



Auto-Tune 8

World Standard Professional
Pitch and Time Correction

Owner's Manual

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

Contents

Chapter 1	Getting Started	
	What's New in Auto-Tune 8	3
	Installing and Authorizing	5
	Technical Support	5
Chapter 2	Introducing Auto-Tune 8	
	Some background	6
	So what exactly is Auto-Tune 8?	6
	A little bit about pitch	6
	How Auto-Tune 8 detects pitch	7
	How Auto-Tune 8 corrects pitch	8
	Automatic Mode	8
	Graphical Mode	11
	Pitch Shifting and Formant Correction	12
	Time Shifting and Correction	13
Chapter 3	Auto-Tune 8 Controls	
	Common Controls	15
	The Options Dialog	19
	Automatic Mode Controls	22
	Graphical Mode Controls	34
	Pitch and Envelope Graph Displays	44
	Time Shifting	54

Chapter 4	Auto-Tune 8 Tutorials	
	Tutorial 1: Automatic Mode Basics	64
	Tutorial 2: Flex-Tune	66
	Tutorial 3: Targeting Ignores Vibrato Function	66
	Tutorial 4: Natural Vibrato Function	67
	Tutorial 5: Transpose and Formant Control	68
	Tutorial 6: Graphical Mode Basics	68
	Tutorial 7: Precision	70
	Tutorial 8: Make Curve Function	70
	Tutorial 9: Import Auto Function	72
	Tutorial 10: Make Notes Function	74
	Tutorial 11: Time: Error Correction	76
	Tutorial 12: Time: Creative Editing	78
Chapter 5	The Auto-Tune Vocal Effect	80
Chapter 6	The Auto-Tune 8 Scales	82

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 8, the latest (and indisputably greatest) generation of the worldwide standard in professional pitch and time correction and manipulation.

Before you proceed any farther, we'd like to strongly encourage you to register and authorize your copy of Auto-Tune 8. (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 8 box, it's probably a good idea to write down the serial number that appears on the bottom of the box for future reference.

At Antares, we are committed to excellence in quality, customer service, and technological innovation. With your purchase of Auto-Tune 8, 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

1: Getting Started



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 8 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 8, only better. To get up to speed quickly, just check out the new feature overview below and then refer to related sections of in Chapter 3.

ONE BIG IMPORTANT NOTE

For those upgrading from versions of Auto-Tune prior to Auto-Tune 7, it is critical to note the following:

Auto-Tune 8 will NOT open sessions created with Auto-Tune Evo or earlier versions. The improvements made to the core technology are so extensive that it just won't work.

For that reason, we have configured Auto-Tune 8 such that it and Auto-Tune Evo and all earlier versions of Auto-Tune can be active in your DAW simultaneously.

However, it's important to note that Auto-Tune Evo (and earlier versions) have long been discontinued and we will not be releasing future updates to any of them. Consequently, it's inevitable that between computer OS advancements and host updates, those earlier versions will eventually stop working (if they haven't already).

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

- If you are satisfied with the current Auto-Tune 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 the earlier versions of Auto-Tune and replace them with instances of Auto-Tune 8.

What's New in Auto-Tune 8

The following are the key new features that have been added in Auto-Tune 8:

Automatic Mode

Flex-Tune Pitch Correction Technology

By far the most dramatic addition to Auto-Tune 8 is our new Flex-Tune pitch correction technology.

Other real-time pitch correction methods, including previous versions of Auto-Tune, are always pulling every note towards a scale note, in the process distorting any of the singer's expressive vocal gestures. In contrast, Flex-Tune only provides correction when the vocalist approaches a scale note. At all other times, they are free to sing with whatever vocal gestures best express their emotional connection to their song, secure in the knowledge that Auto-Tune 8 will pass them through, exactly as they are sung.

Low Latency Mode

Auto-Tune 8's low latency mode allows for use when tracking or during live performance, letting vocalists monitor their performance with no disorienting delay.

Graphical Mode

Editing Tools Active During Playback

For those who prefer editing on the fly or with looped segments, Auto-Tune 8's editing tools are now active during playback, so you never have to stop and restart just to hear the results of an edit.

Audio Feedback of Note Object Pitch

Auto-Tune's Note mode was already the easiest way to re-pitch already recorded melodies. In Auto-Tune 8, you can choose to have any note edits provide audio feedback of the note's pitch, so selecting new notes is just a matter of using your ears.

Hide or Show Amplitude Envelope in Main Edit Display

You can now choose to hide or show the amplitude envelope plot in the main edit window.

Hide or Show Envelope Display

You can now choose to hide or show the dedicated envelope display. Particularly useful when working on a laptop, where screen real estate is at a premium.

Increased Maximum Timeline Resolution in Bars + Beats Mode

The maximum resolution of the timeline in Bars + Beats mode has been increased to 16th notes.

Automatic Update Notification

Auto-Tune 8 will notify you whenever an update to the plug-in or an upgrade is available.

How To Use This Manual

If this is your first experience of Auto-Tune, you will find that Auto-Tune 8 has a very friendly user-interface and is extremely easy to use. However, because Auto-Tune 8 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 8 Controls, or Chapter 4, Auto-Tune 8 Tutorial, to learn the essential information you will need to operate Auto-Tune 8.

The Contents Of This Manual

Chapter 1: Getting Started

The chapter you are reading.

Chapter 2: Introducing Auto-Tune 8

This chapter presents some basic facts about pitch and how Auto-Tune 8 functions to correct pitch and timing errors. The basic functionality of Auto-Tune 8 is discussed, and information you need in order to use it effectively is provided.

Chapter 3: Auto-Tune 8 Controls

This chapter is reference information for all of the controls used in the Auto-Tune 8 interface.

Chapter 4: Auto-Tune 8 Tutorial

This chapter introduces you to details of how Auto-Tune 8 works by guiding you through several tutorials. The tutorials will give you insight into how and when to use each of Auto-Tune 8's key functions.

Chapter 5: The Auto-Tune Vocal Effect

What it is. How to do it.

Chapter 6: The Auto-Tune 8 Scales

Brief descriptions of the various scales available in Auto-Tune 8.

Installing Auto-Tune 8

Any unique instructions for installing Auto-Tune 8 for your specific host or plug-in format are located in the Auto-Tune 8 Read Me file that accompanies the plug-in. This file may also contain any last-minute Auto-Tune 8 information that didn't make it into this manual.

Auto-Tune 8 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 8

Authorization is the process by which Auto-Tune 8 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: You will need to authorize Auto-Tune 8 before you can run it in your host. If you plan to follow along with the manual (a good idea), go do it now.

