antares

Harmony Engine

Vocal Modeling Harmony Generator

Owner's Manual

Antares Audio Technologies
231 Technology Circle, Scotts Valley, California 95066 USA
www.antarestech.com
Printed in USA Rev 1.0 PN P25035-0607-M01

The Obligatory Legal Mumbo-Jumbo

The Antares Harmony Engine software and this User's Manual are protected by copyright law. Making copies, adaptations, or derivative works without the prior written authorization of Antares Audio Technologies, is prohibited by law and constitutes a punishable violation of the law.

Antares Audio Technologies retains all ownership rights to the Harmony Engine software and its documentation. Use of Harmony Engine is limited by the following license agreement.

Please carefully read all the terms and conditions of this license agreement. At the time of installation of the Harmony Engine software you will be presented with a copy of the agreement and asked whether or not you agree to it. Continuing with the installation process beyond that point constitutes such agreement.

Harmony Engine License Agreement
Antares Audio Technologies grants you a non-transferable, non-exclusive license to use Harmony Engine under the terms and conditions stated in this agreement. Use of Harmony Engine indicates your agreement to the following terms and conditions.

License
You may:

1. Use Harmony Engine on only one computer at a time. Authorization requires an USB iLok Smart Key which must be purchased separately.

You may not:

1. Make copies of Harmony Engine or of the user manual in whole or in part except as expressly provided for in this agreement. Your right to copy Harmony Engine and the user manual is limited by copyright law. Making copies, verbal or media translations, adaptations, derivative works, or telecommunication data transmission of Harmony Engine without prior written authorization of Antares, is prohibited by law and constitutes a punishable violation of the law.
2. Make alteration or modifications to Harmony Engine (or any copy) or disassemble or de-compile Harmony Engine (or any copy), or attempt to discover the source code of Harmony Engine.
3. Sub-license, lease, lend, rent, or grant other rights in all or any portion of Harmony Engine (or any copy) to others.

Term of the Agreement
This agreement is effective until terminated by you or Antares. You may terminate the agreement at any time by notifying Antares and destroying all copies of the manual, and erasing Harmony Engine from all machine-readable media, whether on-line or on archival copies.

In the event of breach of any of the terms of this agreement, you shall pay the attorney's fees of Antares that are reasonably necessary to enforce the agreement plus resulting damages.

Product Installation and Required Activation
There are technological measures in the Harmony Engine that are designed to prevent unlicensed or illegal use of the Software. You agree that Antares Audio Technologies may use these measures to protect Antares Audio Technologies against software piracy.

Limited Warranty And Disclaimer
Harmony Engine AND ACCOMPANYING MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Antares Audio Technologies does not warrant that the functions contained in the program will meet your requirements. The entire risk as to the use, quality, and performance of Harmony Engine is with you.

SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.

Limitation of Liability
IN NO EVENT WILL ANTARES BE LIABLE FOR ANY DAMAGES, INCLUDING LOSS OF DATA, LOST PROFITS OR OTHER SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES ARISING FROM THE USE OF Harmony Engine OR ACCOMPANYING MATERIALS. THIS LIMITATION WILL APPLY EVEN IF ANTARES OR ITS AUTHORIZED AGENT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. YOU ACKNOWLEDGE THAT THE LICENSE FEE REFLECTS THIS ALLOCATION OF RISK. SOME JURISDICTIONS DO NOT ALLOW LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

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

Contents

Welcome!

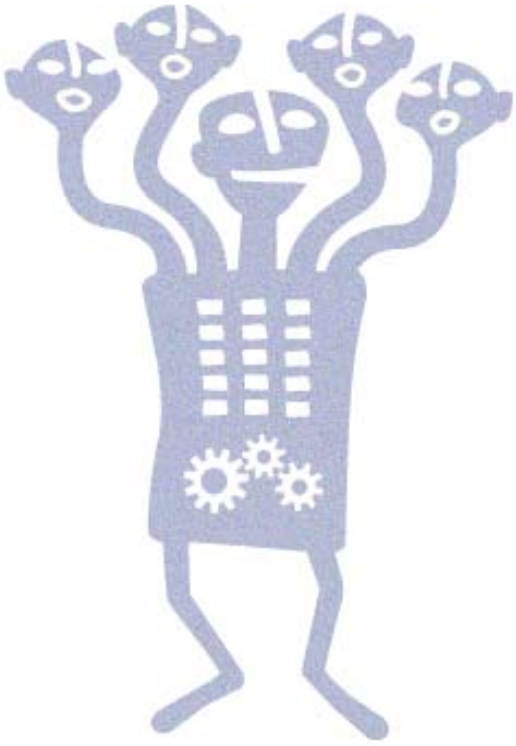
On behalf of everyone at Antares Audio Technologies, we'd like to offer both our thanks and congratulations on your decision to purchase Harmony Engine, the quickest, easiest to use tool for realistic harmony creation. Before you proceed any farther, we'd like to strongly encourage you to register and authorize your copy of Harmony Engine. (You can skip ahead to the Authorization and Installation instructions on page 3. We'll wait.)

As a Harmony Engine owner, you are entitled to 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.

With your purchase of Harmony Engine, 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



Chapter 1: Getting Started

How To Use This Manual

We know you're probably anxious to get some harmony going. While we've designed the Harmony Engine interface to be largely self-explanatory, Harmony Engine introduces some entirely new concepts to the process of quickly and easily creating realistic harmonies, so, to really get the most out of Harmony Engine, we strongly encourage you to read this manual.

Of course, you're welcome to just launch your host and play around with Harmony Engine for a while, but to get a good idea of Harmony Engine's capabilities (and how to accomplish various basic tasks) you should at least check out Chapter 4, Factory Presets. We've included a variety of presets that configure Harmony Engine to let you quickly and easily interact with its various modes and functions. Then check out Chapter 5, Tutorial Sessions, where you can see (and hear) exactly how Harmony Engine was used to create some of the audio demos on our web site and installation CD ROM. The demos' composers have been kind enough to allow us to include the actual sessions for you to load into your host and experiment with. Open them up. Check out the Harmony Engine settings. Tweak some controls and see what happens.

Finally, when you're ready to learn everything Harmony Engine can do, check out Chapter 3 for detailed descriptions of every function.

The Contents Of This Manual

Chapter 1: Getting Started
The chapter you are reading. Provides information on installing and authorizing Harmony Engine.

Chapter 2: Introducing Harmony Engine
Provides a brief introduction to what Harmony Engine is all about and gives an overview of Harmony Engine's key features.

Chapter 3: Harmony Engine Controls
This chapter is reference information for every control used in the Harmony Engine interface.

Chapter 4: Factory Presets
Descriptions of the factory presets that ship with Harmony Engine.

Chapter 5: Tutorial Sessions
Describes the complete host sessions provided as hands-on examples of how Harmony Engine is used.

Installing Harmony Engine

Harmony Engine is designed to function as a plug-in in a wide variety of digital audio applications. Please refer to your specific host application's user manual for more information on installing and using plug-ins.

Authorizing Harmony Engine

Authorization is the process by which Harmony Engine is allowed to run on your computer. Detailed instructions covering the available authorization options will be found in the file "Authorization Read Me" which is included on the installation CD ROM or with your software download.

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 in the meantime. (During this period, click the "Continue" 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 will no longer be able to launch Harmony Engine until it's authorized.

Technical Support

In the unlikely event that you experience a problem using Harmony Engine, try the following:

1. Make sure you have the latest version of the software. You can download and install the latest version of the software from the following web page:

   http://www.antarestech.com/download/update.shtml

2. If you are having problems authorizing your software, be sure that you have the latest version of the PACE Interlok drivers. You can download and install the latest version for your operating system from the following web page:

   http://www.antarestech.com/drivers

If your problem is not resolved after taking the above actions, 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. Consult our searchable knowledgebase at:

   http://www.antarestech.com/support/index.html

4. Call your local Antares dealer.

Chapter 2: Introducing Harmony Engine

What the Heck is This Thing?

Harmony Engine is a real-time harmony generating plug-in that puts professional-quality vocal harmony arrangements within reach of any songwriter, producer, musician or engineer.

Traditionally, harmony tools have offered two basic operating modes:

One option was fully automatic modes based on either parallel or "smart" scale-based intervals. These were relatively easy to set up, but offered very little in the way of creative control.

A second option was MIDI modes that provided control of each individual note of each individual harmony voice. While this technique offered absolute control, it also demanded that you be skilled in the intricacies of vocal arranging (as well as having the time and patience to enter every note into a MIDI track, hardly a trivial undertaking).

With Harmony Engine, we set ourselves the task of creating a tool that would let anyone who could hear the harmonies they wanted in their mind, quickly and easily create those harmonies in a song or other project. While Harmony Engine offers all of the traditional harmony generation methods, it adds a variety of new operating paradigms that allow you to approach the harmony generation process from a purely musical point of view.

What's It Got?

With four independent harmony voices, a variety of powerful harmony generating modes, humanization features for natural sounding performances, and a flexible real-time preset system for harmony and vocal type, Harmony Engine provides incredibly easy-to-use tools to quickly and easily produce virtually any vocal arrangement you can imagine.

