside 67 minutes — the time needed to read the main part of the manual and do the tutorials — and you will well on your way to becoming a kantos 1.0 power user.

(And for the inveterate manual readers among you, we've provided all the info in linear text form in Chapter 12: Reference.)

Chapter 2:
Installation and Authorization

Installing kantos 1.0

For any special instructions on installing kantos 1.0 for your specific plug-in format, check the Read Me file that accompanies the plug-in. This file may also contain any last-minute kantos 1.0 information… so read it!

kantos 1.0 works with many digital audio applications, and each one handles plug-ins slightly differently. Please refer to your host application's documentation for more information on installing and using plug-ins.

Authorizing kantos 1.0

To run kantos 1.0, the computer on which it runs needs to be authorized using a "challenge/response" authorization technique. The first time you launch this software, you will be presented with a string of words (the Challenge) and will be asked to enter another string of words (the Response).

> ***Note:*** *When initially installed, this software will run for ten days without authorization.*

So even if you can't authorize it right away, you can still use your software. (During this period, click the "Try It" button whenever you are presented with the Trial Period screen at launch.) But don't procrastinate too long. After those ten days are up, you can't launch kantos 1.0 until you enter the correct Response.

CHALLENGE/RESPONSE AUTHORIZATION

You can obtain a Response via the Antares web site, email, or fax. Web authorization, an automated process, is available 24 hours a day. Email and fax authorization involve the participation of actual live people and, depending on when you send your challenge, may take from one to three days to provide a response.

For web authorization, follow these directions:

- Launch kantos 1.0. To access Challenge/Response authorization, press "Next" at the Trial Period screen to access the Challenge screen.

The Challenge screen displays the Challenge string. To receive the appropriate Response you will need to provide us with both the Challenge string and the registration code that was included on the yellow card in your software package (if you bought a retail package) or supplied with your download.

- To obtain your Response, have your registration code and Challenge string at hand. (If you will be accessing the web from the same computer that will be running your software, you can press "Copy Challenge" at the Challenge screen and then simply paste the Challenge into the appropriate field on the web page below.)
- Point your web browser to:

  https://transactions.antarestech.com/

  and simply follow the directions. (Be extremely careful to enter the registration code and Challenge string accurately.)

If, for some reason, you do not have access to the web but do have email, copy and paste your Challenge string and registration code into an email along with your name and the product name (e.g., kantos 1.0 for MAS), and send it to:

register@antarestech.com

You will receive your Response string by return email.

If you do not have access to the web or email, fax your Challenge string along with your registration code to us at 831.461.7801. Be sure to include your fax number. We will fax the Response string back to you at that number.

> ***Note:*** *You may optimize (defragment) the hard disk containing the Challenge/Response authorization, or even re-install your system, without losing the authorization. However, if you re-format the hard drive or if it fails, contact Antares for the re-authorization procedure (you are a registered user, right?).*

Chapter 3: Overview

antos 1.0 uses relatively familiar synthesizer modules (oscillators, filters, LFOs, etc.), but it's controlled by audio, not a keyboard or other MIDI controller. For example, feed it a vocal track, and kantos 1.0 will transform your vocal into a synthesizer melody line. Although kantos 1.0 works most predictably with monophonic source material, you can also process polyphonic material (chords, loops, etc.) and get some often-spectacular results.

Here's the basic kantos 1.0 setup:

- In your digital audio recording software, patch kantos 1.0 as an insert effect into the channel with the audio that will control kantos 1.0. Note that kantos 1.0 does not insert as a plug-in instrument (e.g., VSTi), but as a plug-in processor. This is because, like a signal processor, it accepts audio at its input.
- Optimize the audio for the most reliable triggering.
- Set up your synth sound using the various modules.

kantos 1.0 provides a variety of signal and processing modules; each serves a function in the creation of a kantos 1.0 preset. Let's get an overview of these modules, then put them to use. (For brevity, we'll refer to kantos 1.0 simply as kantos from here on.)

Audio Input and Gate Generator

The first step in creating or playing a kantos preset is to route the controlling audio into kantos, then set a nice hot level (the hotter the signal, the more reliable the pitch detection).

The Gate Generator analyzes the input signal, and derives triggers to initiate envelopes, as well as gates to control the envelope duration. A real-time display makes it easy to tweak adjustments for optimum results. Also, a noise gate can clean up any annoying background noise in the control audio, as well as prevent any low-level signals (typically at the beginning or end of a note or phrase) from confusing the pitch detector.

A manual gate button lets you trigger notes manually while programming, or for special effects while playing kantos with audio.

Oscillators And Filters

kantos provides 2 flexible wavetable oscillators. A wavetable oscillator can use not only periodic waveforms as sound sources (sawtooth wave, triangle, etc.) but also digital audio samples, such as a plucked string. kantos ships with a variety of wavetables; download new ones from our web site (www.antarestech.com). You can also create your own wavetables with pretty much any decent sample editor. An optional retrigger function from the gate generator can insure that the sample starts from its beginning with each new note.

Standard oscillator controls let you select the octave of the signal, transpose by semitones, and fine tune by cents.

Each oscillator not only feeds its own independent multimode resonant filter and chorus generator, but also includes a pitch constrain keyboard. Pressing one or more keys limits the notes that the oscillator can play. This is useful for limiting the output to the notes of a particular key or scale, and for generating interesting melodic material from polyphonic and unpitched input. Pressing all of the keys limits the oscillator to a diatonic scale, thereby removing any expressive pitch gestures (e.g., vibrato) from the input audio. A Glide control selects how quickly the pitch will slew from one note to the next.

Articulator

This is the heart of kantos 1.0, and is making its debut on this planet for the first time. The Articulator can apply the harmonic content and formant information detected by its input section to the output of kantos' sound sources. The 2-axis Amount and Q control defines the amount and character of the harmonic processing. That may sound complex, but the interface is so easy to use you'll just end up dragging a virtual ball around until things sound good. Really.

Furthermore, a Formant Offset parameter shifts the input's detected formants up or down in frequency, affecting the sound's character in yet another way; a companion Emphasis section can tailor the sound's overall harmonic balance.

Noise Generator And Filter

The Noise Generator is a broadband noise source with its own dedicated multimode resonant filter. It's useful for (among other things) adding sibilance to a patch, and for passing through the Articulator to create a unique "whispering" effect.

Modulation Matrix

Although kantos 1.0 generates incredible expressive control from the input audio's pitch, dynamics and harmonic characteristics, it also provides a flexible Modulation Matrix for an almost limitless variety of dynamic effects. Any source can control multiple destinations, and any destination can be controlled by multiple sources. Almost every variable parameter is available as a destination (including the modulation amounts of each of the control routings).

LFOs

kantos includes two multi-waveform LFOs which are routed in the Modulation Matrix. Their frequency can be set manually, or by Tap Tempo (described below).

Envelope Generators

Two ADSR Envelope Generators are also included as modulation sources that can feed destinations in the Modulation Matrix.

Normally, a preset's dynamics are derived from the dynamics of the input audio. However, the Amp Envelope has an "On" button that allows the envelope to control dynamics (in addition to any destination[s] set in the Mod Matrix).

Delay

For rhythmic effects, kantos includes a delay line with variable feedback. The delay time can be set in absolute time or, via the Tap Tempo function, in BPM. The Delay effect's level and panning is controlled by the main Output Mixer.

Tempo Control

The Tempo Control section affects any or all of the delay time, LFO 1 frequency, and LFO 2 frequency. Specify the frequency by typing a value in the BPM field, or "tapping" the on-screen Tap button (or the "T" key on your computer's keyboard). You can have separate settings for the delay, LFO 1, and LFO 2; the display will show the value of the most recently-set module.

Sub-Mixer

The Sub-Mixer controls the levels of the internal sound sources. In addition to the wavetable oscillators and noise generator, two additional sine wave oscillators track the fundamental frequencies of their respective wavetable oscillators.

Main Mixer and Output

The main Mixer balances the main synth output, the delay line return, and, if desired, the original unprocessed input audio. If kantos has been instantiated as a mono in/stereo out plug-in, each of the main mixer inputs include a pan control.

Important tips about tracking the pitch of input audio

kantos often seems miraculous because, well, it is. But it can also be picky about input signals; here are some tips on obtaining the best pitch tracking results from monophonic signals.

