antares

Auto-Tune evo

Pitch Correcting Plug-in

Auto-Tune reborn!

Owner's Manual

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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 Auto-Tune Evo, the latest (and indisputably greatest) generation of the worldwide standard in professional pitch correction.

Before you proceed any farther, we'd like to strongly encourage you to register and authorize your copy of Auto-Tune Evo. (You can skip ahead to the Authorization and Installation instructions on page 5. We'll wait.) Also, if you're planning on discarding that lovely Auto-Tune Evo box, it's probably a good idea to 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.)

At Antares, we are committed to excellence in quality, customer service, and technological innovation. With your purchase of Auto-Tune Evo, 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

Auto-Tune Evo represents the most substantial advancement in power and ease of use since Auto-Tune's original introduction in 1997.

If you are new to Auto-Tune, we encourage you to read this manual and work through the tutorials in Chapter 4. It's the quickest way to become familiar with what Auto-Tune Evo does and how it does it.

If you are upgrading from a previous version of Auto-Tune, you will find that most of what you're already doing will continue to work in Auto-Tune Evo, only better. However, there's more new stuff in Auto-Tune Evo than in any previous Auto-Tune update. To get up to speed quickly, just check out the new feature overview below and then refer to the detailed New Feature Quick Start Guide in Chapter 5, which will tell you everything you need to know to make use of Auto-Tune Evo's new capabilities.

ONE BIG IMPORTANT NOTE

It is critical to note that Auto-Tune Evo will NOT open sessions created with Auto-Tune 5. The improvements made to the core technology are so extensive that it just won't work. For that reason, we have configured Auto-Tune Evo such that it and Auto-Tune 5 can be active in your DAW simultaneously.

However, it's also important to note that we will not be releasing future updates to Auto-Tune 5, so it is inevitable that between computer OS advancements and host updates, Auto-Tune 5 will eventually stop working.

If you have current saved sessions with instances of Auto-Tune 5 that you may need to access into the indefinite future, we offer the following suggestions:

- If you are satisfied with the current Auto-Tune 5 settings, use whatever method your host offers (bouncing, offline editing, etc.) to permanently render the corrected tracks.
- If you believe you will need to keep editing into the future, remove the instances of Auto-Tune 5 and replace them with instances of Auto-Tune Evo.

What's new in Auto-Tune Evo

The following are the key new features that have been added in Auto-Tune Evo:

General Features

- **Dramatically enhanced core technology:** While Auto Tune's patented processing technology has always provided unmatched speed and accuracy, for Auto-Tune Evo, Dr. Andy has gone back to the proverbial drawing board to create a seriously evolved voice processing technology that takes advantage of the hugely more powerful computers that are now the norm for digital audio recording.

  The result is Evo™ Voice Processing Technology, offering powerful new features and capabilities along with pitch detection and correction that is substantially more accurate and reliable over a much wider range of audio input quality.
- **Redesigned user interface:** Continuing the process begun with Auto-Tune 5, we have again refined the Auto-Tune user interface to allow for smoother, more intuitive workflow.
- **Reorganized common controls:** With the addition of the new pitch shifting, formant correction, and throat modeling capabilities described below, we have reorganized the

common control area to ensure that all of the parameters used by both Automatic and Graphical correction modes are easily available at all times.

- **Tracking control back where it belongs:** Back in Auto-Tune 5, we consolidated the Auto Mode and Graphical Mode Tracking controls and moved the resulting control to the Options dialog. This turned out to be a none-too-popular move. It's now back in the common control area where it's instantly accessible in either mode. (And speaking of the Tracking control, the new Evo Processing technology allows the Tracking control to more easily correct (the now rare) octave pitch-tracking errors.)

Automatic Mode Features

- **Real-time pitch shifting:** Auto-Tune Evo's new Transpose control provides extremely high-quality real-time pitch shifting over a two-octave range (+/- one octave in semi-tone increments).
- **Formant correction (Native versions only):** While Auto-Tune's classic pitch adjustment technology still provides the optimum results for the very small intervals typical of conventional pitch correction, for larger intervals or outright pitch-shifting, engaging Auto-Tune Evo's Formant Correction function preserves vocal character over a much wider pitch-shift range.
- **Throat modeling (Native versions only):** Utilizing the latest incarnation of Antares' unique throat modeling technology, the new Throat Length control actually allows you to modify vocal character by passing it through a variable-length physical model of the human vocal tract.

  (Throat modeling is only available when Formant Correction is engaged.)

Graphical Mode Features

- **Resizable Graphical Mode window:** In most hosts, Auto-Tune Evo's Graphical Mode window can be resized in real-time, limited only by the size of your monitor. (In hosts that don't support real-time resizing, the window size can be set in the Options dialog. In VST hosts, resizing is limited to a maximum size of 1600 x 1200 pixels — still not too shabby.)
- **New Note-based pitch correction and pitch shifting:** In addition to Lines and Curves, Auto-Tune Evo introduces an entirely new method of pitch editing: Note Objects. Clicking the Make Notes button will cause Auto-Tune Evo to analyze the tracked audio and create graphic representations of the target notes (which can be fine-tuned with the Number of Note Objects control). These objects can then easily be edited, shifted in pitch, and individually pitch corrected or retuned. New Note Objects can be drawn with the new Notes Tool, and the transitions between Notes can easily be customized with the Curve Tool.

  Like Auto-Tune Evo's other editing techniques, Note Objects can be employed in selected parts of your track and intermixed with the other techniques. You are always free to select whichever method (Notes, Curves or Lines) is most effective for each particular editing task.
- **Object-based Retune Speed settings!** In one of Auto-Tune Evo's initially less obvious, but functionally most powerful changes, Retune Speed is now an independent property of each individual correction object (Curve, Line or Note).

  Since each object can have its own Retune Speed setting, you will no longer need to automate Retune Speed to get the optimum rate for each note of a performance. (Because of this, the Retune Speed knob is only active when one or more objects are selected.)

- **Customizable object-based default Retune Speeds:** Since you will typically use different pitch correction objects for different tasks (e.g., traditional pitch correction, pitch shifting, T-Pain-style effects, etc.), you can streamline your workflow by setting your own custom default Retune Speeds for each type of object (i.e., Curves, Lines, and Notes) in the Options dialog.
- **Real-time display of output pitch:** In addition to Auto-Tune's traditional Tracked Pitch, Line and Curve plots, Auto-Tune Evo provides a new Output Pitch curve that displays the exact output pitch based on the current Retune Speed. This curve updates in real time as you adjust the Retune Speed, so there's never any doubt about the precise effect of each setting.
- **Comprehensive programmable keyboard shortcuts:** Auto-Tune Evo's new Key Binding system (located in the Options dialog) lets you assign virtually any Graphical Mode function to each of the QWERTY number keys (i.e., the number keys across the top of your keyboard). So no matter what your personal editing workflow, you can ensure that your most-used functions are always only a key press away.
- **New Pitch Graph display mode:** Clicking the Show Lanes button will switch the Pitch display to the new "Lanes" display mode. This is particularly useful when using Note Objects for pitch correction or pitch-shifting individual notes.
- **Global Transposition:** As with Auto Mode, Auto-Tune Evo's Transpose control provides extremely high-quality pitch shifting over a four-octave range (+/- one octave in semi-tone increments).

  Although you can also accomplish overall transposition in Graphical Mode by selecting all the correction objects in your track and manually moving them up or down, in most cases, using the Transpose function will provide superior results.

  Note that this control does not affect the Pitch Graph Display. It provides overall transposition on top of any pitch shifting accomplished with the graphical editing tools.
- **Formant correction (Native versions only):** Again, as described above for Auto Mode, Auto-Tune Evo's Formant Correction function helps to preserve vocal character when a voice is shifted up or down more than a semitone or two.
- **Throat modeling (Native versions only):** And yes, it's just as described above in Auto Mode. Perfect for subtle modification of vocal character, or at more radical settings, for dramatic special effects.

  (Available only when Formant Correction is engaged.)
- **New graphical Paste function:** The revised Paste function displays a graphic representation of your copied data and lets you visually place it at the desired destination before finalizing the Paste. (Perfect for copying Note Object-based edits to other parts of a track.)
- **Enhanced pitch displays:** Auto-Tune Evo provides simultaneous displays of Tracked Pitch, Correction Object Pitch, and the resulting Output Pitch at the current cursor location.
- **Nudge controls for pitch correction objects:** To aid precise editing, the new Nudge controls let you move selected object(s) up or down in precise one pixel increments. (The actual pitch increments depend on the current zoom value of the edit window.)
- **Enhanced I-Beam Tool behavior:** Double-click with the I-Beam in the Pitch Edit or Envelope display to instantly highlight the entire range of tracked pitch.

How to use this manual

If this is your first experience of Auto-Tune, you will find that Auto-Tune Evo has a very friendly user-interface and is extraordinarily easy to use. However, because Auto-Tune Evo does things that have never been done before, some aspects of the user-interface may not be immediately obvious. You should at least read either Chapter 3, Auto-Tune Evo Controls, or Chapter 4, Auto-Tune Evo Tutorial, to learn the essential information you will need to operate Auto-Tune Evo.

And as we mentioned above, if you are upgrading from Auto-Tune 5, go straight to Chapter 5, the New Feature Quick Start Guide, to learn everything you need to know (about Auto-Tune's new features, anyway).

The contents of this manual

Chapter 1: Getting Started
The chapter you are reading.

Chapter 2: Introducing Auto-Tune Evo
This chapter presents some basic facts about pitch and how Auto-Tune Evo functions to correct pitch errors. The basic functionality of Auto-Tune Evo is discussed, and information you need in order to use it effectively is provided.

Chapter 3: Auto-Tune Evo Controls
This chapter is reference information for all of the controls used in the Auto-Tune Evo interface.

Chapter 4: Auto-Tune Evo Tutorial
This chapter introduces you to details of how Auto-Tune Evo works by guiding you through several tutorials. The tutorials will give you insight into how and when to use each of Auto-Tune Evo's key functions.

Chapter 5: New Feature Quick Start Guide
This chapter contains detailed information about each of Auto-Tune Evo's new features. All of this information is also included in Chapter 3, but is presented here to allow experienced Auto-Tune 5 users to quickly come up to speed on the enhancements and new capabilities in Auto-Tune Evo.

Chapter 6: The Auto-Tune Vocal Effect (i.e., the Cher/T-Pain style effect)
What it is. How to do it.

Chapter 7: Other Creative Applications for Auto-Tune Evo
Some cool, but not-so-obvious stuff you can do with Auto-Tune Evo.

Chapter 8: The Auto-Tune Evo Scales
Brief descriptions of the various scales available in Auto-Tune Evo.

Installing Auto-Tune Evo

Any unique instructions for installing Auto-Tune Evo for your specific host or plug-in format are located in the Auto-Tune Evo Read Me file that accompanies the plug-in. This file may also contain any last-minute Auto-Tune Evo information that didn't make it into this manual.

Auto-Tune Evo is designed to work with a wide variety of digital audio applications. Please refer to your host application's user manual for more information on installing and using plug-ins.

Authorizing Auto-Tune Evo

Authorization is the process by which Auto-Tune Evo is allowed to permanently 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 DVD 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 Auto-Tune Evo until it's authorized.

Technical Support

In the unlikely event that you experience a problem using Auto-Tune Evo, try the following:

1. Make sure you have the latest version of the plug-in. You can download and install the latest version of Auto-Tune Evo 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://portal.knowledgebase.net/article.asp?article=174703&p=5764

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. Consult our searchable knowledgebase at:

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

3. Check our web page for tips, techniques, or any late-breaking information:

   http://www.antarestech.com

4. Ask that guy down the street. (You know. The one who lives in his mom's basement and spends his days playing World of Warcraft™. He'll know.)

Chapter 2: Introducing Auto-Tune Evo

Some background

In 1997, Antares Audio Technologies first introduced the ground-breaking Auto-Tune Pitch Correcting Plug-In. Auto-Tune was a tool that actually corrected the pitch of vocals and other solo instruments, in real time, without distortion or artifacts, while preserving all of the expressive nuance of the original performance. *Recording Magazine* called Auto-Tune the "holy grail of recording." And went on to say, "Bottom line, Auto-Tune is amazing… Everyone with a Mac should have this program." (In fact, we know of quite a few people back then who bought kilo-buck Pro Tools™ systems just to be able to run Auto-Tune.)

In the intervening years, Auto-Tune has established itself as the worldwide standard in professional pitch correction. Today, it's used daily by tens of thousands of audio professionals to save studio and editing time, ease the frustration of endless retakes, save that otherwise once-in-a-lifetime performance, or to create signature vocal effects for artists like Cher, Madonna, T-Pain, and many, many others.

Auto-Tune is, in fact, the world's largest-selling audio plug-in.

Now, over a decade later, recognizing the enormous increase in the power of the computers we all use for audio recording, we've evolved Auto-Tune to the next level of performance. With Evo™ Vocal Processing Technology's dramatically enhanced pitch detection and correction performance, a plethora of new capabilities and productivity features, and a refined interface designed for functionality and ease-of use, Auto-Tune Evo is, indeed, Auto-Tune reborn.

So what exactly is Auto-Tune Evo?

Auto-Tune Evo is a precision tool for correcting intonation errors or creatively modifying the intonation of a performance. Auto-Tune Evo employs state-of-the-art digital signal processing algorithms (many, interestingly enough, drawn from the geophysical industry) to continuously detect the pitch of a periodic input signal (typically a solo voice or instrument) and instantly and seamlessly change it to a desired pitch (defined by any of a number of user-programmable scales, MIDI input, or through the use of graphical editing tools).

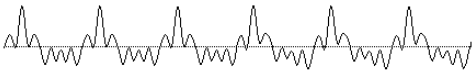
To take maximum advantage of the power of Auto-Tune Evo, you should have a basic understanding of pitch and how Auto-Tune Evo functions to correct pitch errors. This chapter presents basic terminology and introduces Auto-Tune Evo's operating paradigm, giving you the background you need to use it effectively.

A little bit about pitch

Pitch is traditionally associated with our perception of the "highness" or "lowness" of a particular sound. Our perception of pitch ranges from the very general (the high pitch of hissing steam, the low pitch of the rumble of Godzilla's enormous footsteps as he stomps his way through Tokyo) to the very specific (the exact pitch of a solo singer or violinist). There is, of course, a wide range of variation in the middle. A symphony orchestra playing a scale in unison, for example, results in an extremely complex waveform, yet you are still able to easily sense the pitch.

The vocalists and the solo instruments that Auto-Tune Evo is designed to process have a very clearly defined quality of pitch. The sound generating mechanism of these sources is a vibrating element (vocal chords, a string, an air

column, etc.). The sound that is thus generated can be graphically represented as a waveform (a graph of the sound's pressure over time) that is periodic. This means that each cycle of waveform repeats itself fairly exactly, as in the periodic waveform shown in the diagram below:



Because of its periodic nature, this sound's pitch can be easily identified and processed by Auto-Tune Evo.

Other sounds are more complex. This waveform:

is of a violin section playing a single note in unison. Our ears still sense a specific pitch, but the waveform does not repeat itself. This waveform is a summation of a number of individually periodic violins. The summation is non-periodic because the individual violins are slightly out of tune with respect to one another. Because of this lack of periodicity, Auto-Tune Evo would not be able to process this sound.

Some pitch terminology

The pitch of a periodic waveform is defined as the number of times the periodic element repeats in one second. This is measured in Hertz (abbreviated Hz.). For example, the pitch of A3 (the A above middle C on a piano) is traditionally 440Hz (although that standard varies by a few Hz. in various parts of the world).

Pitches are often described relative to one another as intervals, or ratios of frequency. For example, two pitches are said to be one octave apart if their frequencies differ by a factor of two. Pitch ratios are measured in units called cents. There are 1200 cents per octave. For example, two tones that are 2400 cents apart are two octaves apart. The traditional twelve-tone Equal Tempered Scale that is used (or rather approximated) in 99.9% of all Western tonal music consists of tones that are, by definition, 100 cents apart. This interval of 100 cents is called a semitone.

The twelve equally-spaced tones of the Equal Tempered Scale happen to contain a number of intervals that approximate integer ratios in pitch. The following table shows these approximations:

INTERVAL	CENTS	NEARBY RATIO	RATIO IN CENTS
minor second	100	16/15	111.75
major second	200	9/8	203.91
minor third	300	6/5	315.64
major third	400	5/4	386.31
perfect fourth	500	4/3	498.04
tritone	600		
perfect fifth	700	3/2	701.65
minor sixth	800	8/5	813.69
major sixth	900	5/3	884.36
minor seventh	1000	16/9	996.09
major seventh	1100	15/8	1088.27
octave	1200	2	1200.00

As you can see, the intervals in the Equal Tempered Scale are NOT equal to the harmonious integer ratios. Rather, the Equal Tempered Scale is a compromise. It became widely used because once a harpsichord or piano is tuned to that scale, any composition in any key could be played and no one chord would sound better or worse than that same chord in another key.

How Auto-Tune Evo detects pitch

In order for Auto-Tune Evo to automatically correct pitch, it must first detect the pitch of the input sound. Calculating the pitch of a periodic waveform is a straightforward process. Simply measure the time between repetitions of the waveform. Divide this time into one, and you have the frequency in Hertz. Auto-Tune Evo does exactly this: It looks for a periodically repeating waveform and calculates the time interval between repetitions.

The pitch detection algorithm in Auto-Tune Evo is virtually instantaneous. It can recognize the repetition in a periodic sound within a few cycles. This usually occurs before the sound has sufficient amplitude to be heard. Used in combination with a slight processing delay, the output pitch can be detected and corrected without artifacts in a seamless and continuous fashion. (Although it must be kept in mind that some plug-in protocols introduce a certain amount of inherent and unpredictable delay.)

Auto-Tune Evo was designed to detect and correct pitches up to the pitch C6. (If the input pitch is higher than C6, Auto-Tune Evo will occasionally interpret the pitch an octave lower. This is because it interprets a two cycle repetition as a one cycle repetition.) On the low end, Auto-Tune Evo will detect pitches as low as 25Hz (when the Bass Input Type is selected). This range of pitches allows intonation correction to be performed on virtually all vocals and instruments.

Of course, Auto-Tune Evo will not detect pitch when the input waveform is not periodic. As demonstrated above, Auto-Tune Evo will fail to tune up even a unison violin section. But this can also occasionally be a problem with solo voice and solo instruments as well. Consider, for example, an exceptionally breathy voice, or a voice recorded in an unavoidably noisy environment. The added signal is non-periodic, and Auto-Tune Evo 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 Auto-Tune Evo be a bit more casual about what it considers "periodic." Experimenting with this setting will often allow Auto-Tune Evo to track even noisy signals.

A NOTE: The above description has been in pretty much every Auto-Tune manual since the beginning. While it is still definitely true in the general case, it must be noted that Auto-Tune Evo will do a much better job than any prior version of Auto-Tune with borderline troublesome material.

How Auto-Tune Evo corrects pitch

Auto-Tune Evo provides two separate and distinct ways to approach pitch correction: Automatic Mode and Graphical Mode. The basic functionality of each is described on the following pages.

Automatic Mode

Auto-Tune Evo's Automatic Mode works by continuously tracking the pitch of an input sound and comparing it to a user-defined scale. The scale tone closest to the input is continuously identified. If the input pitch exactly matches the scale tone, no correction is applied. If the input pitch varies from the desired scale tone, an output pitch is generated which is closer to the scale tone than the input pitch. (The exact amount of correction is controlled by the Retune Speed and Humanize settings, described below and in Chapter 3.)

Scales

The heart of Automatic Mode pitch correction is the Scale. Auto-Tune Evo lets you choose from major, minor, chromatic or 26 historical, ethnic and micro-tonal scales. Individual scale notes can be bypassed, resulting in no pitch correction when the input is near those notes. Individual scale notes can also be removed, allowing a wider range of pitch correction for neighboring pitches. The scale can be detuned, allowing pitch correction to any pitch center.

For added flexibility, you can also select the target pitches in real time via MIDI from a MIDI keyboard or a pre-recorded sequencer track.

Retune Speed
Auto-Tune Evo also gives you control over how rapidly, in time, the pitch adjustment is made toward the scale tone. This is set with the Retune Speed control (see Chapter 3 for more details).

Fast Speed settings are appropriate for short duration notes and for mechanical instruments, like oboe or clarinet, whose pitch typically changes almost instantly. A fast enough setting will also minimize or completely remove a vibrato, as well as produce the infamous "Cher effect."

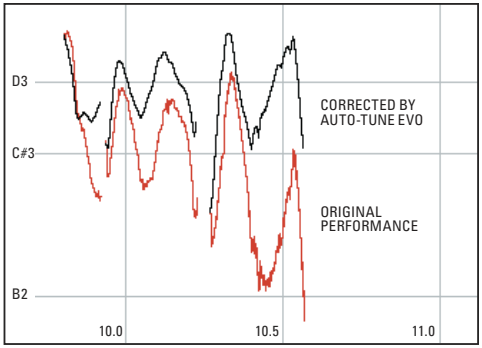
Slow Speed settings, on the other hand, are appropriate for longer notes where you want expressive pitch gestures (like vibrato) to come through at the output and for vocal and instrumental styles that are typified by gradual slides (portamento) between pitches. An appropriately selected slow setting can leave expressive gestures intact while moving the average pitch to the correct tonal center.

Vibrato
Auto-Tune Evo allows real-time adjustment of the depth of any natural vibrato present in the input.

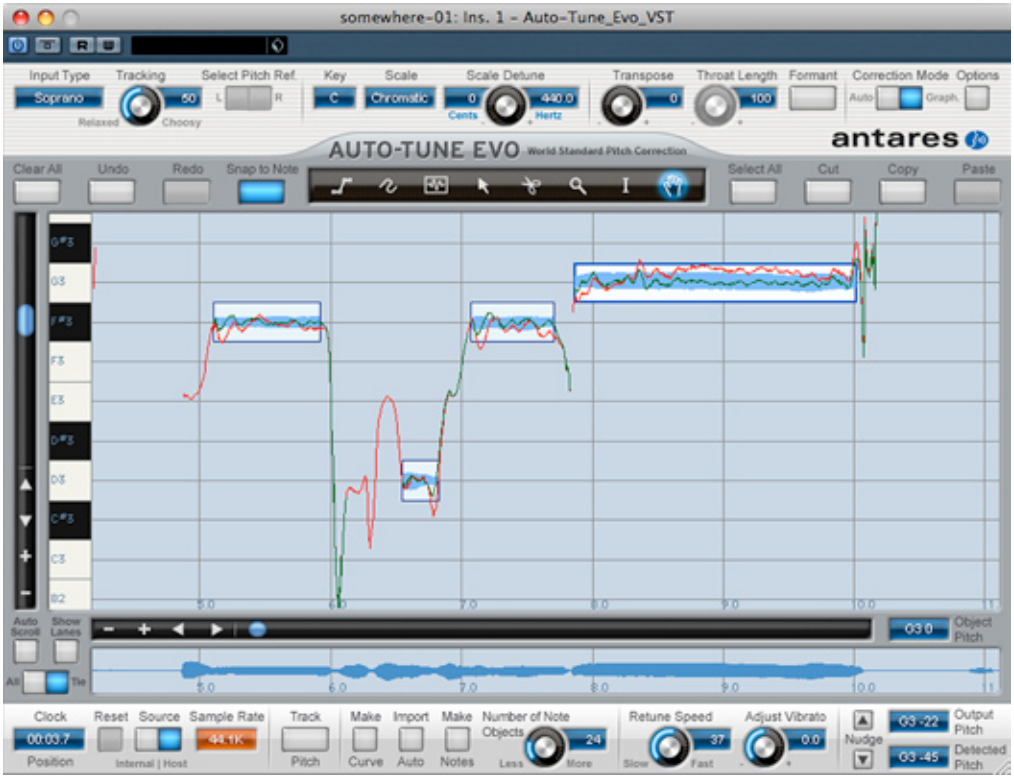
Auto-Tune Evo can also add a vibrato to an input that does not naturally exhibit one. You can program the vibrato rate along with individual vibrato depths for pitch, amplitude (loudness) and formant (resonant frequencies). You can also specify delayed vibrato with independently programmable onset delay and onset rate.