Key Harmony Engine Features Include:

- Four high-quality, formant-corrected harmony voices with independent vocal character, vibrato, and pan settings
- Antares Throat Modeling technology that lets you process each harmony voice through a physical model of the human vocal tract
- A variety of innovative Harmony Control modes, from fully automatic to individual control of every note:

  Fixed or Scale Intervals: Simply set the key and harmony voice intervals and let Harmony Engine do the rest

  Chord Degrees or Chord Name: Define your harmony chord-by-chord, complete with inversions and variable vocal ranges

  Chord by MIDI: Define your harmony in real time via a MIDI controller or pre-recorded MIDI track

  MIDI Omni: Directly "play" the four harmony voices as if they were voices of a synth or sampler

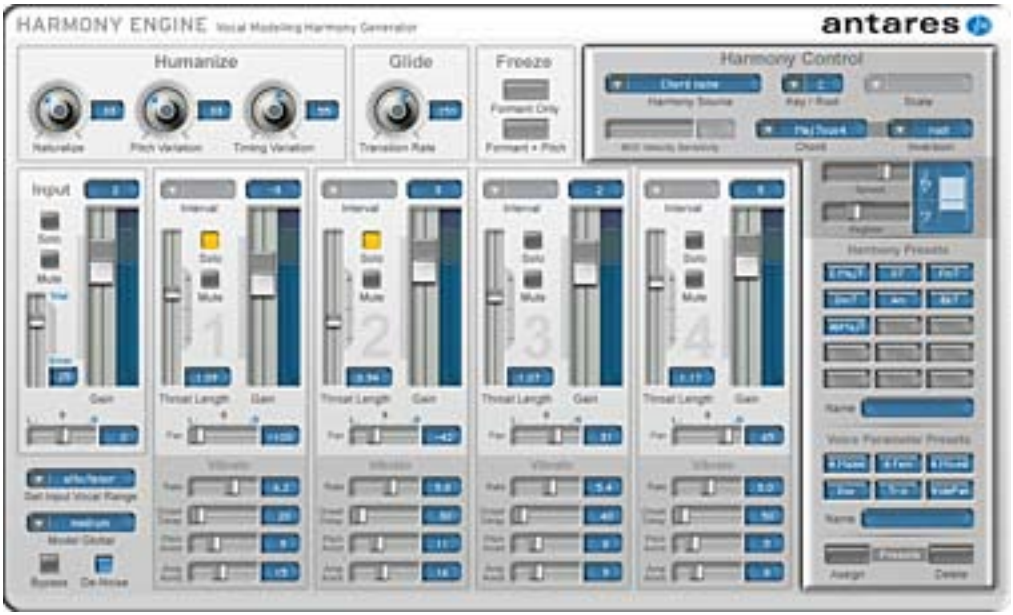
  MIDI Channel: Use four separate MIDI channels for absolute control over each note of your vocal arrangement
- Spread and Register controls that allow you to quickly and intuitively set the pitch range and harmony style of your vocal arrangement

- Humanize functions that provide selectable amounts of variation to each harmony voice for realistic, natural sounding results
- A Freeze function that allows a unique variety of backup vocal effects by letting you instantly freeze pitch and/or formant articulation
- A Harmony Preset matrix that lets you create up to 15 complete harmony settings and instantaneously recall them, in real time or via automation
- A Voice Parameter Preset matrix that lets you create and instantly recall up to 6 different "vocal groups"
- Five-channel output capability (host dependent) that lets you assign or export the original input and each of the four harmony voices to their own channels for further processing

Whether you're an experienced vocal arranger, a songwriter looking for that perfect backup vocal, or a composer experimenting with unique vocal effects, Harmony Engine gives you entirely new ways to create the harmony parts you hear in your head. In fact, experimenting with different harmonies is so easy (and, dare we suggest, fun), you may find yourself using Harmony Engine to explore harmonic alternatives you may have never otherwise considered.

Harmony Engine is, quite simply, the quickest, easiest tool for flexible, realistic harmony creation.

Chapter 3: Harmony Engine Controls



This chapter is a reference for all of the controls used in the Harmony Engine interface.

Continuous Controls

Continuous controls in Harmony Engine are represented by virtual knobs or faders.

Knobs can be controlled by either vertical or horizontal mouse movement:

VERTICAL: Position the cursor over a knob, press and hold the left mouse button (or the only mouse button, if you're using a one-button mouse) and move the cursor up to turn the knob clockwise or down to turn the knob counterclockwise. The current value of the knob's parameter appears in its associated numeric display.

HORIZONTAL: Position the cursor over a knob, press and hold the left mouse button and move the cursor to the right to turn the knob clockwise or to the left to turn the knob counterclockwise. The current value of the knob's parameter appears in its associated numeric display.

For faders, simply click on the "thumb" of the fader and move it to the desired setting.

Option (Mac)/Control (PC)-clicking a knob or fader returns it to its default value.

NOTE: *The specific modifier key may vary from host to host (Steinberg hosts on the Mac, for example, use the Command (Apple) key instead of the Option key). Refer to the Harmony Engine Read Me for details (or just try a few until you find the one that works).*

Setup

The functions described in this section are used to tell Harmony Engine things about the source audio or otherwise affect the plugin as a whole.

Input Audio

For accurate harmony generation and best modeling performance, Harmony Engine needs to be able to detect the pitch of the original performance. To do that, Harmony Engine requires a clean, pitched, monophonic signal. (In this context, "clean" refers both to lack of noise and lack of processing with effects like chorus, reverb, etc.)

NOTE: Keep in mind that the input must not only be monophonic, but actually a solo voice or instrument (as opposed to a unison section). For example, a group of singers singing the same note will typically not be reliably tracked.

You can have problems with certain solo voices and solo instruments as well. Consider, for example, an exceptionally breathy voice, or a track recorded in an unavoidably noisy environment. The added noise is non-periodic and Harmony Engine will have difficulty determining the pitch of the composite (voice + noise) sound. Luckily, there is a control (the Tracking control, discussed in Chapter 3) that will let Harmony Engine be a bit more casual about what it considers "periodic." Experimenting with this setting will often allow Harmony Engine to track even moderately noisy signals.

Routing

Harmony Engine should typically be instantiated as an insert effect on the track that will supply the source audio. Harmony Engine can be instantiated on a mono or stereo track, but since it processes only a single channel of audio, if you instantiate it on a stereo track, the two channels will be mixed together before being processed.

Harmony Engine's output can be mono or stereo (or, in some circumstances, five channels — see below). Unless you have some overriding reason for using a mono output, we highly recommend using it in stereo output mode, since in mono mode, all panning controls are disabled. This prevents you from positioning the harmony voices across the stereo soundstage and dramatically impacts (in a not-so-swell way) the overall effect.

Five Channel Output

Depending on your particular host's routing capabilities, you may be able to use Harmony Engine in five channel output mode to send or export the original input and the four harmony voices to five separate channels for subsequent individual processing. Unfortunately, the ability and method of accomplishing this (if it exists at all) varies from host to host and typically involves making non-standard use of a host's 5.1 capabilities. Check your host's manual for details.

NOTE: While it is our intention to provide tips in our Knowledgebase on using five channel output in the major hosts that support it, your primary resource should be a detailed knowledge of how routing works in your host. In this case, your host's manual is your best friend.

TIP: If your host supports five channel output mode, try processing each output with an instance of AVOX CHOIR. Instant giant choral group!

Effects

The cleaner the input signal, the easier Harmony Engine's task of reliably detecting its pitch. For this reason, effects designed to improve the quality of the input

(e.g., de-essing, noise reduction, etc.) should be applied to the audio before it is input to Harmony Engine.

NOTE: If you will using both de-essing and compression on your vocal track, it has been our experience that using the de-esser before the compressor provides improved results in Harmony Engine.

As mentioned above, effects like chorus or reverb can negatively affect Harmony Engine's ability to reliably detect the pitch of the input audio. As a result, you should not apply these effects to the input audio before it is routed into Harmony Engine. Either apply them to the Harmony Engine output or, if you only want them on the original audio, apply them to a copy of the original audio on another track and then mute the original input in Harmony Engine.

Set Input Vocal Range
As a result of Antares research into the unique characteristics of various types of audio signals, Harmony Engine offers a selection of optimized processing algorithms for the most common types of inputs. Choices include Soprano Voice, Alto/Tenor Voice, Bass/Baritone Voice and Instrument (a general setting for anything that isn't actually a vocal). Matching the appropriate algorithm to the input results in faster and more accurate pitch detection and more accurate modeling.

To select vocal range, click on the Vocal Range pop-up and then select the appropriate range from the pop-up list.

IMPORTANT NOTE: We really can't stress this enough. Getting this setting right is key to getting the best performance from Harmony Engine. Choosing the wrong Vocal Range (or just forgetting to set it at all) will result in compromised performance. Pay attention.

Model Glottal
The glottal waveform is created by the vibration of a singer's vocal chords. While the glottal waveform is largely defined by each singer's individual anatomy, it is also affected by the specific singing style of a particular performance. For example, singing softly results in a markedly different glottal waveform than does belting a song with great energy and volume.

The Model Glottal control lets you tell Harmony Engine what performance style you would like to model. The options are soft, medium, loud, and intense. (If you want to preserve the stylistic character of the original vocal, start with this control set to Medium.)

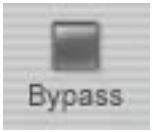
Despite the value names (soft, loud, etc.), these settings result in only modest change to the actual level of the signal (with the "intense" setting providing the most gain). Its primary purpose is to model the glottal waveform that would result from the various styles of singing. If you want to further adjust the levels, use the individual Harmony Voice Gain controls described below.

NOTE: The Model Glottal control affects all of the harmony voices. To define individual vocal characteristics for each voice, use the Throat Length controls described later in this chapter.

ANOTHER NOTE: The Model Glottal control does not affect the Original Input.

TIP: The actual effect of this control depends a great deal on the characteristics of the original audio. Consequently, in most cases the best approach is to simply try the various settings and pick the one that best fits the style of your particular performance.

To select glottal waveform, click on the Model Glottal pop-up and then select the desired stylistic character from the pop-up list.



Bypass
This control is used to (you guessed it) bypass the plug-in. It has been designed to provide artifact-free bypass switching so that you can use it to seamlessly enable harmony only where desired on a track.