Technical Support

In the unlikely event that you experience a problem using Auto-Tune 8, try the following:

Make sure you have the latest version of the plug-in. You can download and install the latest version of Auto-Tune 8 from the following web page:

<http://www.antarestech.com/download/latest-software.php>

If that doesn't solve your problem, try the following:

1. Consult our web-based support resources at:

<http://www.antarestech.com/support/>

2. Submit a question directly to our Customer Support department at:

<http://www.antarestech.com/support/contact.php>

3. Join the Antares online User Forum. The User Forum is a place where Antares product users can gather to exchange information, compare notes, and get to know other Antares users from around the world. Check it out at:

<http://antarestech.invisionzone.com/>

4. For the quickest access to new developments, follow us on Twitter and "Like" our Facebook pages:

<http://twitter.com/AntaresAudio>

<http://www.facebook.com/pages/Antares-Audio-Technologies/68524457680>

<http://www.facebook.com/pages/Auto-Tune/81891651280>

2: Introducing Auto-Tune 8

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 and, as of Auto-Tune 7, time correction. Today, it’s used daily by tens of thousands of audio professionals around the world to save studio and editing time, ease the frustration of endless retakes, save that otherwise once-in-a-lifetime performance, or to create what has become the signature vocal effect of our time.

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

Now, well over a decade and a half after its introduction, Auto-Tune 8 introduces Flex-Tune™ pitch correction technology and establishes yet another new standard in natural real-time pitch correction.

So what exactly is Auto-Tune 8?

Auto-Tune 8 is a precision tool for correcting intonation and timing errors or creatively modifying the intonation or rhythmic articulation of a performance.

For pitch correction, Auto-Tune 8 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 8’s pitch correction functions, you should have a basic understanding of pitch and how Auto-Tune 8 functions to correct pitch errors. This chapter presents basic terminology and introduces Auto-Tune 8’s operating paradigm, giving you the background you need to use it effectively.

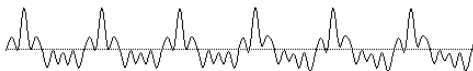
Later in the chapter, we’ll provide an overview of Auto-Tune 8’s time manipulation features.

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 8 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 8.

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 8 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 A₄ (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 8 detects pitch

In order for Auto-Tune 8 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 8 does exactly this: It looks for a periodically repeating waveform and calculates the time interval between repetitions.

The pitch detection algorithm in Auto-Tune 8 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 very 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 8 was designed to detect and correct pitches up to the pitch C6. (If the input pitch is higher than C6, Auto-Tune 8 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 8 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 8 will not detect pitch when the input waveform is not periodic. As demonstrated above, Auto-Tune 8 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 8 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 8 be a bit more casual about what it considers “periodic.” Experimenting with this setting will often allow Auto-Tune 8 to track even noisy signals.



NOTE: The above description has been in pretty much every Auto-Tune manual since the beginning. While it is still true in the general case, it must be noted that Auto-Tune 8 includes technology (originally introduced in Auto-Tune Evo) that does a much better job with borderline troublesome material than any prior version of Auto-Tune.

How Auto-Tune 8 corrects pitch

Auto-Tune 8 provides two separate and distinct ways to approach pitch correction: Automatic Mode and Graphical Mode. The basic functionality of each is described below.

Automatic Mode

Auto-Tune 8’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, and the amount of variation falls within the range set by the Correction Style control (described below), 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 8 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

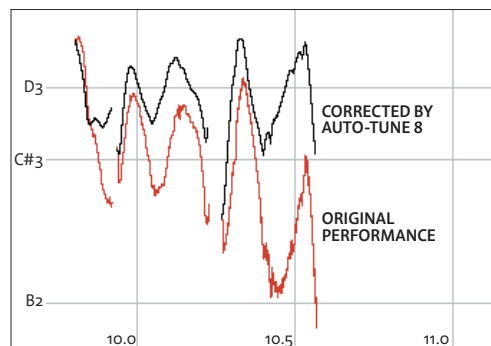
Auto-Tune 8 also gives you control over how rapidly, in time, the pitch adjustment is made toward the scale tone. This is set with the Retune Speed control (see Chapter 3 for more details).

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 iconic Auto-Tune Vocal 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.

An Example of Classic 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 8’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 general shape of the expressive gestures. (Setting C# and B to “Remove” is necessary to keep Auto-Tune 8 from trying to correct the seriously flat tail of the last note to those pitches. See Chapter 3 for more details.)

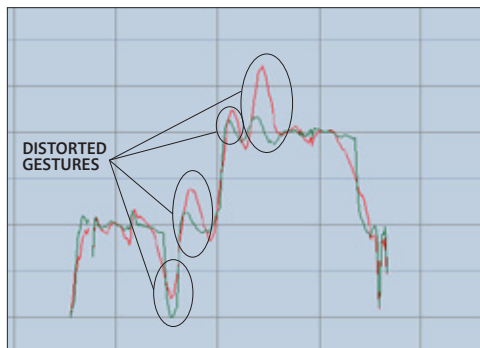
Flex-Tune

New in Auto-Tune 8 is the Correction Style control. Other real-time pitch correction methods, including previous versions of Auto-Tune, are always pulling every note towards a scale note, in the process distorting any of the singer’s expressive vocal gestures. In contrast, Flex-Tune only provides correction when the vocalist approaches a scale note. At all other times, they are free to sing with whatever vocal gestures best express their emotional connection to their song, secure in the knowledge that Auto-Tune 8 will pass them through, exactly as they are sung.

The new Correction Style control lets you choose how close to the scale pitch the singer has to be for Auto-Tune 8 to apply correction. In the Classic position, correction is always applied. This results in the same style of correction as previous versions of Auto-Tune. As you move the control into the Flex-Tune range, the correction area around the scale note gets smaller and smaller until, at the extreme clockwise position, no correction will be applied at all.

An Example of Flex-Tune Correction

In this example, we first look at the plot of a vocal line with intricate vocal gestures processed with the Correction Style control set to 0 (classic Auto-Tune correction). As you can see, the scale notes are in tune, but the various gestures are distorted by also being pulled to the scale notes.



This second plot shows the result of setting the Correction Style control to the Flex-Tune setting of 75. The vocal gestures are now reproduced exactly as they were sung.