By combining a fast Retune Speed setting with Auto-Tune Evo's Vibrato settings, you can even remove a performer's own vibrato and replace it with Auto-Tune Evo's programmed vibrato, all in real time. Also, unusual combinations of Vibrato Waveform, Rate and Depth settings can be used for some interesting special effects.

An Example of Automatic Mode Correction
As an example, consider this before-and-after graphic representation of the pitch of a vocal phrase that contains both vibrato and expressive gestures.



In the original performance, we can see that although the final note should be centered around D, the vocalist allowed the tail of the note to fall nearly three semitones flat. The "after" plot is the result of passing this phrase through Auto-Tune Evo's Automatic Mode programmed to a D Major Scale (with C# and B set to "Remove") and a Retune Speed setting of 25. That Retune Speed causes the pitch center to be moved to D, while still retaining the vibrato and expressive gestures. (Setting C# and B to "Remove" is necessary to keep Auto-Tune Evo from trying to correct the seriously flat tail of the last note to those pitches. See Chapter 3 for more details.)



Graphical Mode

The Graphical Mode is similar to the Automatic Mode in that it also continuously tracks the pitch of the incoming sound and modifies the output pitch to be closer to a desired pitch. But in the Graphical Mode, the desired pitch is not a predefined scale tone, but rather is a graphical representation of your desired pitch (called a "correction object").

As in Automatic Mode, the rate of change towards the desired pitch is controlled by the Retune Speed control, but in Graphical Mode you can assign a different Retune Speed to each individual correction object, ensuring that any pitch change is as natural (or as wacky) as you desire.

The key feature of Graphical Mode is the Pitch Graph display. On this display, the vertical axis represents pitch (with higher notes towards the top) while the horizontal axis represents time. Depending on you host, you can resize the Graphical Mode window up to the limit of your monitor size.

On the Pitch Graph, the red curve represents the original pitch contour of the input track, while the desired target pitch or pitch contour (as defined by one of the three possible Correction Objects described below) is indicated in blue. The green curve displays the exact output pitch based on the current setting of the Retune Speed for each correction object.

The horizontal grid lines (or Lanes, when Show Lanes in selected) represent scale pitches. The key annotation, scale name, and scale detune value are those defined by the common area

controls at the top of the interface. They do not affect the computations of the Graphical Mode in any way. They are merely a reference to guide you in setting the target pitches.

Graphical Mode also includes the Envelope Graph, which displays the amplitude (loudness) envelope of the sound whose pitch is shown in the Pitch Graph. The horizontal scale of this graph will either 1) show the envelope of the entire extent of the pitch-detected sound or 2) align with the horizontal scale and position of the Pitch Graph above it.

To define the desired pitches, Graphical Mode provides three different Pitch Correction Objects: Lines, Curves and Notes. You can draw desired target pitches using the Line and Curve drawing tools, selectively modify the existing pitch contours using the Make Curve function, or use Auto-Tune Evo's new Note Objects to display and modify the pitch of each individual target note. The different Objects can be freely intermixed on a track to accomplish different tasks, or just to allow you to work in whichever way feels easiest.

Complete image scaling and scrolling controls are provided, along with a selection of graphical tools which allow easy editing, including cut, copy and paste functions.

Given the power of the tools, there is a huge variety of possible Graphical Mode workflows, but the basic steps you will typically perform in Graphical Mode are:

- In your host application, select some sound for processing.
- Bring up Auto-Tune Evo. Set the buffer length to at least the number of seconds from the beginning of the track to the end of the audio you are going to process. Press the Track Pitch button, then play back the audio. The pitch will be detected and then displayed in the Pitch Graph as a red curve.
- When you have tracked all the audio you want to work with, stop the transport and click the Track Pitch button again to exit Track Pitch mode.
- Define target pitches using any combination of Correction Objects and the graphical tools and adjust each object's Retune Speed for the desired effect.
- If desired, set a transposition interval, engage formant correction, or modify vocal character with the Throat Length control.
- Play back the track. The pitch will be corrected or shifted as specified.

Pitch Shifting, Formant Correction and Throat Modeling

Entirely new to Auto-Tune Evo are the Pitch Shifting, Formant Correction, and Throat Modeling functions located in the common control area and available in both Automatic and Graphical Modes.

Pitch Shifting

In addition to any pitch correction applied by either Automatic or Graphical Mode, Auto-Tune Evo provides a Transpose function that lets you shift the overall pitch of your performance over a two octave range (+/- an octave), selectable in precise semitone increments.

In Automatic Mode, this transposition is accomplished in real time.

In Graphical Mode, this function does not affect the Pitch Edit Display. It provides overall transposition after any pitch shifting accomplished with the graphical editing tools.

Although you can also accomplish overall transposition in Graphical Mode by selecting all the correction objects in your track and manually moving them up or down, in most cases, using the Transpose function will provide superior results.

Formant Correction

A sound's "formants" are the combined acoustic resonances that result from the physical structure of whatever is producing the sound.

In the case of a human voice, air from your lungs is forced through your vocal chords, causing them to vibrate. From there, the voice is propagated through the throat, the mouth and out through the lips. It is the shape of these structures that create the resonant characteristics that define your unique vocal identity.

When a vocal is pitch-shifted by large intervals without formant correction, not only is the pitch of sung notes shifted, but the formants are shifted as well. The resulting effect is not just of a person singing higher or lower notes, but of a person who is literally growing or shrinking (depending on the direction of the shift). While this can be useful for producing singing chipmunks, it typically does not produce realistic pitch-shifting over ranges larger than a semitone or two.

Engaging Auto-Tune Evo's Formant Correction prevents the shifting of a voice's resonant frequencies to ensure that its vocal characteristics are preserved over the pitch shift range.

AN IMPORTANT NOTE: Over the very small intervals usually associated with basic pitch correction, formant shifting is essentially inaudible and Auto-Tune's classic pitch adjustment technology still provides the optimum results. Formant Correction is designed to be used with overall transposition or on tracks where notes are shifted by large intervals.

Throat Modeling

As mentioned above, the shape of a singer's throat is a prime contributor to their vocal character. Auto-Tune Evo's Throat Length control lets you use Antares' unique throat modeling technology to modify a voice's character by passing it through a precise physical model of the human vocal tract.

Chapter 3: Auto-Tune Evo Controls

This chapter is a reference for all of the controls used in the Auto-Tune Evo interface. How these controls are used together for intonation correction is demonstrated in Chapter 4, Auto-Tune Evo Tutorial.

If you are upgrading from Auto-Tune 5, you can probably skip ahead to Chapter 5, New Feature Quick Start Guide.

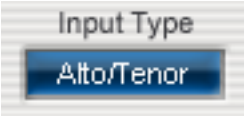
Continuous Controls

Auto-Tune Evo's continuous controls are represented graphically as virtual knobs. Depending on your preference, you can control knobs by vertical, horizontal or radial mouse movement. Set your preference in the Options dialog described below.

Double-clicking on a knob will return it to its default value. In some host applications, Command (Mac)/Control (PC) clicking on a knob will also reset it to default (see the Auto-Tune Evo Read Me and/or your host application manual for details).

Common Controls

The following controls and displays are visible regardless of which operating mode is selected. Their settings affect both Automatic and Graphical Modes.



Input Type
As a result of Antares research into the unique characteristics of various types of audio signals, Auto-Tune Evo offers a selection of optimized processing algorithms for the most commonly pitch-corrected inputs. Choices include Soprano Voice, Alto/Tenor Voice, Low Male Voice, Instrument, and Bass Instrument. Matching the appropriate algorithm to the input results in even faster and more accurate pitch detection and correction.

To select the desired Input Type, click on the Input Type pop-up and then select the desired type from the pop-up list.

NOTE: Choosing the wrong Input Type (or just forgetting to set it at all) can result in compromised performance. Pay attention.

ANOTHER NOTE: When any Input Type other than Bass Instrument is selected, Auto-Tune Evo is reliably able to detect pitches down to A0 (55Hz). Selecting Bass Instrument lowers the lowest detectable frequency by about one octave to 25Hz. Since the lowest E string on a bass guitar is approximately 41Hz, Bass Instrument (as its name so ably implies) allows you to apply pitch correction to those pesky fretless bass lines as well as other low bass range instruments. However, when Bass Instrument is selected, pitches above A4 may be incorrectly tuned, so be sure to select Bass Instrument only when correcting bass range tracks.

Tracking
In order to accurately identify the pitch of the input, Auto-Tune Evo 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 Auto-Tune Evo to still consider it periodic.

If you are working with a well-isolated solo signal (e.g., tracking in a studio or off of a multi-track master) you can typically set the Tracking control to 50 and forget it.

If, on the other hand, your signal is noisy or not well-isolated (as might be more common in a live performance situation) or you are dealing with a particularly breathy or guttural voice, it may be necessary to allow more signal variation (higher Tracking numbers). However, under these circumstances tracking is not guaranteed and a too "relaxed" setting may introduce distortion and popping.

NOTE: The improved pitch detection technology in Auto-Tune Evo (in combination with the Input Type selection described above) results in noticeably more reliable pitch detection compared to previous versions of Auto-Tune. If you have used older versions of Auto-Tune, you may find that situations that previously required constant modifications of the Tracking control now track perfectly at the default setting.

Select Pitch Reference
Auto-Tune Evo provides the ability to pitch correct stereo tracks while maintaining the tracks' phase coherence. (Refer to your host application's manual for instructions on assigning a plug-in to a stereo track.) Click the appropriate button to select which of the two stereo tracks (left or right) Auto-Tune Evo will use as a pitch reference.

NOTE: If there is a marked difference in the two tracks, pick the cleanest, most isolated track. For example, if one track is a close mic'd vocal while the other is mic'd from farther away for ambience, or is heavily processed, select the close mic'd track.

ANOTHER NOTE: Auto-Tune Evo will only pitch correct true stereo tracks. If the second track (i.e., the track not selected as a pitch reference) is simply an independent unrelated track, unpredictable (and potentially unpleasant) sounds may result. On the other hand, something interesting might happen. You never know.

When Auto-Tune Evo is instantiated on a mono track, this control is inactive (grayed out).

Key Selection
This control lets you select the key of the track you plan to process.

To select the desired key, click on the Key pop-up and then select the desired note from the pop-up list. This determines the pitch of the first note of the scale according to the standard A3 = 440 Hertz.

Scale Selection
This control is used in combination with the Key selection above to define the scale of the track you plan to process.

To select a scale, click on the Scale popup and then select the desired scale from the pop-up list.

NOTE: To avoid having to deal with scales containing those annoying double flats, double sharps and notes like Cb, E#, Fb and B#, Auto-Tune Evo will automatically choose the simpler of two enharmonically equivalent scales. For example, if you select Db Major, the Edit Scale Display will duly display the Db Major scale. However, if you then go to the Scale selection pop-up and select Minor, the Key will automatically be changed to C# and the Edit Scale Display will, in fact, display the much friendlier C# Minor scale. This will be reflected on both the Auto Mode Scale Edit display and the Pitch Graph Display in the Graphical Mode.

Auto-Tune Evo comes with 29 preprogrammed scales. The first three equal-tempered scales, chromatic, major, and minor, are the ubiquitous scales typically found in Western tonal music. The other scales are historical, ethnic, and micro-tonal scales. An in-depth discussion of these scales and their history is beyond the scope of this manual. The interested reader will find more information in *Tuning In — Micro-tonality In Electronic Music* by Scott R. Wilkinson, published by Hal Leonard Books.

A brief description of each scale can be found in Chapter 8, The Auto-Tune Evo Scales.

Scale Detune
The Detune parameter allows you to change the pitch standard of Auto-Tune Evo from the default A = 440Hz. The value is set in cents (100 cents = 1 semitone). The range of adjustment is from -100 to +100 cents. For convenience, the detune amount is also displayed in Hertz relative to A440.

The Detune function can be used to tune a vocal performance to some irreparably out-of-tune instrument (a piano or organ, for example), or to allow correction to other than the conventional 440Hz standard.

A TIP: If you have a tone that you want to use as the pitch standard, select that tone and play it in a loop. Adjust Scale Detune until the Change meter reads zero. (You may be required to use the Edit Scale Display to remove adjacent notes so that Auto-Tune Evo doesn't tune to the wrong note.)

The default Scale Detune setting is 0 cents. Double-clicking or Command (Mac)/Control (PC) clicking the Scale Detune knob will reset it to that value.

Transpose
In addition to any pitch correction applied by either Automatic or Graphical Mode, the Transpose control lets you shift the overall pitch of your performance over a two octave range (+/- one octave), selectable in precise semitone increments.

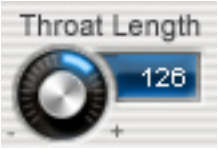
In Automatic Mode, this transposition is accomplished in real time.

In Graphical Mode, this function does not affect the Pitch Edit Display. It provides overall transposition on top of any pitch shifting accomplished with the graphical editing tools.

As noted above, although you can also accomplish overall transposition in Graphical Mode by selecting all the correction objects in your track and manually moving them up or down, in most cases, using the Transpose function will provide superior results.

NOTE: If you are transposing more than a semitone or two and your intent is to preserve the performer's vocal character, be sure to engage the Formant Correction function described below. Transposing large intervals (especially transposing higher) without formant correction will result in the "munchkinization" effect familiar from tape speed changing and early digital sampling. (Of course, if singing chipmunks are what you're going for, leave Formant Correction off.)

The default Transpose setting is 0 semitones (i.e., no transposition). Double-clicking or Command (Mac)/Control (PC) clicking the Transpose knob will reset it to that value.



Throat Length
As mentioned above, the shape of a singer's throat is a prime contributor to their vocal character. Auto-Tune Evo lets you modify the vocal quality of a performance by actually varying the geometry of a physical model of the human vocal tract and processing the original performance through that model.

The Throat Length control lets you modify the length of the modeled throat. The range of the control is .50 to 1.80. 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 0.70 represents a 30% decrease in throat length.

NOTE: This control is only active when Formant Correction is engaged. When Formant Correction is not engaged, this control is disabled (grayed out). Since Formant Correction is not available in the TDM versions of Auto-Tune Evo, Throat Length is also not available in the TDM versions. If

you wish to use the Throat Length function on a TDM system, be sure to select the RTAS version of Auto-Tune Evo.

In addition to simply changing vocal timbre, increasing throat length is useful when the original performance is female and you want to transpose it down and have it sound more male. Conversely, decreasing throat length is useful when the original input is male and you want to transpose it up and have it 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. Auto-Tune Evo automatically applies appropriate formant correction when it shifts pitch with Formant Correction Enabled.

Formant Correction
Click the Formant button to toggle Auto-Tune Evo's formant correction function on and off. The button will turn blue when formant correction is active and will be pale gray when it is inactive.

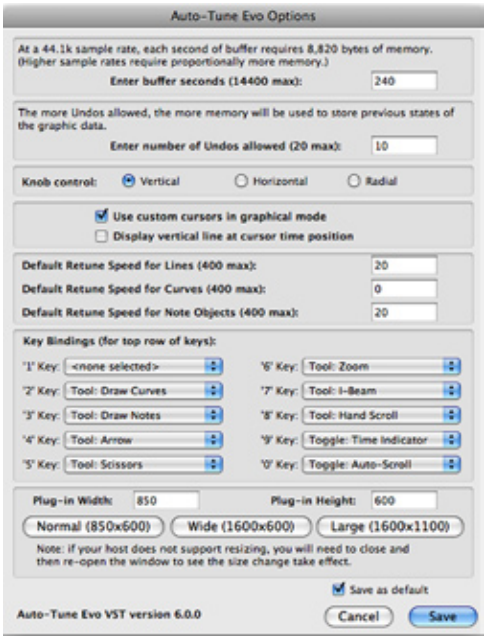
Engaging Auto-Tune Evo's Formant Correction prevents the shifting of a voice's resonant frequencies to ensure that its vocal characteristics are preserved over the pitch shift range. (For a more complete explanation of formant correction, refer to the Pitch Shifting and Formant Correction section in Chapter 2.)

AN IMPORTANT NOTE: Over the very small intervals usually associated with basic pitch correction, formant shifting is essentially inaudible and Auto-Tune's classic pitch adjustment technology still provides the optimum results. Formant Correction is designed to be used with overall transposition or on tracks where notes are shifted by large intervals.

ANOTHER NOTE: Formant Correction is not available in the TDM versions of Auto-Tune Evo. If you wish to use the Formant Correction function on a TDM system, be sure to select the RTAS version of Auto-Tune Evo.

Correction Mode
Click the appropriate button to select either Automatic or Graphical Mode.

Options
Clicking the Options button will bring up a window containing a number of settings that fall into the "set and forget" category.



BUFFER SIZE This controls the number of seconds of memory buffer space that are permanently reserved for pitch tracking and pitch correction data in Graphical Mode. (There is a separate buffer for each plug-in occurrence.) To change the buffer allocation, click in the data field and enter the required number of seconds.

The maximum buffer length is 14,400 seconds (i.e., 4 hours).

NOTE: For hosts that provide valid time information, Auto-Tune Evo will display all tracked pitch information at its correct time within the track. If your host supports this capability, setting the buffer to the length of the entire song and tracking the pitch in one pass will allow you to quickly and easily move to each section of audio to be corrected as necessary.

NUMBER OF UNDOS Auto-Tune Evo provides multiple Undo/Redo capability in Graphical Mode. Select the maximum allowable number here (up to 20). Choosing a higher number allocates more memory for saving intermediate states.

KNOB CONTROL Lets you select how you want to control the "knobs" in the Auto-Tune Evo interface.

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.

RADIAL: Click anywhere around the circumference of the knob, press and hold the left mouse button and "rotate" the knob in the desired direction. The current value of the knob's parameter appears in its associated numeric display.

USE CUSTOM CURSORS Click the check box to use Custom Cursors in Graphical Mode. Normally, Auto-Tune Evo displays different cursor shapes in the Pitch Graph Display to help you grab and drag objects (e.g., the object cursor, the anchor point cursor, etc.). However, some host applications mistakenly think that they own the cursor when it is in a plug-in window. This may cause the cursor to flash as the host and Auto-Tune Evo alternately try to set the cursor shape. If this annoys you, unclick this check box. It will stop the flashing, but you will no longer see Auto-Tune Evo's custom cursors.

DISPLAY VERTICAL LINE AT CURSOR TIME POSITION Click the check box to cause a vertical line to be displayed at the cursor

position in Graphical Mode. This is most useful when you are comparing the various pitch values (tracked pitch, correction object pitch, and output pitch) at one or more time locations in your track.

A TIP: Since the line indicator can be somewhat annoying during normal editing tasks, you can, if you prefer, uncheck this box in the Options dialog and then assign Toggle Time Indicator to one of the number keys as described below. That way, you can turn it on only when you need it, without having to call up the Options dialog every time.

DEFAULT RETUNE SPEEDS With Auto-Tune Evo's introduction of independent Retune Speeds for each correction object, we've added the ability to set custom default Retune Speeds for each of the three object types: Lines, Curves and Notes. These are the initial Retune Speed values that are assigned to each newly created object. (You may, of course, modify each individual object's setting as needed.)

To choose your own values, just pay attention to what values you most commonly use for the various objects and set those as defaults. Update as necessary.

A TIP: Your choice of default values will depend greatly on your particular workflow and your typical use of the various correction objects. If, for example, you usually use Make Curve or Import Auto to tweak pitch while preserving all pitch gestures, usually use Lines for quick correction of individual out-of-tune notes, and usually use Note Objects for precise programming of Cher or T-Pain-style effects, you might set the Curves default to 0, the Lines default to 20 and the Notes default to 0.

KEY BINDINGS The Key Bindings section allows you to assign your most commonly used Graphical Mode tools and controls to the 10 number keys that appear above the letter keys on the QWERTY portion of your keyboard.

NOTE: Since some hosts reserve the numeric keypad for host keyboard shortcuts even when a plug-in window is active. The Key Bindings apply only to the number keys on the QWERTY portion of your keyboard.

The following functions are available for assignment:

Graphic Tools
Line
Curve
Note
Arrow
Scissors
Zoom
I-Beam
Hand Scroll

Edit Functions
Clear All
Undo
Redo
Select All
Cut
Copy
Paste

Control Toggles
Snap To Note
Auto-Scroll
Show Lanes
Track Pitch
Display Time Indicator

Correction Objects
Make Curves
Import Auto
Make Notes

Other Controls
Nudge Up
Nudge Down
Zoom In Horizontal
Zoom Out Horizontal
Zoom In Vertical
Zoom Out Vertical
Retune Speed Faster
Retune Speed Slower

WINDOW SIZE (VST and Audio Units versions only): Since some hosts and/or plug-in formats do not support real-time plug-in window resizing (i.e., dragging on the corner of the window), the Window Size controls allow you to select among three preset sizes or specify a custom size of your choice.

The preset sizes (measured in pixels) are:

Normal: 850 wide by 600 high

Wide: 1600 wide by 600 high

Large: 1600 wide by 1100 high

Clicking any of the Preset buttons will enter those dimensions in the Width and Height data entry fields. To enter a custom size, simply click in the desired field and enter the value of your choice.

The new size will take affect when you click the Save button.

NOTE: Some hosts do not support immediate resizing of an open plug-in window. If yours in one of those, after clicking Save, you will have to close the Auto-Tune Evo window and reopen it to have the size change take affect.

ANOTHER NOTE: Since real-time resizing is supported in all current versions of Pro Tools LE and HD, neither the RTAS nor TDM versions of Auto-Tune Evo include (or need) the Window Size controls.