- **No time-based processing** (echo, reverb, delay, chorus, etc.). We mean it. If you want to have both kantos and the original input audio with processing in your mix, use a dry version of the audio to drive kantos and copy the same audio to another track for independent processing and mixing.
- **Retain a signal's natural dynamics for accurate triggering** — super-compressed audio with no dynamic range works fine for controlling pitch, but you may not be able to derive accurate triggers.
- **Use hot input levels** that make full use of the available headroom.
- **Avoid overlapping notes** (for example, no other notes ringing in the background if you're playing guitar); the input should be monophonic. However, this applies only to situations where you want really accurate pitch tracking. kantos can do some nifty things with polyphonic material, just not necessarily predictable things.
- **Some inputs are just plain weird.** For example, a xylophone attack is so harmonically complex that kantos has to wait until the main part of the note begins so it can figure out what the heck is going on. And some instruments have harmonics that are stronger than the fundamental during certain portions of the note. This is also problematic.

Chapter 4: Control Protocols

Sliders

Sliders have little blobs of light that you grab and move to change a parameter value.

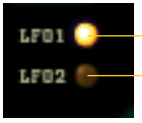
- For fine-tuning, hold down the Command (Mac) or Control (Windows) key while moving the slider.
- Some slider parameters can be reset to default values. Hold down the Option (Mac) or Alt (Windows) key and then click on the blob of light.

SLIDER

BLOB OF LIGHT

Buttons

Buttons look like little white LEDs. Click once to turn on, and again to turn off.

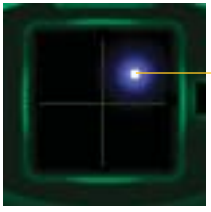


BUTTON ON

BUTTON OFF

Biaxial Graphic Adjusters

These are variations on X-Y controllers. There's a square with a glowing blue ball inside; grab the ball and move it around on the X-Y axis to get different sounds. All three filters and the Articulator have Biaxial Graphic Adjusters.



GRAB AND MOVE THE BLUE BALL

Numericals

You can adjust numbers directly. Click on the numerical (it becomes highlighted). Type in the desired value, or use up/down arrow keys to increment/decrement values and then hit Enter.

CLICK ON A NUMERICAL, TYPE IN A NEW VALUE

Chapter 5:
Fun With Oscillators and Filters

Loading kantos Presets

How you load presets depends on your sequencer. Cubase shows a strip along the bottom, like this:

The tutorials always start with the kantos default preset. You do not need to load this preset; simply close kantos, then open it again to "refresh" its memory and call up the default preset.

However, when doing the tutorials you will need to bring certain audio files into your program to drive kantos. Consult your hard disk recording program's documentation for how to do this. With many programs you can simply drag and drop the appropriate audio file from the CD-ROM into a track, but this is not always the case.

The Oscillator

kantos uses the audio signal to drive two oscillators. The oscillator pitch follows the input signal pitch. A Sub-Mixer adjusts the blend of the two oscillators, as well as some other signal sources. We'll look at the oscillator parameters; the Filter and Chorus parameters will be covered later.

- Both oscillators work identically, so when you've learned one, you've learned them both.

Load the file GUITAR__TUTORIAL.AIF into your hard disk recording program of choice and loop it (suggested tempo: 100 BPM). Set the Gate Generator parameters to On = -6, Off = -16, floor = -20, and Hold = 200 ms.

- When you're done with each step, for best results return the control to its original setting.
- There are two oscillators, but we're going to investigate only one for now to keep life simple.

TUTORIAL: GETTING TO KNOW THE OSCILLATORS

Note: *To hear the raw oscillator sound without processing, at the Articulator turn off the Osc1 In, Osc2 In, and Noise In buttons. You can also hear the raw oscillator sound by clicking on the Manual Gate button above the Gate Generator.*

- Start your sequencer playing. Set the Input control so that the overload light at the top of the meter illuminates on the strongest audio peaks.
- Adjust the Octave control (+2 to –2 octaves). This transposes in octaves.
- Adjust the Semi control (+12 to –12 semitones). This transposes in semitone steps.
- Adjust the Cents control (+100 to –100 cents). This is for "fine tuning." Remember, you can return this to the default (0 cents) by Option-clicking on the Cents control.
- Play with the Glide control. Note that the notes now slide from one pitch to the next, rather than go in steps.
- Let's get rid of that buzzy sawtooth wave and try some different waveforms. The Wave parameter is in the upper right in the picture above (it shows "buzz" as being selected). Click on the arrow next to the Wave name.

- Cool! A pop-up menu appears with lots of waves. You can create your own too, or download new waves from www.antarestech.com. Choose some different waves, and note how they affect the sound.
- If the oscillator waveform has a specific attack rather than just being a continuous waveform, click on the Retrigger button. This causes the wavetable to always start at the beginning when a new gate is generated.
- After you finish auditioning waves, select Stringpad when you're done.

TUTORIAL: CONSTRAINING PITCH

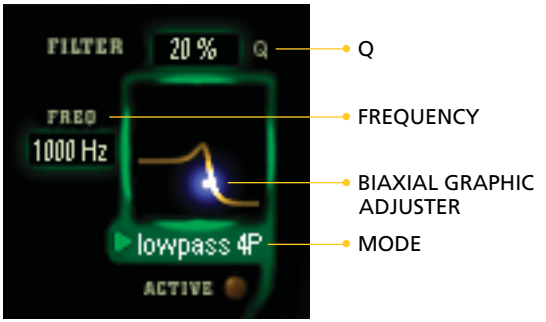
The same crafty people who unwittingly unleashed "The Cher Effect" on the world with Auto-Tune have now used this power for good: kantos can follow pitch-bending, constrain input notes to all notes of a scale, or constrain the input to only certain notes. This is all managed from the parameters in the vicinity of the little "virtual keyboard."

Keep the GUITAR_TUTORIAL.WAV file playing, and…

- To constrain all Osc1 pitches to semitone intervals, click on the Osc1 All button. The keyboard keys glow with an otherworldly luminescence.
- For no pitch constraint, click on Clear. The keyboard notes go dark. You'll now hear pitch-bending and vibrato present in the original signal.
- To constrain to certain notes, click on the desired notes. Input notes will be constrained to the nearest selected note (e.g., if you select C, F, and A, and the input is D#, it will be constrained to F). Click on the low C for now.
- All input notes will now play back as C.
- Click on C, E, and G. All notes are constrained to the notes in a C major chord.
- Click on these notes again to turn them off. Click on D, F, and A. Now all notes are constrained to the notes in a D minor chord.
- Leave the constraint settings as desired before we delve into the next topic. Don't close your sequencer yet, we'll use this file for the next tutorial as well.

The Filter

The filter affects the oscillator's frequency spectrum. It can hype the highs, lower the lows, focus on a particular frequency, or add vibrant (we've really wanted to use that word!) resonant effects.



- All three filters work identically, so when you've learned one, you've learned them all.

The filter has three main parameters; the following chart explains how these parameters relate to each other.

- **Mode** selects the filter structure (chosen similarly to the oscillator waveform — click on the arrow just below the Biaxial Graphic Adjuster, and choose one of six modes).
- **Frequency** sets the frequency at which the filter starts affecting the signal.
- **Q** sets the filter's sharpness.

TUTORIAL: THE BIAXIAL GRAPHIC ADJUSTER

The Biaxial Graphic Adjuster lets you change frequency and Q simultaneously by drawing on the filter's X-Y control pad. Here's how it works.

> ***Note:*** *It is possible to adjust the filter so that you don't hear any sound — for example, if the lowpass filter frequency is lower than the lowest oscillator frequency. Don't call tech support, just re-adjust the filter.*

- Press Play on your sequencer to hear the tutorial file again.
- Enable the Osc 1 filter's Active button so that it glows.
- Choose the desired filter mode. Lowpass 4P is a good choice for starters.
- Click your cursor on the blue biaxial ball.
- Drag the ball right to raise the Freq parameter, drag left to decrease.
- Drag the ball up to increase Q, and down to decrease Q.
- Experiment with the various modes to hear how they affect the overall sound. When you're done, de-activate the filter.

Note that while this kind of real-time playing can be fun, the most common filter application is to add dynamic effects by controlling it with a signal such as input dynamics or an envelope. This routing would be done in the Modulation Matrix.