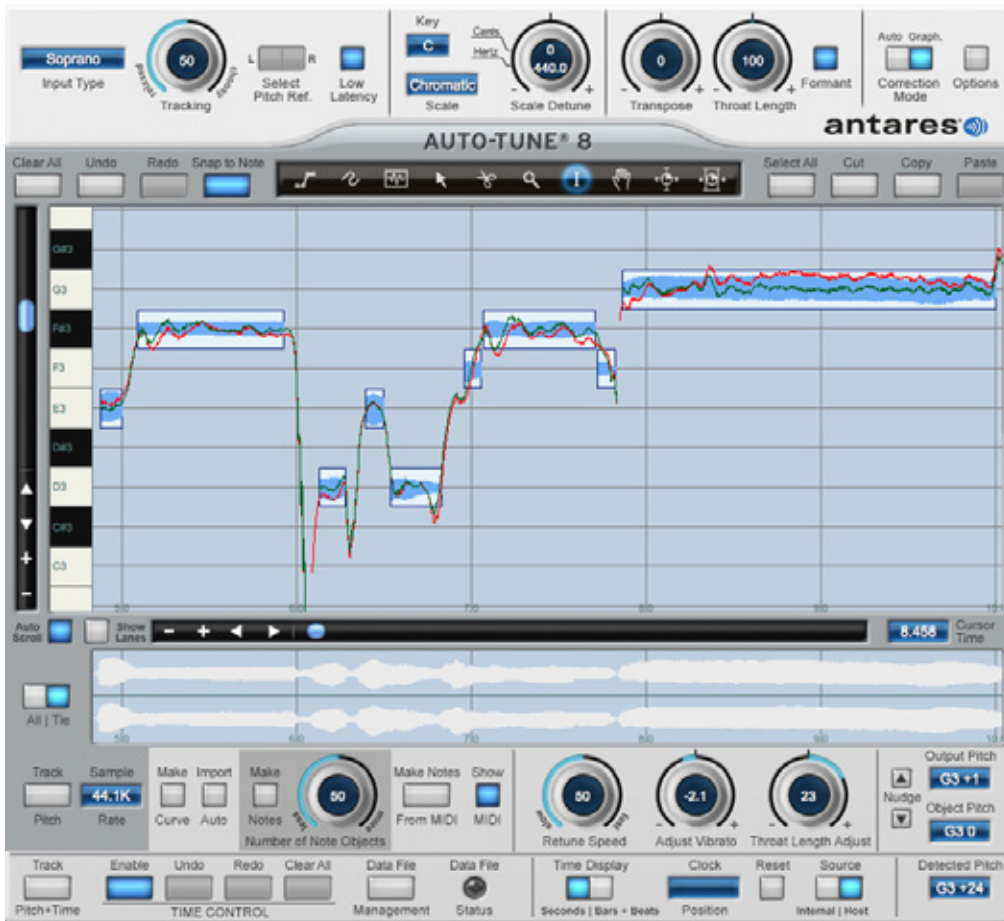


Vibrato

Auto-Tune 8 allows real-time adjustment of the depth of any natural vibrato present in the input.

Auto-Tune 8 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 8’s Vibrato settings, you can even remove a performer’s own vibrato and replace it with Auto-Tune 8’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.



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 your 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 is 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 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.

In addition, Auto-Tune 8 includes the ability to define target pitches using MIDI. Similar in concept to the Target Notes Via MIDI function in Automatic Mode, when tracking pitch in Graphical Mode, Auto-Tune 8 will record any MIDI note information routed to it (either from another MIDI track or live from a MIDI controller) and (optionally) display the data on the Pitch Graph Display. You can then use the Make Notes From MIDI function to convert the MIDI information into Note Correction Objects.

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 8. 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 to exit Track Pitch mode.
- Define target pitches using any combination of Correction Objects (Lines, Curves or Notes) and the graphical tools and adjust each object's Retune Speed and vibrato depth for the desired effect.
- If desired, set a transposition interval, engage formant correction, or modify overall vocal character with the Throat Length control. Then use the Throat Length Adjust control to individually set the vocal timbre of each note.
- Play back the track. The pitch will be corrected or shifted as specified.

Pitch Shifting, Formant Correction and Throat Modeling

Auto-Tune 8's Pitch Shifting, Formant Correction, and master Throat Modeling functions are 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 8 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 on top of 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 8'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 8'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.

Auto-Tune 8 also includes the ability in Graphical Mode to individually modify the throat modeling for each note or correction object, offering an entirely new level of creative control.

Time Shifting and Correction

We've designed Auto-Tune 8's time control capabilities to combine an extremely high-quality time-shifting algorithm with an exceedingly intuitive user interface designed to make it quick and easy to correct timing errors or exercise your creative imagination.

Time Tracking

In order to do its time shifting magic, Auto-Tune 8 must first create a copy of the audio you wish to edit. This is accomplished with the Track Pitch and Time function. To help manage this audio data, we've provided a convenient Data File Management dialog that allows you to establish or move the location of the data files, rename their folder, as well as delete them if they are no longer necessary (after bouncing the final time-modified audio, for example).

The File Management System will also alert you if the data files are not where Auto-Tune 8 expects them to be and will provide information to help you find them.

Time Tools

Although allowing for an enormous amount of flexibility, Auto-Tune 8's time shifting functions make use of two easy-to-use tools; the Move Point tool and the Move Region tool.

The Move Point tool allows you to select a range of audio and pick any point in the range and move it forward or back in time, compressing and expanding the audio around it.

The Move Region tool is designed for moving notes, words, or phrases while preserving the timing of the moved element. As with the Move Point tool, you first select a range of audio and then select the region within that selection that you want to move and move it forward or back in time, again compressing and expanding the audio around it.

Both tools are context sensitive. That is, they change function (from selection to moving, for example) depending on what lies beneath them on the screen. As a result, the time manipulation process becomes smooth and intuitive, never breaking your creative flow with the need to switch tools or remember some command key to temporarily change function.

The time functions also have their own Undo/Redo controls independent of the pitch correction controls and an Enable button that allows you to instantly switch between your original audio and your time shifted audio.

Enhanced Amplitude Envelope Display

To help you visualize the affects of your edits, whenever time control is enabled the Amplitude Envelope Display will display both the original audio (in the lower portion of the display) and the time-shifted audio (in the upper portion). Additionally, the display's horizontal axis will turn red to indicate the ranges of audio that have been time-tracked, so you will always know which ranges are currently available for time editing.

Non-destructive Editing

Since Auto-Tune 8 works on a copy of your audio, time editing always leaves your original audio intact. At any point you can simply turn off the Time Control Enable button to instantly return to your track's original timing.

3: Auto-Tune 8 Controls

This chapter is a reference for all of the controls used in the Auto-Tune 8 interface. How these controls are used together for pitch correction and time shifting is demonstrated in Chapter 4, Auto-Tune 8 Tutorial.

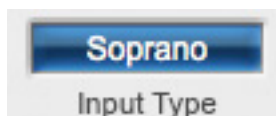
Continuous Controls

Auto-Tune 8'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).

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 8 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 8 is reliably able to detect pitches down to A₁ (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 8 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 8 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 multitrack 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 8 (in combination with the Input Type selection described above) results in noticeably more reliable pitch detection compared to Auto-Tune 5 and earlier. 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

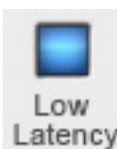
Auto-Tune 8 provides the ability to pitch correct stereo tracks while maintaining the tracks’ phase coherence. (Refer to your host application’s

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 8 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 8 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 8 is instantiated on a mono track, this control is inactive (grayed out).



Low Latency

Normally, Auto-Tune makes use of a processing delay to provide the best processing quality when executing transposition (as opposed to just pitch correction).

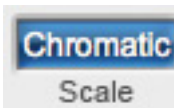
When you do your pitch and time correction during mixdown, your DAW’s delay compensation will account for this processing delay. However, if you want to use Auto-Tune 8 during the tracking process or to process a live performance, that delay would prove distracting. In that case, click the Low Latency button to reduce the processing delay to a virtually undetectable level.