SAVE AS DEFAULT: When the "Save as default" box is checked, any changes you make to the various Options settings are saved as defaults for all future instances of Auto-Tune Evo.

If you want to make a temporary change to an Option setting for a particular track, but want to retain the previous default for future instances, uncheck the "Save as default" box before clicking the Save button. Your modified value will take effect in the current instance of Auto-Tune Evo, but future instances will revert to the previously saved value.

Bypass
Auto-Tune Evo does not include a dedicated Bypass control as that function is typically provided by the host application's plug-in interface.

Automatic Mode Controls

Pitch Correction Functions

Retune Speed
Retune Speed controls how rapidly the pitch correction is applied to the incoming sound. The units are milliseconds. A value of zero will cause instantaneous changes from one tone to another and will completely suppress a vibrato (note that any related volume changes will remain). Values from 10 to 50 are typical for vocals (unless you're going for the now-infamous Cher or T-Pain-style effect, in which case use 0). Larger values let through more vibrato and other interpretative pitch gestures but also slow down how rapidly pitch corrections are made. Although the above suggestions can be used as starting points, finding the correct Retune Speed setting for a particular performance is largely a matter of trial-and-error and depends on such attributes as song tempo, note duration and vocal style, among others. As always, let your ears be your guide.

The default Retune Speed value is 20. Double-clicking or Command (Mac)/Control (PC) clicking the Retune Speed knob will reset it to that value.

Humanize
One tuning situation that can be problematic is a performance that includes both very short notes and longer sustained notes. The problem is that in order to get the short notes in tune, you'd have to set a fast Retune Speed, which would then make any sustained notes sound unnaturally static. Luckily, the Humanize easily solves this problem.

The Humanize function differentiates between short and sustained notes and lets you apply

a slower Retune Speed just to the sustained notes. Thus, the short notes are in tune and the sustained notes still allow the natural variations of the original performance.

Here's how it works:

Start by setting Humanize to 0 and adjusting the Retune Speed until the shortest problem notes in the performance are in tune. At this point, any sustained notes may sound unnaturally static. If so, start advancing the Humanize control. The higher the Humanize setting, the more the Retune Speed is slowed for sustained notes. The goal is to find the point where the sustained notes are also in tune and just enough of the natural variation in the performance is present in the sustained notes to sound natural and realistic. (If you set Humanize too high, any problem sustained notes may not be fully corrected.)

This is one of those settings where you have to let your ears be your guide. The optimum Humanize setting for any particular performance will depend on the performance style, the other Automatic Mode settings and the specific effect you desire.

The default Humanize setting is 0. Double-clicking or Command (Mac)/Control (PC) clicking the Humanize knob will reset it to that value.

Natural Vibrato
The Natural Vibrato function allows real-time modification (either increase or decrease) of the depth of any vibrato present in the input audio while preserving the original shape and character of the vibrato.

This function uses the same Stochastic Optimal Linear Estimation Theory as the Targeting Ignores Vibrato function (described below) to differentiate between vibrato and intended pitch changes, adjusting the vibrato depth while leaving intended pitch changes intact.

The Natural Vibrato function acts independently of the pitch correction functions. Of particular note is the fact that setting a scale note or notes to Bypass still allows vibrato adjustment for those notes. So, if you want to adjust a performance's vibrato while making no other pitch changes, you can simply set all scale notes to Bypass and still use the Natural Vibrato function to adjust vibrato depth.

NOTE: This function acts only on vibrato present in the original performance. If the original performance does not contain vibrato, this control will have no audible effect.

ANOTHER NOTE: Natural Vibrato adjustments function independently of the Create Vibrato functions described below. However, since both functions can operate simultaneously, they can interact in ways that may or may not be useful, depending on your intent. In most cases, you should probably use one or the other.

The default Natural Vibrato setting is 0. Double-clicking or Command (Mac)/Control (PC) clicking the Natural Vibrato knob will reset it to that value.

Targeting Ignores Vibrato
Target note identification is the process by which Auto-Tune decides which note is the note the performer intended to sing or play, so that it may re-tune any pitch errors closer to that note. Normally, the target note is the nearest active scale note to the current input pitch.

The Targeting Ignores Vibrato feature is designed to help with target note identification when the performance includes vibrato so wide that it approaches adjacent scale notes. The most common symptom of this problem is a pronounced "warbling" as the input is alternately tuned to each of the upper and lower adjacent notes.

When this function is "On," Auto-Tune Evo uses the impressively named Stochastic Optimal Linear Estimation Theory to attempt

to recognize vibrato and differentiate between it and intended note changes. Our testing has shown that it works a lot of the time — but not always (it depends a great deal on the actual performance). When it works, Auto-Tune Evo ignores the wide vibrato as far as target note selection is concerned. When it doesn't, it works pretty much the same way it would work if the function were "Off."

The default state of this control is Off. When you've got a vibrato problem, try turning it on and see if it helps.

The Edit Scale Display

The Edit Scale Display is used to create custom scales or to modify any of the preset scales selected in the Scale popup. Edits made using this display are associated with each scale. That is, each scale retains its own edits independent of the other scales. For example, if you select C Major in the Key and Scale popups and Remove or Bypass certain notes and then change to C Minor and make other edits, when you return to C Major your previous edits associated with C Major will be restored.

The Edit Scale window displays each note of the currently selected scale in the currently selected key. If the selected scale includes more than twelve notes, Up and Down arrows will appear to allow scrolling through all of the available notes.

Beside each note name are two buttons: a Bypass button and a Remove button. Click on a button to toggle its state. The button will light to indicate that its mode is active.

If neither of these buttons are lit, Auto-Tune Evo treats this note as a normal scale note, i.e., when the input pitch is close to this note, Auto-Tune Evo will correct the pitch to this note at the rate set by the Retune Speed control.

If the scale selected in the Scale popup contains exactly 12 notes (e.g., Chromatic, Pythagorean, Meantone Chromatic, Just, etc.), the Virtual Keyboard (see below) will be active and any edits to the scale notes made in the Edit Scale Display will also be reflected on the Virtual Keyboard.

NOTE: Although Auto-Tune Evo allows setting scale note behaviors in individual octaves, any edits made via the Edit Scale Display will affect all octaves. To edit notes in individual octaves, use the Virtual Keyboard.

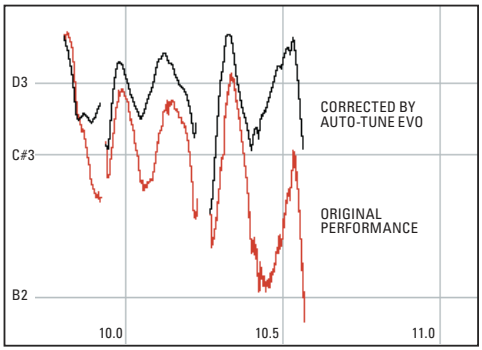
Bypass
If the Bypass button is lit, when the input pitch is close to this note the input will be passed through with no correction.

Why set Scale notes to "Bypass?"
There are two main reasons to set one or more scale notes to "Bypass."

1. If a performance includes pitch gestures around one or more specific notes that you want to preserve with no modification whatsoever, you can set just those notes to Bypass. This lets Auto-Tune Evo correct any pitch problems elsewhere in the scale but passes everything near the bypassed notes completely unprocessed.
2. If a performance contains only a single error, you can set all notes to Bypass except the one "sour" note. Auto-Tune Evo will then pass the entire performance through unprocessed except for the sour note, which will be corrected.

Remove
If the Remove button is lit, then the note is simply removed from the current scale. For example, selecting the Chromatic scale and then setting C#, D#, F#, G#, A# to Remove would cause a C Major scale to remain. In that case Auto-Tune Evo would always retune the input to the closest note of the C Major scale.

Why set Scale notes to "Remove?"
To understand why it is sometimes necessary to set even correct scale notes to "Remove," let's look again at the example from Chapter 2.



This phrase is in D Major and, if all the pitch errors were no greater than about 49 cents, would work fine with a standard D Major scale (D, E, F#, G, A, B, C#). However, the pitch error of three semitones at the end of the last note is so large that with B and C# present in the Scale, as the pitch fell, Auto-Tune Evo would see first C# and then B as the target pitch and therefore allow the error to remain. With C# and B removed from the Scale, Auto-Tune Evo continues to see D as the target pitch for the entire duration of the note and therefore pulls the phrase up to the correct pitch.

Cents
The number in the Cents column is the associated note's interval, in cents, from the root note of the scale. It's provided for reference purposes and to help you choose which notes of a micro-tonal scale to include or remove.

Set Major/Set Minor
When any scale that includes more than seven notes (i.e., any non-diatonic scale) is selected, the Set Major and Set Minor buttons will appear. Clicking on either of these buttons will "Remove" all notes from the scale except for those notes closest to the notes of a traditional diatonic major or minor scale (depending, of course, on which button you clicked).

Set All
Clicking this button sets all notes in the current scale to Scale Notes in all octaves. This function is useful as a Reset button to instantly erase all previous Remove and/or Bypass settings and reset an edited scale to its default state.

Remove All
Clicking this button sets all notes in the current scale to Remove in all octaves.

Bypass All
Clicking this button sets all notes in the current scale to Bypass in all octaves.

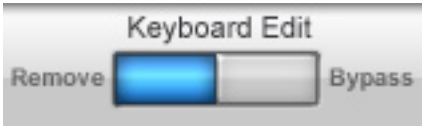
The Virtual Keyboard

The Virtual Keyboard displays Auto-Tune Evo's pitch detection range and acts as a real-time display of the currently detected pitch, a display of the current Scale settings, and as a tool for setting target note behaviors in specific octaves.

IMPORTANT NOTE: The keyboard is only active for scales with exactly twelve notes. It will be grayed out (hence inactive) when any other scale is selected. "But wait!" you might be thinking, "I want to edit Major and Minor scales in individual octaves and the keyboard is grayed out when I select either one." No problem. Simply select Chromatic, then use the Set Major or Set Minor button to set up the scale of your choice and edit away.

KEY COLORS The color of the keys of the Virtual Keyboard indicate their current state as follows:

COLOR	STATE
Blue	The currently detected input pitch
White or Black	Scale Note
Gray	Removed
Light Brown	Bypassed

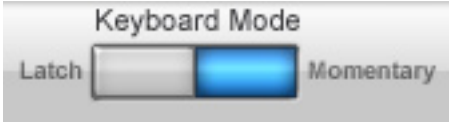


KEYBOARD EDIT These buttons are used to select which state (Remove or Bypass) will be toggled when you click on a key.

When Remove is selected, clicking on any key that is not currently set to Remove will set that key to Remove. Clicking on any key that is currently set to Remove will set that key to a Scale Note.

When Bypass is selected, clicking on any key that is not currently set to Bypass will set that key to Bypass. Clicking on any key that is currently set to Bypass will set that key to a Scale Note.

NOTE: In the descriptions above, "clicking" on a key refers to pressing the mouse button down and then releasing it. The edit action is executed when the mouse button is released. Therefore, if the Keyboard Mode is set to Latch (see below), dragging across the keyboard highlights each key in turn, but it is only when you release the mouse button that the resulting key will change state.



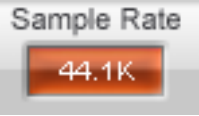
KEYBOARD MODE When the Latch mode is active (i.e., the Latch button is blue), any edits made to the keyboard will latch -i.e., clicking a key will change its state and the key will retain that state until some other action causes it to change.

When the Momentary mode is active (i.e., the Momentary button is blue), keyboard edits are only active for as long as the mouse is held down on a key.

NOTE: Pressing and holding the Shift key on your keyboard will temporarily toggle the Keyboard Mode.

A TIP: The main purpose of the Momentary mode is to allow you to deal easily with specific individual events in a performance. However, you can also use it to "play" the target melody notes in real time. To do this, set the scale to Chromatic

and use the Scale Edit window Remove All button to remove all notes from the scale. Set Keyboard Edit to Remove and Keyboard Mode to Momentary. Now use your mouse to play the target melody on the keyboard. It's not as easy as Target Notes via MIDI, but if you don't have a MIDI controller handy, it'll do in a pinch.



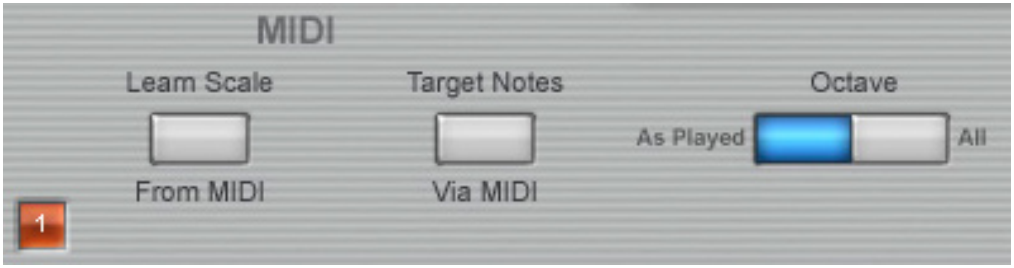
Sample Rate Display
This display indicates the sample rate of the current audio file as reported to Auto-Tune Evo by the host application.

NOTE: Auto-Tune Evo is high sample rate compatible. If your host application and audio hardware are capable of dealing with up to 192 kHz files (96kHz files for HD Accel systems), Auto-Tune Evo will process them correctly. However, it's important to remember that high sample rate files require substantially more DSP power than 44.1 kHz and 48 kHz files, so the number of possible simultaneous Auto-Tune Evo instantiations will be decreased.

YET ANOTHER NOTE: If you are using external A/D converters with independently selectable sample rates, it can be possible to establish a mismatch between the actual conversion sample rate and what the host application thinks is the sample rate. If this happens, Auto-Tune Evo will appear to be correcting pitch to the "wrong" key. If this appears to be happening, check to be sure that your converter sample rate and your host application sample rate (as displayed by Auto-Tune Evo) match.

Pitch Shifting, Formant Correction and Throat Modeling
To use the Pitch Shifting, Formant Correction and/or Throat Modeling functions in Automatic Mode, refer to the descriptions of the Transpose, Throat Length, and Formant controls in the Common Controls section earlier in this chapter.

Auto-Tune Evo MIDI Functions



Auto-Tune Evo provides two functions that require it to receive MIDI data from the host application. Depending on your intent, this data could come in real time from a MIDI controller (typically a keyboard) or from a prerecorded MIDI sequencer track. Refer to your host application's manual for details on how to route MIDI to Auto-Tune Evo.

Please note that some host applications may not support the routing of MIDI information to plug-ins. In that case the MIDI functions will not be selectable.

Instance ID
Some host applications assign numerical instance IDs to multiple instances of the same plug-in. If your host does this, the ID will appear in an orange display in the lower left-hand corner of the MIDI control area. Instance IDs are useful when you are using any of Auto-Tune Evo's MIDI functions, as they allow you to be sure that you are routing the MIDI stream to the correct instance of Auto-Tune on the desired track.

Learn Scale From MIDI
In most cases, you will probably tell Auto-Tune Evo which notes are valid scale notes using the Key and Scale popups, the Edit Scale Display and/or the Virtual Keyboard. However, there may be occasions when it is not clear exactly what key a melody line is in, or where the melody line has too many accidentals to fit comfortably into a conventional scale. For those occasions, the Learn Scale From MIDI function allows you to simply play the melody into Auto-Tune Evo from a MIDI keyboard or sequencer track and let Auto-Tune Evo construct a custom scale containing only those notes that appear in the melody.

To use the Learn Scale From MIDI function, ensure that the desired MIDI source is routed to Auto-Tune Evo and then click the Learn Scale From MIDI button. Its color will change to blue and the Edit Scale display will automatically be set to a chromatic scale with all of the notes set to Remove.

Now simply play the melody to be corrected from your keyboard or sequencer. Tempo and rhythm don't matter, so take your time and make sure you don't play any wrong notes.

As each note is played, the corresponding Remove button in the Edit Scale Display is turned off (adding that note to the scale as a Scale Note). Assume, for example, that your melody starts with D, B, and then A. After playing those notes the display would look like this:

When you have played the entire melody, press the Learn Scale From MIDI button again to end the process. The Edit Scale Display will now contain a scale containing only those notes that appeared in your melody.

If you happen to have made an error during note entry, or want to try again for any other reason, simply click the Learn Scale From MIDI button and start the process again.

NOTE: When you start the process by pressing the Learn Scale From MIDI button, all notes are first Removed from the chromatic scale in preparation for adding just the notes you play. If you then press the Learn Scale From MIDI button again without playing any notes, you will be left with a chromatic scale with all notes removed. In this state, Auto-Tune Evo will pass all notes with no correction applied. So don't do that.

Target Notes Via MIDI

To use the Target Notes Via MIDI function, ensure that the desired MIDI source is routed to Auto-Tune Evo, then click the Target Notes Via MIDI button. Its color will change to blue and the Edit Scale display will automatically be set to a chromatic scale with all of the notes set to Remove. While in this mode, Auto-Tune Evo continuously monitors its MIDI input for Note On messages. At any instant, the scale used for correction is defined by all MIDI notes that are on. For example, if MIDI notes A, C and E are held, Auto-Tune Evo's input will be retuned to an A, C or E, whichever is closest to the input pitch.

The source of the MIDI input would typically be a MIDI keyboard or sequencer track, and could consist of chords, scales, or, most powerfully, the exact melody that the input should be corrected to.

IMPORTANT NOTE: If you will not be defining Auto-Tune Evo's target pitches via MIDI, be sure that the Target Notes Via MIDI button is off. If it is left on and no MIDI note data is present, Auto-Tune Evo will pass through all audio unprocessed — giving the impression that Auto-Tune Evo is not functioning.

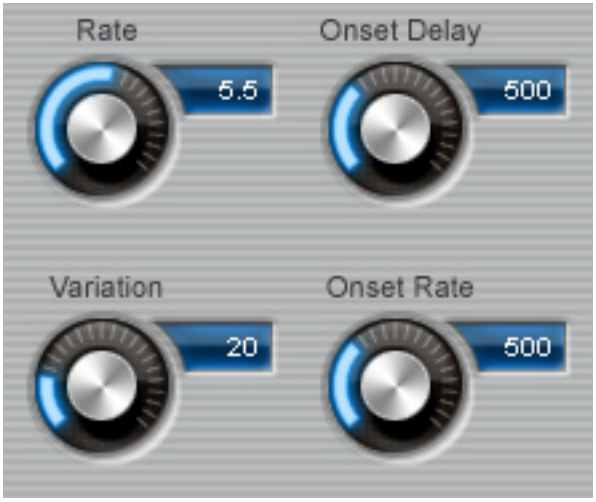
ANOTHER NOTE: We realize that there is some possibility of confusion between the Target Notes Via MIDI function and the Learn Scale From MIDI function described above. To clarify: Target Notes Via MIDI is used to specify target pitches in real time while pitch correction is occurring, while Learn Scale From MIDI is used in advance of correction to create a custom scale.

Octave As Played/All Octaves

For both of the MIDI functions (Learn Scale from MIDI and Target Notes via MIDI), you can choose whether you want incoming MIDI notes to affect all octaves or just the notes in the specific octaves in which they are played.

Simply click the desired button. The button will change color to blue to indicate your choice.

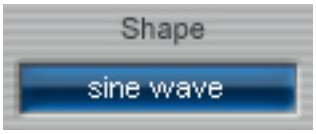
Create Vibrato Functions



The controls in this section are designed to add a synthesized vibrato to the input.

While vibrato is typically perceived to be a variation solely in pitch, careful analysis shows that, depending on the voice or instrument and the style of the individual performer, variations in amplitude (loudness) and formant resonances are also involved. Reflecting this, Auto-Tune Evo includes a plethora of vibrato functions to allow the creation of much more convincing vibratos. (And for the adventuresome, they can be abused to create some "interesting" effects.)

The controls are:



Shape Menu
Selects the shape of the vibrato.The choices are:

NO VIBRATO Pretty self-explanatory.

SINE WAVE Changes smoothly from minimum to maximum and back again. The most common choice for a conventional vibrato.

SQUARE Jumps to maximum where it spends 50% of the cycle and then jumps to minimum for the remaining 50% of the cycle.

SAWTOOTH Gradually rises from minimum to maximum and then drops instantaneously to minimum to start the cycle again.

Rate
Sets the rate of the vibrato over a range of 0.1 Hz to 10 Hz. The default Rate setting is 5.5 Hz. Double-clicking or Command (Mac)/Control (PC) clicking the Rate knob will reset it to that value.

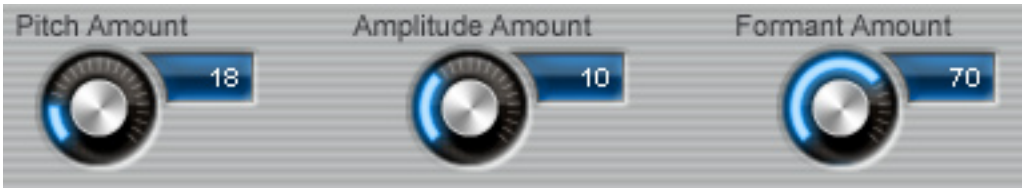
Variation
Sets the amount of random variation that will be applied to the Rate and Amount parameters on a note to note basis. Useful for humanizing the vibrato by adding random "errors."

The range is from 0 (no variation) to 100 (maximum variation). The default Variation setting is 20. Double-clicking or Command (Mac)/Control (PC) clicking the Variation knob will reset it to that value.

Onset Delay
Sets the amount of time (in msec) between the beginning of a note and the beginning of the onset of vibrato. The range is from 0 to 1500ms (1.5 seconds). The default value is 500ms. Double-clicking or Command (Mac)/ Control (PC) clicking the Onset Delay knob will reset it to that value.

Onset Rate
Sets the amount of time (in msec) between the end of the Onset Delay (set above) and the point at which the vibrato reaches the full Amounts set in the Pitch, Amplitude and Formant Amount settings. The range is from 0 to 1500ms (1.5 seconds). The default value is 500ms. Double-clicking or Command (Mac)/ Control (PC) clicking the knob will reset it to that value.

Onset Example: As an example of the above parameters, assume an Onset Delay of 1000ms and an Onset Rate of 750ms. In that case, each time a new note starts there will be no vibrato at all for the first second (1000ms) followed by a 3/4 second (750ms) period during



which the vibrato depths will increase from none to the full amounts set in the various Amount parameters — for a total of 1.75 seconds from the beginning of the note to the time full vibrato depth was reached.

Pitch Amount
Sets the amount that the pitch changes. The range is from 0 (no change) to 100 (maximum change). The default setting is 18. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

Amplitude Amount
Sets the amount that the loudness changes. For the most realistic vibrato, the amount of amplitude change should be substantially less than pitch change, although for special effects, anything goes.