MODE	GENERAL EFFECT	WHAT FREQ DOES	WHAT Q DOES
lowpass 4 pole	reduces highs	rolls off highs at 24dB/octave starting at the selected cutoff freq	boosts response at the cutoff frequency and slightly lowers the level of frequencies below the cutoff frequency
lowpass 2 pole	reduces highs more gently than 4 pole mode	rolls off highs at 12dB/octave starting at the selected cutoff freq	boosts response at the cutoff frequency (but more gently than 4 pole mode), and slightly lowers the level of frequencies below the cutoff frequency
bandpass 4 pole	boosts a range of frequencies	boosts a range of frequencies centered at the freq parameter	boosts a range of frequencies centered at the freq parameter
bandpass 2 pole	boosts a range of frequencies, but with a wider slope	boosts a range of frequencies centered at the freq parameter	narrows/widens the range of frequencies
highpass 4 pole	reduces lows	rolls off lows at 24dB/octave starting at the selected cutoff freq	boosts response at the cutoff frequency and slightly lowers the level of frequencies above the cutoff frequency
highpass 2 pole	reduces lows more gently than 4 pole mode	rolls off lows at 12dB/octave starting at the selected cutoff freq	boosts response at the cutoff frequency (but more gently than 4 pole mode) and slightly lowers the level of frequencies above the cutoff frequency

The Active button turns the filter on and off. If you don't need a filter, turn it off to reduce the stress on your hard-working CPU. This will cause it to like you.

The Chorus

Chorus is an effect that copies the oscillator sound, and detunes it in a periodic fashion (sort of like a slow, mild vibrato). Mixing the copied, modulated sound with the original oscillator produces a fat, animated effect. Not only do we now have the equivalent of two oscillators, the other oscillator has a chorus also, giving the equivalent of a four-oscillator synthesizer capable of generating downright corpulent timbres.

TUTORIAL: USING THE CHORUS

- Press Play on your sequencer to play the tutorial file (if you're getting tired of hearing this, don't worry — starting with the next tutorial, we'll be using a different audio example).
- Choose the Sawtooth wave.
- Click on the Chorus Active button to enable this function.
- Adjust Depth for the desired amount of detuning. Also experiment with the Rate control, which determines the rate at which the detuning occurs.
- With slow rate settings, lots of detuning adds a really annoying effect that can help clear a room when needed.
- Rate = 0.3 Hz and Depth = 10% gives a subtle chorusing effect.

The Noise Generator

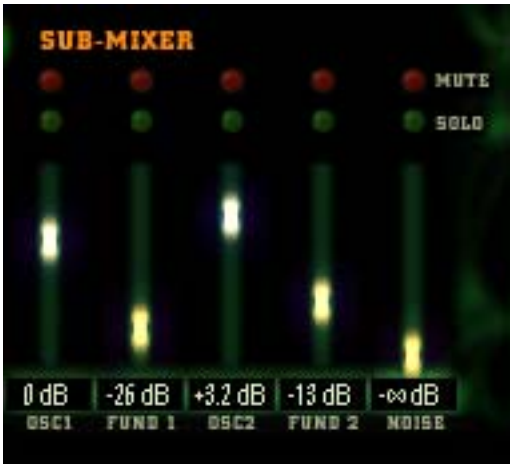
kantos presents yet another signal source: a noise generator with filter. This isn't too exciting by itself, but works wonders in conjunction with the Articulator. The output is gated on and off with the main oscillator signal (or not, as you see fit), and can deliver scary whispering effects as well as emphasize vocal sibilance.

For tutorials on the Noise Generator, refer to Chapter 7 on the Articulator.

Chapter 6: Applied Mixology, Delay, and Tempo Sync

Before getting into the Articulator, let's get into the mixing capabilities.

The Sub-Mixer



kantos produces five audio sources for use in your final sound:

- **Oscillator 1:** The sound of oscillator 1.
- **Fundamental 1:** kantos tracks the input signal's pitch, derives the fundamental frequency, and generates a sine wave (i.e., a wave with no harmonics – just the fundamental) at that frequency. The fundamental follows any tuning or pitch constraint settings, but does not go through the Articulator. Therefore, mixing in this waveform can reinforce the bass in cases when the Articulator passes only the upper harmonics of the oscillator.
- **Oscillator 2:** The sound of oscillator 2.
- **Fundamental 2:** The oscillator 2 version of what we described previously for oscillator 1.
- **Noise:** Output from the Noise Generator.

Other Sub-Mixer controls are:

- **Solo** button (one per channel). When enabled, this allows you to hear one channel (if its fader is up) while muting the rest. Multiple channels can be soloed.
- **Mute** button (one per channel). When enabled, this silences the associated channel. Multiple channels can be muted.

TUTORIAL: USING THE SUB-MIXER

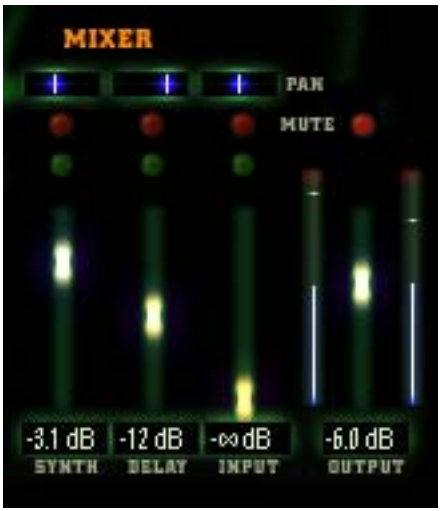
Before beginning this tutorial, let's start with a clean slate. Remove the kantos plug-in from your sequencer, then call it up again to start with the default patch.

- Load the file VOCALS_WORDS.AIF and loop it. Set the Gate Generator parameters as follows: On = -10, Off = -20, Floor = -40, Hold = 100 ms.
- As the audio plays, adjust the levels of the various Sub-Mixer sliders. Note how each element affects the sound. Hint: Use different wave settings for the two oscillators.
- Click on a channel's Solo button to hear the channel by itself (assuming the channel's fader is up).
- Click on Mute for a channel that has its fader up and hear the sound go away.

The Main Mixer and Output

The main Mixer adjusts the balance of:

- The synth output. This is the Sub-Mixer output.
- Delay line return. kantos can add delay effects to the sound; this slider adjusts the delay level.
- The original unprocessed audio input.



Important note: *kantos has lots of modules that can produce substantial amounts of gain, so if you turn everything up, the program can easily run out of headroom and introduce clipping distortion. Now, some of you perverse hardcore techno types might appreciate this as a "feature," which is fine with us. But those who want a somewhat purer sound are advised to realize that wherever levels can be set, kantos can overload. Most platforms assume a lower level from plug-ins than kantos can provide, so be careful.*

Another important note: *The mixer lets you mix the input signal into the kantos output. But you may want to add processing independent of kantos to the input signal. For example, suppose you want kantos to double the vocal with a super-wonderful synth, but also want reverb and echo on the vocal. The reverb and echo will confuse kantos, and give unreliable results. For best results, copy the audio you want to process to a separate track, and add processing to that. Use the original, unprocessed track to drive kantos.*

Even with rhythmic loops, an unprocessed version of the loop may well provide more predictable gates and tighter rhythm. Send that version to kantos and copy the loop to another track for processing and mixing.

Okay, so much for warnings. Here's the scoop on the other Mixer controls.

- **Solo** button (one per channel). When enabled, this allows you to hear one channel (if its fader is up) while muting the rest. Multiple channels can be soloed.
- **Mute** button (one per channel). When enabled, this silences the associated channel. Multiple channels can be muted.
- **Pan** control. This places the channel output in the stereo field, from full left to full right, or anywhere in between. If kantos 1.0 has been instantiated as a mono in/stereo out plug-in, each of the main mixer inputs include a pan control. If instantiated as a mono out plug-in, there won't be any pan controls.
- **Output level**. Determines the overall kantos output. This also has a Mute button so you can silence kantos if needed.
- **Output level meters and clip indicators**. These help in adjusting the Output Level control, which should be set so that the clip indicators flash only on the strongest audio peaks.

- Continue playing the VOCALS_WORDS.AIF file, and adjust the levels of the various Mixer sliders. Note how each element affects the sound.
- Click on a channel's Solo button to hear the channel by itself (assuming the channel's fader is up).
- Click on Mute for a channel that has its fader up and hear the sound go away.
- Move the output level slider all the way to the top, so that the overload indicators shine like the sun at midday. You should hear a very distorted sound – some people actually like this effect, so use it if desired.

The Delay

kantos has a simple delay line, with delay time variable from 10 ms to 999 ms (drag the delay time slider, or enter a value in the corresponding numerical). The delay processes the Sub-Mixer output; the main Mixer synth output does not need to be up to use the delay.

A feedback parameter feeds some of the delay output back to the input, producing multiple echoes. This is variable from 0% to 100% via slider or numerical.