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 A4 = 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 8 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 8 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 8 Scales



Scale Detune

The Detune parameter allows you to change the pitch standard of Auto-Tune 8 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.

It should be noted that this control functions differently in Automatic and Graphical modes:

AUTOMATIC MODE In Automatic Mode, the Scale Detune control shifts the pitch reference by the set amount.

GRAPHICAL MODE In Graphical Mode, the Scale Detune control shifts the position of the horizontal graph pitch reference lines (or lanes, if Show Lanes is selected), such that any correction objects created or adjusted relative to those reference lines will reflect the Scale Detune setting.



VERY IMPORTANT NOTE: If you create any pitch correction objects and subsequently adjust the Scale

Detune setting, this will **NOT** change the output pitches of the existing objects. If you will be working in Graphical Mode on a track that requires scale detuning, set the proper detune amount **BEFORE** beginning pitch correction.



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 8 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 8 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 180. Values above 100 represent a lengthening of the throat while values below 100 represent a shortening of the throat.


The actual values represent the percentage change in the throat length. For example, a value of 120 represents a 20% increase in throat length, while a value of 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).*

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 100.

 *IMPORTANT NOTE: This function is specifically for changing the existing quality of a voice, not for manual formant compensation for pitch shifting. Auto-Tune 8 automatically applies appropriate formant correction when it shifts pitch with Formant Correction Enabled.*

 *ANOTHER NOTE: This control sets the overall Throat Length for your entire track. Additionally, Throat Length can be adjusted on a note-by-note basis in Graphical Mode using the Throat Length Adjust function described in the Graphical Mode section below.*



Formant Correction

Click the Formant button to toggle Auto-Tune 8’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 8’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.)

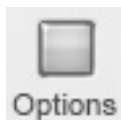


AN IMPORTANT NOTE: Over the very small intervals usually associated with basic pitch correction, formant shifting is essentially inaudible and Auto-Tune's classic pitch adjustment technology still provides the optimum results. Formant Correction is designed to be used with overall transposition or on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



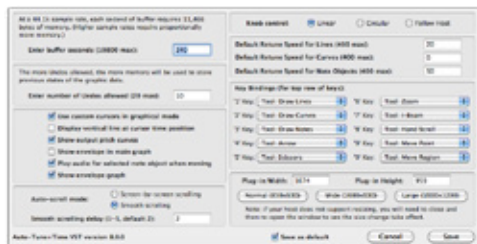
Correction Mode

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



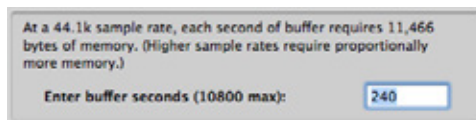
The Options Dialog

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



They are:

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 8 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 8 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.



NOTE: The value selected here applies independently to both pitch correction Undo/Redos and time control Undo/Redos. For example, if you set this value to 15, you will have 15 levels of undo for pitch correction actions and an additional 15 levels for time control actions.

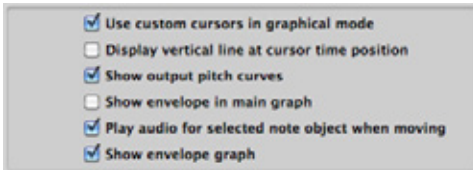


KNOB CONTROL Lets you select how you want to control the "knobs" in the Auto-Tune 8 interface.

LINEAR: 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 or to the right to turn the knob clockwise or down or to the left to turn the knob counterclockwise. The current value of the knob's parameter appears in its associated numeric display.

CIRCULAR: Click any where 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.

FOLLOW HOST: Some hosts also allow you to select a knob control method and pass that selection on to plug-ins. If yours does, selecting Follow Host will automatically set Auto-Tune 8’s Knob Control to the method selected in your host. If you select Follow Host, but your host doesn’t supply that information to Auto-Tune 8, knob control will default to Linear.



USE CUSTOM CURSORS IN GRAPHICAL MODE Click the check box to use Custom Cursors in Graphical Mode. Normally, Auto-Tune 8 displays different cursor shapes in the Pitch Graph Display to help you select ranges and 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 8 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 8’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.

SHOW OUTPUT PITCH CURVES Click the check box to cause the green output curve to be visible. When not checked, only the red tracked pitch curve and the various correction objects (Line, Curve or Note) will be visible.

SHOW ENVELOPE IN MAIN GRAPH Click the check box to cause the amplitude envelope to be visible in the main editing window. This is particularly useful when selecting edit points during time editing.

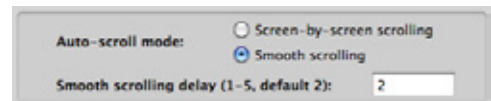
PLAY AUDIO FOR SELECTED NOTE

OBJECT When this box is checked, clicking and holding on a Note object will result in a tone sounding at the current pitch of the Note object. Continuing to hold the mouse down and moving the Note object up or down will result in the tone changing to match the position of the Note. Releasing the mouse button will end the tone.



NOTE: If you have selected “Snap to Note,” the tone will be limited to exact semitones.

SHOW ENVELOPE GRAPH Click the check box to cause the dedicated Envelope Graph to be displayed under the main editing window. If you are working on a laptop with limited screen real estate, unchecking this box to cause the Envelope Graph to disappear will give you more screen space for the main editing window.



AUTO-SCROLL MODE Click to select the auto-scrolling method.

With screen-by-screen scrolling, the display remains stationary until the play position reaches the right-hand edge of the window, at which time the display jumps to the next screen of data.

With smooth scrolling, Auto-Tune 8 will automatically scroll the Pitch Graph Display to ensure that the current play position is always visible in the display.

SMOOTH SCROLLING DELAY We have found that some hosts result in smoother smooth scrolling than others. If you have selected Smooth Scrolling and the display does not scroll smoothly (i.e., it jerks or jumps), changing the Smooth Scrolling Delay value can often help.

Default Retune Speed for Lines (400 max):	20
Default Retune Speed for Curves (400 max):	0
Default Retune Speed for Note Objects (400 max):	50

DEFAULT RETUNE SPEEDS Since Auto-Tune 8 allows independent Retune Speeds for each correction object, we've provided 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 the Auto-Tune Vocal Effect, you might set the Curves default to 0, the Lines default to 20 and the Notes default to 0.