The range is from 0 (no change) to 30 (maximum change). The default setting is 10. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

Formant Amount
Sets the amount that the resonant timbre changes. The range is from 0 (no change) to 100 (maximum change). The default setting is 70. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

NOTE: The vibrato is re-started every time Auto-Tune Evo matches the incoming pitch to a different scale tone. Also, the vibrato is applied after the effects of the Retune Speed control. Hence, even with a slow retune value of 50, a square wave vibrato will make instantaneous changes in pitch.

ANOTHER NOTE: As mentioned above, although we perceive vibrato primarily as a variation in pitch, in most cases there is also matching (though more subtle) variations in amplitude and timbre. Setting Auto-Tune Evo's Retune Speed to 0 will remove an existing vibrato's pitch variation, but the amplitude and timbral variation will remain. If you then apply a new vibrato using Auto-Tune Evo's Create Vibrato section, the results may be less than convincing. Auto-Tune Evo's Vibrato section is more often useful for adding a vibrato to an input that originally had none, or for various special effects.

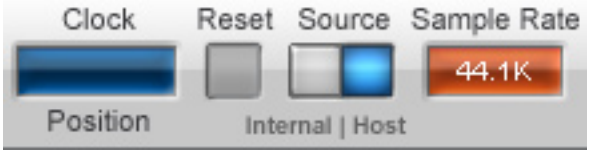
YET ANOTHER NOTE: The Create Vibrato controls function completely independently of the Natural Vibrato function. Changes in that function have no direct effect on the depth of any vibrato resulting from the Create Vibrato controls. However, since both functions can operate simultaneously, they can interact in ways that may or may not be useful, depending on your intent. In most cases, you should probably use one or the other.

The Pitch Change Meter
The Pitch Change Indicator shows you how much the pitch is being changed, measured in cents (100 cents = one semitone). For example, if the indicator bar has moved to the left to -50, it indicates that the input pitch is 50 cents too sharp and Auto-Tune Evo is lowering the pitch by 50 cents to bring the input back to the desired pitch.

Hold Button
Clicking and holding the word "Hold" while Auto-Tune Evo is processing audio will freeze both the Pitch Change Amount Indicator and the blue Detected Pitch indication on the virtual keyboard for as long as you hold down the mouse button. This is useful for figuring out exactly what's going on with a particular note in a performance that would otherwise pass too quickly to see.

Graphical Mode Controls

The Clock Controls



Sync to host transport (host dependent)
If your host provides valid time information, once you have tracked audio and created correction curves (see below), Auto-Tune Evo will maintain sync with the host program, allowing you to move around in your track at will.

NOTE: In some cases, this functionality may require updating to the latest version of your host program. Check the Read Me file for details.

Additionally, if your host does not provide valid time information or does not strictly adhere to its plug-in format specification, sync problems could ensue. In that case, see the Selectable Clock Source section below. (Again, check the Read Me file for any specific examples.)

Selectable Clock Source
For hosts that do not provide valid time information, Auto-Tune Evo's clock display and selection functions let you use an internal time reference, in which case you will have to always start tracking and correction from the same point in your file (see below for details).

Since all of the controls in the Clock section are used together, we will describe them as a group.

Determining if your host provides valid clock information
To determine if your host supplies valid clock information, on the Source selector, click the Host button to select the host-supplied clock and put your host into Play. If Auto-Tune Evo is receiving valid timing information from your host, the Clock Position display should constantly update to reflect your current position in the track. Moving forward or backward in the track should result in corresponding display updates. If this is in fact happening, you have confirmed your host's timing info. Simply leave the Source setting on Host and enjoy all of Auto-Tune Evo's host sync features.

On the other hand, if the display does not update or if it does not accurately reflect your host's transport, Auto-Tune Evo may be getting bad (or no) clock information. In that case, you will need to use the Internal clock option.

Using Internal Clock Mode
To select Auto-Tune Evo's Internal clock, click the Internal button.

To track and correct pitch in Internal Clock mode:

1. Use your host transport to move to the beginning of the section you want to correct and note that position, as you will need to return to that precise place for correction.
2. Click the Reset button to set the clock position to 00:00:0.
3. Click the Track Pitch button, play the desired audio and then stop the transport.
4. Use the various tools described below to create your pitch correction curves.
5. Use your host transport to return to the precise start location defined in step 1.
6. Click the Reset button to reset the clock position to 00:00:0.
7. Play your audio. Auto-Tune Evo will apply your corrections.

NOTE: Some hosts that require Internal Clock nonetheless have the capability to automatically reset the clock to 00:00:0. (Versions of Pro Tools HD and Pro Tools LE prior to v7.2 specifically have this capability.) In those cases, steps 2 and 6 above are not necessary.

In Internal Clock Mode, the following features are unavailable:

Sync to Host Transport (obviously)

Multiple simultaneous Graphical Mode instances with windows not open

NOTE: As the various host developers are constantly updating their applications' functionality, it may be necessary to update to the latest version of your host to use Host Clock Mode.

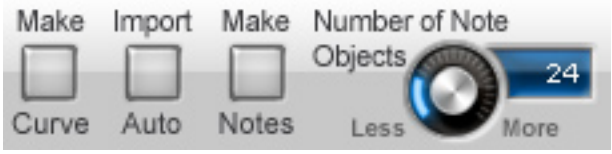
In addition, we are working with host developers to ensure that as many as possible provide valid clock info, so even if yours doesn't now, it may well add that capability in a future version. (And if it doesn't now, you might want to drop the developers an email and let them know you'd like it to.)

Sample Rate Display
This display indicates the sample rate of the current audio file as reported to Auto-Tune Evo by the host application.

NOTE: Auto-Tune Evo is high sample rate compatible. If your host application and audio hardware are capable of dealing with up to 192 kHz files (96 KHz files in Pro Tools HD Accel systems), Auto-Tune Evo will process them correctly. However, it's important to remember that high sample rate files require substantially more DSP power than 44.1 kHz and 48 kHz files, so the number of possible simultaneous Auto-Tune Evo instantiations will be decreased.

ANOTHER NOTE: If you are using external A/D converters with independently selectable sample rates, it can be possible to establish a mismatch between the actual conversion sample rate and what the host application thinks is the sample rate. If this happens, Auto-Tune Evo will appear to be correcting pitch to the "wrong" key. If this appears to be happening, check to be sure that your converter sample rate and your host application sample rate (as displayed by Auto-Tune Evo) match.

Pitch Tracking and Correction Objects



Track Pitch
The Track Pitch function is used to detect the pitch of the audio to be processed so that it can be displayed on the Pitch Graph Display.

Locate the desired audio and press the Track Pitch button. (If you are using Auto-Tune Evo's Internal clock (see below) you may (depending on your host) need to click the Reset button to reset the clock position to 00:00:0.) The Track Pitch button will flash blue and red to indicate that Auto-Tune is in Track Pitch mode.

Next, start playback of the audio. A graphic representation of the pitch will be drawn to the display as the audio plays. When all of the audio you want to correct has played, stop playback. Note that Auto-Tune will remain in Track Pitch mode (the button will continue to flash). If you are using the Host Clock and want to track the pitch of audio elsewhere in your track, simply use your host's transport controls to move to that audio and start playback again. Auto-Tune will continue tracking pitch at that point. When you have tracked all of the audio you want to correct, click the Track Pitch button again. You will exit Track Pitch mode and, if you have Auto-Scroll enabled (as described in the Pitch Graph Display section below), the Pitch Graph will automatically scale in such a way as to include all of the tracked audio. If you have not enabled Auto-Scroll, no scaling will occur.

NOTE: If you are using Auto-Tune Evo's Internal Clock (because your host does not provide valid clock information), you will not be able to navigate around your audio while tracking as described above. In that case you should either track all of the audio at once, or track an individual section, then correct it and bounce the changes (or use a destructive editor if available) and then move on to the next section.

ANOTHER NOTE: If the length of the audio to be processed exceeds the currently set size of the buffer as set in the Options dialog (or your start point lies beyond the current buffer area), tracking will stop when the buffer is full and a warning message will appear notifying you of that fact. If this happens, increase the buffer size as necessary.

YET ANOTHER NOTE: Be cautious about changing the Tracking value (in the Options dialog) after performing the Track Pitch function. Auto-Tune Evo uses the Tracking setting during both the Track Pitch function and while correcting pitch. Changing the Tracking setting after Tracking Pitch, but before correcting, may result in unpredictable pitch modifications or strange (though possibly interesting) artifacts.

Correct Pitch
In versions of Auto-Tune prior to Auto-Tune 5, after creating correction objects, you would have to press the Correct Pitch button in order to put Auto-Tune into correction mode. As a result, the Auto-Tune window always had to be open in order to use Graphical Mode. Well, no longer. Now, simply create your corrections and play. Essentially, anytime you are not tracking pitch, Auto-Tune Evo will be correcting. It is this basic change that allows you to use multiple instances of Auto-Tune Evo simultaneously in Graphical Mode without having to have their windows visible.

NOTE: The ability to use multiple instances of Auto-Tune Evo simultaneously in Graphical Mode without having to have their windows visible is only available for hosts that provide valid time information. See the Clock Source section above for details.

Make Curve
The Make Curve button is enabled whenever there is any red input pitch contour data present in the Pitch Graph (whether it is displayed in the current Pitch Graph view or not). Pressing the Make Curve button causes blue target pitch contour objects (curves for short) to be created from the input pitch contour data. These curve objects can then be dragged and stretched for very meticulous pitch correction. This is one of the central techniques of Auto-Tune Evo's Graphical Mode and is described in more detail in Chapter 4.

Additionally, green output pitch curves are created that represent the exact pitches output at the currently selected Retune Speed. If you select the correction curve, move it, and adjust the Retune Speed, you will see the green output curve change in real time to reflect the changing Retune Speed.

NOTE: If a range of time has been selected by using the I-Beam Tool (see below), the Make Curve button works only in the selected time range. Otherwise it works on all red pitch data.

ANOTHER NOTE: Whenever you create Correction curves with the Make Curve function, those curves will initially be assigned the default Curves Retune Speed set in the Options dialog. If that default value is "0" (as it may well be), the green output curve will be positioned exactly on top of the blue correction curve, effectively hiding it. Even though you can't see it, it may still be selected and edited in all the ways described in the Editing Tools section.

YET ANOTHER NOTE: Remember that while all new curves are created with the default Curves Retune Speed, you can then select individual curves (or cut up single curves to create multiple curves) and assigned a custom Retune Speed to each one. This is an incredibly powerful capability for insuring that your corrections are as natural and seamless as possible.

Import Auto
The Import Auto button is enabled whenever there is any red input pitch contour data present in the Pitch Graph (whether it is displayed in the current Pitch Graph view or not).

Pressing the Import Auto button causes blue target pitch contour objects (curves for short) to be created from the red input pitch contour data. The blue curve(s) created by the Import Auto function is a precise representation of the pitch correction that would result from processing the tracked input pitch through the current settings of Auto-Tune Evo's Automatic Mode. In addition to the Key and Scale selections, the Retune Speed, and any Scale Detune, it reflects the Automatic Mode's Edit Scale settings, Targeting Ignores Vibrato mode (if selected), and Humanize, Natural Vibrato and Create Vibrato settings.

As described above for Make Curve, green output pitch curves are also created that represent the exact pitches output at the currently selected Retune Speed.

NOTE: If a range of time has been selected by using the I-Beam Tool, the Import Auto button works only in the selected time range. Otherwise it works on all red pitch data.

ANOTHER NOTE: The curves created by Import Auto will initially be assigned the same default Curves Retune Speed as those created with Make Curve. In fact, pretty much everything we said about the Make Curve function above is equally applicable to the Import Auto function.

Once you have used the Import Auto function to create a blue target pitch curve, setting the Graphical Mode Retune Speed to 0 (or having set the default Curves Retune Speed to 0) will result in exactly the same output as you would have gotten by processing the audio through Automatic Mode. Alternatively, you can adjust the Retune Speed for all or selected correction curve segments, or further edit the blue curve using any of the Graphical Mode tools to get precisely the effect you want.

If you aren't satisfied with the results of the Import Auto function, simply switch to Automatic Mode, modify any of the settings as desired, and then return to Graphical Mode and click Import Auto again.

NOTE: In addition to its use as a Graphical Mode correction tool, the Import Auto function can also be used to provide an informative visual representation of the results of Automatic Mode settings. If there are times when you'd prefer to use Automatic Mode, but can't quite zero in on the ideal settings, examining the results of various settings with the Import Auto function can give you a visual picture of exactly what's going on. This will often make it readily apparent which Automatic Mode settings need to be changed to give your desired results.

STILL ANOTHER NOTE: One potentially confusing aspect of the Import Auto function is the relationship between the Automatic Mode Retune Speed setting and the Graphical Mode Retune Speed setting. To summarize:

The Automatic Mode Retune Speed controls how the input audio would be processed in Automatic Mode. Changing this setting will change the shape of the blue curve that will be created by the Import Auto function.

The Graphical Mode Retune Speed controls how quickly the pitch of the input audio will be changed to that of the blue target pitch curve. As mentioned above, to precisely duplicate the results of Automatic Mode, set the Graphical Mode Retune Speed to 0.

Make Notes

The Make Notes function provides an entirely new range of ways to use Auto-Tune Evo.

For pitch correction, it combines the ease of Automatic Mode with the control of Graphical Mode to allow you to get optimum results with a minimum of tedious tweaking.

Combined with Auto-Tune Evo's formant correction and throat modeling capabilities, it provides an easy, intuitive method of modifying the pitch of individual notes or phrases.

And when programming Cher or T-Pain style vocal effects, it gives you absolute control over exactly which notes will be quantized to.

Here's how it works:

The Make Notes button is enabled whenever there is any red input pitch contour data present in the Pitch Graph (whether it is displayed in the current Pitch Graph view or not). Pressing the Make Notes button causes Auto-Tune Evo to analyze the input pitch and create Target Note objects (Notes for short), each of which is centered on a horizontal Pitch Graph line. These Notes represent the pitches that Auto-Tune Evo sees as the performer's target notes.

NOTE: If a range of time has been selected by using the I-Beam Tool (see below), the Make Notes button works only in the selected time range. Otherwise it works on all red pitch data.

Notes also display the audio's envelope contour over the Note's duration and a green output pitch curve based on the currently selected Retune Speed.

NOTE: The Retune Speed behavior for Notes is a bit different from that of the other correction objects. Unlike the other correction objects, Notes do not provide a blue correction curve. The implied correction curve is the horizontal Pitch Graph line upon which the Note is centered (unless the Note has been moved off of that line - see the Snap To Note function for details). Setting the Retune Speed to "0" will cause the output to be locked to that note, suppressing any of the original performance's expressive gestures.

As you select slower Retune Speeds, the output progressively reflects the shape and position of the original tracked input pitch.

This is much easier to understand visually than to describe. Simply zoom in on a Note and adjust its Retune Speed over its entire range. You will see the green output curve change in real time and all will be clear.

ANOTHER NOTE: Remember that while all new Notes are created with the default Notes Retune Speed set in the Options dialog, you can then select individual Notes (or cut up single Notes to create multiple Notes) and assigned a custom Retune Speed to each one.

Once created, Note objects can be dragged up or down to change their pitch, can have their beginning and/or end positions moved forward or backward, or can be cut into multiple shorter Notes for individual processing. Check out the tutorial in Chapter 4 for an example of working with Notes.

Number of Note Objects

When Auto-Tune Evo analyzes the input pitch for the purpose of creating Note objects, it must make decisions about what constitutes notes and what constitutes transitions between notes as well as differentiating between a single note with wide vibrato and a series of separate notes of alternating pitch. Often, the "right" choice depends on the style and technique of a specific performance. The Number of Note Objects control lets you give Auto-Tune Evo some guidance in making these decisions.

NOTE: This function is only available when some tracked audio has been selected with the I-Beam tool. If no audio is selected, the knob will not become active. Once some audio is selected, the knob will become active. To set the Number of Note Objects value for all tracked audio, double-click the I-Beam tool in the Pitch or Envelope Display to highlight the range of all tracked audio.

IMPORTANT NOTE: Adjusting the Number of Note Objects in a range where you have already performed some pitch correction will regenerate new Note objects and replace any correction objects that were previously in that range. As a result, adjusting the Number of Note Objects value should be the first action you take before proceeding with any pitch correction or Note or Curve-based pitch shifting. If not, frustration is almost guaranteed to ensue.

When Number of Note Objects is set to the "Less" end of its range:

- Small variations in pitch are treated as a single Note.
- Large cyclical variations in pitch are seen as vibrato and treated as a single Note.
- A gradual pitch change is seen as a transition between notes and no Note objects are created for it.

When Number of Note Objects is set to the "More" end of its range:

- Small variations in pitch are treated as separate Notes.
- Large cyclical variations in pitch are seen as individual notes that alternate between the central pitch and the upper and lower adjacent pitches and separate Notes are created for each pitch.
- A gradual pitch change is seen as a glissando and multiple successive Notes are created for it.

As you might imagine, when Number of Note Objects is set to intermediate values, the results fall somewhere between these two extremes.

A TIP: As good as Auto-Tune Evo's analysis capabilities are, there may nonetheless be occasional situations in which its creation of Notes is not exactly what you want. In those cases, you can use the editing tools described later in this chapter to quickly and easily modify any errant Notes.

Again, what may seem slightly bewildering in verbal description, is immediately obvious when you see it in action. So track some pitch and experiment with the Number of Note Objects control. You'll see.

Retune Speed
The Retune Speed setting is used only during the pitch correction process. It's similar in function but separate from the Retune Speed control in Automatic Mode.

In Graphical Mode, the target pitch is not the scale tone nearest to the input, but rather the blue target pitch object (for Curves and Lines) or the exact note represented by a Note object.

The Retune Speed control allows you to specify how quickly Auto-Tune Evo will change the pitch of the input to that of the target pitch curve or Note Object pitch. A value of zero will cause the output pitch to precisely track the target pitch of a curve line or be locked to a the pitch of a Note object. Slower values will have the effect of "smoothing out" the target pitch curve. As ever, you should let your ears be your guide to selecting the proper value for each note in a particular performance.

Since each correction object (Curve, Line or Note) can have its own independent Retune Speed, the Retune Speed control is only active when at least one correction object is selected.

Whenever you select a single correction object, the Retune Speed Control will become active and its data display will show the object's current Retune Speed.

If you select multiple objects with different Retune Speeds, the Retune Speed control will move to a value that is an average of the Retune Speeds of all of the selected objects. However, the Retune Speeds of those objects will not be modified until you actually move the Retune Speed control, at which time all of the objects' Retune Speeds will snap to the new value and continue to follow any changes you make to the Retune Speed control.

VERY IMPORTANT NOTE: Although it's been mentioned before (and will probably be mentioned again), we can't stress too strongly the extent to which the ability to assign independent Retune Speeds to individual correction objects streamlines Auto-Tune Evo's Graphical Mode workflow and makes it easier than ever to get natural sounding correction results.

In the past, your choice was typically picking a Retune Speed that was a "good enough" compromise for an entire track, or painstakingly automating the Retune Speed from phrase to phrase or even note to note (with the attendant cost in time and effort). With independent object Retune Speeds, getting exactly the desired effect for every note of a performance is a quick, simple, and intuitive process.

Adjust Vibrato
The purpose of this function is to let you quickly and easily change (either increasing or decreasing) the amount of an existing vibrato, while preserving the original shape and character of the vibrato.

To use this function, select the I-Beam tool and highlight the range of audio you'd like to edit. Set the desired amount of change using the Adjust Vibrato slider. A blue correction curve will be created that reflects your setting, along with a green output curve that will be defined by the current default Curves Retune Speed.

NOTE: Double-clicking with the I-Beam tool in the Pitch or Envelope Graph will highlight all tracked audio.

If a correction object already exists in the selected range (as a result of Make Curve, Import Auto, Make Notes, or the use of the Line or Curve tool), that object will be replaced by the Adjust Vibrato curve. Consequently, if you need to both modify the vibrato and correct the pitch of a phrase, you should first adjust the vibrato and then manipulate the resulting blue curve to correct the pitch. (If you do it in the opposite order, your vibrato adjustment will wipe out your previously executed pitch

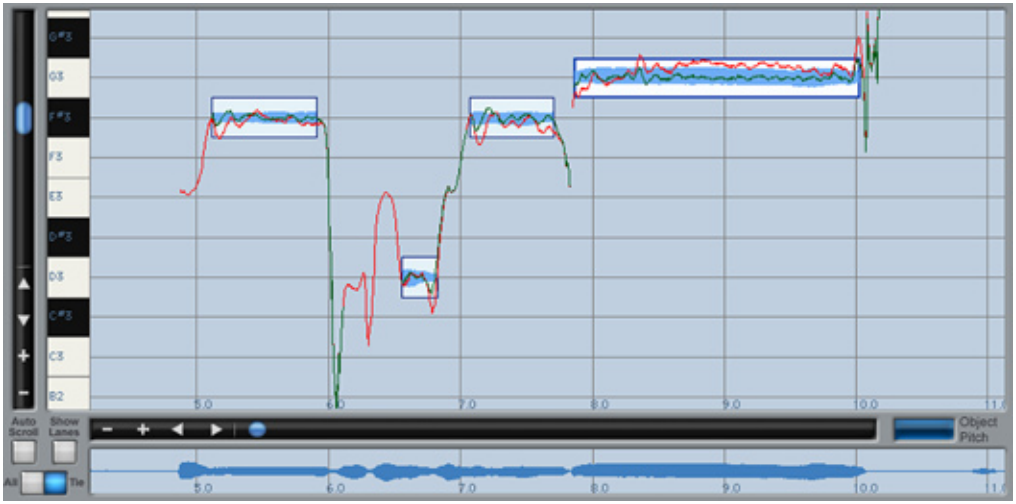
correction, often resulting in exclamations of a possibly profane nature.)

The default Adjust Vibrato setting is 0. Command (Mac)/Control (PC) clicking the slider will reset it to that value.

NOTE: This function is only available when some tracked audio has been selected with the I-Beam tool. If no audio is selected, the knob will not become active. Once some audio is selected, the knob will become active.

ANOTHER NOTE: This function uses the same Stochastic Optimal Linear Estimation Theory as the Auto Mode's Targeting Ignores Vibrato function to attempt to differentiate between vibrato and intended pitch changes. Therefore, you can typically select a portion of your audio containing both vibrato and intended pitch change and the Adjust Vibrato function will scale the vibrato while leaving the intended pitch changes alone. But again, depending on the actual performance, sometimes this will work better than others. If Adjust Vibrato seems to be making changes to parts of the audio you'd like to leave alone, simply Undo the adjustment and use the I-Beam to select only the vibrato portions you wish to edit.

The Pitch and Envelope Graph Displays



The Pitch Graph Display

The Pitch Graph displays the pitch contour of the audio to be processed as well as the pitch correction objects that you create and a plot of the exact output pitch based on each object's current Retune Speed. On this display, the vertical axis represents pitch (with higher notes towards the top) while the horizontal axis represents time.