Click the Bypass button to toggle its state. When it's red, all harmony voices are muted and the original input will be passed to all output channels. This happens seamlessly (i.e., with no click or artifact on activation).

NOTE: When Bypass is enabled, the original input will still be passed through with the plug-in's normal processing delay, allowing seamless transitions between harmony and no harmony.

De-Noise
Engaging the De-Noise function reduces noise that is inherent in the formant correction/shifting process.

NOTE: While a quick A/B will sometimes give the impression that engaging De-Noise attenuates the highs, it is only the noise (which tends to be high-pitched) that is being attenuated. (This is very much like the effect of turning on and off Dolby® NR on a cassette deck back in prehistoric times).

The default setting for De-Noise is "On." Click the De-Noise button to toggle its state.

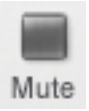
Original Input

Gain
The Gain fader controls the gain of the original input whenever the channel is not muted.

The default Gain value is -6dB. Option (Mac)/Control (PC)-clicking the fader returns it to that value.

Solo
Engaging Solo mode causes the original input signal to appear at the output and simultaneously mutes all Harmony Voice channels that are not also soloed.

When the Solo button is yellow, Solo mode is engaged. Click the button to toggle its state.



Mute
Engaging Mute mode causes the original input signal to be muted from the output.

When the Mute button is blue, Mute mode in engaged. Click the button to toggle its state.

NOTE: If both the Input Channel's Solo and Mute buttons are pressed, Solo takes precedence. However, if Solo is then disengaged, the original input will then be muted.

ANOTHER NOTE: Moving a channel's Gain slider to its minimum setting also results in completely muting its output.

Pan
Sets the original input's location in the stereo spectrum when its output is not muted and Harmony Engine is assigned to a stereo output.

If Harmony Engine is not assigned to a stereo track, this control will be disabled.

Command (Mac)/Control (PC) click the control to reset it to its default value of 0 (center).

Tracking
As previously mentioned, for best performance, Harmony Engine requires a clean, pitched monophonic signal.

Specifically, in order to accurately identify the pitch of the input, Harmony Engine requires a periodically repeating waveform, characteristic of a voice or solo instrument. The Tracking control determines how much variation is allowed in the incoming waveform for Harmony Engine to still consider it periodic.

If you are working with a clean, well-isolated solo signal you can typically set the Tracking control to 25 and forget it (hence, that's the default value).

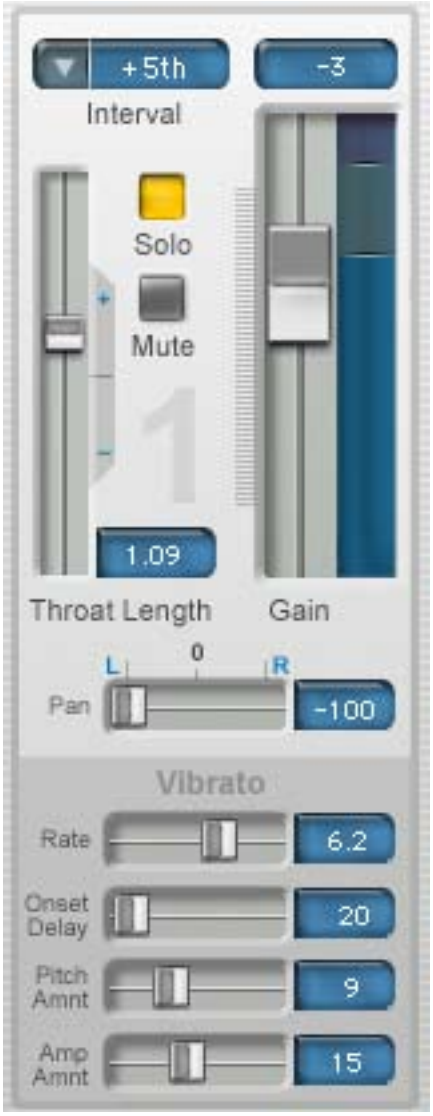
If, on the other hand, your signal is noisy or not well-isolated (as might be more common in a live performance situation or a track with headphone bleed) or you are dealing with a particularly breathy or guttural voice, it may be necessary to adjust the tracking for best performance.

Interestingly (to us, anyway), during the development of Harmony Engine we discovered that (unlike Auto-Tune®, where we can usually predict with pretty fair accuracy what kind of Tracking adjustments a signal will require) it was almost impossible to predict, just from listening, what setting would work best. This led to our choice of labels for the extremes of the control's range.

As the labels imply, there is no hard and fast rule for what settings will work well with what kinds of input. If you're having a problem (such as octave errors or loss of pitch tracking), experiment until you get the best result.

A TIP: One of the things that can cause tracking problems is excessive sibilance and/or other unpitched articulations. De-essing (prior to compression) can often alleviate these problems.

IMPORTANT NOTE: Like the Vocal Range setting, getting this setting right is critical for best performance. If you are experiencing problems, these are the controls to adjust. (Even, if in the case of the Vocal Range, it means trying a "wrong" one. Whatever works.)



Harmony Voices 1-4

Each of the four Harmony Voice channels are functionally identical and contain identical controls.

It may be useful to think of the four Harmony Voices as being similar to the voices of a four-voice synthesizer. Each voice has independent controls for setting its timbre, vibrato, pan and level. The method by which pitches are assigned to voices varies with the Harmony modes selected in the Harmony Control section. In this section, we'll describe the Harmony Voice controls. The Harmony modes will be discussed later in this chapter.

NOTE: *As mentioned below in the Harmony Control section, harmony notes will be assigned to the various harmony channels such that the lowest pitched note will be assigned to the highest numbered active channel and the progressively higher pitched notes will be assigned in order to the progressively lowered numbered active channels. For example, for a four note chord, the lowest note will be assigned to harmony channel 4, the next higher to channel 3, the next higher to channel 2 and the highest to channel 1.*

Gain

Each Gain fader controls the gain of its Harmony Voice channel whenever that channel is not muted.

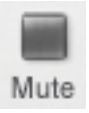
In the various MIDI Harmony modes, the Gain control sets the maximum gain level for its channel (i.e., the gain at MIDI velocity value 127).

The default Gain value is -6dB. Option (Mac)/Control (PC)-clicking a fader returns it to that value.

Solo
Engaging a channel's Solo mode causes that channel's signal to appear at the output and simultaneously mutes any other channels (Harmony Voice and/or Input Voice) that are not also soloed.

When a channel's Solo button is yellow, Solo mode in engaged on that channel. Click a button to toggle its state.

NOTE: If both a channel's Solo and Mute buttons are pressed, Solo takes precedence.



Mute
Engaging a Harmony Voice channel's Mute mode causes that channel's signal to be muted from the output.

When a Mute button is blue, that channel's Mute mode in engaged. Click a Mute button to toggle its state.

NOTE: If both a channel's Solo and Mute buttons are pressed, Solo takes precedence. However, if Solo is then disengaged, the channel will then be muted.

ANOTHER NOTE: Moving a channel's Gain slider to its minimum setting also results in completely muting its output.

Throat Length
This control is used to define the unique vocal quality of a Harmony Voice by actually varying the geometry of the channel's model vocal tract. It is used in combination with the Model Glottal control and the various forms of pitch shifting to define gender and/or vocal quality.

The Throat Length control allows you to lengthen or shorten its Harmony Voice channel's modeled throat. The range of this control is .75 to 1.50. Values above 1.00 represent a lengthening of the throat while values below 1.00 represent a shortening of the throat.

The actual values represent the percentage change in the throat length. For example, a value of 1.20 represents a 20% increase in throat length, while a value of 0.80 represents a 20% decrease in throat length.

In addition to simply changing vocal timbre, increasing throat length is useful when the original input is female and you want the Harmony Voices that are being shifted down to sound male. Conversely, decreasing throat length is useful when the original input is male and you want the Harmony Voices that are being shifted up to sound female or childlike.

NOTE: While this control gives you the ability to radically change the throat length, keep in mind that the variation in the length of human vocal tracts is rarely more than about 20% in either direction. If you are looking for a "realistic" vocal characteristic, start with modest settings of this control. More extreme settings can produce dramatic results, but probably not what anyone would call "realistic."

Command (Mac)/Control (PC) click the control to reset it to its default value of 1.00.

IMPORTANT NOTE: This function is specifically for changing the existing quality of a voice, not for manual formant compensation for pitch shifting. Harmony Engine automatically applies appropriate formant correction when it shifts a channel's pitch.

Interval
The Interval popup sets a Harmony Voice's pitch interval relative to the original input in Fixed Interval and Smart Interval modes.

In both modes, the range is plus-or-minus two octaves. In Fixed Interval mode, the popup displays half-steps in the range -24 to +24. In Smart Interval mode, the popup displays scale degrees in the range 16va to 16vb.

This control is inactive in all Chord Name and MIDI modes.

NOTE: Harmony Engine remembers the most recent Interval settings for each of the two interval harmony modes. So, if you select Fixed Interval and set a harmony voice to +3 semitones, and then change to Smart Interval and set that same harmony voice to -5th, if you then change back to Fixed Interval, the Interval setting will return to +3 semitones.

For reference, here are the equivalent scale intervals for each semitone interval:

Semitones = Scale Interval

1 = minor 2nd
2 = major 2nd
3 = minor 3rd
4 = major 3rd
5 = perfect 4th
6 = aug 4th/dim 5th
7 = perfect 5th
8 = aug 5th/min 6th
9 = major 6th
10 = minor 7th
11 = major 7th
12 = octave
13 = minor 9th
14 = major 9th
15 = minor 10th
16 = major 10th
17 = perfect 11th
18 = aug 11th
19 = perfect 12th
20 = minor 13th
21 = major 13th
22 = minor 14th (rarely used)
23 = major 14th (rarely used)
24 = 2 octaves

Pan
These controls set each harmony voice's position on the stereo soundstage when the voice is not muted and Harmony Engine is assigned to a stereo output.