- Setting feedback to 100% can produce runaway feedback that goes into oscillation. Reduce overall levels before setting high feedback levels.

  An important note: *If you assign a control source to the Delay Level in the Modulation Matrix, when that source is applying positive modulation you will hear the Delay return even with the Delay fader all the way down. If that isn't what you want, either remove the modulation assignment or press the Mute button above the Delay fader to silence the signal.*

Delay Tempo Sync/Tap Tempo

You can synchronize the delay time to song tempo in two ways:

- Click your mouse button on the Tap button in the Tempo section, or hit the keyboard "T" key, on quarter notes of the song's tempo.
- Enter the song tempo in the Tempo sync numerical box.

In either case, the delay time equals the duration of a quarter note at the song tempo.

- To create an eighth note delay, tap out eighth notes for the tap function, or enter double the tempo in the numerical. For half-note delays, tap out half-notes for the tap function, or enter half the tempo in the numerical.

TUTORIAL: MESSIN' AROUND WITH DELAY

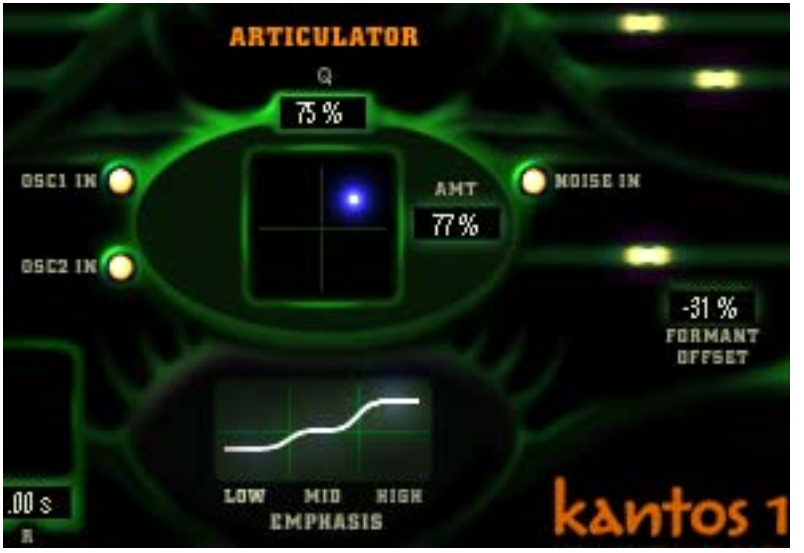
- Continue playing the VOCALS_WORDS.AIF file.
- Turn up the Delay slider in the main Mixer to around –6 or so.
- Vary the delay time slider and note how the delay time changes.
- Increase the Feedback amount to create multiple echoes. The effect will be most obvious at longer delay times. Caution: Avoid the 100% setting unless the monitoring level is way down.
- Click on the Tempo Delay button, then enter a value in the tempo numerical between 60 and 400 BPM. Note how the delay time changes to reflect the new tempo.
- Click on the Tap icon in the Tempo section at a quarter note rate, or tap on your computer keyboard's "T" key. The tempo you are tapping will be shown in the numerical field.

Congratulations! You now know your way around the delay module.

- The more taps you give kantos, the more accurate the reading because the taps are averaged over time.
- Keyboards often scan keys fairly slowly, so if you tap the T key really fast, it might not register. Make sure each T key tap is more than a few milliseconds long.
- You can use kantos as a tempo-to-time interval calculator. Want to know the duration of a quarter note at 133 BPM? Enter that value in the Tempo numerical, then observe the delay time at the delay slider (451 ms, in case you wondered). Or enable an LFO to calculate BPM to Hz.

Chapter 7: The Articulator

The Articulator is the heart of kantos 1.0. It uses the harmonic content and formant information detected by kantos 1.0's input section, and applies that to the output of the oscillators and noise generator. The process is somewhat like a vocoder, which uses the harmonic content of a voice and applies that to an oscillator or other instrument. The kantos Articulator can give the same kind of effects, but because it's an Antares product, it also does much more than expected.



Like the filters, the Articulator uses a Biaxial Graphic Adjuster; the two parameters are Amount and Q, which define the amount and character of the harmonic processing. Here are the Top 5 things you need to know about the Articulator:

- The Articulator has three inputs: Osc 1, Osc 2, and Noise In. Enable their "LEDs" to send them to the Articulator.
- With the control dot at the lower left-hand corner, the input passes through unaffected. This equals numerical values of 0% Q and 0% Amount.

- Moving the dot to the upper right hand corner produces the maximum effect. This equals numerical values of 100% Q and 100% Amount.
- The Formant Offset parameter shifts the input's detected formants (overall harmonic structure) up or down in frequency, providing yet another twisted way to affect the sound's character.
- The Emphasis section is a three-band graphic equalizer with separate controls for low, mid, and high frequencies. Use it to tailor the sound's overall character.

TUTORIAL: KOOL ARTICULATOR FUN!

- Continue playing the VOCALS_WORDS.AIF file. If needed, bring down the delay slider (or click on its mute button) from the previous tutorial. Also turn down the Input slider in the main Mixer so you don't hear the original vocal.
- Start off by dragging the glowing blue ball to the lower left-hand corner, where the Articulator has no effect.
- Drag the ball around and note the audio result.
- Vary the Formant slider. As you move it to the right, the sound becomes brighter. Toward the left, the sound becomes darker and lower.
- Enable and disable the Articulator's Osc1 and Osc2 buttons to hear how they affect the sound. Leave them enabled for now, along with the Noise In button.
- Bring up the Sub-Mixer Noise slider and check out the creepy whispering effect.
- Click on the Noise Filter's Active button and experiment with different filter settings.
- Experiment with the Emphasis sliders to check out how they affect the sound.

Chapter 8: Modulation Mastery

What Is Modulation?

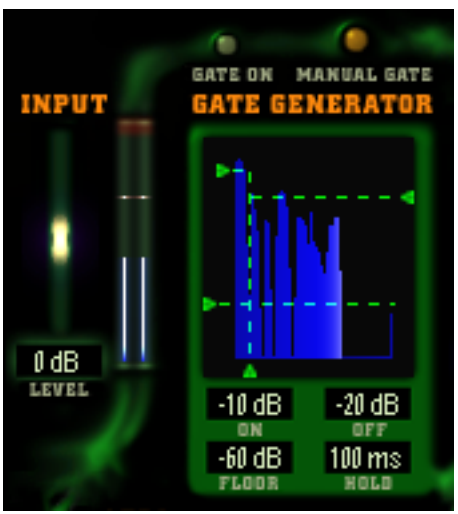
Modulation is the process of using a control signal to vary a sound-altering or sound-generating parameter. For a simple example, turning up an amp's volume is an example of "modulating" the amplitude with a "control signal" (your hand turning the knob). More examples: synthesizer vibrato uses an LFO to modulate oscillator pitch, and the tremolo in a guitar amp modulates level with a periodic waveform.

Some of the modulation has handy defaults. For example, the detected pitch of the input defaults to controlling the oscillator pitch. Also, unless you specifically click on the Amp Envelope's On button, input dynamics are automatically routed to the oscillator and noise levels. This is the most common way to use kantos; generally the input dynamics control the sound.

kantos has seven modulation sources, and 35 possible modulation destinations. That should keep you busy for a while. Before we investigate these in detail, though, let's look at how to adjust the Gate Generator, as this generates triggers that can be an essential part of the modulation process.

The Gate Generator

The Gate Generator (GG) helps kantos determine when to trigger envelopes, reset waveforms, and other useful duties. The GG resembles a sophisticated noise gate with four main parameters; here's what those parameters do.



On: When a signal exceeds this threshold, kantos recognizes it as a new note and generates a note-on trigger.

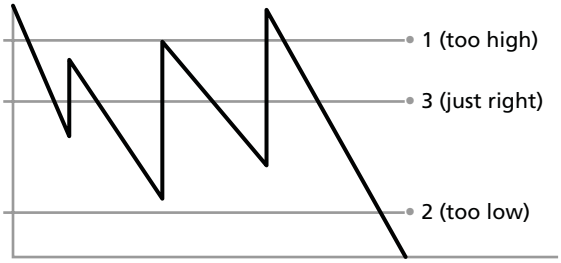
Off: When a signal drops below this level, kantos decides the note has stopped and generates a note-off.

Floor: kantos ignores signals below this level. Set this above any hum, residual noise, etc. so kantos isn't confused by these signals.