Key Bindings (for top row of keys):	
'1' Key: Tool: Draw Lines	'6' Key: Tool: Zoom
'2' Key: Tool: Draw Curves	'7' Key: Tool: I-Beam
'3' Key: Tool: Draw Notes	'8' Key: Tool: Hand Scroll
'4' Key: Tool: Arrow	'9' Key: Tool: Move Point
'5' Key: Tool: Scissors	'0' Key: Tool: Move Region

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
- Move Point
- Move Region

Edit Functions

- Clear All
- Undo
- Redo
- Select All
- Cut
- Copy
- Paste

Time Control

- Undo Time Change
- Redo Time Change
- Clear All Time Changes

Control Toggles

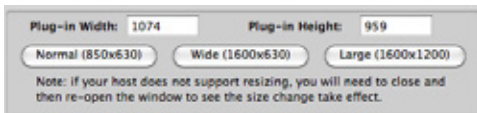
- Snap To Note
- Auto-Scroll
- Show Lanes
- Track Pitch
- Cursor Time Indicator
- Show Output Curve
- Show MIDI
- Track Pitch + Time
- Enable Time Control

Correction Objects

- Make Curves
- Import Auto
- Make Notes
- Make Notes from MIDI

Other Controls

Reset Internal Cock
 Nudge Up
 Nudge Down
 Zoom In Horizontal
 Zoom Out Horizontal
 Zoom In Vertical
 Zoom Out Vertical
 Adjust Retune Speed Faster
 Adjust Retune Speed Slower
 Adjust Vibrato Depth More
 Adjust Vibrato Depth Less
 Adjust Throat Length Longer
 Adjust Throat Length Shorter




WINDOW SIZE 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 630 high
 Medium: 1000 wide by 600 high
 Large: 1600 wide by 900 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 is one of those, after clicking Save, you will have to close the Auto-Tune 8 window and reopen it to have the size change take affect.

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 8.

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 8, but future instances will revert to the previously saved value.

Bypass

Auto-Tune 8 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 Auto-Tune Vocal 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.



Correction Style

The Correction Style control lets you select either the classic Auto-Tune-style pitch correction or our new Flex-Tune pitch correction technology, which is designed to provide

pitch correction while also preserving a singer's expressive vocal gestures intact.

Other real-time pitch correction methods, including previous versions of Auto-Tune, are always pulling every note towards a target scale note, in the process distorting any of the singer's expressive vocal gestures. In contrast, Flex-Tune only provides correction when the vocalist approaches a scale note. At all other times, they are free to sing with whatever vocal gestures best express their emotional connection to their song.

The Correction Style control lets you choose how close to the scale pitch the singer has to be for Auto-Tune 8 to apply correction. In the Classic position, correction is always applied. This results in the same style of correction as previous versions of Auto-Tune. As you move the control into the Flex-Tune range, the correction area around the scale note gets smaller and smaller until, at the extreme clockwise position, no correction will be applied at all.

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



Humanize

One situation that can be problematic in Automatic Mode 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 function 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 another 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.

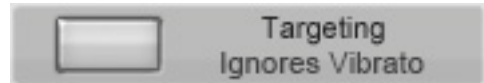


NOTE: This function acts only on vibrato present in the original performance. If the original performance does not contain vibrato, this control will have no audible effect.



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.



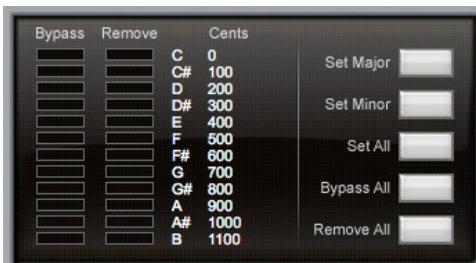
Targeting Ignores Vibrato

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 8 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 8 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 8 treats this note as a normal scale note, i.e., when the input pitch is close to this note, Auto-Tune 8 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 8 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.”

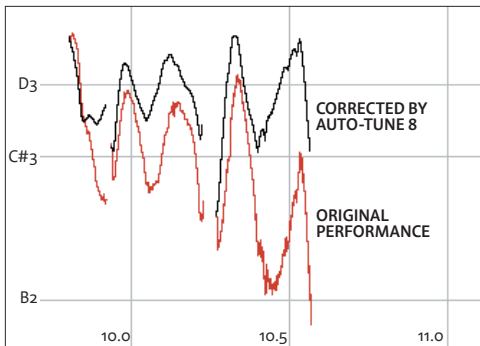
1. If a performance includes pitch gestures around one or more specific notes that you want to preserve with no modification whatsoever, you can set just those notes to Bypass. This lets Auto-Tune 8 correct any pitch problems elsewhere in the scale but passes everything near the bypassed notes completely unprocessed.
2. If a performance contains only a single error, you can set all notes to Bypass except the one “sour” note. Auto-Tune 8 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 8 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 8 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 8 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 8'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.

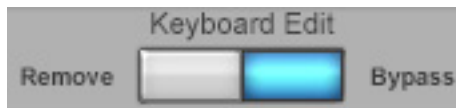
"But wait!" you might be thinking, "I want to edit Major and Minor scales in individual octaves and the keyboard is grayed out when I select either one." No problem. Simply select Chromatic, then use the Set Major or Set Minor button to set up the scale of your choice and edit away.



ANOTHER NOTE: New in Auto-Tune 8, when either the Major or Minor scale is selected, the virtual keyboard will display the the currently detected pitch (although the keyboard will still not be active for editing).

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 Note
Light Brown	Bypassed Note



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.

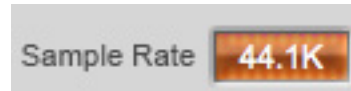


A TIP: The main purpose of the Momentary mode is to allow you to deal easily with specific individual events in a performance. However, you can also use it to “play” the target melody notes in real time. To do this:

- *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 8 by the host application.



NOTE: Auto-Tune 8 is high sample rate compatible. If your host application and audio hardware are capable of dealing with up to 192 kHz files, Auto-Tune 8 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 8 instantiations will be decreased.

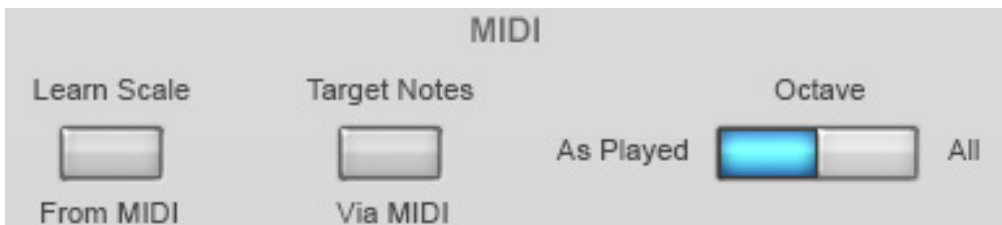


YET ANOTHER NOTE: If you are using external A/D converters with independently selectable sample rates, it can be possible to establish a mismatch between the actual conversion sample rate and what the host application thinks is the sample rate. If this happens, Auto-Tune 8 will appear to be correcting 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 8) 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.

Automatic Mode MIDI Functions



Auto-Tune 8 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 8.