If Harmony Engine is not assigned to a stereo track, these controls will be disabled.

The control range is from -100 (panned full left) to 100 (panned full right). Not surprisingly, a value of 0 represents the center of the soundstage.

The default Pan values are different for each Harmony Voice channel as follows:

Channel 1: -50
Channel 2: 50
Channel 3: -100
Channel 4: 100

Option (Mac)/Control (PC)-clicking a Pan control returns it to its default value.

Vibrato Controls
The following four controls are used to add an independently programmable vibrato to each Harmony Voice. In using these controls, it's useful to consider the following principles:

- If the Input Audio does not contain its own natural vibrato, you can feel free to do pretty much whatever you want with the Vibrato controls.

- If the Input Audio does contain its own natural vibrato and the Humanize control has been set to allow it to be present in the Harmony Voices (or you are using Fixed Interval mode), using the Vibrato controls may cause interference between the natural and programmed vibratos, with unnatural-sounding results. This is not to say that this can't be an interesting effect, only that it is unlikely to sound realistic.
- If the Input Audio contains its own natural vibrato and the Humanize control is set to 0 (preventing the pitch component of the natural vibrato from being present in the Harmony Voices), any loudness component of the natural vibrato will still be present in the Harmony Voices. Depending on the amount of loudness variation, there might still be interference with programmed vibrato. However, unless the loudness variation is fairly extreme, it is unlikely to be a problem.

Vibrato Rate
This control sets the rate of the vibrato (in Hz) for its Harmony Voice. The range is from 1.0 Hz to 9.0 Hz.

The default Vibrato Rate values are slightly different for each Harmony Voice channel as follows:

Channel 1: 6.2 Hz
Channel 2: 5.8 Hz
Channel 3: 5.4 Hz
Channel 4: 5.0 Hz

Option (Mac)/Control (PC)-clicking a fader returns it to its default value.

Vibrato Onset Delay
This control sets the onset delay of the vibrato for its Harmony Voice. The control reads out in milliseconds such that there is no vibrato for the selected time and then there is a transition to full vibrato over the selected time.

"Huh?" you might be asking. Understandable. Here's an example:

If you select 750 (i.e., 750 milliseconds), for the first 750 ms after the onset of a note, there will be no vibrato. Over the next 750 ms, the vibrato will transition from none to the full amounts set in the Amount controls below. Therefore, a setting of 750 results in a total of 1500 ms (i.e., a second and a half) from note onset to full vibrato amounts.

The default Onset Delay values are slightly different for each Harmony Voice channel as follows:

Channel 1: 20
Channel 2: 30
Channel 3: 40
Channel 4: 50

Option (Mac)/Control (PC)-clicking a fader returns it to its default value.

Vibrato Pitch Amount
This control sets the depth of the pitch modulation for its voice. The range is from 0 (no pitch variation) to a maximum of 100.

The default Pitch Amount value is 0 (i.e., no pitch vibrato). Option (Mac)/Control (PC)-clicking the fader returns it to that value.

Vibrato Amplitude Amount
This control sets the amount of loudness variation for its voice. The range is from 0 (no variation) to a maximum of 100.

The default Amplitude Amount value is 0 (i.e., no loudness variation). Option (Mac)/Control (PC)-clicking the fader returns it to that value.

Humanization

The functions in the Humanize section are designed to allow you to add a selectable amount of random variation to each harmony voice as well as deciding how much (if any) of the original input's vibrato and pitch gestures will be present in the harmony voices.

Each of these controls affect all active harmony voices. However, they affect each harmony voice individually (i.e., if you set a certain range of pitch variation, the actual amount of variation will be a bit different for each active harmony voice).

Experiment with different combinations of the Pitch and Timing controls. They can create dramatically different vocal ensembles. With Timing Variation at its minimum and substantial Pitch Variation, you have a vocal group that's rhythmically tight but a bit loose with intonation. Conversely, reversing those settings gives you a group that's solidly in tune, but rhythmically loose. There are, of course, many variations in between. Match the performance style to the style of your music.

Naturalize
This control selects the amount of the original input's vibrato and pitch gestures that will be present in the harmony voices.

If the original input contains natural vibrato and you are planning to use the harmony voices' Vibrato controls to add programmable vibrato to the harmony parts, this control should usually be set to 0 to minimize the amount of the original vibrato in the harmony voices.

NOTE: In Fixed Interval mode (only), the harmony voices will always parallel all of the original input's vibrato and pitch gestures. Setting the Naturalize function above 0 in that case will actually accentuate (i.e., expand the range of) the vibrato and gestures.

The range of the control is from 0 (no input vibrato or pitch gestures) to a maximum of 100 (harmony voices duplicate the input vibrato and/or pitch gestures - except in Fixed Interval mode as mentioned above) .

The default Naturalize value is 0. Option (Mac)/ Control (PC)-clicking the knob returns it to that value.

Pitch Variation
The Pitch Variation control lets you select the amount of random variation in pitch applied to each harmony voice. The higher the value, the larger the maximum amount of allowable variation in each voice. As mentioned above, the actual amount of pitch variation will be different (and continuously variable) for each active harmony voice.

The range of the control is from 0 (no pitch variation) to a maximum of 100 .

The default Pitch Variation value is 30. Option (Mac)/Control (PC)-clicking the knob returns it to that value.

Timing Variation
The Timing Variation control lets you select the amount of random variation in timing applied to each harmony voice. The higher the value, the larger the maximum amount of allowable timing variation. As mentioned above, the actual amount of timing variation will be different (and continuously variable) for each active harmony voice.

Harmony Engine's timing variation is completely independent of pitch variation. The range of the control is from 0 (no timing variation) to a maximum of 100 .

The default Timing Variation value is 50. Option (Mac)/Control (PC)-clicking the knob returns it to that value.

Glide

The Glide function allows you to control the speed at which harmony voices transition from note to note during legato phrasing.

Transition Rate
This control lets you set a selectable amount of glide (or, for those who grew up with synthesizers, portamento) between overlapping note transitions. The control reads out in milliseconds and represents the time it takes to get halfway to the destination pitch.

NOTE: Glide only takes effect when successive notes overlap or butt up against each other. If there is any silence between two notes (even a few milliseconds worth), no glide will be applied.

The range of the control is from 0 milliseconds (essentially instant transitions) to a maximum of 1000 milliseconds.

The default Transition Rate is 125 milliseconds. Option (Mac)/Control (PC)-clicking the knob returns it to that value.

Freeze

The Freeze functions allow you to freeze either the formants or both the pitches and formants of the harmony voices while the original input continues. Which mode you select depends on the specific effect you desire.

Formant Only
Click the Formant Only button to engage the Formant Only Freeze function. The button will turn blue to indicate the function is active and the harmony voices' formants and articulation will be frozen at the instant the button is clicked.

In Formant Only mode, the harmony voices will continue to change pitch per the current harmony mode and will respond to Register and Spread changes as well.

Click the button again to disengage the function and return the channels to normal behavior.

One useful effect of this mode is to simulate a backup group holding a particular word in a lyric while continuing to provide harmony behind the lead singer (in this case, the original input). There are, however, a lot of other really intriguing possibilities (highly dependent on your particular vocal). We encourage you to play around and discover some for yourself.

NOTE: The Formant Only mode is not available in Fixed Interval or Smart Interval modes. The button is disabled in those modes.

Formant + Pitch
Click the Formant + Pitch button to engage the Formant + Pitch Freeze function. The button will turn blue to indicate the function is active and both the harmony voices' formants and articulation and their current harmony pitches will be frozen at the instant the button is clicked.

Click the button again to disengage the function and return the channels to normal

This is useful for, among other things, having the harmony voices hold a chord while the original input continues with the melody over it.

IMPORTANT NOTE: In both Freeze modes, there must be audio present in the original input and harmony sounding in at least one harmony voice at the moment the Freeze function is engaged. If not, all harmony output will be muted until the function is disengaged, giving the impression that Harmony Engine is somehow "broken." Be careful.

Harmony Control

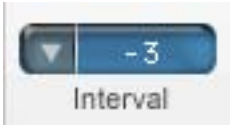
The controls in this section allow you to chose the method by which Harmony Engine decides which harmony notes are assigned to each harmony voice.

These controls, in combination with the Freeze controls and the Harmony and Voice Parameter Preset sections described below, is where the truly unique power of Harmony Engine lies.

While Harmony Engine offers the usual extremes of automatic fixed and "smart" scale interval modes on one hand (very easy to use, but with little creative control) and the ability to completely specify every note of each harmony voice via MIDI on the other (ultimate control, but requiring solid expertise in note-by-note vocal arranging), it's the powerful new options in the middle that we believe will provide you with innovative (and downright entertaining) ways of creating the harmony arrangements you hear in your mind.

The desired harmony mode is selected with the Harmony Source popup menu. Depending on which mode you select, the other controls in this section will be either activated or disabled as necessary. Rather than discuss each control separately, we'll look at all of the controls that function in each mode.

Here's how they all work:

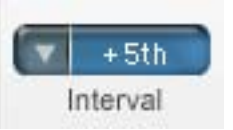


Fixed Interval Mode
When Fixed Interval mode is selected, the Interval popups in the individual harmony voice channels are enabled and all of the other controls in the Harmony Control section are disabled.

In this mode, each enabled harmony voice tracks the original input at the interval defined by the number of semi-tones up or down selected in the track's Interval popup.