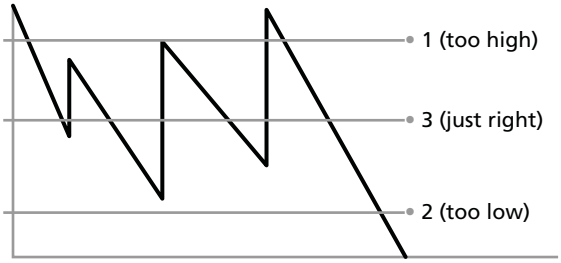
Hold: Sets a minimum time before a note off occurs, regardless of what the input signal is doing.

> ***Note:*** *kantos is happiest with a hot signal level. Set the Input Level control so that the overload light at the top of the input meter light on strong signal peaks.*

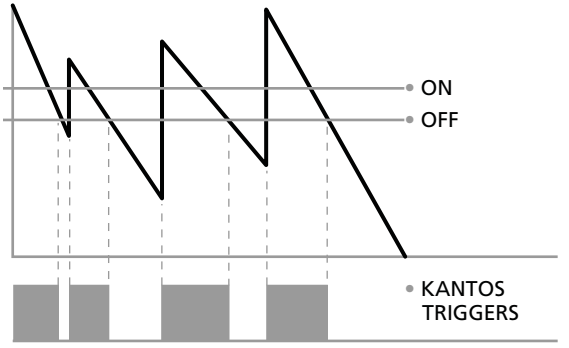
The following example shows a signal's amplitude envelope. The (1) On setting is too high, as it misses some of the notes. The (2) On setting it too low, because all the notes are above it, so there's only a trigger generated at the beginning. The On setting (3) is just right.



The Off setting is usually around the same level as the On setting. However, you can set it lower if the material is very percussive, with fast, high attacks and quick decays. In the following drawing, Off setting (1) is too high, because it hardly lets any of the note through. Off setting (2) is too low, because the note never turns off. Off setting (3) is just right.

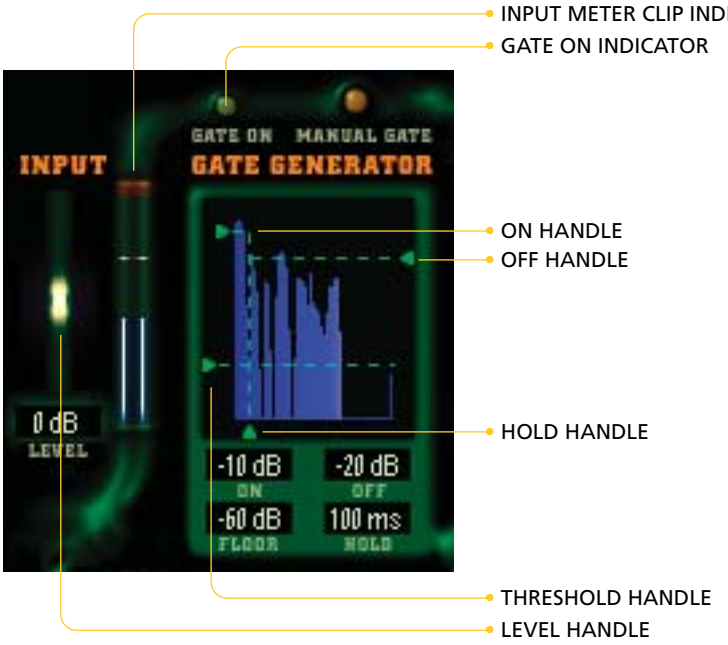


Here's the final result. The bottom shows how the correct On and Off settings generate triggers that respond to the note duration. Note that kantos also tracks the dynamics, so the final result can sound as dynamic as the original signal.



TUTORIAL: SETTING GATE GENERATOR PARAMETERS

By now you should have a pretty good idea of how kantos works, so load any audio file into your hard disk recording program of choice (or use one of the tutorial files) and loop it.



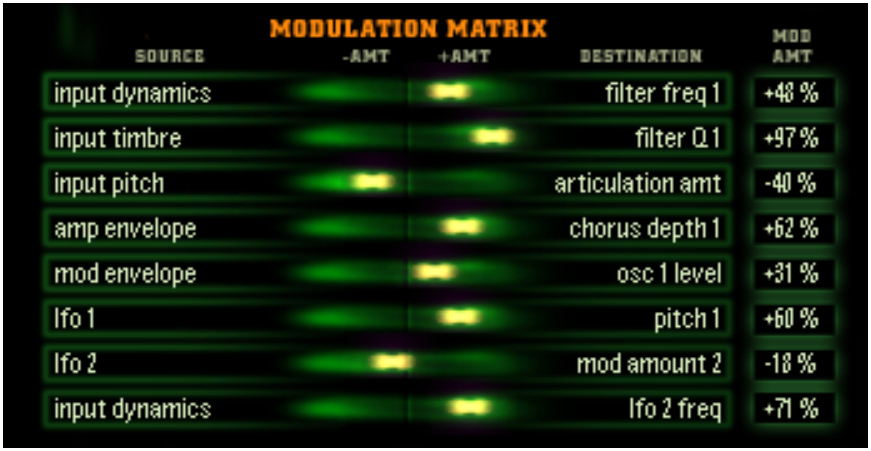
- Set Input Level so that the input meter clip indicators flash on peaks.
- Set the GG parameters as follows: On = 0 dB, off = -1 dB, floor = -80 dB, hold = approximately 100 ms.
- Enable the Amp Envelope ON button.
- Start your sequencer. You probably won't hear anything, because the On parameter will be higher than the audio.
- Place your cursor on the On parameter arrow and drag down slowly. You'll start hearing the notes as kantos triggers them. The Gate On light should flash with every new note.
- Set the Off parameter to about 5-10 dB less than the On parameter. The Gate On light should hopefully trigger reliably on every note; if not, adjust until it does.
- Raise the Floor parameter to determine if cutting out very low-level signals improves the triggering.
- Experiment with the Hold parameter. At minimum, the Gate On light lights with every note. Now change Hold to maximum (999 ms). Whenever the gate goes on, it's forced on for 999 ms before it can retrigger. The Gate light will stay on most of the time at maximum Hold times. Hold is useful if there's a trill or "flamming" type effect you want kantos to "mask" (ignore).
- You can trigger the gate manually at any time by clicking on the Manual Gate button or pressing "G" on the keyboard.

The Modulation Matrix

You are not a kantos master until you understand the modulation section. This is actually "deeper" than any other section of kantos and offers creative possibilities that will boggle your mind. *Caution:* Some kantos users have had their heads explode when they realized the awesome power of the modulation section. Ease into this part slowly so you don't encounter a similar problem.

kantos has eight possible modulation routings, each of which can send any one of seven sources to any one of 35 destinations. Each of the routings is created identically, using the following process:

- Select the modulation source intended to modulate a particular destination. Do this by clicking on one of the Source boxes and selecting the source from the pop-up menu.
- Select the corresponding modulation destination. Click on the Destination box to the right of the Source box and select one of the 35 destinations from the pop-up menu.



- Determine how the source will affect the destination with the AMT slider (located between the Source and Destination boxes). Positive amounts add the source signal to the parameter. For example, when using the input signal dynamics to control filter frequency, a positive amount will kick the filter frequency higher with higher input dynamics. Negative amounts do the opposite: higher input dynamics will lower the filter frequency. Note that you can also enter the AMT value in the numerical to the right of the Destination box.

Modulation Sources

The seven modulation sources are:

- **Input dynamics:** Generates a control signal proportional to the original audio signal's dynamics. The louder the incoming signal, the higher the control signal.
- **Input timbre:** Generates a control signal proportional to the original audio signal's harmonic structure. Brighter signals produce a higher control signal.
- **Input pitch:** Generates a control signal proportional to the original audio signal's pitch. A higher-pitched note produces a higher control signal.
- **Amp envelope:** Provides a control signal from the amplitude envelope. Envelopes will be covered in more detail later.
- **Mod envelope:** Provides a control signal from the modulation envelope. Envelopes will be covered in more detail later.
- **LFO1:** Provides the periodic waveform from LFO1. LFOs will be covered in more detail later.
- **LFO2:** Provides the periodic waveform from LFO2. LFOs will be covered in more detail later.