The horizontal grid lines or lanes (depending on the current display mode) represent scale pitches. The grid lines provide a reference to guide you in drawing and editing correction objects. The positions of the graph lines correspond to the pitches of the notes in the currently selected scale. Changing the Scale Detune setting will result in the scale pitch graph lines moving up or down relative to the tracked pitch.

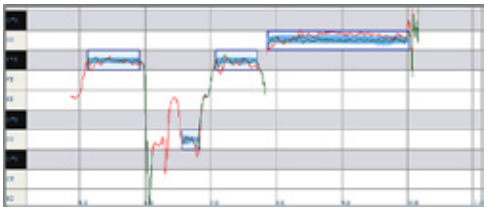
New to Auto-Tune Evo is the ability to resize the Graphical Mode window to take advantage of those nice big monitors that have become so much more affordable. In most hosts, Auto-

Tune Evo's Graphical Mode window can be resized in real-time, limited only by the size of your monitor.

In hosts that don't support real-time resizing, the window size can be set in the Options Dialog as described above. In VST hosts, resizing is limited to a maximum size of 1600 x 1200 pixels — still not too shabby.

Show Lanes
The Pitch Graph Display's default mode displays horizontal lines that represent each pitch. Prior to Auto-Tune Evo, this was Auto-Tune's only display mode and is still probably the most useful mode with Curve and Line correction objects.

However, with the introduction of Note objects, we have added an additional Lanes display mode that, as the name implies, displays horizontal lanes that extend from the left-hand "keys" and are tinted to differentiate the sharps and/or flats. Note objects snap neatly into these lanes. They are particularly useful when you will be using Note objects to shift the pitch of individual notes.



NOTE: The Show Lanes option is only available when the Major, Minor or Chromatic scales are selected. In all other cases, the Show Lanes button will be disabled.

Click the Show Lanes button to toggle its state. The button will turn blue when Show Lanes mode is on (but of course when Show Lanes mode is on, the Pitch Graph is full of Lanes, so it's pretty hard to get confused about which mode you're in).

NOTE: You can switch back and forth between display modes at any time. Switching modes has no effect on any previous correction objects. So you could, for example, use the default graph mode for creating and tweaking some curves in one section of your track, and then switch to Lanes mode to create and edit some Notes objects in a different section of the track. Your previously created and edited curves would remain unaffected.

Pitch Graph Scale
The Pitch Graph Scale Buttons control the horizontal (time) and vertical (pitch) scaling of the graph. Clicking the appropriate "+" button causes the view to zoom in, while clicking a "-" button causes it to zoom out.

NOTE: The horizontal scale buttons always control the Pitch Graph. They also control the Envelope Graph when it is set to "Tie" (see below).

Detected Pitch Display
The Detected Pitch Display will always show the exact pitch of the tracked input data (the red curve) at the current cursor position.

Output Pitch Display
The Output Pitch Display will always show the exact output pitch (the green curve) at the current cursor position.

Object Pitch Display
The Object Pitch Display will always show the exact target pitch of the correction object at the current cursor position.

For Lines and Curves, this will correspond to the pitch indicated by the blue target pitch curve.

For Notes, this will correspond either to the pitch of the graph line or lane on which the Note is situated, or, if Snap to Note has been

turned off and the Note has been offset from the graph line or lane, it will display the note and the amount of offset (in cents).

The Envelope Graph Display

The Envelope Graph displays the amplitude (loudness) envelope of the sound whose pitch is shown in the Pitch Graph.

All/Tie Buttons
The Envelope Graph's horizontal (time) scale is controlled by the "All" and "Tie" buttons.

Clicking the All button causes the envelope graph to display all of the currently tracked audio. This is useful for quickly locating and selecting various portions of audio spread over the duration of a song.

Clicking the Tie button slaves the position of the Envelope Graph to that of the Pitch Graph. When this setting is selected, the horizontal scale of the Envelope Graph is controlled by the Pitch Graph horizontal scale buttons.

Auto Scroll
When Auto-Scroll is on (the button is blue), Auto-Tune Evo will automatically scroll the Pitch Graph Display to ensure that the current play position is always in the display.

When Auto-Scroll is off (the button is pale gray), the display will not scroll to follow the play position.

NOTE: In addition to the above, if Auto-Scroll is off while tracking pitch, when the transport is stopped and the Track Pitch button is clicked to exit Track Pitch Mode, Auto-Tune Evo will not automatically scale the display to encompass all of the tracked audio, as it normally would.

This is useful when you have zoomed in to a problematic bit of audio and want to track it a number of times with different Tracking settings and observe the effects of the different settings. If Auto-Scroll were on, Auto-Tune Evo would rescale the display after each tracking pass, annoyingly requiring you to zoom back in to the bit you were interested in each time. With Auto-Scroll (and therefore automatic rescaling) off, that wouldn't be necessary.

Editing Tools

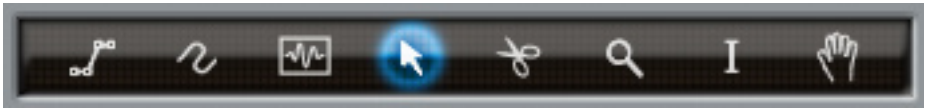
Editing Modality
Unlike versions of Auto-Tune prior to Auto-Tune 5, with Auto-Tune Evo, you are free to use any of the graphical editing functions while either tracking or correcting pitch.

You can, for example:

- Draw new correction objects while you are either tracking or correcting pitch.
- Edit existing correction objects while correcting pitch — even when the position indicator is passing over the object you're editing (in which case the edit takes effect as soon as you release your mouse button).
- Click Make Curve, Import Auto or Make Notes while tracking or correcting pitch. (If you do this while tracking pitch, the resulting objects will apply only to the audio that has already been tracked at the instant you click the respective button).
- Cut, copy or paste correction objects while tracking or correcting pitch.

Now, just because you *can* do something, doesn't necessarily mean you would want to (or that it even makes sense to), but with this functionality, you have a lot of flexibility in developing whatever workflow works best for you.

The Graphical Tools



The graphical tools are used in conjunction with the edit buttons to create or modify the desired correction objects.

NOTE: In addition to clicking on the various tools, if your host passes key presses to plug-ins, you can assign selected tools to QWERTY number keys using the Key Binding function in the Options dialog.

The Line Tool
The Line Tool is used to draw multi-segment straight lines on the Pitch Graph. Start the process by selecting the Line Tool and clicking anywhere on the Pitch Graph to set an anchor point. As you move the cursor, a line will extend from the anchor point to the cursor position. Click again to set a second anchor point and define the first segment of your pitch contour. Continue clicking and defining lines until your contour is complete. End the process by double-clicking on the final anchor point or pressing esc on your keyboard.

Pressing Option/Alt on your keyboard during line entry will force the current segment to be perfectly horizontal.

NOTE: Due to issues in Pro Tools HD and LE for PC that are beyond our control, using the Alt key to constrain a line segment to horizontal does not function in those versions. However, you can get an equivalent effect by using the Snap To Note function (see below) to constrain a line segment to a semitone, and then using the Arrow Tool to move that horizontal line segment to any intermediate pitch.

If you have enabled Snap To Note mode (see below), each segment will automatically snap to the nearest semitone. Pressing the Shift key on your keyboard while drawing a line temporarily toggles the state of the Snap To Line button. I.e., if Snap To Note mode is not enabled, pressing Shift will enable it for as long as Shift is pressed. Conversely, if Snap To Note mode is enabled, pressing Shift will disable it for as long as Shift is pressed.

If you move the cursor outside the Pitch Graph during point entry, the graph will automatically scroll.

To delete the last anchor point entered, press delete on your keyboard (you can do this repeatedly back to the very first anchor point).

Only one pitch correction object (Line, Curve, or Note) can exist at any time point on the Pitch Graph. When you complete the entry of a line object, any object(s) that previously existed at the same time will be deleted.

NOTE: If, while the Line Tool is selected, you move the cursor onto the Envelope Graph Display, it will temporarily change to the Magnifying Glass Tool, allowing you to quickly and easily move to any other point in your audio and then resume editing without needing to manually change tools.

The Curve Tool
The Curve Tool is used to draw arbitrary curves on the Pitch Graph. Start the process by selecting the Curve Tool and clicking anywhere on the Pitch Graph to set an anchor point. Hold down your mouse button and move the cursor to draw the desired pitch contour curve. End the process by releasing your mouse button.

Unlike the Line Tool, the Pitch Graph will not scroll if you attempt to move the Curve Tool cursor outside the current display area.

The Snap To Note mode does not affect the Curve Tool.

Only one pitch contour object (Line, Curve, or Note) can exist at any time point on the Pitch Graph. When you complete the entry of a Curve

object, any object(s) that previously existed at the same time will be deleted.

NOTE: If, while the Curve Tool is selected, you move the cursor onto the Envelope Graph Display, it will temporarily change to the Magnifying Glass Tool, allowing you to quickly and easily move to any other point in your audio and then resume editing without needing to manually change tools.

The Note Tool

The Note Tool is used to draw new Notes (duh!). Simply click and drag near the desired horizontal graph line or lane (depending on the current display mode) to create a new Note.

Only one pitch contour object (Line, Curve, or Note) can exist at any time point on the Pitch Graph. When you complete the entry of a new Note, any object(s) that previously existed at the same time will be deleted.

NOTE: New Notes will always be drawn precisely on semitone or scale note graph lines or lanes (depending on the display mode), regardless of the setting of the Snap To Note button. If you wish to create a note that is offset from a line or lane, first draw the note on the nearest line or lane, then ensure that Snap To Note mode is off and use either the Arrow tool or the Nudge buttons to move the Note to the desired pitch.

ANOTHER NOTE: If, while the Note Tool is selected, you move the cursor onto the Envelope Graph Display, it will temporarily change to the Magnifying Glass Tool, allowing you to quickly and easily move to any other point in your audio and then resume editing without needing to manually change tools (is this beginning to sound familiar?).

The Arrow Tool

The Arrow Tool is used to select and drag or edit existing correction objects (Lines, Curves, or Notes) as well as to add or delete anchor points to existing lines.

The Arrow Tool behaves as follows:

MANIPULATING LINES AND CURVES: Clicking on the background of the Pitch Graph and dragging horizontally selects objects' anchor points. Shift-clicking extends the selection.

Dragging beyond the Pitch Graph boundaries automatically scrolls the graph.

Moving the Arrow Tool over a Line or Curve causes the cursor to change to the object cursor (a horizontal bar). Clicking on an unselected curve or line segment with the object cursor causes the curve or segment and its anchor points to become selected and allows that object to be dragged. Clicking on an already selected curve or line segment with the object cursor allows that object, along with all other selected objects, to be dragged.

By default, when you click to drag an object, you will be restricted to vertical movements only (the cursor will indicate this state). The effect of this is to allow you to modify the pitch contour while preserving the object's location in time. This is particularly handy after using the Make Curve or Import Auto buttons.

In some host applications, holding down the Option/Alt key and then clicking to drag will allow movement in both vertical and horizontal directions.

Moving the Arrow Tool over a Line or Curve anchor point (whether that point is currently selected or not) causes the cursor to change into the anchor point cursor (four diagonal arrows). Clicking on an anchor point with the anchor point cursor deselects all other objects and anchor points and selects that anchor point so that it can be dragged. Dragging an anchor point stretches or compresses the correction object relative to the nearest unselected anchor point(s).

The extent to which you can drag selected objects is constrained by the position of neighboring unselected objects.

Clicking on the background of the Pitch Graph deselects all selected objects.

ADDING AND DELETING ANCHOR POINTS: Moving the Arrow Tool over an existing line segment and double-clicking will add an

intermediate anchor point at that point. The cursor will change to the anchor point cursor and the new anchor point can then be dragged.

Moving the Arrow Tool over an existing anchor point (except for end points) and double-clicking will remove that anchor point and cause a straight line to be drawn between the now adjacent anchor points.

The Arrow Tool will not add or delete anchor points on curves, only on lines created with the Line Tool.

MANIPULATING NOTE OBJECTS: The Arrow tool is used to modify the pitch of a Note object (i.e., move it up or down on the Pitch Graph) or to modify the start and/or end points of a Note (i.e., adjust those points forward or backward in time).

When you move the Arrow tool over a Note object, the cursor will change to one of two states, depending on where over the Note it is positioned.

When the cursor is over the central area of a note, the pitch shift cursor (vertical up and down arrows) will be displayed. Clicking on the Note when the pitch shift cursor is displayed will allow you to drag the note up or down to a new pitch. If the Snap To Note function is active, the Note's movement will be constrained to the grid lines or lanes of the Pitch Graph. If the Snap To Note function is not active, you can move the note to any arbitrary pitch.

A TIP: When moving a Note with Snap To Note off, you can refer to the Object Pitch Display to determine the Note's exact pitch at any position.

When the cursor is near either end of a note, the length adjustment cursor (horizontal left and right arrows) will be displayed. Clicking on either end of a Note when the length adjustment cursor is displayed will allow you to drag the selected end point left or right to a new position, effectively lengthening or shortening the Note.

Unlike Lines and Curves, whose movement is constrained by adjacent objects, extending a Note's start or end point will replace any other correction objects that currently exist in the extended time range.

NOTE: When extending a Note, as long as you are dragging the end point (i.e., as long as you hold your mouse button down), moving the end point over an existing object will cause it to be overwritten, but then moving it back to its original position will cause the overwritten object to reappear. However, once you release the mouse button and finalize the move, the overwritten object is gone forever. Subsequently dragging the Note's end point back to its original position will not cause the overwritten object to reappear.

ANOTHER NOTE: When extending a Note, any new pitch material that becomes part of the lengthened Note will inherit the original Note's Retune Speed (as displayed by its green output curve). As a result, it may (or may not) be necessary to adjust the Retune Speed to achieve the best result with the additional material.

A TIP: If you are working on a performance with such wide vibrato that even with Number of Note Objects set to its lowest setting you still end up with a series of notes rapidly alternating between the desired pitch and the upper and lower adjacent pitches, instead of manually moving each upper and lower note back to the desired central pitch, just grab the appropriate end of the first or last central pitch Note and drag it over all of the other Notes. You'll end up with a single Note on the desired frequency whose vibrato you can tame with a single adjustment of the Note's Retune Speed.

While all of the above may seem a bit mind-boggling on first reading, in practice it's quite intuitive. Spend a minute or two playing with the Arrow Tool and all will become clear.

NOTE: If, while the Arrow Tool is selected, you move the cursor onto the Envelope Graph Display, it will temporarily change to the Magnifying Glass Tool, yadda, yadda, yadda…

Scissors Tool
Moving the Scissors Tool over an existing Curve, Line, or Note object and clicking will break the object in two at the point clicked. Both of the new objects will be unselected.

For Curves and Lines, although it will look like there is only one anchor point created at the break point, there are actually two (one for each of the two newly created line or curve segments). Simply use the Arrow Tool to move the top anchor point to reveal the other one.

NOTE: Scissors Tool, Envelope Graph Display, temporarily Magnifying Glass Tool. Yup.

Magnifying Glass
In the Pitch Graph, use the Magnifying Glass to click and drag a box around an area of interest. Dragging off the Pitch Graph automatically scrolls the graph. When you release the mouse button, the scale and position of the Pitch Graph will be changed to display the area enclosed by the box.

When the Magnifying Glass cursor is displaying the default "+", clicking the Magnifying Glass anywhere in the pitch display will increase the display's horizontal and vertical zoom factors one step (if possible).

Pressing Option(Mac)/Alt(PC) will cause the cursor to change to "-". In this state, clicking anywhere in the pitch display will decrease the display's horizontal and vertical zoom factors one step (if possible).

Dragging the Magnifying Glass in the Envelope Display will cause the selected time range to appear in the Pitch Display (most useful for navigating when the Envelope Display is in "All" mode). The pitch range of the Pitch Display will be automatically scaled such that all of pitch information in that time range is visible on the screen.

I-Beam Tool
Drag the I-Beam Tool in either the Pitch or Envelope Display to select an area to apply Make Curve, Import Auto, Make Notes, Number of Note Objects, or Adjust Vibrato. The selection area will be reflected in both displays.

Double-clicking with the I-Beam tool in either the Pitch or Envelope Display will highlight the range of all currently tracked audio.

If the Envelope Display is set to All, using the I-Beam Tool to make a selection anywhere in the Envelope Display will cause the selected audio to appear in the Pitch Display. This is handy for quickly moving around your track to make various edits.

Hand Tool
Drag the Hand Tool in any direction in the Pitch Display to move the area displayed.

If you move any selected cursor into the left-hand "key" area, it will temporarily change to the Hand tool, allowing you to quickly scroll the Pitch Display up or down as desired.

POP QUIZ!: If, while the Hand Tool is selected, you move the cursor onto the Envelope Graph Display, what happens? (Send your answer to info@antarestech.com with the words "Pop Quiz" in the subject line.)

The Edit Buttons

Once some audio has been tracked and/or correction objects created, they can be affected or edited in various ways with the Edit Buttons.

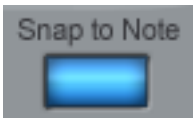
The Edit Buttons are context sensitive, i.e., only the buttons that are applicable to the current state of the pitch display are active. If a particular button does not have a valid function relative to the current pitch display state, it will be "grayed out" (i.e., colored dark gray). If it does have a valid function, it will appear pale gray.

The Clear All Button
Clicking the Clear All button erases all tracking and correction information, whether or not it is currently visible on the Pitch Display. Since you can not undo this function (and accidentally executing it could be catastrophic), you must confirm your intent in a warning dialog.

NOTE: If you're absolutely certain you want to clear everything and don't want to be bothered by the confirmation dialog, Option-click the Clear All button to bypass the warning.

The Undo Button
The Undo button becomes active whenever you move or modify a target pitch contour object. Clicking the Undo button once will undo the most recent change. If you have made multiple changes, you can continue to click Undo to undo additional changes up to the limit that you set in the Options dialog.

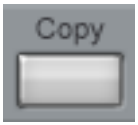
The Redo Button
The Redo button becomes active whenever you have executed at least one Undo. Clicking the Redo button once will redo the most recent undone change. If you have executed multiple undos, you can continue to click Redo to redo additional changes up to the limit that you set in the Options dialog.



The Snap To Note Button
Press this button to enable Snap To Note mode when using the Line Tool or moving Note objects. In Snap To Note mode, each line segment will automatically snap to the nearest semitone and Notes can only be moved to exact semitones (or exact scale notes for microtonal scales).

Pressing the Shift key on your keyboard while drawing a line or moving a Note object temporarily toggles the state of the Snap To Note button. I.e., if Snap To Note mode is not enabled, pressing Shift will enable it for as long as Shift is pressed. Conversely, if Snap To Note mode is enabled, pressing Shift will disable it for as long as Shift is pressed.

The Select All Button
The Select All button causes all correction objects, whether currently visible on the Pitch Graph view or not, to become selected.



The Cut And Copy Buttons
The Cut and Copy buttons become active whenever one or more correction objects are selected. Cut removes selected objects. Both Cut and Copy copy selected objects to the Auto-Tune Evo clipboard. You can then paste the objects elsewhere in the Pitch Graph display.

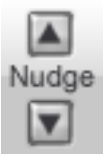
The Paste Button
The Paste button becomes active whenever one or more objects have been Cut or Copied to the clipboard.

To paste object(s) from the clipboard:

- Navigate to the general area where you want to paste the object(s.)
- Click the Paste button (the cursor will turn into the Paste cursor).
- Press and hold your left (or only) mouse button. A graphic representation of the object(s) to be pasted will appear.
- While holding down the mouse button, drag the objects to the exact location where you wish to paste them.
- Once they are at the proper location, release the mouse button to complete the paste.

NOTE: Since only one correction object (Line, Curve, or Note) can exist at any time point on the Pitch Graph, any object(s) that previously existed at the time where an object is pasted will be deleted. Hence, before you complete the paste, be sure that the area you're pasting into does not contain any correction object(s) that you want to keep.

A TIP: When pasting an object, the object retains the Retune Speed(s) of the originally copied object. That speed may or may not be appropriate for the pitch data at the object's new location. Observe the resulting green output pitch curve and adjust the Retune Speed as necessary.



The Nudge Buttons
The Nudge buttons allow you to move all currently selected correction objects up or down in precise one-pixel increments.

NOTE: If Snap To Note mode is enabled, Note objects can not be nudged. If you want to nudge a Note object, first turn off Snap To Note. After nudging the Note to its new pitch, you can re-engage Snap To Note. The nudged note will remain at its offset pitch (unless you subsequently use the Arrow tool to move it, in which case it will once again be constrained to scale notes).

The actual pitch interval for each Nudge step depends on the current vertical zoom setting of the Pitch Graph. When the display is zoomed far out, the interval is larger than when zoomed in. The extremes of the nudge intervals are as follows:

When zoomed all the way out: 20 cents per nudge

When zoomed all the way in: 2 cents per nudge

For maximum control, zoom in as close as possible to your object(s) of interest before using the Nudge buttons.

Keyboard Equivalents
Some host applications support the following keyboard command equivalents for the above Edit Buttons. Others reserve these commands for their own use. Consult your host application's manual for details (or just try them and see if they work).

Command/Control-Z	Undo
Command-Shift-Z/Control-Y	Redo
Command/Control-X	Cut
Command/Control-C	Copy
Command/Control-V	Paste
Command/Control-A	Select All

Pitch Shifting, Formant Correction and Throat Modeling

To use the Pitch Shifting, Formant Correction and/or Throat Modeling functions in Graphical Mode, refer to the descriptions of the Transpose, Throat Length, and Formant controls in the Common Controls section earlier in this chapter.

Pen Tablet Input

If you do a lot of your pitch correction using Graphical Mode, you may want to consider using a USB pen tablet like the Wacom Graphire or Intuos.

A pen tablet lets you control Auto-Tune Evo's graphical tools (as well as all the other controls) using a familiar pen-style input device. Once you become comfortable with one (which usually only takes a few minutes), a pen tablet typically offers increased drawing accuracy with less wrist stress in long sessions. Some tablets also include programmable function keys for often-used keyboard commands.

Chapter 4 : Auto-Tune Evo Tutorials

This chapter introduces you to how Auto-Tune Evo works by guiding you through a number of brief tutorials.

These tutorials make use of a number of audio and MIDI files. (We will assume that you are familiar with loading audio and MIDI files into your host application.)

If you purchased a packaged version of Auto-Tune Evo, your will find the required files in the "Tutorial Audio" folder on the installation DVD ROM.

If you purchased your copy of Auto-Tune Evo via download, you will have to separately download the Tutorial Audio files from the same web page from which you downloaded Auto-Tune Evo.