Since no allowance is made for diatonic scale tones, using this mode in conventional diatonic harmony with any intervals aside from octaves will almost certainly result in dissonant, out-of-scale notes. As a result, this mode is best for drones, chant and other applications where absolutely parallel harmony is desired.

NOTE: In Fixed Interval mode, all of the input audio's pitch gestures are followed regardless of the Naturalize setting. Increasing the Naturalize setting above 0 will actually expand the range of those gestures.



Scale Interval Mode
When Scale Interval mode is selected, the Key/Root and Scale popups are enabled (along with the Interval popups in the individual harmony voice channels) and all of the other controls in the Harmony Control section are disabled.

In Scale Interval mode, each harmony voice tracks the original input at the interval defined by the scale degree selected in its Interval popup in combination with the Key and Scale settings.

In contrast to the Fixed Interval mode, this mode always chooses harmony notes that fall in the selected key and scale. For example, If you have selected C Major as the key and set a harmony voice's Interval popup to +3rd, when the input is C, the harmony voice will sound at E (a major 3rd). However, when the input is D, the harmony voice will sound at F (a minor 3rd).

IMPORTANT NOTE: An exception to the above is when Unison or any Octave interval is selected. In that case, the harmony voice will track the input note-for-note, regardless of whether they are scale notes or not.

To use Scale Interval mode, select your song's key with the Key/Root popup. Note that sharp/flat keys are specified as flats with the exception of F#. If your song is in an unlisted key, you should choose the enharmonic equivalent:

Db = C# Ab = G#
Eb = D# Bb = A#
F# = Gb

The Scale popup offers three variations of the major and four variations of the minor scales:

Major
Major with no 7th (Maj/no 7th)
Major with a flat 7th (Maj/flat 7th)

Natural Minor (Minor)
Harmonic Minor (Harm. minor)
Minor with a natural 6th (Minor/nat. 6th)
Minor with a major 7th (Minor/Maj7th)

There aren't really any hard-and-fast rules for picking one over the others. Depending on the structure of your particular song, one may offer better results. Trial-and-error is the method of the day.

VERY IMPORTANT NOTE: When you are using Scale Interval mode in combination with the Harmony Preset buttons described below, the settings of the Key/Root and Scale popups are ***not*** *stored with button presets. This is so that you can program all of your desired harmony intervals to preset buttons and then, if you need to change the key of your song, you can simply change the Key/Root and Scale popups and all of your button presets will automatically be transposed to the new key.*

To accommodate modulations or songs with complex harmonic structures, you can either create multiple host presets with the required Key/Scale combinations or use automation to change the Key and/or Scale settings at the appropriate places in your song (thereby automatically transposing any Harmony Presets to the correct keys).

NOTE: In Scale Interval mode, it is particularly important that the original input be properly in tune before being input to Harmony Engine. If the original falls between scale notes, you can get annoying results as the harmony voice flips back and forth between two adjacent harmony notes. If in doubt, Auto-Tune® the original first.

Register & Spread
The Register and Spread controls are used together with their associated graphic display to define the general range and "closeness" of the harmony notes in Chord Degrees, Chord Name, and Chord via MIDI modes. They provide an amazingly easy and intuitive method of arranging your harmonies in almost any desired style.

Since they function identically in all three modes, we'll describe their use here and then just reference them in the individual mode descriptions that follow.

Register
The Register control sets the general range of the lowest generated harmony note, with the leftmost setting being the lowest and the rightmost setting the highest. As you move the control, you will see the lower boundary of the graphic range display change in response.

If you adjust this control while a chord is sounding (not recommended during a real performance, but instructive for understanding what it's doing), you will hear the lowest note of the chord move up or down by octaves in response to your adjustments.

Spread
The Spread control sets the "closeness" of the generated harmony notes. Lower settings result in the harmony notes being spaced tightly together, while higher settings result in the harmony notes being spaced progressively farther apart.

As you move the Spread control, you will see the upper boundary of the graphic range display change in response.

If you adjust this control while a chord is sounding (again, for instructive purposes), you will hear all but the lowest note of the chord move apart or together in response to your adjustments.

Here are some example settings:

Wide harmony:

High, very tight harmony:

Low, very tight harmony:

Medium range, moderately tight harmony:

IMPORTANT NOTE: When using Register and Spread, the harmony notes will be assigned to the various harmony channels such that the lowest pitched note will be assigned to the highest numbered

active channel and the progressively higher pitched notes will be assigned in order to the progressively lowered numbered active channels. For example, for a four note chord, the lowest note will be assigned to harmony channel 4, the next higher to channel 3, the next higher to channel 2 and the highest to channel 1.

This ensures that you can use each channel's Throat Length control to define a timbre, confident of that channel's general range. In the example above, for instance, since harmony channel 4 will always be assigned the lowest note, you might choose to lengthen the Throat setting a bit to reinforce its identity as a bass voice.

In the end, this is all actually a lot easier to see and hear than it is to describe, so just play with the controls for a bit and you'll understand what's happening.

Chord Degrees Mode

When Chord Degrees mode is selected, the Key/Root, Scale, Chord, Inversion, Register, and Spread controls are enabled and the Interval popups in the individual harmony voice channels are disabled.

In Chord Degrees mode, the harmony notes are generated by the combination of the settings of the Key, Scale, Chord, Inversion, Register, and Spread controls. This mode is specifically designed to be used with the Harmony Preset buttons described below.

Start by setting the song's Key and Scale in the same way as described above for Scale Interval mode. Again, if your song is in an unlisted key, use the enharmonic equivalent:

Db = C#	Ab = G#
Eb = D#	Bb = A#
F# = Gb	

Next, for each chord that appears in your song, select the chord from the Chord popup (specified as a degree of the selected key and scale) and the desired inversion from the Inversion popup.

Finally, set the chord's voicing with the Register and Spread controls as described in the previous section.

VERY IMPORTANT NOTE: When you are using Chord Degrees mode in combination with the Harmony Preset buttons described below, the settings of the Key/Root and Scale popups are ***not*** *stored with button presets. This is so that you can program all of the chords in your song to preset buttons*

and then, if you need to change the key of your song, you can simply change the Key/Root and Scale popups and all of your button presets will automatically be transposed to the new key.

NOTE: As mentioned in the Register and Spread section, the harmony notes will be assigned to the various harmony channels such that the lowest pitched note will be assigned to the highest numbered active channel and the progressively higher pitched notes will be assigned in order to the progressively lowered numbered active channels.

Once you get everything the way you want it, assign the settings to a Harmony Preset button as described below.

Repeat the process for each of the chords in your song. If your song modulates, you can either create a new host preset in the new key or use automation to change the Key and/or Scale setting to the new key (which, as mentioned above, will automatically transpose all of the chords to the new key).

A TIP: Keep in mind that you can, for example, assign the same chord, but with different Register and Spread settings, to multiple Harmony Preset buttons so that you can have different harmony voicings for the same chord depending on where it appears in your song.

When you have programmed all of the chords and any alternative voicings, you're ready to play your song and simply select the various Harmony Presets at the appropriate times, either manually (by clicking the buttons) or, better yet, via automation.

IMPORTANT NOTE: In Chord Degrees mode, the harmony notes are generated independently of the actual pitch of the original track. The original can be out of tune (or even a monotone, for that matter), but the harmony notes will still be perfectly in tune with the A=440 pitch reference.

Chord Name Mode

When Chord Name mode is selected, the Key/Root, Chord, Inversion, Register, and Spread controls are enabled, while the Scale popup and the Interval popups in the individual harmony voice channels are disabled.

Chord Name mode is almost identical to Chord Degrees mode, with the exception that instead of setting a key and scale and then defining the chords by scale degree, you define each chord by its explicit name, independent of the scale or key.

In Chord Name mode, the Key/Root popup is used to define the root note of the chord. (And yes, this is where the discussion of enharmonic equivalents that we've already included twice above would go. If you don't already know it by heart, check it out in the Chord Degrees section.)

The Chord popup is used to define the type of chord, and the Inversion popup, not unexpectedly, defines the inversion.

The Register and Spread controls function exactly as described above.

As in the Chord Degree mode, assign all the chords and voicings you need to Harmony Preset buttons and harmonize away.

IMPORTANT NOTE: In Chord Name mode, the harmony notes are generated independently of the actual pitch of the original track. The original can be out of tune (or even a monotone, for that matter), but the harmony notes will still be perfectly in tune with the A=440 pitch reference.

Chord Degrees vs. Chord Name
Why use one versus the other?

The advantages of Chord Names are that if you have a lead sheet with written chord names, it's extremely simple to quickly define and assign all of the chords you need to Harmony Preset buttons. Additionally, the Chord Name mode offers a wider variety of chord types.

The advantages of Chord Degrees are that some people are more familiar with that naming convention (especially if they studied formal harmony in an academic environment). More usefully, if you are early in the song creation process and the song's final key may eventually change, if you've used Chord Degrees mode it's only necessary to change the Key popup to the new key and all the rest of your work is still applicable.

Chord via MIDI Mode
When Chord via MIDI mode is selected, Register, Spread and the MIDI Velocity control is enabled, while all other section controls and the Interval popups in the individual harmony voice channels are disabled.

Chord via MIDI is very similar to the two preceding modes, except that instead of defining chord name by some combination

of popups, they are defined in real time by all "On" MIDI notes appearing on an assigned MIDI channel. These notes are treated as if they were a chord (regardless if they actually are an "official" chord or not) and are re-voiced by the settings of the Register and Spread controls such that the lowest note played will always be the lowest pitched note and will be assigned to the highest numbered active harmony voice.

The MIDI notes can, of course, be played in real time from a controller or recorded into a MIDI track that is then routed to Harmony Engine.