 **NOTE:** Although these days virtually all major hosts allow the routing of MIDI to plug-ins, there may still be a few hosts lurking out there that do not support it. If you happen to be using one of those, these 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 8'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

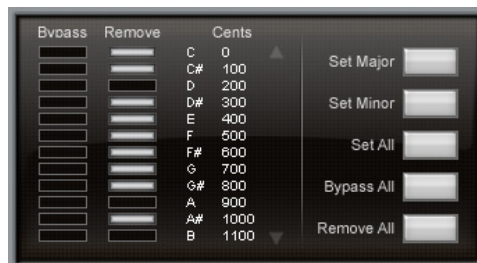
In most cases, you will probably tell Auto-Tune 8 which notes are valid scale notes using the Key and Scale popups, the Edit Scale Display, and/or the Virtual Keyboard. However, there may be occasions when it is not clear exactly what key a melody line is in, or where the melody line has too many accidentals 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 8 from a MIDI keyboard or sequencer track and let Auto-Tune 8 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 8 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 that state, Auto-Tune 8 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 8, 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 8 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 8'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 8'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 8 will pass through all audio unprocessed — giving the impression that Auto-Tune 8 is not functioning.

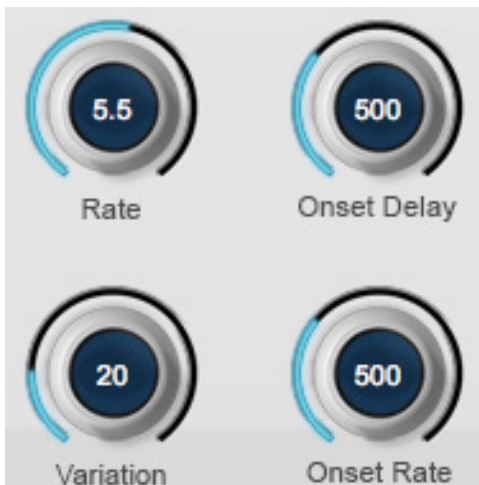
 **ANOTHER NOTE:** We realize that there is some possibility of confusion between the Target Notes Via MIDI function and the Learn Scale From MIDI function described above. To clarify: Target Notes Via MIDI is used to specify target pitches in real time while pitch correction is occurring, while Learn 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 8 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

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 8 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 8'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 8's Create Vibrato section, the results may be less than convincing. Auto-Tune 8'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 Amount Indicator

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 8 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 8 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 objects (see below), Auto-Tune 8 will maintain sync with the host program, allowing you to move around in your track at will.

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.

Selectable Clock Source

For hosts that do not provide valid time information, Auto-Tune 8'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).

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 8 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 8'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 8 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 8'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 8 will apply your corrections.



NOTE: Some hosts that require Internal Clock nonetheless have the capability to automatically reset the clock to 00:00:0. 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.

Time Display Mode

Use this control to display the timeline labels in the Pitch Graph Display in either bars and beats (as defined by your host's tempo), or absolute time in hours, minutes, seconds, and fractions of seconds.

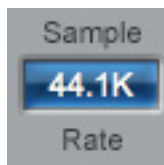


NOTE: If you select Bars + Beats, you will only see the timeline labels for regions where you have tracked pitch or pitch and time.



ANOTHER NOTE: If after tracking pitch or pitch and time, you change the time signature in your host anywhere in the range of tracked audio, you will need to retrack the audio in order for the changed time signature to be reflected by the Bars + Beats display. For that reason, you should, whenever possible, set your time signatures before tracking pitch or pitch and time.

This control also sets the format for the Cursor Time Position display.



Sample Rate Display

This display indicates the sample rate of the current audio file as reported to Auto-Tune 8 by the host application.

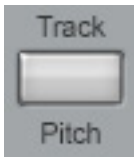


NOTE: Auto-Tune 8 is high sample rate compatible. If your host application and audio hardware are capable of dealing with up to 192 kHz files, Auto-Tune 8 will process them correctly. However, it's important to remember that high sample rate files require substantially more DSP power than 44.1 kHz and 48 kHz files, so the number of possible simultaneous Auto-Tune 8 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 8 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 8) 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.

NOTE: If you will only be correcting the pitch of your vocal and will not be editing the time, you need only use the Track Pitch function as described below. However, if you will also be editing the time, you should instead use the Track Pitch + Time function as described in the Graphical Mode Time Controls section later in this chapter.

To track pitch, locate the desired audio and press the Track Pitch button. (If you are using Auto-Tune 8'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 and its amplitude envelope will be drawn to the display as the audio plays. When all of the audio you want to correct has played, stop playback. 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's Internal Clock, after stopping playback in your host, you must click the clock Reset button to stop Auto-Tune's transport and return you to the beginning of your tracked region.



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 8 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 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 8 will be correcting. It is this basic change that allows you to use multiple instances of Auto-Tune 8 simultaneously in Graphical Mode without having to have their windows visible.





NOTE: The ability to use multiple instances of Auto-Tune 8 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 precise pitch correction. This is one of the central techniques of Auto-Tune 8'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 8's Automatic Mode. In addition to the Key and Scale selections, the Retune Speed, Correction Style 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 8.

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 8'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 the Auto-Tune Vocal Effect, 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 8 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 8 sees as the performer's target notes.




IMPORTANT NOTE: In selecting target pitches, the Make Notes function considers only the notes in the currently selected Key and Scale. If the melody includes many accidentals, it may be more convenient to select the chromatic scale.


Since it is likely that the first thing you will want to do after Making Notes is to adjust the Number of Note Objects setting (as described in the next section), when you click the Make Notes button, the entire range of tracked audio will be selected, enabling the Number of Note Objects control (this is equivalent to having selected the I-Beam and double-clicked in the pitch graph — except you don't actually have to do that).

 **NOTE:** If prior to clicking the Make Notes button, a range of time has been already selected by using the I-Beam Tool, the Make Notes function will apply only in the selected time range.

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 8 analyzes the input pitch for the purpose of

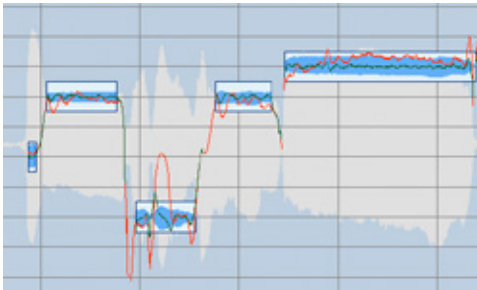
creating Note objects, it must make decisions about what constitutes notes and what constitutes transitions between notes as well as differentiating between a single note with wide vibrato and a series of separate notes of alternating pitch. Often, the "right" choice depends on the style and technique of a specific performance. The Number of Note Objects control lets you give Auto-Tune 8 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.

 **ANOTHER NOTE:** As mentioned above, whenever the Make Notes function is used without previously highlighting a time range with the I-Beam (i.e., is used for the entire track), Auto-Tune 8 will automatically highlight the entire range of tracked audio, allowing you to immediately adjust the Number of Note Objects setting without having to manually select the I-Beam to highlight the audio range.