Tutorial 1: Automatic Mode Basics

This tutorial will guide you through the basic Automatic Mode functions using the file "A2-A3-A2 sweep." This is a simple synthesized waveform sweeping slowly from A2 up to A3 and back to A2. While it is unlikely that you'd ever need to process such an input with Auto-Tune Evo, it provides a very clear example of what each of the main Auto-Tune Evo controls do.

Begin the tutorial by doing the following:

1. Load or import "A2-A3-A2 sweep" into a track of your host program. Play the track so that you are familiar with the original audio.
2. Set up Auto-Tune Evo to be an insert effect on that track.
3. Set Auto-Tune Evo to Automatic Mode.
4. Set the Key to "A" and the Scale to "Major."
5. Set the Retune Speed to zero.
6. Set "A2-A3-A2 sweep" to loop continuously and put your host program into Play mode.

What you will hear is an A major scale. This is because Auto-Tune Evo is continuously comparing the input pitch to the notes of the A major scale and instantaneously correcting the output pitch to the nearest of the scale tones.

Now do the following:

1. In the Edit Scale Display, click the Remove buttons next to the notes B, D, F# and G#.
2. Play "A2-A3-A2 sweep" again.

You will now hear an arpeggiated A Major triad because you have removed all the other notes from the scale.

To continue:

1. In the Edit Scale Display, click the Bypass button next to E.
2. Play "A2-A3-A2 sweep" again.

You will now hear the effect of not correcting the E. During the time that Auto-Tune Evo would normally be tuning the input to E, Auto-Tune Evo instead enters bypass mode and passes the input through uncorrected.

To continue:

1. Set the Retune Speed to about 30.
2. Play "A2-A3-A2 sweep" again. Compare the 30 setting to the 0 setting.
3. Try various other Speed settings.

The setting of 0 is fast: Auto-Tune Evo makes instantaneous pitch changes. The setting of 30 is slower. Auto-Tune Evo makes gradual pitch changes. This parameter controls how rapidly the pitch correction is applied to the incoming pitch. The units are milliseconds. A value of zero will cause instantaneous changes from one tone to another and will completely suppress a vibrato (note that related volume changes will remain). Retune values from 10 to 50 are typical for vocals.

To continue:

1. Set the Retune Speed to 0
2. In the Edit Scale Display, click the Remove buttons next to all the notes except F#.
3. Play "A2-A3-A2 sweep" again. As the sound is playing, move Scale Detune knob.

The output pitch will be locked to F#, however, you will hear the output pitch change with the Detune slider movement. This is because the Detune knob is changing the pitch standard of the scale.

Finally:

1. Select "sine wave" from the Vibrato Type pop-up.
2. Play "A2-A3-A2 sweep" again.
3. Experiment with the various vibrato controls to hear their effects.

Tutorial 2: Targeting Ignores Vibrato Function

This tutorial will demonstrate the purpose and use of the Automatic Mode's Targeting Ignores Vibrato function.

Begin the tutorial by doing the following:

1. Load or import "wide_vibrato" into a track of your host program. This is a recording of a male voice singing a sustained "G" with a pronounced vibrato. Play the track so that you are familiar with the original audio. Despite the wide vibrato, you will notice that the singer's pitch drifts alternately sharp and flat.
2. Set up Auto-Tune Evo to be an insert effect on that track.
3. Set Auto-Tune Evo to Automatic Mode.
4. Set the Key to "C" and the Scale to "Chromatic."
5. Set the Input Type to Low Male Voice
6. Set Retune Speed to a value of 24.
7. Use your host program's controls to Bypass Auto-Tune Evo. Set "wide_vibrato" to loop continuously and put your host program into Play mode. Watch the blue Detected Pitch indication on Auto-Tune Evo's Virtual Keyboard. As you will see, the singer's vibrato is so wide that it consistently gets closer to G# and F# than G, causing Auto-Tune to intermittently select those notes as target pitches.
8. Check that Targeting Ignores Vibrato is not selected and remove Auto-Tune Evo from Bypass. Watch the Detected Pitch indication and listen to the result. As you will hear, whenever Auto-Tune Evo thinks G# or F# is the target pitch, it will move the input closer to those notes, in effect making the situation worse.
9. Now, leaving all other settings the same, click Targeting Ignores Vibrato. With Targeting Ignores Vibrato engaged, Auto-Tune Evo's vibrato identification algorithm recognizes the pitch excursions as vibrato and continues to use "G" as the target pitch.

Next, we'll use Graphical Mode for a dramatic graphic demonstration of the effect of Targeting Ignores Vibrato:

1. Still using "wide_vibrato," set up Auto-Tune Evo as described in Steps 1-5 above.
2. Set Retune Speed to 0.
3. Make sure Targeting Ignores Vibrato is Off.
4. Set Auto-Tune Evo to Graphical Mode.
5. Click the Track Pitch button and play wide_vibrato through Auto-Tune Evo. A red curve representing the pitch contour of wide_vibrato will be drawn to the screen as the file plays.
6. Stop playback and click the Track Pitch button again to stop the tracking function.
7. Click the Import Auto button. A blue curve will appear. This curve represents the pitch correction that would result from processing the audio with the current Automatic Mode settings. Note all the instances in which Auto-Tune Evo identifies G# or F# as the target pitch.
8. Set Auto-Tune Evo back to Automatic Mode.
9. Set Targeting Ignores Vibrato to On.
10. Return once again to Graphical Mode.
11. Click Import Auto (there is no need to track pitch again, as the red pitch curve is still present in the Pitch Graph).
12. Notice that the blue curve is now a straight line on "G," indicating that the Improved Targeting algorithm has accurately identified the pitch excursions as vibrato and has therefore ignored it as far as target pitch selection is concerned.

Tutorial 3: Natural Vibrato Function

This tutorial will demonstrate the use of the Natural Vibrato function using the same audio file we used in the previous tutorial.

Begin the tutorial by doing the following:

1. Load or import "wide_vibrato" into a track of your host program. This is a recording of a male voice singing a sustained "G" with a pronounced vibrato. Play the track so that you are familiar with the original audio.
2. Set up Auto-Tune Evo to be an insert effect on that track.
3. Set Auto-Tune Evo to Automatic Mode.
4. Set the Key to "C" and the Scale to "Chromatic."
5. Set the Input Type to Low Male Voice
6. Set Retune Speed to a value of 24.
7. Set "wide_vibrato" to loop continuously and put your host program into Play mode.
8. Set Natural Vibrato to 12 and note the effect on the vibrato. Set Natural Vibrato to -12 and note the effect on the vibrato.
9. Set all Scale notes to Bypass to disable any pitch correction. Again, adjust Natural Vibrato as in Step 8 and note that its effect is still active.

Tutorial 4: Using the Automatic Mode MIDI Functions

This tutorial will introduce you to Auto-Tune Evo's two Automatic Mode MIDI functions: Learn Scale From MIDI and Target Notes Via MIDI.

With Learn Scale From MIDI, you can create the correct scale for a particular melody without knowing a G-sharp from a B-flat. Simply play the melody on a MIDI keyboard which is patched through your host application to Auto-Tune Evo or play an existing MIDI file with contains the MIDI notes of the melody to be processed.

Begin the tutorial by doing the following:

1. Load or import the audio file "somewhere" into a track of your host program. This is a recording of Somewhere Over the Rainbow sung with fairly extreme pitch errors. (Our very talented singer made us promise to tell you that she did this on purpose at our request.)
2. Set up Auto-Tune Evo to be an insert effect on that track.
3. Import the MIDI file "somewhere.mid" into your host program's MIDI sequencer.
4. Select Auto-Tune Evo as the target for the MIDI track.
5. Select Automatic Mode and click the "Learn Scale from MIDI" button so that it turns blue and its indicator changes to "On."
6. Click the All Octaves button so that it turns blue (if it is not already).
7. Play the MIDI file through once and watch as the scale develops on Auto-Tune Evo's virtual keyboard and in the Scale Edit window. As each note is sung, it is added to the scale until the scale includes every note that appears in the melody.
8. Set the Retune control to 20 and play the audio track using this scale.

NOTE: You can also instantaneously define a scale by playing all of the notes of the scale as a chord (i.e., all scale notes played on the same beat) and recording that into a MIDI track. This is an ideal way to use Auto-Tune Evo in music with many key (scale) changes.

With Target Notes Via MIDI, Auto-Tune Evo looks at its MIDI input in real time to determine its current target note(s). Try the following with the provided audio and MIDI files:

1. Set up your host program and load or import the "somewhere" audio and MIDI files as described in steps 1–4 above.
2. Select Automatic Mode and click the "Target Note Via MIDI" button so that it turns blue and its indicator changes to "On."
3. Click the Octaves as Played button so that it turns blue (if it is not already).
4. Play the audio and MIDI track together and watch the current target note change in real time on the Virtual Keyboard — and listen to the results.

The most interesting part of the Target Notes Via MIDI feature is that it only operates for the duration of the MIDI note — that is, when there is no current MIDI Note On value, Auto-Tune Evo is effectively in Bypass mode. This means that if you delay the MIDI notes, then the audio performs its attacks as performed and then corrects to pitch when the MIDI note occurs (at whatever Retune Speed is set). In the case of the 'Somewhere' vocal performance, most of the intonation problems happen during the notes' sustain portions. Try moving the notes in the MIDI file around and listen to the results. This gives far more subtle control than Automatic Mode alone, while not being quite as tweaky as operating in Graphical Mode.

NOTE: The MIDI functions look only at MIDI note values. Controller data such as Pitch Bend or Mod Wheel do not affect Auto-Tune Evo's performance.

Tutorial 5: Transpose and Formant Control

This tutorial will demonstrate Auto-Tune Evo's pitch shifting, formant correction and throat modeling capabilities. It will make use of the same audio file used in the previous tutorial.

Begin the tutorial by doing the following:

1. Load or import the audio file "somewhere" into a track of your host program.
2. Set up Auto-Tune Evo to be an insert effect on that track. (If you are using a Pro Tools HD system, use the RTAS version of the plug-in.)
3. Set the Key to "G" and the scale to "Major." Set the Retune Speed knob to 27.
4. Play the audio file. Note that these settings do a pretty good job of correcting the most obvious problems in the performance.
5. Set the Transpose control to 6 (a perfect fifth up). Check to be sure that Formant is off.
6. Play the audio file and listen to the quality of the voice. Since the formants are being shifted with the pitch, you will hear the familiar "chipmunk" effect.
7. Click the Format button to turn on formant correction. Set the Throat Length to 120.
8. Play the audio file again and note the difference.
9. Play the audio file again while adjusting the Throat Length control to hear the effect of changing the modeled vocal tract.
10. Repeat steps 5 through 9 with different settings of the Transpose control.

Tutorial 6: Graphical Mode Basics

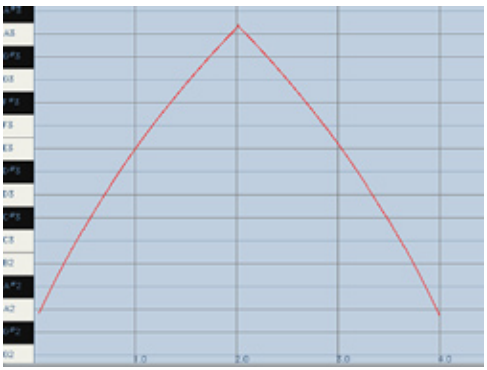
This tutorial will introduce you to the basic Graphical Mode functions, again using the "A2-A3-A2 sweep" file from Tutorial 1.

Begin the tutorial by doing the following:

1. Load or import "A2-A3-A2 sweep" into a track of your host program. Play the track so that you are familiar with the original audio.
2. Set up Auto-Tune Evo to be an insert effect on that track.
3. Set Auto-Tune Evo to Graphical Mode.
4. Set the Key to "A" and the Scale to "Major."
5. Click the Track Pitch button.
6. Play the sweep signal through Auto-Tune Evo. A red curve representing the pitch contour of the signal will be drawn to the screen as the file plays.
7. Stop playback and click the Track Pitch button again to stop the tracking function.

To continue:

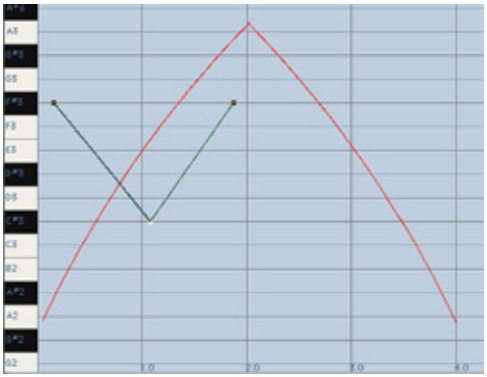
1. Select the Magnifying Glass tool and drag out a box on the Pitch Graph that encloses the red curve. The result will be something like the following:



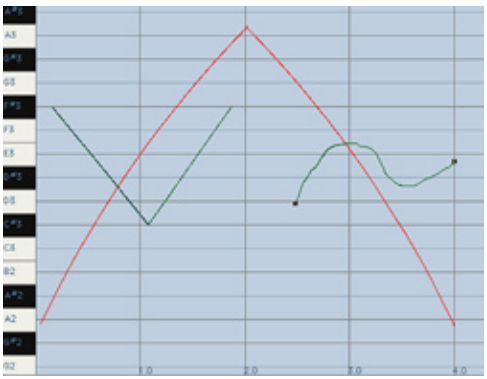
2. Select the Line tool and enter a line similar to that below. By clicking multiple anchor points on the Pitch Graph, line segments joining the points will be drawn.

To erase the last point entered, press <delete> on the keyboard (you can press <delete> repeatedly to erase back to the first anchor point).

When done, double-click the last point or press <esc> on the keyboard. A green output curve will appear reflecting the current default Line Retune Speed.



3. Set the Retune Speed to 0 and observe the green output curve. Play back the sound to hear the effect.
4. Select the Curve tool and create a curve similar to the one shown below. Click and hold the mouse button and drag to draw the curve. When done, release the mouse button.



5. Play back the sound to hear the effect.
6. Vary the Retune Speed between 0 and 400 and note the effect on both the green output curve and the audio.

Now that we have some correction objects on the Pitch Graph Display, this would be a good time to become familiar with the functions of the Arrow and Scissors Tools. (Refer back to Chapter 3 for detailed descriptions of the Arrow and Scissors Tools' behaviors.)

As you experiment in the following steps, play back the file to hear the effect of each action.

7. Select the Arrow Tool.
8. Drag the Arrow Tool across the Pitch Graph to select objects.
9. Move the cursor over curves and anchor points. Practice selecting entire curves and individual anchor points.
10. Use the Arrow Tool to drag selected curves and individual anchor points.
11. Use the Arrow Tool to double-click anywhere on one of the existing line (not curve) segments to create a new anchor point. Use the Arrow Tool to drag the new point to a new position.
12. Still using the Arrow Tool, double-click on the new anchor point you created in Step 11 to delete it and return the line to its initial state.
13. Select the Scissors Tool and click on an existing line or curve to break it in two at that point. A stacked pair of anchor points will be created at the point you click. Select the Arrow Tool again and use it to drag each of the new end points in turn to new positions.
14. Select one or more objects and play with the Edit Buttons (Undo, Cut, Copy, Paste, Select All).

This would also be a good time to see if the Edit Button keyboard equivalents work in your host application:

Command/Control-Z	Undo
Command-Shift-Z/Control-Y	Redo
Command/Control-X	Cut
Command/Control-C	Copy
Command/Control-V	Paste
Command/Control-A	Select All

Tutorial 7: Precision

This tutorial is actually more of a demonstration to show the extraordinary precision with which Auto-Tune Evo can track and correct intonation problems. If this doesn't sound interesting, feel free to proceed to Tutorial 8 below.

(By this time, we'll assume you're comfortable loading files and calling up Auto-Tune Evo.)

1. Arrange the files "C2 Ahhh v3" and "C2 Ohhh v1" so that they are on separate tracks and can be played simultaneously.
2. Assign a separate instance of Auto-Tune Evo to each of the two tracks and select Automatic Mode for each of them.
3. In each Auto-Tune Evo, set the Retune slider to 0.
4. In each Auto-Tune Evo, set the Key pop-up to B-flat.
5. Do whatever your host application requires to bypass both instances of Auto-Tune Evo.
6. Play back the files so you can hear them together without processing.

Believe it or not, these vocal samples from a sample CD are supposed to be the same pitch. Yikes!

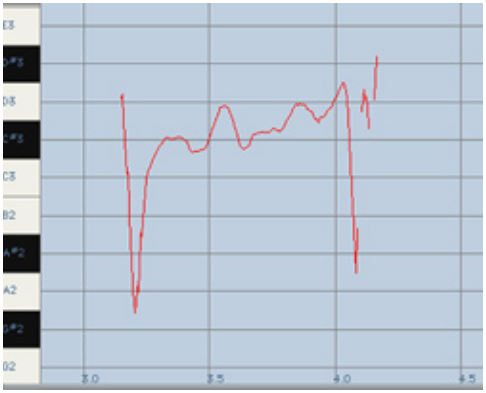
7. Now enable Auto-Tune Evo on each of the tracks and play the files again.

If you've done everything right, you will hear the samples so well in tune that they sound like one voice

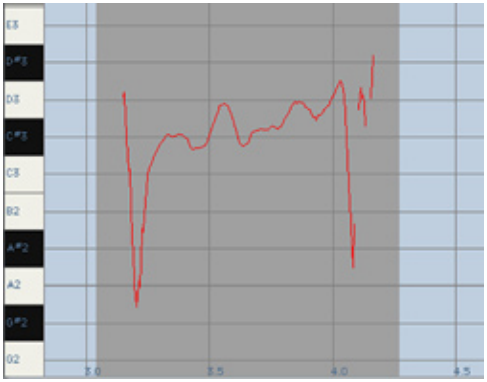
Tutorial 8: Make Curve Function

This tutorial will introduce you to the Make Curve function. The Make Curve function gives you precise control over pitch accuracy and inflection.

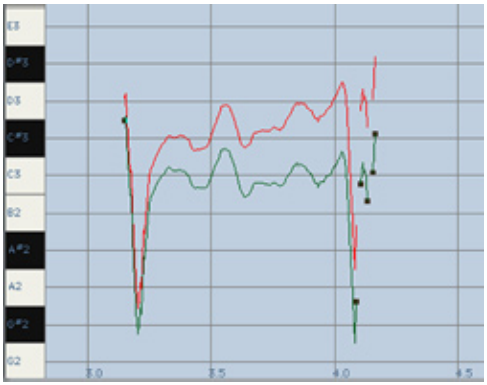
1. Setup to process the file "Crowd All" through Auto-Tune Evo.
2. Select Graphical Mode.
3. Press the Track Pitch button.
4. Play the "Crowd All" file.
5. Select the Magnifying Glass Tool and drag out a box on the Pitch Graph that encloses the red curve for the "-gether" part of the last word, "together." You will see something like the following:



6. Use the I-Beam Tool to drag a selection of "-gether" in the Pitch or Envelope Display. The result will be something like the following:



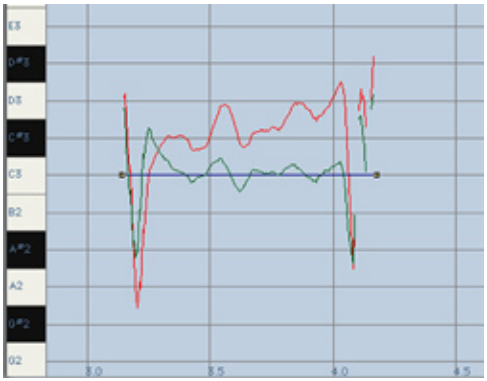
7. Click the Make Curve button. Auto-Tune Evo will compute a new blue curve object from the existing pitch data as well as a green output curve that reflects the default Curve Retune Speed. (The new curves may be difficult to see at first because they may exactly overlay the red curve.) Click the I-Beam Tool on the background of the Pitch Graph to cancel the area selection.
8. Select the Arrow Tool and click precisely on the left end of the curve to select only the left anchor point (you'll know you're over the anchor point when the cursor changes to the up-and-down arrow cursor). Drag this straight up, stretching the curve so it is centered around the D3 graph line.
9. Drag the Arrow tool across all of the visible curves to select them. Then move the Arrow Tool over the body of a correction curve so that the cursor changes to the horizontal bar. Click and drag the curves straight down so they centered on the C3 graph line. The Pitch Graph should now appear as follows:



10. Set the Retune Speed to 0 and play back the sound. Note that the errant note is now in tune.

To continue, here is an alternative approach to the same pitch problem using the Line Tool.

1. Click "Select All" and then click "Cut" to delete the curves you created in the steps above.
2. Make sure Snap To Note is engaged and use the Line Tool to draw a horizontal line at C3 as shown below:



3. Set the Retune Speed to 20 and play back the sound. Experiment with other Retune Speeds to see their effect on the green correction curve and to hear their effects.

Some notes:
Vibratos and other pitch gestures typically occur with related loudness gestures. Specifically, with vibratos, some vocalists produce mostly pitch variations and little loudness variations while others produce small pitch variations and a lot of loudness variations (the latter is often called tremolo). Nonetheless, almost all voices seem to produce a combination of both pitch and related loudness variations. Therefore, trying to take an existing vibrato and change it (say speed it up) often sounds unnatural because the new pitch variation does not correspond to the original (and still present) loudness variation.

These considerations are also important when correcting pitch. It's rarely effective to draw in a new pitch gesture at the desired pitch, even though that gesture may have worked well in another performance.

As this tutorial has demonstrated, the following two techniques provide successful approaches to Graphical Mode pitch correction:

- The first technique uses the Make Curve button to create a curve of the existing pitch, allowing you to drag that curve up or down,

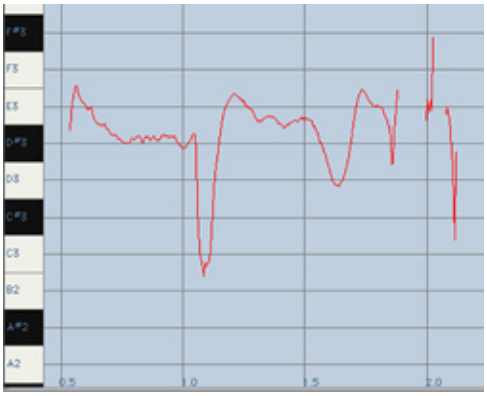
or stretch it by dragging one end vertically. The Retune Speed can then be set very fast (0 to 5). This will force a precise re-tuning, but will sound extremely natural since the target pitch curve will precisely synchronize with the original loudness gestures of the voice.

- The second technique is to draw a flat line segment across the duration of a tone at the desired pitch and then set the Retune Speed in the range of 20 to 40. This has the effect of gently moving the input pitch towards the desired pitch. The slower values of 20 to 40 will let through a vibrato but still draw the overall pitch closer to being in tune. The average pitch will eventually settle to the given line and the pitch gestures will occur both sharper and flatter relative to that line. The settling time is about twice the Retune Speed setting (in milliseconds). 20 to 40 will let through about one-half of a typical vibrato. Slower settings will let through more vibrato but will cause the new pitch to be reached more slowly.