Modulation Destinations

The 35 destinations are:

OSCILLATOR/FILTER-RELATED PARAMETERS

- Pitch 1
- Pitch 2
- Semitone 1
- Semitone 2
- Chorus Freq 1
- Chorus Depth 1
- Chorus Freq 2
- Chorus Depth 2
- Filter Freq 1
- Filter Q 1
- Filter Freq 2
- Filter Q 2
- Filter Freq 3
- Filter Q 3

PROCESSING-RELATED PARAMETERS

- Articulation Amount
- Articulation Q
- Formant Offset
- Delay Time
- Delay Feedback

MIXER-RELATED PARAMETERS

- Osc 1 Level
- Sine 1 (Fund 1) Level
- Osc 2 Level
- Sine 2 (Fund 2) Level
- Noise Level
- Delay Level

MODULATION-RELATED PARAMETERS

- LFO 1 Freq
- LFO 2 Freq
- Mod Amount 1
- Mod Amount 2
- Mod Amount 3
- Mod Amount 4
- Mod Amount 5
- Mod Amount 6
- Mod Amount 7
- Mod Amount 8

The Mod Amount parameter is a special case, and will be discussed after we cover LFOs and Envelopes.

LFOs (Low Frequency Oscillators)

LFOs generate low-speed control waveforms. We already had a close encounter with an LFO when checking out the Chorus; the Chorus Rate and Level controls set the speed and depth of an LFO dedicated to the Chorus. LFO1 and LFO2 are general purpose modulation sources.

There are two adjustable parameters for each LFO. The parameter with the arrow chooses the LFO waveform. Choices are:

SINE TRIANGLE RAMP UP RAMP DOWN SQUARE RANDOM

- **Sine** is the traditional LFO waveform that provides a smooth periodic control signal.
- **Triangle** is similar to sine, but has peaks at the highest and lowest levels.
- **Ramp Up** rises up to maximum, then snaps down to zero before repeating.
- **Ramp Down** snaps up to maximum, then falls down to zero before repeating.
- **Square** alternates between the highest and lowest levels.
- **Random** spits out varying levels at varying times.

LFO Tempo Sync/Tap Tempo

You can synchronize the LFO time to song tempo (one LFO cycle = 1 measure) in two ways:

- Click your mouse button on the Tap button in the Tempo section, or hit the keyboard "T" key, on quarter notes of the song's tempo. The more taps you give kantos, the more accurate the reading because the taps are averaged over time. Note: keyboards often scan keys fairly slowly, so if you tap the T key really fast, it might not register. Make sure each T key tap is more than a few milliseconds long.
- Enter the song tempo in the tempo sync numerical box

In either case, the setting affects whichever LFO is enabled in the Tempo box.

About Envelopes

kantos has two ADSR envelopes. These generate a control signal when triggered (as indicated by the Gate On light illuminating after being off). The control signal follows a particular pattern, as described by the name ADSR (attack, decay, sustain, release). Each phase lasts for a specific period of time before moving to the next phase.

- Attack: After triggering, this is the time required to go from full off to maximum level.
- Decay: After reaching maximum level, decay sets the amount of time until the envelope reaches the sustain level.
- Sustain: The envelope stays at this level for as long as the trigger remains on.
- Release: After the trigger turns off, this sets the time required for the envelope to go from the sustain level back to zero.

EDITING ENVELOPES

There are two ways to edit envelope parameters.

- Enter numbers in the numericals
- Click and drag the envelope shapes to create the shape you want.

Here's the deal with click/dragging:

- **Set attack time:** Click in the rectangle containing the attack curve. If you host application supports custom cursors, the cursor changes to a double-arrow; drag left or right to change the attack time.
- **Set decay time and sustain level:** Click in the decay or sustain section. The cursor turns into a quad arrow if your host can handle this. Drag up or down to set the sustain level, left or right to set decay time.
- **Set release time:** Click in the rectangle containing the release curve; drag the cursor left or right to change the release time.

AMP ENV VS. MOD ENV

The two envelopes have identical parameters, but the functionality differs.

- Normally, a preset's dynamics are derived from the dynamics of the input audio. However, enabling the Amp Envelope's "On" button controls dynamics with the Amp envelope. The Amp envelope is still available as a modulation source.
- The Mod envelope exists solely as a modulation source.

Modulation Amount Destinations

Mod Amount 1-8 are special destinations. Modulating the Amt parameter changes the way in which a source modulates a destination. The easiest way to explain this is with an example.

Suppose you have selected LFO as a modulation Source in modulation slot 1 and Osc 1 Pitch as its Destination (a basic setup for adding vibrato). But you want the LFO to fade in over about 950 ms rather than come on instantaneously. Here's how to do it:

- Set LFO modulation AMT for the maximum desired vibrato depth.
- Use another modulation routing to assign the Mod Envelope to control Mod Amount 1.
- Set the Mod Envelope Attack time to 950 ms and the Sustain to 100%.

The Mod Envelope now causes the LFO to fade in over 950 ms.

Triggering New Parts From Loops

This is not a tutorial per se, but a demonstration of how you can use what you've learned about triggering and modulation to create entirely new parts from drum loops. We've included a few tutorial presets and an audio file for this purpose:

- Load the tutorial audio file DrumBeefLoop.aif
- Use it to drive the presets BasicLoop1 through BasicLoop4. These presets include the original input audio in the mix, so you can immediately hear how kantos creates new parts from the loop.
- Try adjusting the Gate Generator settings, the Pitch Constrain settings and various modulation routings to hear the effect they have on kantos's output.

Chapter 9: Creative Applications

Using kantos with guitar

While kantos is designed to be particularly effective with voice input, it also makes a killer monophonic guitar synth. For the best tracking from guitar input, follow these guidelines:

- Drive kantos with a clean guitar sound. Processing with echo, delay, reverb or heavy distortion will compromise pitch tracking.
- If you want a heavily processed guitar part doubled by a sound from kantos, split your guitar signal into two feeds: a clean version to kantos and the second feed to your guitar processors. Record each to a separate track for mixdown. Another option is to record a clean guitar to your hard disk recorder and copy the track. Feed kantos with one track, and use the other to drive a guitar amp plug-in (e.g., Warp VST, AmpliTube, ReValver, Nigel, etc.).
- Play cleanly to ensure that only one note is sounding at a time and that previous notes to not overlap new notes.
- If you're using the Gate Generator, set a fairly high Floor setting so kantos doesn't respond to hum and other crud that tends to hitch a free ride with the guitar's signal.
- A guitar's initial pluck contains a ton of non-harmonic signals that can confuse kantos. If this is a problem, sometimes simply switching to a lighter gauge pick and picking more softly will allow kantos to track pitch more accurately.

Polyphonic and unpitched input

Although kantos can not predictably detect pitch from polyphonic input (e.g., chords, counterpoint, complete mixes) or unpitched input (e.g., spoken words, noise, percussion, sound effects, etc.), it can generate some striking (and often surprising) sounds and textures from them. Here are a few guidelines:

- Adjust the Gate Generator to trigger envelopes and retrigger wavetables for various rhythmic effects. With a lot going on in polyphonic inputs, small changes to the Gate On and Gate Off levels can result in markedly different rhythms.

- Experiment with different Gate Hold times to establish various rhythmic pulses.
- Use the Pitch Constrain keyboards to limit the generated pitches to ones that will fit into your song's harmonic structure. Select different notes in each of the Oscillators for interesting harmonic effects.
- Select Oscillator wavetables that have distinct attacks, and turn on Retrigger for complex rhythms.
- The Modulation Matrix is always your friend, but in this application, can even become your best friend.
- Use Noise as the sound source. In the Mod Matrix, assign input dynamics to the Noise Filter and send it on to the Articulator with 100% amount and 100% Q. Modulate Formant Offset with some other source. Go crazy.

Loop Applications

For loop-based music, kantos can generate unique rhythmic loops in several ways:

- Use a drum loop as input. Tune one oscillator low and constrain to one note for a bass pulse. Constrain the other oscillator to three or four notes for rhythmic pseudo-arpeggiation. Add some noise through the Articulator. Sit back and collect compliments for your innovative sounds.
- To get a quick idea of how drum loops can be used with kantos, load the tutorial audio file DrumBeefLoop.aif and use it to drive the presets BasicLoop1 through BasicLoop4. These presets include the original input audio in the mix, so you can immediately hear how kantos creates new parts from the loop. In real life, you're usually better off keeping the original loop and the kantos parts on separate tracks for subsequent processing.
- Spoken words make great loops. Edit a bit of speech so that it loops in tempo with your song and use it to drive kantos. Program some slow modulations in the Mod Matrix so that the loop evolves in interesting ways over time.
- The kantos factory presets include some presets designed primarily for melodic lines, and others designed to do interesting things with loops. Try misusing them. Feed a loop into a melodic preset. Sing into a loop preset that uses pitch constraint. Remember, there are no accidents.