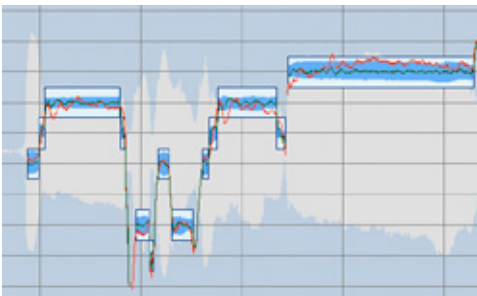
 **AN IMPORTANT NOTE:** Adjusting the Number of Note Objects in a range where you have already performed some pitch correction will regenerate new Note objects and replace any correction objects that were previously in that range. As a result, adjusting the Number of Note Objects value should be the first 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 8’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.

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 8 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 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 8'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 depth of an existing vibrato, while preserving the original shape and

character of the vibrato.

 **NOTE:** Since each correction object (Curve, Line or Note) can have its own independent Vibrato Depth adjustment, the Adjust Vibrato control is only active when at least one correction object is selected.

To use this function, select one or more correction objects whose vibrato you'd like to adjust. Set the desired amount of change (either more or less) using the Adjust Vibrato knob. The green output pitch curve will change to reflect your setting.

 **NOTE:** An correction object's green output pitch curve is defined both by the object's Retune Speed and the setting of the Adjust Vibrato function. A variety of results can be had by experimenting with iterative adjustments to both functions.

 **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 Scissors tool (described below) to cut the correction object into two or more objects and select only the objects you wish to edit.

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



Throat Length Adjust

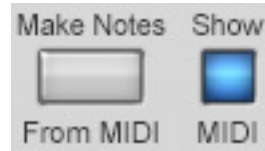
To give you maximum control over the timbre of your vocal tracks, the Throat Length Adjust control lets you

independently set the throat length of each individual correction object (Curve, Line or Note). While the overall Throat Length for your track is still set by the master Throat Length control in the Common Controls section, each correction object can have its own independent adjustment (either longer or shorter) as desired.

NOTE: Since each correction object can have its own independent Throat Length adjustment, the Throat Length Adjust control is only active when Formant Correction is enabled and at least one correction object is selected.

The default Throat Length Adjust setting is 0 (in which case the object(s) will have the Throat Length as set by the master Throat Length control). Command (Mac)/Control (PC) clicking the slider will reset it to that value.

Graphical Mode MIDI Functions




New in Auto-Tune 8 is the ability to record a MIDI input in Graphical Mode and use the recorded MIDI notes

to create Note Correction Objects. This makes it extremely quick and easy to set the target notes of a known melody line or create harmony parts from the original vocal (although, if you're often generating harmony parts, we highly recommend our Harmony Engine Evo Vocal Modeling Harmony Generator as the most efficient solution).


Depending on your intent, the MIDI data could come from a prerecorded MIDI sequencer track or in real time from a MIDI controller (typically a keyboard) played during the pitch or pitch + time tracking process.

Recording MIDI Information

The only thing you need to do to record MIDI data is to route your MIDI source to Auto-Tune 8.

 *NOTE: Although virtually all major hosts these days allow the routing of MIDI to plug-ins, there may still be a few hosts lurking out there that do not support it. If you happen to be using one of those, this MIDI function will not be available.*

Once a MIDI source is routed to Auto-Tune 8, any MIDI Note On and Note Off events from that source will automatically be recorded whenever you track pitch or pitch + time.

 *ANOTHER NOTE: Since only one Note Correction Object can exist at any time point on the Pitch Graph, the incoming MIDI data is recorded with "last note played" priority. What this means is that if two MIDI notes overlap at all, the later note's Note On will also generate a Note Off for the earlier note.*

In practice, if your MIDI file is a single melody line that has been carefully played or programmed such that no two notes overlap, everything will be as you expect. If notes overlap, you may or may not get exactly the result you want. If not, simply edit the MIDI data (or play more precisely). If your MIDI file is polyphonic, you're likely to get pretty wacky results. If wacky isn't what you're looking for, it's probably better not to do that.

Show MIDI

When the Show MIDI button is blue, any MIDI data that has previously been recorded will be displayed as red boxes on the Pitch Graph. Clicking the Show MIDI button will toggle its state.



NOTE: The red MIDI notes display is for reference only. Unless you choose to make Note Objects from the MIDI notes as described below, the MIDI notes will have no effect on Auto-Tune 8's pitch correction.

Make Notes From MIDI

Clicking the Make Notes From MIDI button will convert any currently recorded MIDI notes into Note Correction Objects.



NOTE: If a range of time has been selected using the I-Beam Tool, the Make Notes From MIDI button works only in the selected time range. Otherwise it works on all red MIDI data.

Since the assumption is that you will create your MIDI track with your desired timing, the recorded MIDI notes are not affected by the time manipulation tools. As a result, if you will be performing time correction on your audio in a range where you will be using the Make Notes From MIDI function, you should use the following workflow:

1. Create a MIDI track with the desired timing and route it to Auto-Tune 8.
2. Track Pitch + Time (which also records the MIDI data).
3. If necessary, click the Show MIDI button to display the recorded MIDI notes.
4. Use the time tools described later in this chapter to adjust the timing of your audio to match the timing of the displayed MIDI notes.
5. Click the Make Notes From MIDI button to convert the MIDI notes in Note Correction Objects that will now be in perfect sync with your audio.

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. Optionally, the amplitude envelope of the displayed audio can be displayed as a background element of the graph.

On the 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.

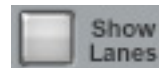
The grid lines provide a reference to guide you in drawing and editing correction objects. The positions of the graph lines correspond to the pitches of the notes in the currently selected scale. Changing the Scale Detune setting will result in the scale pitch graph lines moving up or down relative to the tracked pitch.

If "SHOW ENVELOPE IN MAIN GRAPH" is checked in the Options window, the amplitude

envelope will be visible in the main editing window. This can be particularly useful when selecting edit points during time editing.

You can resize the Graphical Mode window to take advantage of those nice big high-resolution monitors that have become so affordable. In most hosts, Auto-Tune 8'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

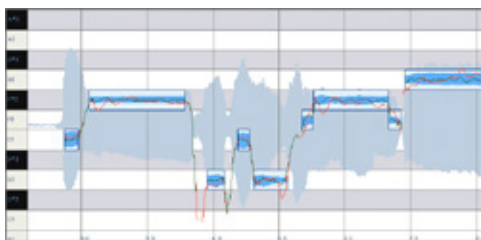
The Pitch Graph Display's default mode displays horizontal lines that represent

each pitch. This is probably the most useful mode with Curve and Line correction objects.


However, with the introduction of Note objects, we 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).



Object Pitch Display

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

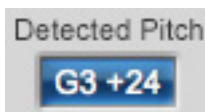
For Lines and Curves, this will correspond to the pitch indicated by the blue target pitch curve.

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).



Output Pitch Display

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



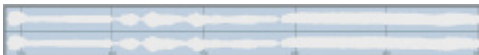
Detected Pitch Display

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



Cursor Time Display

The Cursor Time Display (as you've probably already guessed) will show the time at the current cursor position. The format of this display (either absolute time or bars and beats) will be the same as that set by the Time Display Format selector described in the Clock Controls section above.