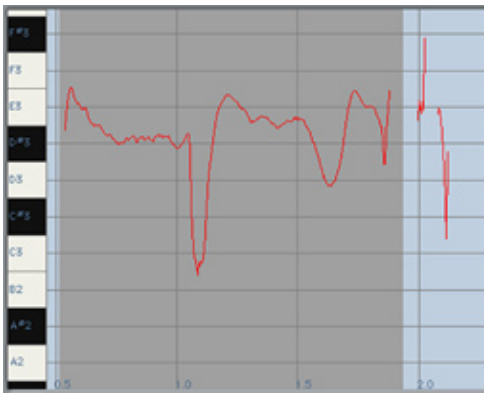
Tutorial 9: Import Auto Function

The Import Auto function allows you to display and edit the pitch corrections that would result from specific Automatic Mode settings.

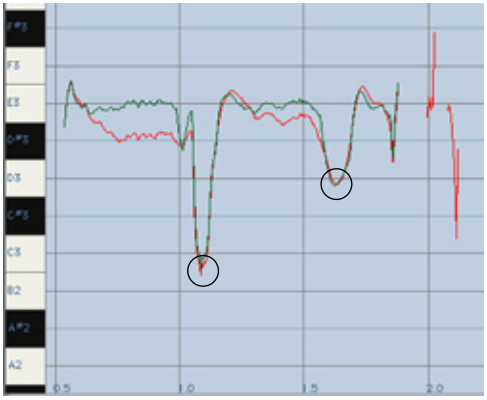
1. Setup to process the file "Crowd All" through Auto-Tune Evo.
2. Set the Key and Scale to C Major. Select Automatic Mode and set the Retune Speed to the default of 20.
3. Select Graphical Mode.
4. Press the Track Pitch button.
5. Play the "Crowd All" file.
6. Select the Magnifying Glass Tool and drag out a box on the Pitch Graph that encloses the red curve for the words "crowd all rushed." You will see something like the following:



7. Use the I-Beam Tool to drag a selection in the Pitch or Envelope Graph as shown:



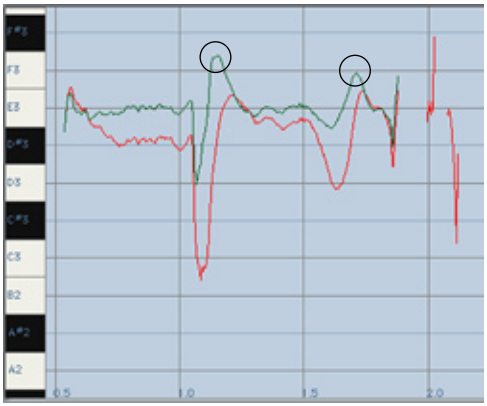
8. Click the Import Auto button. Auto-Tune Evo will compute a new blue curve object from the existing pitch data as well as a green output curve:



PITCH DRAWN TO NEIGHBORING NOTES

Assuming that this entire phrase should be centered around E3, there are several problem spots, indicated above, where the pitch is being incorrectly adjusted towards neighboring tones.

9. To hear the pitch corrections that would be produced in Automatic Mode, set the Graphical Mode Retune Speed to 0 (which will cause the green output curve to exactly match the blue object curve). Play back the file.
10. Switch to the Automatic Mode and click the Remove buttons next to C, D, F, A, and B.
11. Return to the Graphical Mode and use the I-Beam tool to drag out a selection in the Envelope Graph, as in Step 7.
12. Press the Import Auto button. Auto-Tune Evo will compute new blue and green curves from the existing pitch data:



RAISED PITCHES

Note how the pitch errors from the previous curve have been removed. Also, note the raised pitches indicated above. This occurs because the Automatic Mode Retune slider value of 20 is slow compared to the rapidly increasing pitch that is occurring at that point in time. But even with the raised pitches, the average output pitch is centered on E3 and the phrase sounds in tune.

Tutorial 10: Make Notes Function

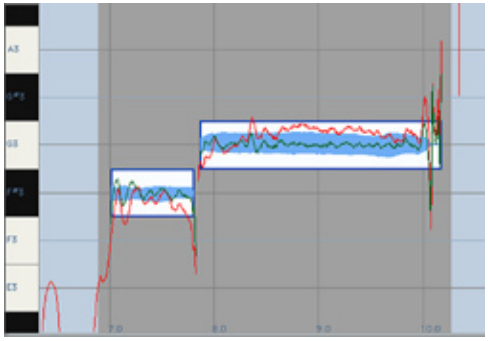
This tutorial will help you become familiar with Auto-Tune Evo's new Notes correction objects and how they are used for pitch correction and selective pitch shifting.

For this tutorial, we will once again use the "somewhere" audio file.

1. Load or import the audio file "somewhere" into a track of your host program.
2. Set up Auto-Tune Evo to be an insert effect on that track.
3. Select Graphical Mode and select G Major as the Key and Scale.
4. Press the Track Pitch button.
5. Play the "somewhere" file and track the initial phrase, "Somewhere, over the rainbow, skies are blue…" (approximately the first 17 seconds of the file). Stop the transport and click Track Pitch again to exit the tracking function. Assuming Auto-Scroll is enabled, the display will scale to include all of the tracked audio.

There are two obvious problem areas in this phrase, the words "rainbow" and "blue." We'll start with "rainbow."

6. Select the Zoom tool and drag it across the tracked pitch from about 7 seconds to 10 seconds to zoom in to the area of interest. If Auto-Scroll is currently enabled, turn it off.
7. Select the I-Beam tool and highlight the range of the word "rainbow" (again, from about 7 seconds to 10 seconds).
8. Click the Make Notes button and adjust the Number of Note Objects control to get two notes, the first on F#3 and the second on G3. (Note that if you set Number of Note Objects too high - above 80 in this case - unwanted notes will be created on F3 as a result of the drop in pitch at the beginning and end of "rain…") Your display should look something like this:



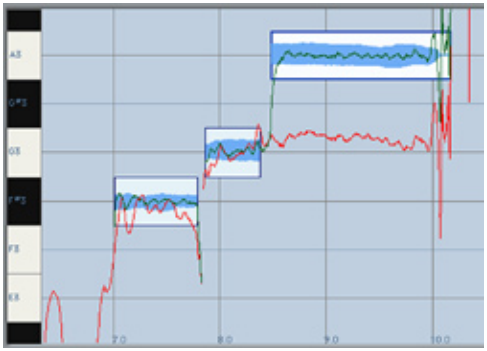
You will notice that the two syllables of "rainbow" have different problems. "Rain…" is slightly flat, while "…bow" is quite sharp. Luckily, thanks to Auto-Tune Evo's independent object Retune Speeds, we can quickly customize each note's correction.

9. Select the Arrow tool. Click the graph background to deselect both notes and then click on the F#3 note to select it. Adjust the Retune Speed control. Observe the green output pitch curve and audition the resulting range of correction.
10. With the Arrow tool still selected, click on the G3 note. Again, adjust the Retune Speed for the desired correction. Note that with a long held note like this, too fast a Retune Speed can sound unnatural. The trick is to select a speed that pulls the overall note in tune, while still allowing enough of the singer's original natural variation.

A NOTE: An indication of Auto-Tune Evo's seriously enhanced pitch-tracking capabilities is the wildly oscillating curve at the end of "rainbow." That is actually the result of Auto-Tune Evo tracking the faint reverb tail at the end of the word.

We'll continue with an example of selective pitch shifting.

11. Ensure that Formant Correction is engaged. With the Arrow tool still selected, move the cursor over the middle of the G3 note and notice that it turns into the pitch shift cursor (little vertical up-and-down arrows). Click on the note and drag it up two semitones to A3. Play the file and listen to the melodic change.
12. Select the Scissors tool and click on the A3 note at about the 8.3 second point (at the pronounced pitch peak) to cut it into two notes.
13. Select the Arrow tool again and drag the first of these two notes back down to G3. Play the file and listen to the result.
14. To create a smoother transition between the G3 and A3 notes, move the Arrow tool cursor over the left end of the A3 note so that the cursor turns into the length adjustment cursor (little horizontal left-and-right arrows). Drag the left end of the note about a 1/10 of a second to the right to open a transition between it and the previous note. It should look something like this:



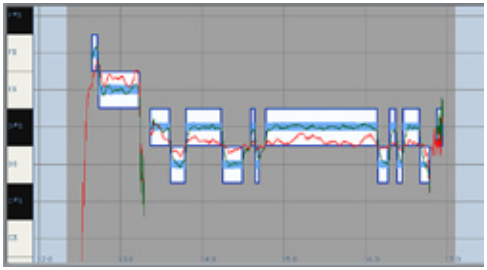
Note the shape of the green output curve and play the file.

You can continue to adjust the left A3 note's end point and/or its Retune Speed until you get exactly the transition you desire.

NOTE: You can also use the Curve tool to draw an arbitrary transition between any two notes.

Finally, we'll look at why using the chromatic scale can be a problem for particularly troublesome performances, along with another way to deal with the problem.

15. Use the Zoom tool focus on the words "are blue."
16. Set the Key and Scale to G Chromatic.
17. Select the I-Beam tool and highlight the range of the words "are blue" (from about 12.5 seconds to 17 seconds). For maximum effect, set Number of Note Objects to a least 50.
18. Click Make Notes:



Yikes! Since much of the word "blue" is so sharp that it's closer to D#3 than to the intended D3, A lot of the Note objects end up on D#3. Changing the Number of Note Objects setting to see its effect can be quite educational here, but no setting will give us what we really want, which is "blue" as one note on D3.

19. One way to fix this would be to manually drag each note segment from D#3 to D3, but that would be annoyingly fiddly and time-consuming. Instead, use the Arrow tool to drag the right end of any of the note segments already on D3 to the end of "blue" (just shy of 17 seconds). Then drag the left end of that same note to the beginning of "blue" (at about 13.3 seconds). All of the unwanted D#3s are overwritten and you end up with one correct note on D3:

20. The easiest solution, of course, is to select the right scale. Change the Key and Scale from G Chromatic to G Major. Click Make Notes again. Set the Number of Note Objects to 20. Voilà.

Chapter 5: New Feature Quick Start Guide

This chapter brings all of the new Auto-Tune Evo features together in one place to help experienced Auto-Tune 5 users learn the new features without having to slog through all of the stuff they already know. (The items below also appear in their appropriate places elsewhere in the manual.)

With a few exceptions, the new features in Auto-Tune Evo are additions to the current Auto-Tune 5 functionality. In other words, pretty much everything that isn't a new feature works pretty much the same as it did in Auto-Tune 5. The exceptions are noted below.

ONE BIG IMPORTANT NOTE

It is critical to note that Auto-Tune Evo will NOT open sessions created with Auto-Tune 5. The improvements made to the core technology are so extensive that it just won't work. For that reason, we have configured Auto-Tune Evo such that it and Auto-Tune 5 can be active in your DAW simultaneously.

However, it's also important to note that we will not be releasing future updates to Auto-Tune 5, so it is inevitable that between computer OS advancements and host updates, Auto-Tune 5 will eventually stop working.

If you have current saved sessions with instances of Auto-Tune 5 that you may need to access into the indefinite future, we offer the following suggestions:

- If you are satisfied with the current Auto-Tune 5 settings, use whatever method your host offers (bouncing, offline editing, etc.) to permanently render the corrected tracks.
- If you believe you will need to keep editing into the future, remove the instances of Auto-Tune 5 and replace them with instances of Auto-Tune Evo.

Now back to the good stuff.

General Features

Dramatically enhanced core technology

While Auto Tune's patented processing technology has always provided unmatched speed and accuracy, for Auto-Tune Evo, Dr. Andy has gone back to the proverbial drawing board to create a seriously evolved voice processing technology that takes advantage of the hugely more powerful computers that are now the norm for digital audio recording.

The result is Evo™ Voice Processing Technology, offering powerful new features and capabilities along with pitch detection and correction that is substantially more accurate and reliable over a much wider range of audio input quality.

Redesigned user interface

Continuing the process begun with Auto-Tune 5, we have again refined the Auto-Tune user interface to allow for smoother, more intuitive workflow.

Reorganized common controls

With the addition of the new pitch shifting, formant correction, and throat modeling capabilities described below, we have reorganized the common control area to ensure that all of the parameters used by both correction modes are easily available at all times. The following controls that were previously located in the Automatic Mode window are now in the common area:

- Key
- Scale
- Scale Detune

Tracking control back where it belongs

Back in Auto-Tune 5, we consolidated the Auto Mode and Graphical Mode Tracking controls and moved the resulting control to the Options dialog. This turned out to be a none-too-popular move. It's now back in the common control area where it's instantly accessible in either mode. (And speaking of the Tracking control, the new Evo Processing technology allows the Tracking control to more easily correct (the now rare)octave pitch-tracking errors.)

Options Dialog

The following additions have been made to the Option dialog:

DISPLAY VERTICAL LINE AT CURSOR TIME POSITION Click the check box to cause a vertical line to be displayed at the cursor position in Graphical Mode. This is most useful when you are comparing the various pitch values (tracked pitch, correction object pitch, and output pitch) at one or more time locations in your track.

A TIP: Since the line indicator can be somewhat annoying during normal editing tasks, you can, if you prefer, uncheck this box in the Options dialog and then assign Toggle Time Indicator to one of the number keys as described below. That way, you can turn it on only when you need it, without having to call up the Options dialog every time.

DEFAULT RETUNE SPEEDS Recognizing that you will likely use different pitch correction objects for different tasks (e.g., traditional pitch correction, pitch shifting, T-Pain-style effects, etc.), you can streamline your workflow by setting your own custom default Retune Speed settings for each type of object (i.e., Curves, Lines, and Notes). See the Graphical Mode section below for details.

KEY BINDINGS Auto-Tune Evo's new Key Binding system lets you assigned virtually any Graphical Mode function to each of the QWERTY number keys (i.e., the number keys across the top of your keyboard). So no matter what your personal editing workflow, you can ensure that your most-used functions are always only a key press away. See the Graphical Mode section below for details.

WINDOW SIZE (VST and Audio Units versions only) Since some hosts and/or plug-in formats do not support real-time plug-in window resizing (i.e., dragging on the corner of the window), the Window Size controls allow you to select among three preset sizes or specify a custom size of your choice.

The preset sizes (measured in pixels) are:

Normal: 850 wide by 600 high

Wide: 1600 wide by 600 high

Large: 1600 wide by 1100 high

Clicking any of the Preset buttons will enter those dimensions in the Width and Height data entry fields. To enter a custom size, simply click in the desired field and enter the value of your choice.

The new size will take affect when you click the Save button.

NOTE: Some hosts do not support immediate resizing of an open plug-in window. If yours in one of those, after clicking Save, you will have to close the Auto-Tune Evo window and reopen it to have the size change take affect.

ANOTHER NOTE: Since real-time resizing is supported in all current versions of Pro Tools LE and HD, neither the RTAS nor TDM versions of Auto-Tune Evo include (or need) the Window Size controls.

SAVE AS DEFAULT When the "Save as default" box is checked, any changes you make to the various Options settings are saved as defaults for all future instances of Auto-Tune Evo.

If you want to make a temporary change to an Option setting for a particular track, but want to retain the previous default for future instances, uncheck the "Save as default" box before clicking the Save button. Your modified value

will take effect in the current instance of Auto-Tune Evo, but future instances will revert to the previously saved value.

Automatic Mode Features

Highlights

- Transpose (Real-time pitch shifting)
- Formant correction (Native versions only)
- Throat modeling (Native versions only)

Details

Transpose

In addition to any pitch correction applied by Automatic Mode, the Transpose control lets you shift the overall pitch of your performance over a two octave range (+/- one octave), selectable in precise semitone increments.

In Automatic Mode, this transposition is accomplished in real time.

NOTE: If you are transposing more than a semitone or two and your intent is to preserve the performer's vocal character, be sure to engage the Formant Correction function described below. Transposing large intervals (especially transposing higher) without formant correction will result in the "munchkinization" effect familiar from tape speed changing and early digital sampling. (Of course, if singing chipmunks are what you're going for, leave Formant Correction off.)

ANOTHER NOTE: Although the Transpose control is limited to semitone intervals, you can combine this control with the Scale Detune control to pitch shift your track by any arbitrary microtonal interval over the two-octave range with single-cent accuracy.

The default Transpose setting is 0 semitones (i.e., no transposition). Double-clicking or Command (Mac)/Control (PC) clicking the Transpose knob will reset it to that value.

Formant correction (Native versions only)

Click the Formant button to toggle Auto-Tune Evo's formant correction function on and off. The button will turn blue when formant correction is active and will be pale gray when it is inactive.

Engaging Formant Correction prevents the shifting of a voice's resonant frequencies to ensure that its vocal characteristics are preserved over the pitch shift range. (For a more complete explanation of formant correction, refer to the Pitch Shifting and Formant Correction section in Chapter 2.)

AN IMPORTANT NOTE: Over the very small intervals usually associated with basic pitch correction, formant shifting is essentially inaudible and Auto-Tune's classic pitch adjustment technology still provides the optimum results. Formant Correction is designed to be used with overall transposition or on tracks where notes are shifted by large intervals.

ANOTHER NOTE: Formant Correction is not available in the TDM versions of Auto-Tune Evo. If you wish to use the Formant Correction function on a TDM system, be sure to select the RTAS version of Auto-Tune Evo.

Throat modeling (Native versions only)

The shape of a singer's throat is a prime contributor to their vocal character. Auto-Tune Evo lets you modify the vocal quality of a performance by actually varying the geometry of a physical model of the human vocal tract and processing the original performance through that model.

The Throat Length control lets you modify the length of the modeled throat. The range of the control is .50 to 1.80. 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 0.70 represents a 30% decrease in throat length.

NOTE: This control is only active when Formant Correction is engaged. When Formant Correction is not engaged, this control is disabled (grayed out). Since Formant Correction is not available in the TDM versions of Auto-Tune Evo, Throat Length is also not available in the TDM versions. If you wish to use the Throat Length function on a TDM system, be sure to select the RTAS version of Auto-Tune Evo.

In addition to simply changing vocal timbre, increasing throat length is useful when the original performance is female and you want to transpose it down and have it sound more male. Conversely, decreasing throat length is useful when the original input is male and you want to transpose it up and have it 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. Auto-Tune Evo automatically applies appropriate formant correction when it shifts pitch with Formant Correction Enabled.

Graphical Mode Features

Highlights

- Resizable Graphical Mode window
- New Note-based pitch correction and pitch shifting
- Object-based Retune Speed settings!
- Customizable object-based default Retune Speeds
- Real-time display of output pitch
- Comprehensive programmable keyboard shortcuts
- New Pitch Graph display mode
- Global Transposition
- Formant correction (Native versions only)
- Throat modeling (Native versions only)
- New graphical Paste function
- Enhanced pitch displays
- Nudge controls for pitch correction objects
- Enhanced I-Beam Tool behavior
- New Auto-Scaling Behavior

Details

Resizable Graphical Mode window

New to Auto-Tune Evo is the ability to resize the Graphical Mode window to take advantage of those nice big monitors that have become so much more affordable. In most hosts, Auto-Tune Evo's Graphical Mode window can be resized in real-time, limited only by the size of your monitor.

In hosts that don't support real-time resizing, the window size can be set in the Options Dialog as described above. In VST hosts, resizing is limited to a maximum size of 1600 x 1200 pixels — still not too shabby.

New Note-based pitch correction and pitch shifting

The following controls and tools have been added to support the new Note correction object:

Make Notes

The Make Notes function provides an entirely new range of ways to use Auto-Tune Evo.

For pitch correction, it combines the ease of Automatic Mode with the control of Graphical Mode to allow you to get optimum results with a minimum of tedious tweaking.

Combined with Auto-Tune Evo's formant correction and throat modeling capabilities, it provides an easy, intuitive method of modifying the pitch of individual notes or phrases.

And when programming Cher or T-Pain style vocal effects, it gives you absolute control over exactly which notes will be quantized to.

Here's how it works:

The Make Notes button is enabled whenever there is any red input pitch contour data present in the Pitch Graph (whether it is displayed in the current Pitch Graph view or not). Pressing the Make Notes button causes Auto-Tune Evo to analyze the input pitch and create Target Note objects (Notes for short), each of which is centered on a horizontal Pitch Graph line. These Notes represent the pitches that Auto-Tune Evo sees as the performer's target notes.

NOTE: If a range of time has been selected by using the I-Beam Tool (see below), the Make Notes button works only in the selected time range. Otherwise it works on all red pitch data.

Notes also display the audio's envelope contour over the Note's duration and a green output pitch curve based on the currently selected Retune Speed.

NOTE: The Retune Speed behavior for Notes is a bit different from that of the other correction objects. Unlike the other correction objects, Notes do not provide a blue correction curve. The implied correction curve is the horizontal Pitch Graph line upon which the Note is centered (unless the Note has been moved off of that line - see the Snap To Note function for details). Setting the Retune Speed to "0" will cause the output to be locked to that note, suppressing any of the original performance's expressive gestures. As you select slower Retune Speeds, the output progressively reflects the shape and position of the original tracked input pitch.

This is much easier to understand visually than to describe. Simply zoom in on a Note and adjust its Retune Speed over its entire range. You will see the green output curve change in real time and all will be clear.

ANOTHER NOTE: Remember that while all new Notes are created with the default Notes Retune Speed set in the Options dialog, you can then select individual Notes (or cut up single Notes to create multiple Notes) and assigned a custom Retune Speed to each one.

Once created, Note objects can be dragged up or down to change their pitch, can have their beginning and/or end positions moved forward or backward, or can be cut into multiple shorter Notes for individual processing. Check out the tutorial in Chapter 4 for an example of working with Notes.

Number of Note Objects

When Auto-Tune Evo analyzes the input pitch for the purpose of creating Note objects, it must make decisions about what constitutes notes and what constitutes transitions between notes as well as differentiating between a single note with wide vibrato and a series of separate notes of alternating pitch. Often, the "right" choice depends on the style and technique of a specific performance. The Number of Note Objects control lets you give Auto-Tune Evo some guidance in making these decisions.

NOTE: This function is only available when some tracked audio has been selected with the I-Beam tool. If no audio is selected, the knob will not become active. Once some audio is selected, the knob will become active. To set the Number of Note Objects value for all tracked audio, double-click the I-Beam tool in the Pitch or Envelope Display to highlight the range of all tracked audio.

IMPORTANT NOTE: Adjusting the Number of Note Objects in a range where you have already performed some pitch correction will regenerate new Note objects and replace any correction objects that were previously in that range. As a result, adjusting the Number of Note Objects value

should be the first action you take before proceeding with any pitch correction or Note or Curve-based pitch shifting. If not, frustration is almost guaranteed to ensue.