Re-synthesizing a synth part

Ever record a synth lead or bass part that sounded fine at the time, but when mixdown time rolled around, didn't quite work with the rest of the parts? MIDI is a good way around that problem — just set a different synth patch, but use the MIDI data to drive it. However, quite a few computer-based hard disk recording programs emphasis digital audio at the expense of MIDI, and may lack the flexibility to do extensive MIDI editing.

kantos can solve the problem. For example, suppose you want to record a bass part but aren't sure what kind of timbre you ultimately want to use. Here's what to do.

- Set your synth bass to a clean, single-oscillator sine wave patch with the desired dynamic characteristics (e.g., velocity and envelope control). This type of audio is ideal for driving kantos.
- Record this part into your hard disk recording program.
- When it's time to mixdown, set kantos to create the desired sound, and drive it from the simple sine wave track.
- Experiment with kantos' wealth of parameters until you obtain the perfect sound to go with the rest of your tune.

Chapter 10: A Few Words About the Factory Presets

Unlike traditional MIDI synths, the sounds produced by kantos are defined not just by the presets, but also by the audio that drives them. Whenever a sound designer creates a MIDI preset, they can be sure that when anyone, anywhere plays C3 on a keyboard, they'll hear exactly the same sound that the designer heard when they created the preset. Not so with kantos.

While our sound designers tried to design their presets around general input audio categories (voice, guitar, drum loops, etc.), there's no way they could ever predict the specific audio you will be using to drive them. With that in mind, we offer the following tips for getting the best from the factory presets:

- First and foremost, there are no rules. Try using any input audio with any preset. You never know what might happen.
- That being said, some presets are likely to work better with certain types of audio than others. For example, we've included a symbol ("•" for Mac; "_" for Windows) at the end of the name of any preset that has oscillator pitch constraint set such that the preset will not produce an accurate reproduction of the pitch of the input. So if your goal is to track the pitch of a monophonic melodic input, don't pick a preset with "•" or "_" at the end. Also, some presets have been named to describe the designer's original intent.

  However, don't let your experimentation be limited by any of these cues. We've gotten some amazing results by using voice or guitar to drive presets designed for drum loops. These obviously result more in special effects than recognizable melody, but the effects can be truly stunning.
- The various levels in the presets (Input, Submixer, Mixer and Output levels) have been set to work on a wide range of audio inputs. However, depending on the nature of your specific input, it may be necessary to adjust the levels for best balance and effect. In particular, watch for output clipping. The Filters and Articulator are capable of quite a bit of gain, so if your input has a lot of energy right at their resonant frequencies, problems could ensue.

- If a preset makes use of tempo synced LFOs or Delay, you will almost certainly have to readjust the tempo for your particular input.
- We have included a selection of basic presets designed to serve more as examples and templates than finished presets. BasicVoice1 – 6 and BasicLoop1 – 4 each provide progressively more complex treatments of vocal and rhythmic loop input. They are a great introduction to basic kantos techniques as well as serving as starting points for creation of your own melodic or loop presets.
- We will periodically be posting new presets on our web site for download. Check out the site often for new additions. (Instructions for installing the new presets will be included with the downloads.)

Chapter 11:
Creating Your Own Wavetables

You can expand the Oscillator waveform list in kantos by creating a folder and putting sound files into it.

- On a Mac, create a folder in System/Preferences called 'Kantos Waveforms'
- For Windows 98/XP: WINDOWS\Kantos\User Waveforms
- For Windows NT/2000: WINNT\Kantos\User Waveforms

Start up your host program, instantiate kantos, and verify that the extra waveforms have been added (they will appear at the end of the list).

We'll be posting new wavetables at the Antares web site, so stop by every now and then to check them out.

Creating Custom Wavetables

You can create your own original wavetables using pretty much any sample editor. kantos reads 16 bit mono AIFF files (Mac versions) or WAV files (PC versions) at any sample rate. There is no size restriction, although smaller files (less than around 400k) will work most efficiently. Sounds that are harmonically rich work best with the Articulator, so make sure that the timbres are bright (boost high EQ).

The AIFF format contains header information which includes the original pitch of the recording. In order for kantos to map the waveform correctly, this needs to be set before saving the file. For example, in BIAS Peak, use the Get Info feature to set the root note to the correct octave and pitch.

Loop the file for best results — either the whole file should loop like a wavetable (where the start point is the start of the file and the end point is the end), or just part of it should loop like a sample (where the start point is set after the attack) — kantos can read the loop points either way. Imperfect loops (with obvious clicks or heavily pulsing crossfade loops) can produce distracting audio artifacts in the kantos patch, so try to dial in the best loop possible.

> ***Note:*** *If you're working on a Macintosh, Antares's own Infinity looping tools software will let you create the best possible loop, even in files which are traditionally considered unloopable. (Even cymbals can be looped with Infinity.)*

Chapter 12: Reference

This chapter is a quick reference for all of the controls used in the kantos interface. It is intended for those who need to refresh their memories of what a particular parameter controls, and its range of values. For more basic information and explanations of these parameters, please refer to the main section of the manual.

Of course, you can always just mess around with the controls and see what happens. Don't worry, you won't break anything!

Input

WHAT'S IT FOR?

The input control optimizes the level feeding kantos; an accompanying meter indicates the level. The level should be set so that the overload light (at the top of the meter) lights only on the input signal's very strongest peaks.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Level	-∞ to +12dB	Sets the level for optimum response, as gauged by the input level meter

Oscillator

WHAT'S IT FOR?

An oscillator creates the raw waveform that tracks the input, and can be processed by other kantos 1.0 modules. kantos 1.0 has two oscillators.

WHAT ARE THE PARAMETERS?

Each oscillator has the same parameters.

NAME	RANGE	WHAT IT DOES
Oct	-2 to +2 units	Changes oscillator tuning in octaves
Semi	-12 to +12 units	Changes oscillator tuning in semitones
Cents	-100 to +100 units	Changes oscillator tuning in 1/100ths of a semitone

Glide	0 to 100%	Causes a note to slide to the next note instead of switching instantly. The higher the percentage, the longer the slide.
Wave	number limited only by computer storage	Each wave provides a different oscillator sound
Retrigger	on/off	When enabled, a new gate causes the oscillator to re-start its waveform at the waveform's beginning
Pitch constrain keyboard	Musical scale, C–B	Click on keys to limit the notes kantos plays to those you have selected. These notes will glow.
Pitch constrain All	On/off	Constrains (quantizes) all pitches to semitone intervals. All keyboard notes glow.
Pitch constrain clear	On/off	Places no pitch constraints on the incoming audio. No keyboard notes glow.

Chorus

WHAT'S IT FOR?

The chorus copies one of the oscillators and detunes it in a periodic, cyclic fashion. This "thickens" the sound compared to hearing a single oscillator, and the detuning adds an animated effect compared to a typical static waveform.

WHAT ARE THE PARAMETERS?

Each chorus has the same parameters.

NAME	RANGE	WHAT IT DOES
Active	On/off	The light glows when the chorus is enabled. Disabling the chorus if not in use saves a minuscule amount of CPU power.
Rate	0.1Hz to 20Hz	Changes the frequency of the periodic pitch modulation/detuning
Depth	0 to 100%	Sets the pitch range of the detuning. 100% is the maximum range.

Filter

WHAT'S IT FOR?

kantos has three multi-mode (i.e., capable of different response) filters. Each oscillator has an associated filter that processes the raw oscillator wave by altering the timbre either statically, or dynamically with external modulation. The Noise Generator has a filter that acts identically to an oscillator filter.

WHAT ARE THE PARAMETERS?

Each filter has the same parameters.

NAME	RANGE	WHAT IT DOES
Mode	lowpass 2P lowpass 4P bandpass 2P bandpass 4P highpass 2P highpass 4P	Selects among lowpass, bandpass, and highpass responses, each with selectable "sharpness." 2P (2 pole) filters have gentler, less dramatic filtering responses than 4P (4 pole) types.
Active	On/off	The light glows when the filter is enabled. Disabling the filter if not in use saves CPU power.
Freq	20Hz to 20kHz	Changes the frequency at which the filtering effect occurs
Q	0 to 100%	Boosts the response around the filter Freq, while slightly lowering response outside this range

Articulator

WHAT'S IT FOR?

To give totally radical, way-cool effects never before attained in any other software program. So there.

Seriously, though, the Articulator uses the harmonic content and formant information detected by kantos 1.0's input section, and applies that to any combination of oscillator outputs and the noise generator. This causes the output signal to take on some of the characteristics of the input signal.