NOTE: Each time there is a change in the currently "On" MIDI notes, Harmony Engine will re-voice the harmony based on the Register and Spread controls. If the MIDI data has notes that start or end at slightly different times, each such change will cause the harmony to be re-voiced, potentially shifting existing notes one or more octaves and resulting in unwanted changes. If you're playing the chords manually, play precisely. If you're creating a MIDI track, ensure that all notes of a chord start at exactly the same time.

The MIDI Velocity Sensitivity control can be used to scale the MIDI velocity messages assigned to harmony channel levels. With this control set to 0, MIDI velocity will be ignored and the channel levels will be defined entirely by the Channel Gain settings. As you increase the value of this control, MIDI velocity will have progressively more effect on the channel levels.

NOTE: There are only four available harmony voices, so limit your MIDI input to no more than four notes at a time.

ANOTHER NOTE: Keep in mind that you are not actually "playing" the harmony channels in this mode (that's what MIDI Omni mode is for), but simply defining the notes that make up the chord that the Register and Spread controls will voice.

MIDI Omni Mode

When MIDI Omni mode is selected, the MIDI Velocity control is enabled, while all other section controls and the Interval popups in the individual harmony voice channels are disabled.

In MIDI Omni mode, you are in fact directly "playing" the harmony channels (again, either live from a controller or via a pre-recoded MIDI track).

The MIDI Velocity Sensitivity control can be used to scale the MIDI velocity messages assigned to harmony channel levels. With this control set to 0, MIDI velocity will be ignored and the channel levels will be defined entirely by the Channel Gain settings. As you increase the value of this control, MIDI velocity will have progressively more effect on the channel levels.

A TIP: Keep in mind that there are only four available harmony voices, so limit your MIDI input to no more than four notes at a time. That's easy to do when creating a MIDI track, but if you're playing a controller live, watch out for sloppy fingering, as having five or more notes playing at once will result in voice stealing that may be objectionable.

IMPORTANT NOTE: In MIDI Omni mode, there is no way to guarantee that a particular note will be assigned to a particular harmony voice channel. While Harmony Engine does its best to assign the lowest note to the highest numbered active channel, depending on your fingering, that may not always be possible. Setting different harmony voices to different Gain, Pan, and/or Throat Length settings will almost certainly result in harmony lines jumping from timbre to timbre, which may or may not be acceptable. As a result, this mode is most useful (or, at least, most predictable) when all active harmony voices are set to the same settings.

MIDI Channels Mode

When MIDI Channels mode is selected, Velocity Sensitivity is active and all other section controls and the Interval popups in the individual harmony voice channels are disabled.

This is the mode to use when you want to have absolute control over every note of your harmony arrangement.

In MIDI Channels mode, channels 1-4 of the MIDI bus assigned to Harmony Engine are routed to the matching numbered harmony voice channels. Its main purpose is for executing harmony arrangements where you can be assured that individual harmony lines will always be realized by the desired harmony voice.

About Routing MIDI to Harmony Engine

In order to use the MIDI Harmony Control modes described above, you must be able to route MIDI data to Harmony Engine. The method of routing MIDI to a plug-in varies pretty dramatically (both in technique and ease) among various hosts. If you are unsure how to do it in your particular host, you should refer to your host's manual for instructions. In addition, check the Read Me that accompanies Harmony Engine for a guide to a few of the more obscure routing schemes. Finally, you can open one of the Tutorial Sessions described in Chapter 5 and simply observe how it is done.

Harmony Presets

The Harmony Preset system allows you to assign combinations of harmony control settings to each of 15 buttons for instant recall, either manually or via automation. It is a powerful tool, both for ease of creating vocal arrangements and as a creative tool for quickly and easily experimenting with a variety of harmonic approaches. Particularly in Chord Degrees or Chord Name modes, assign a variety of chords to the preset buttons and, with just a few clicks, audition your vocal with an almost limitless combination of harmonic structures.

Here's how it works:

Harmony Presets store the value of the following controls:

Harmony Source	Inversion
Key/Root	Register
Scale	Spread
Chord	MIDI Velocity Sensitivity

Harmony Channel Intervals (fixed)
Harmony Channel Intervals (scale)

Note that not all of the above controls are available in every mode. When assigning a Harmony Preset to a button, only those controls that are active in the selected Harmony mode are remembered.

In normal operation, a button with a preset assigned to it is blue and displays the first five or six characters of the preset's name. A button with no preset assigned to it is gray and displays no text.

NOTE: If you assign a preset to a button without entering a name for it in the Name field, you'll end up with a blue button (indicating that it has an assigned preset) that displays no text (since it has no name). In general, unless you have a really good memory, this is a bad idea. Don't do it.

When you click a button with a preset assigned, the preset's full name will appear in the Harmony Preset Name field and the various harmony controls will be set to their preset values.

To assign a new preset to a button:

1. Set the controls listed above as desired.
2. Click in the Name field below the Harmony Preset buttons and type a name for the preset. Remember, the first 5 or 6 characters will be displayed on the button, so try to pick something that will remind you what each preset is about.
3. Click the Preset Assign button. The button will flash red and all of the Harmony Preset buttons will turn blue.
4. Click on the Harmony Preset button to which you want to assign the preset. The Assign button will stop flashing and all unassigned Preset buttons will once again turn gray. The selected button will remain blue and its preset name text will be displayed.

If you assign the new preset to a button that already has a preset assigned to it, the new preset will overwrite the old one.

If you click the Assign button and then realize that you forgot to type a name for your preset, you can still click the name field and type a name before clicking a preset button to assign the preset.

If you click the Assign button and then, for some reason, change your mind, simply click it again to exit Assign mode.

To edit an existing preset:

1. Click the existing preset's button to call up its control settings and place its name in the Name field.
2. Edit the controls as desired.
3. Click the Assign button and then the preset's button. The updated values will be recorded and the preset's name will remain the same. Optionally, you can modify the preset name (which will already be in the Name field) before assigning the edited preset to the button.

To create a new preset based on an existing preset:

1. Click the existing preset's button to call up its control settings and place its name in the Name field.
2. Edit the controls as desired.
3. Click in the Name field and type a name for the new preset.
4. Click the Assign button and then the preset button to which you want to assign the new preset.

A TIP: Don't forget to change the name of the new preset before assigning it to a button. Otherwise you end up with two identically named presets with different control values. Not good.

To delete an existing preset:

1. Click Preset Delete button
2. Click the button whose preset you want to delete. The selected preset will be erased and its button will return to the gray unassigned state.

IMPORTANT NOTE: Harmony Presets are local to the instance of Harmony Engine in which they are created. If you want to share a set of Harmony Presets among various instances of Harmony Engine, save the plug-in state as a preset in your host so that it can then be recalled as a starting point in any instance of Harmony Engine.

Voice Parameter Presets

The Voice Parameter Preset system allows you to assign combinations of voice parameter settings to each of 6 buttons for instant recall, either manually or via automation. This makes it easy to instantly change the timbre and configuration of your "vocal group" at any point in your song.

Voice Parameter Presets store the values of the following controls:

Naturalize
Pitch Variation
Timing Variation
Glide Transition Rate

Original Input:
- Solo
- Mute
- Tracking
- Gain
- Pan

Harmony Channels 1-4:
- Solo
- Mute
- Gain
- Throat Length
- Pan
- Vibrato Rate
- Onset Delay
- Pitch Amount
- Amplitude Amount

In normal operation, a button with a preset assigned to it is blue and displays the first 5 or six characters of the preset's name. A button with no preset assigned to it is gray and displays no text.

When you click a button with a preset assigned, the preset's full name will appear in the Name field and the harmony voice parameters will be set to their preset values.

Assigning and deleting Voice Parameter Presets works exactly like the Harmony Presets described above, with the obvious exception that you will be working with the six Voice Parameter Preset buttons and their associated Name field.

If you've already read those instructions, there's really no point in reading the rest of this section, since we just copied and pasted the same stuff and changed all the references to Harmony Presets to Voice Parameter Presets. (On the other hand, if you're reading the manual out of order and got here first, you might as well read about it here.)

To assign a new preset to a button:

1. Set the controls listed above as desired.
2. Click in the Name field below the Voice Parameter buttons and type a name for the preset. Remember, the first 5 or 6 characters will be displayed on the button, so try to pick something that will remind you what each preset is about.
3. Click the Preset Assign button. The button will flash red and all of the Voice Parameter buttons will turn blue.
4. Click on the Voice Parameter button to which you want to assign the preset. The Assign button will stop flashing and all unassigned Preset buttons will once again turn gray. The selected button will remain blue and the preset name text will be displayed.

If you assigned the new preset to a button that already had a preset assigned to it, the new preset will overwrite the old one.

If you click the Assign button and then realize that you forgot to type a name for your preset, you can still click the name field and type a name before clicking a preset button to assign the preset.

If you click the Assign button and then, for some reason, change your mind, simply click it again to exit Assign mode.

To edit an existing preset:

1. Click the existing preset's button to call up its parameters and place its name in the Name field.
2. Edit the parameters as desired.
3. Click the Assign button and then the preset's button. The updated values will be recorded and the preset's name will remain the same. Optionally, you can modify the preset name (which will already be in the Name field) before assigning the edited preset to the button.

To create a new preset based on an existing preset:

1. Click the existing preset's button to call up its parameters and place its name in the Name field.
2. Edit the parameters as desired.
3. Click in the Name field and type a name for the new preset.
4. Click the Assign button and then the preset button to which you want to assign the new preset.

A TIP: Don't forget to change the name of the new preset before assigning it to a button. Otherwise you end up with two identically named presets with different control values. Not good.