When Number of Note Objects is set to the "Less" end of its range:

- Small variations in pitch are treated as a single Note.
- Large cyclical variations in pitch are seen as vibrato and treated as a single Note.
- A gradual pitch change is seen as a transition between notes and no Note objects are created for it.

When Number of Note Objects is set to the "More" end of its range:

- Small variations in pitch are treated as separate Notes.
- Large cyclical variations in pitch are seen as individual notes that alternate between the central pitch and the upper and lower adjacent pitches and separate Notes are created for each pitch.
- A gradual pitch change is seen as a glissando and multiple successive Notes are created for it.

As you might imagine, when Number of Note Objects is set to intermediate values, the results fall somewhere between these two extremes.

A TIP: As good as Auto-Tune Evo's analysis capabilities are, there may nonetheless be occasional situations in which its creation of Notes is not exactly what you want. In those cases, you can use the editing tools described later in this chapter to quickly and easily modify any errant Notes.

Again, what may seem slightly bewildering in verbal description, is immediately obvious when you see it in action. So track some pitch and experiment with the Number of Note Objects control. You'll see.

The Note Tool

The Note Tool is used to draw new Notes (duh!). Simply click and drag near the desired horizontal graph line or lane (depending on the current display mode) to create a new Note.

Only one pitch contour object (Line, Curve, or Note) can exist at any time point on the Pitch Graph. When you complete the entry of a new Note, any object(s) that previously existed at the same time will be deleted.

NOTE: New Notes will always be drawn precisely on semitone or scale note graph lines or lanes (depending on the display mode), regardless of the setting of the Snap To Note button. If you wish to create a note that is offset from a line or lane, first draw the note on the nearest line or lane, then ensure that Snap To Note mode is off and use either the Arrow tool or the Nudge buttons to move the Note to the desired pitch.

ANOTHER NOTE: If, while the Note Tool is selected, you move the cursor onto the Envelope Graph Display, it will temporarily change to the Magnifying Glass Tool, allowing you to quickly and easily move to any other point in your audio and then resume editing without needing to manually change tools.

New Arrow tool behavior for manipulating Note objects

The Arrow tool is used to modify the pitch of a Note object (i.e., move it up or down on the Pitch Graph) or to modify the start and/or end points of a Note (i.e., adjust those points forward or backward in time).

When you move the Arrow tool over a Note object, the cursor will change to one of two states, depending on where over the Note it is positioned.

When the cursor is over the central area of a note, the pitch shift cursor (vertical up and down arrows) will be displayed. Clicking on the Note when the pitch shift cursor is displayed will allow you to drag the note up or down to a new pitch. If the Snap To Note function is active, the Note's movement will be constrained to the grid lines or lanes of the

Pitch Graph. If the Snap To Note function is not active, you can move the note to any arbitrary pitch.

A TIP: When moving a Note with Snap To Note off, you can refer to the Object Pitch Display to determine the Note's exact pitch at any position.

When the cursor is near either end of a note, the length adjustment cursor (horizontal left and right arrows) will be displayed. Clicking on either end of a Note when the length adjustment cursor is displayed will allow you to drag the selected end point left or right to a new position, effectively lengthening or shortening the Note.

Unlike Lines and Curves, whose movement is constrained by adjacent objects, extending a Note's start or end point will replace any other correction objects that currently exist in the extended time range.

NOTE: When extending a Note, as long as you are dragging the end point (i.e., as long as you hold your mouse button down), moving the end point over an existing object will cause it to be overwritten, but then moving it back to its original position will cause the overwritten object to reappear. However, once you release the mouse button and finalize the move, the overwritten object is gone forever. Subsequently dragging the Note's end point back to its original position will not cause the overwritten object to reappear.

ANOTHER NOTE: When extending a Note, any new pitch material that becomes part of the lengthened Note will inherit the original Note's Retune Speed (as displayed by its green output curve). As a result, it may (or may not) be necessary to adjust the Retune Speed to achieve the best result with the additional material.

A TIP: If you are working on a performance with such wide vibrato that even with Number of Note Objects set to its lowest setting you still end up with a series of notes rapidly alternating between the desired pitch and the upper and lower adjacent pitches, instead of manually moving each upper and lower note back to the desired central pitch, just grab the appropriate end of the first or last central pitch Note and drag it over all of the other Notes. You'll end up with a single Note on the desired frequency whose vibrato you can tame with a single adjustment of the Note's Retune Speed.

Object-based Retune Speed settings!

The Retune Speed setting is used only during the pitch correction process. It's similar in function but separate from the Retune Speed control in Automatic Mode.

In Graphical Mode, the target pitch is not the scale tone nearest to the input, but rather the blue target pitch object (for Curves and Lines) or the exact note represented by a Note object.

The Retune Speed control allows you to specify how quickly Auto-Tune Evo will change the pitch of the input to that of the target pitch curve or Note Object pitch. A value of zero will cause the output pitch to precisely track the target pitch of a curve line or be locked to a the pitch of a Note object. Slower values will have the effect of "smoothing out" the target pitch curve. As ever, you should let your ears be your guide to selecting the proper value for each note in a particular performance..

Since each correction object (Curve, Line or Note) can have its own independent Retune Speed, the Retune Speed control is only active when at least one correction object is selected.

Whenever you select a single correction object, the Retune Speed Control will become active and its data display will show the object's current Retune Speed.

If you select multiple objects with different Retune Speeds, the Retune Speed control will move to a value that is an average of the Retune Speeds of all of the selected objects. However, the Retune Speeds of those objects will not be modified until you actually move the Retune Speed control, at which time all of the objects' Retune Speeds will snap to the new value and continue to follow any changes you make to the Retune Speed control.

VERY IMPORTANT NOTE: Although it's been mentioned before (and will probably be mentioned again), we can't stress too strongly the extent to which the ability to assign independent Retune Speeds to individual correction objects streamlines Auto-Tune Evo's Graphical Mode workflow and makes it easier than ever to get natural sounding correction results.

In the past, your choice was typically picking a Retune Speed that was a "good enough" compromise for an entire track, or painstakingly automating the Retune Speed from phrase to phrase or even note to note (with the attendant cost in time and effort). With independent object Retune Speeds, getting exactly the desired effect for every note of a performance is a quick, simple, and intuitive process.

Customizable object-based default Retune Speeds

With Auto-Tune Evo's introduction of independent Retune Speeds for every correction object, we've added the ability to set custom default Retune Speeds for each of the three object types: Lines, Curves and Notes. These are the initial Retune Speed values that are assigned to each newly created object. (You may, of course, modify each individual object's setting as needed.)

The default Retune Speeds are set in the Options Dialog. To choose your own values, just pay attention to what values you most commonly use for the various objects and set those as defaults. Update as necessary.

TIP: Your choice of default values will depend greatly on your particular workflow and your typical use of the various correction objects. If, for example, you usually use Make Curve or Import Auto to tweak pitch while preserving all pitch gestures, usually use Lines for quick correction of individual out-of-tune notes, and usually use Note Objects for precise programming of Cher or T-Pain-style effects, you might set the Curves default to 0, the Lines default to 20 and the Notes default to 0.

Real-time display of output pitch

In addition to Auto-Tune's traditional Tracked Pitch (red) and Correction Object (blue) curves, Auto-Tune Evo provides a new Output Pitch (green) curve that displays the exact output pitch based on the current Retune Speed. This curve updates in real time as you adjust the Retune Speed, so there's never any doubt about the precise effect of each setting.

Comprehensive programmable keyboard shortcuts

The Key Bindings section in the Options Dialog allows you to assign your most commonly used Graphical Mode tools and controls to the 10 number keys that appear above the letter keys on the QWERTY portion of your keyboard.

NOTE: Since some hosts reserve the numeric keypad for host keyboard shortcuts even when a plug-in window is active, the Key Bindings apply only to the number keys on the QWERTY portion of your keyboard.

The following functions are available for assignment:

Graphic Tools
Line
Curve
Note
Arrow
Scissors
Zoom
I-Beam
Hand Scroll

Edit Functions
Clear All
Undo
Redo
Select All
Cut
Copy
Paste

Control Toggles
Snap To Note
Auto-Scroll
Show Lanes
Track Pitch
Display Time Indicator

Correction Objects
Make Curves
Import Auto
Make Notes

Other Controls
Nudge Up
Nudge Down
Zoom In Horizontal
Zoom Out Horizontal
Zoom In Vertical
Zoom Out Vertical
Retune Speed Faster
Retune Speed Slower

New Pitch Graph display mode

The Pitch Graph Display's default mode displays horizontal lines that represent each pitch. Prior to Auto-Tune Evo, this was Auto-Tune's only display mode and is still probably the most useful mode with Curve and Line correction objects.

However, with the introduction of Note objects, we have added an additional Lanes display mode that, as the name implies, displays horizontal lanes that extend from the left-hand "keys" and are tinted to differentiate the sharps and/or flats. Note objects snap neatly into these lanes and they are particularly useful when you will be using Note objects to shift the pitch of individual notes.

NOTE: The Show Lanes option is only available when the Major, Minor or Chromatic scales are selected. In all other cases, the Show Lanes button will be disabled.

Click the Show Lanes button to toggle its state. The button will turn blue when Show Lanes mode is on (but of course when Show Lanes mode is on, the Pitch Graph is full of Lanes, so it's pretty hard to get confused about which mode you're in).

NOTE: You can switch back and forth between display modes at any time. Switching modes has no effect on any previous correction objects. So you could, for example, use the default graph mode for creating and tweaking some curves in one section of your track, and then switch to Lanes mode to create and edit some Notes objects in a different section of the track. Your previously created and edited curves would remain unaffected.

Global Transposition

In addition to any pitch correction applied by Graphical Mode editing, the Transpose control lets you shift the overall pitch of your performance over a two octave range (+/- one octave), selectable in precise semitone increments.

When used in Graphical Mode, the Transpose function does not affect the Pitch Edit Display. It provides overall transposition after any pitch shifting accomplished with the graphical editing tools.

Although you can also accomplish overall transposition in Graphical Mode by selecting all the correction objects in your track and manually moving them up or down, in most cases, using the Transpose function will provide superior results.

NOTE: If you are transposing more than a semitone or two and your intent is to preserve the performer's vocal character, be sure to engage the Formant Correction function described below.

The default Transpose setting is 0 semitones (i.e., no transposition). Double-clicking or Command (Mac)/Control (PC) clicking the Transpose knob will reset it to that value.

Formant correction (Native versions only)

The Formant control operates in Graphical Mode exactly as it does in Automatic Mode. We could paste the exact same text in here, but why waste paper. Go read the description in the Auto Mode section (if you haven't already).

Throat modeling (Native versions only)

Same here. Just like Auto Mode.

New graphical Paste function

The Paste button becomes active whenever one or more objects have been Cut or Copied to the clipboard.

To paste object(s) from the clipboard:

- Navigate to the general area where you want to paste the object(s.)
- Click the Paste button (the cursor will turn into the Paste cursor).
- Press and hold your left (or only) mouse button. A graphic representation of the object(s) to be pasted will appear.
- While holding down the mouse button, drag the objects to the exact location where you wish to paste them.
- Once they are at the proper location, release the mouse button to complete the paste.

NOTE: Since only one correction object (Line, Curve, or Note) can exist at any time point on the Pitch Graph, any object(s) that previously existed at the time where an object is pasted will be deleted. Hence, before you complete the paste, be sure that the area you're pasting into does not contain any correction object(s) that you want to keep.

A TIP: When pasting an object, the object retains the Retune Speed(s) of the originally copied object. That speed may or may not be appropriate for the pitch data at the object's new location. Observe the resulting green output pitch curve and adjust the Retune Speed as necessary.

Enhanced pitch displays

Auto-Tune Evo provides three new simultaneous pitch displays:

Output Pitch Display

The Output Pitch Display will always show the exact output pitch (the green curve) at the current cursor position.

Object Pitch Display

The Object Pitch Display will always show the exact target pitch of the correction object at the current cursor position.

For Lines and Curves, this will correspond to the pitch indicated by the blue target pitch curve.

For Notes, this will correspond either to the pitch of the graph line or lane on which the Note is situated, or, if Snap to Note has been turned off and the Note has been offset from the graph line or lane, it will display the note and the amount of offset (in cents).

Nudge controls for pitch correction objects

The Nudge buttons allow you to move all currently selected correction objects up or down in precise one-pixel increments.

NOTE: If Snap To Note mode is enabled, Note objects can not be nudged. If you want to nudge a Note object, first turn off Snap To Note. After nudging the Note to its new pitch, you can re-engage Snap To Note. The nudged note will remain at its offset pitch (unless you subsequently use the Arrow tool to move it, in which case it will once again be constrained to scale notes).

The actual pitch interval for each Nudge step depends on the current zoom setting of the Pitch Graph. When the display is zoomed far out, the interval is larger than when zoomed in. The extremes of the nudge intervals are as follows:

When zoomed all the way out: 20 cents per nudge

When zoomed all the way in: 2 cents per nudge

For maximum control, zoom in as close as possible to your object(s) of interest before using the Nudge buttons.

Enhanced I-Beam tool behavior

Double-clicking with the I-Beam tool in either the Pitch or Envelope Display will highlight the range of all currently tracked audio. This is useful when you wish to modify the Number of Note Objects setting or the Adjust Vibrato setting of the entire track.

New Auto-Scaling behavior

If Auto-Scroll is off while tracking pitch, when the transport is stopped and the Track Pitch button is clicked to exit Track Pitch Mode, Auto-Tune Evo will not automatically scale the display to encompass all of the tracked audio, as it normally would.

This is useful when you have zoomed in to a problematic bit of audio and want to track it a number of times with different Tracking settings and observe the effects of the different settings. If Auto-Scroll were on, Auto-Tune Evo would rescale the display after each tracking pass, annoyingly requiring you to zoom back in to the bit you were interested in each time. With Auto-Scroll (and therefore automatic rescaling) off, that wouldn't be necessary.

Chapter 6: The Auto-Tune Vocal Effect (i.e., the Cher/T-Pain-Style Effect)

In addition to its adoption as the worldwide standard in professional pitch correction, Auto-Tune has also gained renown as the tool of choice for what has become one of the signature vocal sounds of our time.

First heard on Cher's 1998 mega-hit "Believe," variations of the effect have gone on to appear on songs from a huge variety of artists. Most recently, its use by T-Pain and many of his collaborators has rekindled intense interest in it. Since there seems to be a lot of mythology about how it's accomplished, we thought we'd provide the official Antares version here.

What is it?

Quite simply, the Auto-Tune Vocal Effect is what is technically known as "pitch quantization." That is, instead of allowing all of the small variations in pitch and the gradual transitions between notes that are a normal part of singing (and speaking, for that matter), the Auto-Tune Vocal Effect limits each note to its exact target pitch, stripping out any variation, as well as forcing instantaneous transitions between notes.

How to do it.

There are basically two key elements to producing the Auto-Tune Vocal Effect:

1. Retune Speed = 0
2. Pick the right scale

That's pretty much it. Really.

There are, however, some possible variations in approach, depending mainly on whether you want to use Automatic Mode or Graphical Mode. Here are the details:

Automatic Mode

1. As we already mentioned, start by setting Retune Speed to 0.
2. Set the Key and Scale to the key and scale of your track.
3. Play your track. If you like the result, you're done.
4. If you're not happy with the result, try one or more of the following:
   - Edit the scale notes. Depending on the specific vocal line, adding or removing scale notes can give you distinctly different effects.
   - Try a different key and/or scale.
   - Try the chromatic scale (although our experience is that if you're going for the classic effect, chromatic rarely provides it).
   - Try a Retune Speed of 1 or 2 or a bit slower. This will allow slight pitch variations and slightly less instant note transitions, but may result in the right effect for a particular performance.
5. Don't forget your host's Bypass function. Limiting the Auto-Tune Vocal Effect just to specific phrases can provide sonic contrast in your song.

Graphical Mode

Using Auto-Tune Evo's new graphical Note objects will give you the ultimate control over the Auto-Tune Vocal Effect.

1. Since you want all of your notes quantized, start by opening the Options dialog and setting the default Notes Retune Speed to 0.
2. Unless you will using something other than a standard diatonic scale, turn on Show Lanes mode.
3. Track your audio.
4. Click the Make Notes button. If necessary, adjust the Number of Note Objects control to get as accurate a representation of the desired target notes as possible.
5. Make sure that all of the Note objects in the range where you want the effect to happen butt up against each other (this will ensure that all of the note transitions are instantaneous). If they don't, either use the Arrow tool to extend existing Note boundaries so that they do, or use the Note tool to draw new notes to fill in any gaps.
6. Play your track. If you like the result, you're done.
7. If you're not happy with the result, simply experiment with changing the pitch or length of individual Notes. The beauty of Note objects is that you can literally sculpt any melodic contour to get exactly the effect you desire.
8. Once you get the effect exactly as you like it, Auto-Tune Evo's new graphical Paste function will allow you to copy all of the Note objects and paste them in subsequent verses or choruses or wherever else in your track you'd like the same effect.

Chapter 7: Other Creative Applications for Auto-Tune Evo

Auto-Tune Evo works on vocals so well you may think that's all it can do. Actually, lots of instruments can use it to great advantage. Fretless bass, electric violin, trombone, even the Theremin, all feature continuous pitch potential, unconstrained by frets or keys. Here are some other ideas for using Auto-Tune Evo:

- **Produce instant double tracking in one take!** Record onto two tracks, processing only one of the tracks through Auto-Tune Evo. If you're going for a tight double track, set Retune Speed rather fast and Detune Auto-Tune Evo slightly. Increase both of these parameters to broaden the doubled effect. You can also use some Vibrato to make a more dynamic effect (small depth and rate values are best, with medium delay). Of course, you can also decide to record a single virgin track, and bounce that to another, processing through Auto-Tune Evo. This way you can dial in the effect while auditioning the mix.
- Recording with two mics (as above) while improvising can also **produce heterophonic effects** (the effect of two players and instruments playing the 'same' melody, which actually varies with some different pitch material). The more constrained your scale is in Auto-Tune Evo, the more variation there will be between the two performances.
- **To set up a drone or ambient aura** behind a melodic performance, try sending some of the signal to Auto-Tune Evo with an extremely constrained scale (for example, in the key of C: C, F, G, A#) and then on to a lush, long reverb. The effect produced will be a steady backdrop of chanting tones behind the main melodic material.
- **Don't be afraid to use just as little of Auto-Tune Evo as you need.** It's quite possible that a performer has really quite good intonation, but fails consistently on one or two notes. In this case, use Auto-Tune Evo's individual Bypass function (using the Edit Scale display or on the Virtual Keyboard) to bypass all the notes except the one(s) which need the retuning. This way, Auto-Tune Evo is working in a completely transparent mode, and only when needed.

Chapter 8: The Auto-Tune Evo Scales

The following are brief descriptions of the scales available in Auto-Tune Evo:

Modern Equal Temperament

These first three equal-tempered scales are the ubiquitous scales typically found in Western tonal music:

• Major: a seven-tone equal tempered major scale.

• Minor: a seven-tone equal tempered minor scale.

• Equal Tempered chromatic: a twelve-tone equal tempered chromatic scale.

Historical Tunings

• Ling Lun: a twelve-tone scale dating from 2700 B.C. China.

• Scholar's Lute: a seven-tone scale dating from 300 B.C. China.

• Greek diatonic genus: a seven-tone scale from ancient Greece.

• Greek chromatic genus: a seven-tone scale from ancient Greece.

• Greek enharmonic genus: a seven-tone scale from ancient Greece.

• Pythagorean: a twelve-tone scale dating from 600 B.C. Greece. This scale is derived by tuning twelve pure perfect fifths upward and adjusting the octaves downward. This leads to some pure intervals and some very impure intervals.

• Just (major chromatic): a twelve-tone scale. Just intonation tunes the most frequently used intervals to be pure (integer ratios in frequency). These tunings depend on the mode (major or minor) and the key. This scale is tuned for major mode.

• Just (minor chromatic): (See Just (major chromatic), above)

• Meantone chromatic: a twelve-tone scale. This tuning is a combination of Pythagorean and just tunings so that music in a wider variety of keys could be playable.

• Werckmeister III: a twelve-tone scale. This scale was a first attempt (about Bach's time) to allow an instrument to be played in any scale. It was in response to this scale that Bach wrote Well-Tempered Clavier.

• Vallotti & Young chromatic: a twelve-tone scale. Another derivative of the Pythagorean scale designed to allow arbitrary keys.

• Barnes-Bach (chromatic): a twelve-tone scale. A variation of the Vallotti & Young scale designed to optimize the performance of Bach's Well-Tempered Clavier.

Ethnic Tunings

Indian: This 22 tone scale is used in India to perform ragas.

• Slendro: This five-tone Indonesian scale is played by ensembles called gamelans.

• Pelog: This seven-tone Indonesian scale is more interesting than Slendro and is now the primary scale in Balinese music.

• Arabic 1: This 17 tone scale is the original Arabic scale adopted from the Pythagorean scale.

• Arabic 2 (chromatic): This twelve-tone scale is the modern version of the Arabic scale popular in Arabic music today.

Contemporary Tunings

Equal tempered scales with a large number of tones are typically used to play common tonal harmony with greater purity of intervals and chords. The typical approach is to analyze a passage (or less) of music and select tones from a scale that will best approximate the desired pure intervals.

• 19 Tone: This scale has greater purity of minor thirds and major thirds (and conversely, minor and major sixths) than twelve-tone equal temperament. A disadvantage is that perfect fifths are narrower than those found in twelve-tone equal temperament.

• 24 Tone: Also know as the quarter tone scale, this scale is used for variety but has no advantage in terms of ratios that better approximate pure intervals.

• 31 Tone: In addition to intervals that better approximate pure intervals, this scale also contains good approximations to Indonesian pelog and slendro scales.

• 53 Tone: Related mathematically to the cycle of fifths, the 53-tone scale has very pure major and minor thirds, and fifths and fourths.

• Partch: Harry Partch is considered the father of modern microtonality. This scale was devised by him and used in instrument building and performances.

• Carlos Alpha: Wendy Carlos performed extensive computer analysis to devise a number of equal tempered scales with good approximations for the primary harmonic intervals and their inversions. This scale is good at approximating the primary intervals including 7/4. This scale divides the octave into 15.385 steps forming intervals of 78.0 cents.

• Carlos Beta: This scale divides the octave into 18.809 steps forming intervals of 63.8 cents.

• Carlos Gamma: This scale achieves perfect purity of the primary intervals 3/2, 4/3 and 5/4. This scale divides the octave into 34.188 steps forming intervals of 35.1 cents.

• Harmonic (chromatic): This twelve-tone scale is created in the partials in the fifth octave of the harmonic series. The scale degrees that correspond to the classic just intervals are the major second, major third, perfect fifth and major seventh.

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