A Formant Offset parameter shifts the input's detected formants up or down in frequency, affecting the sound's timbre and spectral content. A companion Emphasis section provides equalization options to tailor the sound's overall tonality.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Osc1 In	On/off	Feeds the Oscillator 1 output into the Articulator for processing
Osc2 In	On/off	Feeds the Oscillator 2 output into the Articulator for processing
Noise In	On/off	Feeds the Noise output into the Articulator for processing
Amount	0 to 100%	Determines the extent to which the input section's harmonic content and formant information affect the output signal
Q	0 to 100%	Sets the overall tonal character of the Articulator's processing.
Formant Offset	-100% to +100%	Shifts the input's detected formants (overall harmonic structure) up or down in frequency to change the output signal's timbre
Emphasis Low	Minimum to maximum	Emphasizes or de-emphasizes low frequencies
Emphasis Mid	Minimum to maximum	Emphasizes or de-emphasizes midrange frequencies
Emphasis High	Minimum to maximum	Emphasizes or de-emphasizes high frequencies

Delay

WHAT'S IT FOR?

The Delay copies the output signal and shifts it later in time; the delayed signal is available at the Sub-Mixer. This output can be fed back into the input and delayed again, thus creating multiple echoes.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Time	10 to 999ms	Sets the amount of delay. This can be overridden by the tempo control (described later).
Feedback	0 to 100%	Determines what percentage of the output signal feeds back to the input. Greater percentages increase the number of echoes that are generated.

Sub-Mixer

WHAT'S IT FOR?

The Sub-Mixer alters the levels of the basic kantos waveforms that make up the output.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Osc1	-∞ to +6dB	Sets the level of the signal generated by Oscillator 1
Fund1	-∞ to +6dB	Sets the level of the sine wave extracted from the input signal and modified by the Osc1 tuning and constraint controls
Osc2	-∞ to +6dB	Sets the level of the signal generated by Oscillator 2
Fund2	-∞ to +6dB	Sets the level of the sine wave extracted from the input signal and modified by the Osc2 tuning and constraint controls
Noise	-∞ to +6dB	Sets the level of the white noise generator
Mute	On/off	Each channel has a mute button. Enabling this takes the associated channel out of the mixer.
Solo	On/off	Each channel has a solo button. Enabling this mutes any non-soloed channels.

Mixer

WHAT'S IT FOR?

The Mixer blends together the Sub-Mixer, Delay Output, and Input, and sets the level of the final overall Output. A companion output meter indicates the output signal level, and has lights at the top of the meter to indicate clipping. The Output level should be set for the maximum level possible without the clip indicators lighting.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Synth	-∞ to 0dB	Sets the level of the Sub-Mixer output in the overall output
Delay	-∞ to 0dB	Sets the level of the output generated by the delay line

Input	-∞ to 0dB	Mixes the original input signal into the overall output
Output	-∞ to 0dB	Sets the overall kantos level
Mute	On/off	Each channel has a mute button. Enabling this takes the associated channel out of the mixer. The output mute silences kantos completely.
Solo	On/off	The Synth, Delay, and Input channels each have a solo button. Enabling this mutes any non-soloed channels.
Pan	Continuously variable from left to right	When kantos is instantiated as a stereo effect, the Synth, Delay, and Input channels each have a pan control that places the channel output anywhere within the stereo field, from left to right.

Gate Generator

WHAT'S IT FOR?

The gate generator analyzes the signal driving kantos and derives information regarding dynamics. This information is used to trigger envelopes, restart waves when Retrigger is selected, etc. Several controls allow kantos to extract this information from a fairly wide variety of signals by adjusting how the Gate responds to these signals.

WHAT ARE THE PARAMETERS?

Note that the parameter ranges are absolute maximum and minimum values. The relative maximum and minimum values can change depending on how parameters are set; for example, the Off parameter cannot be higher than the On parameter, and neither can be lower than the Floor parameter.

NAME	RANGE	WHAT IT DOES
Gate On	Lit/dark	Lights when kantos generates a gate, and stays lit throughout the hold duration, or until the signal goes below the off parameter level
On	-78dB to 0 dB	When the signal driving kantos exceeds this threshold, kantos recognizes it as a new note and generates a note-on trigger.
Off	-79dB to -1dB	When the signal driving kantos drops below this level, kantos decides the note has stopped and generates a note-off.

Floor	-80dB to -2dB	kantos ignores signals below this level. Set this above any hum, residual noise, etc. so kantos isn't confused by these signals.
Hold	10 to 999ms	Sets a minimum time before a note off occurs, regardless of the input signal status
Manual Gate	On/off (momentary)	Click on this to momentarily let the oscillator sound through without any filter or Articulator processing. This is ideal for hearing an oscillator wave's raw, unprocessed sound.

LFOs

WHAT ARE THEY FOR?

The LFOs (low frequency oscillators) are modulation sources that produce a sub-audio, periodic waveform with one of six possible waveforms. For example, when used to control pitch, they create vibrato; when controlling amplitude, they creates tremolo. There are two identical LFOs, LFO1 and LFO2.

WHAT ARE THE PARAMETERS?

Each LFO has the same parameters.

NAME	RANGE	WHAT IT DOES
Wave	Sine, triangle, ramp up, ramp down, square, random	Chooses the shape of the LFO oscillator's output.
Freq	0.1Hz to 20Hz	Changes the LFO frequency

Modulation Matrix

WHAT'S IT FOR?

The Modulation Matrix routes modulation sources to modulation destinations, and sets the amount of modulation. There are 8 possible routings; each one has identical parameters.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Source	7 options	Chooses one of 7 modulation sources

Amt	-100 to +100%	Sets how much of the modulation source affects the modulation destination, and whether the modulation adds to the destination parameter value (+ numbers) or subtracts from it (- numbers).
Destination	36 options including none	Chooses one of 35 modulation destinations, including the modulation amount controls, or no modulation destination (none).

Amp Env

WHAT'S IT FOR?

The Amp envelope generates a control signal that can serve as a modulation source. It is triggered according to signals produced by the Gate Generator. An On parameter allows it to control output dynamics as well as provide general-purpose modulation.

WHAT ARE THE PARAMETERS?

Parameters are changed either by entering a value in the numeric field, or clicking within the area indicated by the graphic and dragging.

NAME	RANGE	WHAT IT DOES
A(ttack)	1 to 999ms	After triggering, this is the time required to go from full off to maximum level
D(ecay)	1 to 999ms	After reaching maximum level, decay sets the amount of time until the envelope reaches the sustain level
S(ustain)	0 to 100%	The envelope stays at this level for as long as the trigger remains on
R(elease)	0.01 to 9.99 seconds	After the trigger turns off, this sets the time required for the envelope to go from the sustain level back to zero
On	On/off	When enabled, the Amp Env determines the output dynamics, which are normally derived from the input signal dynamics

Mod Env

WHAT'S IT FOR?

The Mod envelope generates a control signal that can serve as a modulation source. It is triggered according to signals produced by the Gate Generator.

WHAT ARE THE PARAMETERS?

Parameters are changed either by entering a value in the numeric field, or clicking within the area indicated by the graphic and dragging.

NAME	RANGE	WHAT IT DOES
A(ttack)	1 to 999ms	After triggering, this is the time required to go from full off to maximum level
D(ecay)	1 to 999ms	After reaching maximum level, decay sets the amount of time until the envelope reaches the sustain level
S(ustain)	0 to 100%	The envelope stays at this level for as long as the trigger remains on
R(elease)	0.01 to 9.99 seconds	After the trigger turns off, this sets the time required for the envelope to go from the sustain level back to zero

Tempo

WHAT'S IT FOR?

Synchronizes the LFOs and delay time to a specified tempo, usually that of the song in which kantos is playing.

WHAT ARE THE PARAMETERS?

NAME	RANGE	WHAT IT DOES
Tempo	60 to 400 BPM	Sets the song tempo to which the desired parameters synchronize. Each parameter can have its own tempo setting, although the readout shows only the tempo of the most recently-edited parameter.
LFO1	On/off	When enabled, the LFO1 frequency syncs to the specified tempo
LFO2	On/off	When enabled, the LFO2 frequency syncs to the specified tempo
Delay	On/off	When enabled, the Delay time syncs to the specified tempo
Tap	Momentary on	Repeatedly clicking on this button (or typing the T key on the keyboard) causes kantos to calculate the time between clicks or keystrokes, from which it derives the tempo. The tempo is an average of all clicks or keystrokes.

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