To delete an existing preset:

1. Click Preset Delete button
2. Click the button whose preset you want to delete. The selected preset will be erased and its button will return to the gray unassigned state.

IMPORTANT NOTE: Voice Parameter Presets are local to the instance of Harmony Engine in which they are created. If you want to share a set of Voice Parameter Presets among various instances of Harmony Engine, save the plug-in state as a preset in your host so that it can then be recalled as a starting point in any instance of Harmony Engine.

Chapter 4: Factory Presets

This chapter provides brief descriptions of the factory presets that ship with Harmony Engine.

Since it is extremely unlikely that any factory preset will be immediately useful for any of your personal projects, we have designed the presets to demonstrate various ways of using Harmony Engine. Simply start with a vocal track whose key and chord progression you know and run through the presets while reading their descriptions below.

IMPORTANT NOTE: Unlike synth presets, which will always sound the same for all users, the Harmony Engine presets are heavily dependent on the vocal tracks that you use them on. Consequently, they serve primarily as starting points for various general usages, with the expectation that you will tweak them to work best with your particular track.

Specifically, they all contain the default settings for the Tracking and Vocal Range controls. Before auditioning presets, you must set each of those controls to reflect your actual track.

Also, although the presets were designed with vocal tracks in mind, feel free to experiment with any preset on any source track. There are no rules.

The Presets

In experimenting with the presets below, it is important to keep the following points in mind:

- The presets that use Scale Interval or Chord Degrees mode are programmed with the Key set to C Major or G Major. Unless your composition is actually in C or G Major, you must first change the Key and Scale to the correct settings for your composition.
- Due to the differences in the way various hosts deal with routing MIDI to plug-ins, we have not included any presets that use the various MIDI modes. To experiment with the MIDI modes, use the Tutorial Sessions described in Chapter 5.

Chord Degrees 1

This preset provides the root version all of the available chord degrees on the Harmony Preset buttons, as well as the first inversion of the key's root chord.

The Register and Spread controls are set for fairly wide, mid-range harmonies.

The Voice Parameter Presets provide the following choices:

No Variation: default Throat Lengths and all Humanization settings at 0

Varied: Various amounts of Naturalize, Pitch and Timing Variation and modified Throat Lengths

Vibrato: Similar to Varied, but with the addition of slightly different vibratos to each voice

Things to try:
Play your vocal track and manually click the appropriate chord degree button at each chord change in your song.

Experiment with different chord degrees. Does you melody work with any alternate harmonizations?

Use your host's automation system to record the Harmony Preset buttons and automate chord degree changes.

Try changing the Register and Spread settings. Listen to the effect of various ranges and chord spacings.

Pick a part of your vocal where the chord remains unchanged for a measure or two. Click the Formant Only Freeze button at the beginning of that phrase and listen to the result. Then start again and click the Formant + Pitch Freeze button at the same point and note the difference. In both cases, click the respective buttons again at the end of the phrase to return to normal harmonization.

Click the different Voice Parameter Preset buttons to hear their differences. Try modifying one or more of the voice parameters and save your new version onto one of the unassigned Voice Parameter buttons.

Chord Degrees 2

This preset is similar to Chord Degrees 1 above, but instead of including all of the degrees on the Harmony Preset buttons, it includes the more commonly used degrees along with a variety of inversions of some of the degrees..

The Register and Spread controls are set for fairly wide, mid-range harmonies.

The Voice Parameter Presets provide the following choices:

No Variation: default Throat Lengths and all Humanization settings at 0

Varied: Various amounts of Naturalize, Pitch and Timing Variation and modified Throat Lengths

Vibrato: Similar to Varied, but with the addition of slightly different vibratos to each voice

Things to try:
Pretty much the same things as listed in Chord Degrees 1 above.

Cool Chords 1

This preset (along with the following "Cool Chords" presets) can be thought of as a sort of harmonic toy-box. It uses Chord Name mode to give you a variety of chords in a variety of ranges to try with your melody track.

In this preset, four chords are provided, each in a low, medium and high voicing.

The Voice Parameter Presets provide the following choices:

No Variation: Default Throat Lengths and all Humanization settings at 0

Vibrato: Various amounts of Naturalize, Pitch and Timing Variation and modified Throat Lengths with the addition of slightly different vibratos to each voice

Low2Hi: Throat Lengths optimized for a low input voice that is generally being shifted up (e.g., the original input is a baritone and the harmony voices are in the tenor and alto range).

Hi2Low: Throat Lengths optimized for a high input voice that is generally being shifted down (e.g., the original input is a soprano and the harmony voices are in the alto, tenor, or even bass range).

Things to try:
Just play with the various chords and voicings with your input voice. Do they work?

If the key of the original input is totally incompatible with the chords, mute the original input and listen to just the harmony voices. Since Chord Name mode always generates the correct harmony notes regardless of the input pitch, you can create an entirely re-harmonized version of your input.

Add three new chords of your choice to the three unassigned Harmony Preset buttons.

Customize some (or all) of the Voice Parameters and save them to the unassigned buttons.

Play with the Freeze buttons as described above. Check out their effects when you have complete control of the harmonization.

Since all of the Cool Chords presets operate on basically the same principle, we will just describe their differences below:

Cool Chords 2

In this preset, we've provided five chords, each in a low, medium and high voicing.

The Voice Parameter Presets provide a No Variation version, along with Low, Medium, and High settings that are optimized for those voicing ranges.

Things to try:
Create harmonizations that are entirely in the Low, Medium or High registers. Select various Voice Parameter Presets, both matching and non-matching ranges.

Cool Chords 3

Same as Cool Chords 2, but with a different set of chords.

Cool Chords 4

Six chords, each with a mid register and low register version.

Voice Parameter Presets include the standard No Variation, Varied, and Vibrato settings.

Cool Chords 5

Ten different chords, all in a relatively wide mid-range voicing. Voice Parameter Presets the same as Cool Chords 4.

Things to try:
Add up to five additional chords (or inversions) of your choice to the unassigned Harmony Preset buttons.

Change the Register and/or Spread and/or Inversion of the supplied chords and resave the new versions to the same (or a different) button.

Dissonance

This preset uses Fixed Interval mode to provide three different special effects. In each case, the original input is muted.

diss 1: Four harmony voices at half-tone intervals two octaves below the input.

diss 2: Four harmony voices at half-tone intervals two octaves above the input.

diss 3: Four harmony voices at half-tone intervals clustered around the input.

The two Voice Parameter Presets demonstrate pan control, offering a contrast between all voices panned center and the spread across the stereo soundstage.

Things to try:
Unmute the original input.

Try modifying individual voice intervals

Add various amounts of vibrato to one or more of the harmony voices.

Experiment with various Glide settings.

Try various combinations of Humanize settings.

Duet

This preset uses Scale Interval Mode to provide one harmony voice at a variety of intervals. (Don't forget to change the Key and Scale popups to match your track.) Choices include:

5th up or down
4th up or down
3rd up or down
Octave up or down

Harmony Channel 1 is used for all presets. The other channels are muted.

The Voice Parameter Presets provide a No Variation version, along with Low and High versions, which add Humanization and Throat Length modifications that accentuate the formant changes associated with shifting up or down.

Things to try:
Add vibrato to the harmony voice.

Try different values of Glide.

Unmute one or more of the other channels and experiment with different intervals.

Fixed Intervals

This preset lets you explore the effect of using various parallel intervals in Fixed Interval mode. Other than unison and octaves, this is not something you would typically use in conventional diatonic music, but as this preset will show, it can be useful as an effect in sound design.

Things to try:
Explore other combinations of parallel intervals.

Group

This preset demonstrates how the Harmony Presets and the Voice Parameter Presets can be used together to create variously-sized vocal groups.

Using Scale Interval mode (don't forget to change the Key and Scale popups to match your track), this preset provides four variations of four harmony voices and two variations of two harmony voices.

Up1, Down1, Up2 and Down2 are the four voice presets and are designed to be used with the Voice Parameter presets No Variation, Up and Down.

The Harmony Presets TrioUp and TrioDown are designed to be used with the Voice Parameter presets TrioUp and TrioDown. The Harmony Presets define the proper intervals, while the Voice Parameter presets define the "Trio" by muting harmony channel 3 and 4.

Humanize Fun

This preset is designed to demonstrate the variety of effects available from the Humanize functions, as well show how different Harmony Control modes can be combined in a single preset.

The Voice Parameter presets include one preset with no Humanize functions and five additional presets with various combinations of the three Humanize functions (their names make their settings pretty obvious, but you can also just watch the controls as you select each preset).

Up in the Harmony Presets section, you will see that four different harmony modes are represented. The top three buttons are chords in Chord Name mode. The next 6 are chords in Chord Degrees mode (be sure to set the Key and Scale as necessary). Finally there is a preset in Scale Interval mode (again, set the Key and Scale) and another in Fixed Interval mode.

The point of this is that different parts of a particular project may work best with different harmony modes. For example, Scale Interval mode might work great for an entire song except for one phrase in the bridge where the harmony moves away from the basic scale. In that case, you can have the primary preset be in Scale Interval mode, but still include a few Harmony Presets that specifically define the errant chords in Chord Name mode.

Things to try:
Experiment with the various combinations of Harmony Control modes and Humanize presets.

If your track needs some chords that don't work well in Scale Interval mode, add them to the unused Harmony Presets buttons and try switching back and forth between the modes as necessary.

Vibratos

This preset demonstrates the use of the Vibrato controls to create special effects. It includes one Harmony Preset that features amplitude-only vibrato (more accurately tremolo) and another that features extreme pitch variation.

In each case the original input is muted and the presets impose their effects on a D7 chord.

Things to try:
Adjust the various channels' vibrato settings.

Unmute the original input.

Change Harmony mode to Scale Interval or Chord Degrees and see how the effects work in the context of a song.

Experiment with the Humanize functions (which are turned off by default in this presets).

Vocal Multiplier

This preset uses Fixed Interval mode and Voice Parameter presets to thicken the original input with one, two, three or four unison voices. In each case the active voices' pan settings are adjusted for best effect for that number of voices.

Things to try:
Experiment with different amounts of vibrato on one or more voices.

Click the Formant + Pitch Freeze button to hold the harmony voices in a drone while the original voice continues. Click it again to release the freeze and return to regular doubling.

Try different Humanize settings.

You Can Believe

This preset creates the infamous "Cher Effect" on Harmony Channel 1. A couple of things to keep in mind:

- The preset uses Scale Interval mode, so you will need to set the correct Key and Scale for your track.
- Getting this effect requires the right combination of vocal track style and selected scale. If it isn't giving you the effect you want, try a different key or a different scale (or both). And remember that some vocals are just not candidates for the effect under any circumstances.

Things to try:
Try unmuting one or more of the other three harmony channels and setting various intervals. The results will be highly dependent on your track and the selected Key and Scale, but you might end up with something pretty cool. Then again, you might not.

Chapter 5: Tutorial Sessions

As mentioned in Chapter 1, the composers who produced three of the Harmony Engine demo compositions have been kind enough to allow us to include the actual sessions for you to load into your host and experiment with.

In each case, we've provided versions of each demo for a number of the most popular host applications. To keep the sessions to manageable size, all accompaniment tracks have been mixed to a single stereo track. Any pre-processing of the vocal tracks (compression, EQ, etc.) was pre-rendered to the tracks. For any post-processing of the vocal track and/or Harmony Engine output (delay, chorus, reverb, etc.), we asked the composers to limit themselves to generic effects that come standard with their hosts (so that they could be easily replicated in other hosts).

MIDI

The method of routing MIDI to a plug-in differs pretty dramatically (both in technique and ease) among the various hosts. For that reason, the sessions that use Harmony Engine's MIDI modes are supplied with all MIDI routings in place. Just press Play and everything should just work.

NOTE: If you plan to use Harmony Engine's MIDI modes, but you're not familiar with your host's MIDI routing scheme, examining the sessions that use MIDI can be instructive. Even easier, you can use those sessions as templates. Simply make a copy of a session, delete the existing audio and MIDI data and replace them with your own.

Stay By Me (Paloma Ramos and Jason Poyner; produced by Brian English)

This pop ballad consists of a lead vocal track by singer/songwriter Paloma Ramos with piano accompaniment by co-writer Jason Poyner. Producer Brian English generated MIDI data from Jason's original keyboard performance and edited it for use as harmony control input to a single instance of Harmony Engine.

Brian used two of Harmony Engine's MIDI modes for different harmony voicing effects. In some sections, he used MIDI Omni mode, which created harmony voices at the exact pitches and ranges of the MIDI data. In other sections, he used Chord via MIDI mode, defining the harmony notes by the MIDI data but controlling the range and voicing of the harmony voices with the Register and Spread controls.

In addition, Brian automated Harmony Engine's Formant Only Freeze function at various points in the arrangement to turn the harmony voices into wordless backup parts.

Things to try:
Open Harmony Engine and watch its response to automation as the song plays. Note where it's using MIDI Omni mode and where it's using Chord via MIDI mode. Listen for the different harmony voicing effects.

Note the use of Formant Only Freeze and listen to its effect.

Create alternate harmony voicings by modifying the Register and Spread controls in the Chord via MIDI sections.

Try using the Freeze functions in other parts of the song.

Try completely reharmonizing the song:

- Mute the piano part.
- In Harmony Engine, call up one of the Chord Degrees or Cool Chords presets.
- Play the song and use the Harmony Preset buttons to experiment with different chord progressions.
- To get really wacky, mute the original input in Harmony Engine and go crazy with the chords.

Lift Us Away (gerry bassermann)

This country-tinged song features two vocalists, a male and a female, each processed with an instance of Harmony Engine. Between the two parts, gerry uses three different Harmony Control modes as follows:

Male Singer
The male singer's performance is split into three distinct sections:

In the first section, the harmonic structure is relatively simple, allowing four harmony voices to be generated using Scale Interval mode in G Major. The selected intervals are 8vb, -4th, +3rd, and 8va.

NOTE: Because the Key and Scale are not stored in the Harmony Presets when using Scale Interval mode (see Chapter 3 for the explanation of why it works that way), in addition to automating the Scale Interval Harmony Preset, gerry also uses automation to set the Key and Scale popups to G Major at the beginning of the song.

Leading into the second section, gerry automates Harmony Engine's Bypass function to make the lead-in a solo. Since the second section consists of a more complex harmonic progression than the first, gerry automates a change to Chord Name mode and uses automated Harmony Presets to follow the progression with the Register and Spread controls set to a mid-range voicing.

The third section returns once again to Scale Interval mode and the Key of G Major.

Female Singer
All harmonies for the female singer are generated using MIDI Channel mode. (In most hosts you should be able to examine the MIDI tracks in edit view.)

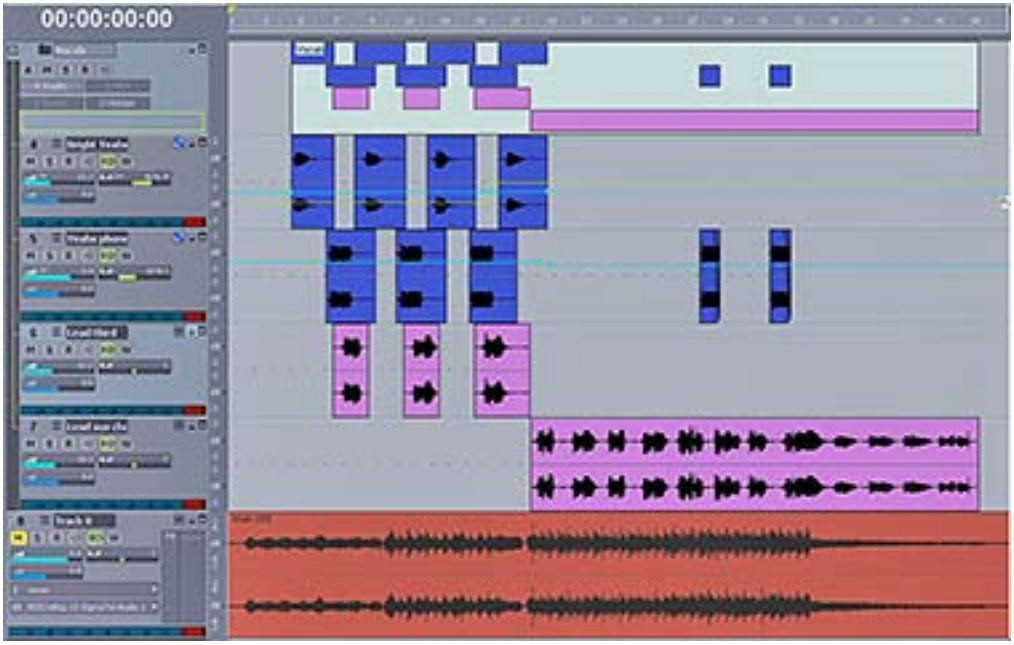
Notice how the number of female harmony voices changes at various places in the song. In MIDI Channel mode, a harmony voice is only active when MIDI data is present on its channel, so it's easy to have a duet in one section and four part harmony in the next (or even from note to note).

Things to try:
Select different intervals in the male singer's Scale Intervals sections.

Try different Register and Spread settings during the male's Chord Name section.

Experiment with the Freeze functions. Try Formant Only during the male singer's second section. Try Formant Only or Formant + Pitch at various places in the female's sections.

Modify the MIDI data and listen to the result.



Let You Know (Erik D and Stacey Dawn)

In this tasty bit of techno from Erik D and Stacey Dawn, the lead vocal and various vocal effects are split onto four separate tracks, each with its own instance of Harmony Engine, allowing the various parts to overlap each other.

Here's what's there:
The first track, intermittent "Yeah"s, uses Harmony Engine set to Scale Interval mode in C Major to create a single harmony part a 5th above the original vocal. All Humanize functions are set to 0.

The next track consists of heavily processed repetitive "Yeah"s used as accents. For this track, Harmony Engine is also set to Scale Interval mode in C Major, but in this case four harmony voices are generated, two voices a 3rd above the original and 2 more a 5th above. Each pair are panned apart form each other and all of the Humanize functions are set to moderate amounts.

The third track is made up of disconnected phrases from what will eventually be the lead vocal. Still using Scale Interval mode in C Major, Harmony Engine creates four voices, all a 3rd below the original. Each of the four voices have different Pan, Vibrato and Throat Length settings. In the Humanize section, Naturalize is set to a moderate amount, with a little bit of Pitch Variation and no Timing Variation.

Finally, the lead vocal uses Harmony Engine to create four harmony voices in Chord Name mode with the chord set to C Sus in 1st inversion. The Register and Spread controls are used to arrange the harmony voices in a medium high, medium tight voicing. Each voice has different Pan, Vibrato, and Throat Length settings, but all Humanize functions are set to 0.

Things to try:
Add one or more additional voices at different intervals to the first "Yeah" track.

Set different intervals for one or more of the harmony voices on the third track.

Experiment with different chords on the lead vocal part.

Try various different Register and Spread settings on the lead vocal.

Use either of the Freeze functions at various points on the lead vocal.

More Sessions?

We may, in the future, provide additional sessions to explore. If so, they will be able to be downloaded from the Antares Software Update page at:

http://www.antarestech.com/download/update.shtml

Check back every now and then to see what appears.

In the meantime, have fun!