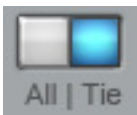


The Envelope Graph Display

The Envelope Graph Display is visible whenever “SHOW ENVELOPE GRAPH” is checked in the Options window.

The Envelope Graph displays the amplitude (loudness) envelope of the sound whose pitch is shown in the Pitch Graph. Additionally, its central horizontal axis will display red in any range in which time has been tracked.

When Time Control is enabled, the Envelope Graph will display two envelopes, one above the other; the original envelope on the bottom and the (potentially) time-shifted envelope on the top. See the Time Controls section for details.



All/Tie Buttons

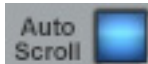
The Envelope Graph’s horizontal (time) scale is controlled by the “All” and “Tie” buttons.

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.



NOTE: If the Envelope Graph Display has been hidden (by unchecking “SHOW ENVELOPE GRAPH” in the Options window), The All/Tie buttons will also be hidden.



Auto Scroll

When Auto-Scroll is on (the button is blue), Auto-Tune 8 will automatically scroll the Pitch Graph Display using the method selected in the Options window (i.e., either smooth or screen-by-screen scrolling).

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 or pitch and time, when the transport is stopped to exit tracking mode, Auto-Tune 8 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 8 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

With Auto-Tune 8, you are free to use the graphical editing functions while correcting pitch. This can be particularly useful if you edit specific sections while looping them, as you can immediately hear the results of an edit without having to stop and restart the transport.

You can, for example:

- Draw new correction objects while you are 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 correcting pitch.
- Cut, copy or paste correction objects while 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: *The two tools dedicated to time correction and manipulation will be described in the Time Controls section later in this chapter.*



ANOTHER NOTE: *In addition to clicking on the various tools, if your host passes key presses to plugins, 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 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.

If "PLAY AUDIO FOR SELECTED NOTE OBJECT" is checked in the Options window, clicking and holding on a Note object will result in a tone sounding at the current pitch of the Note object. Continuing to hold the mouse down and moving the Note object up or down will result in the tone changing to match the position of the Note. Releasing the mouse button will end the tone.



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. If "PLAY AUDIO FOR SELECTED NOTE OBJECT" is checked, you will also hear the pitch of the note as you move it.

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.



AN IMPORTANT NOTE: When we talk about moving a Note Object's end points in time, it's important to understand that what we're doing is adjusting the time range during which that Note defines the target correction pitch of the audio. We are not shifting the time of the audio itself. To shift the time of the audio, use the Time Control tools described later in this chapter.



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

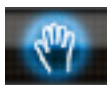
Drag the I-Beam Tool in either the Pitch or Envelope Display to select an area to apply Make Curve,

Import Auto, Make Notes, or Number of Note Objects. 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.

 **NOTE:** This I-Beam Tool is applicable to pitch editing only. Selections for the purpose of time shifting are made by the dedicated time control tools described later in this chapter.



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.



NOTE: Other than the Clear All button, which really does clear everything, these edit buttons are applicable specifically to correction objects and pitch edits. Time shifting has its own set of edit functions, described below.



The Clear All Button

Clicking the Clear All button erases all tracking (both pitch and time) 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.



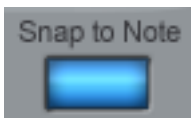
The Undo Button

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.



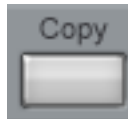
The Select All Button

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 8 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:

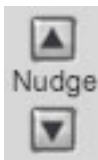
- Navigate to the general area where you want to paste the object(s.)
- Click the Paste button (the cursor will turn into the Paste cursor).
- Press and hold your left (or only) mouse button. A graphic representation of the object(s) to be pasted will appear.
- While holding down the mouse button, drag 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: 1 cent 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 Bamboo or Intuos.

A pen tablet lets you control Auto-Tune 8'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.

Time Shifting Overview



As mentioned back in Chapter 2, in order to do its time shifting magic, Auto-Tune 8 must first create a copy of any audio you wish to edit. As you might imagine, these audio files can be quite large. Unlike the pitch data generated by the traditional Track Pitch function, which is always stored with the instances of Auto-Tune in your session, the audio recorded for time shifting by the Track Pitch + Time function is saved as one or more separate files elsewhere on your computer.

You will find detailed information about these files in the Tracked Data Management section below, but here are some basic guidelines to keep in mind:

- If you always work on one computer and never transfer your projects to other computers, you don't really have to worry about this. Everything will typically take care of itself.

The one exception is that it's wise to delete any tracked audio files once you no longer need them (after bouncing or freezing a processed track, for example), as they will otherwise end up sitting on your computer forever, just taking up space. See below for details.

- If you do transfer your sessions to other computers, any tracked audio files must be transferred with them. Again, see the Tracked Data Management section below for instructions.
- If you know from the beginning that you won't be doing time shifting on a track, use the Track Pitch function. There's no point in recording large files you'll never need.
- If you will be doing time shifting in only a small region of your track, use Track Pitch + Time only in that region. You can do a separate Track Pitch pass for any other regions that only require pitch correction.

- Auto-Tune 8's time shifting is completely nondestructive. Since Auto-Tune 8 works on a copy of your audio, time editing always leaves your original audio intact. At any point you can simply switch off the Time Control Enable button to instantly return to your track's original timing.

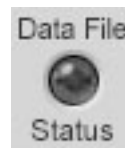
Time Shifting Limits

For both of the time editing tools described below, the total amount of time compression or expansion that can be applied to a range of audio is limited to a 10:1 ratio. That is, a range can be expanded up to 10 times its original length or compressed down to 1/10th of its original length. Once that limit is reached, further compression or expansion (depending, of course on which limit we're talking about) is not possible.



NOTE: The compression and expansion limits are cumulative.

So, if you find yourself unable to make a small time shift, it will almost certainly be because the region you are editing has previously been shifted to (or near) its limit.



Data File Status Indicator

The Data File Status indicator lights whenever Auto-Tune 8 is accessing a tracked audio data file. If all is well, the indicator lights green. If Auto-Tune 8 is,

for some reason, unable to read the file in the time available, the indicator lights red. See the next section for suggestions on how to deal with any such situations.

Computer Power and the Data File Status Indicator

In addition to the limits described above, there are two other related issues that can affect the useful range of time compression: computer speed and session complexity.

When performing time compression, Auto-Tune 8 needs to process the audio at faster than real time. At the limit of 10:1, audio must be processed at ten times its normal rate. Our tests have shown that computers that meet our published system requirements can accomplish this in most cases, but it's important to keep in mind that if your session is particularly complex, with many tracks and lots of other potentially processor-hungry plug-ins all running at once, even the fastest computer may have trouble keeping up.

To alert you to any data access problems, the Data File Status indicator will light red anytime Auto-Tune 8 is unable to read data from its disk file in the time available. If this happens, you should consider the following options:

- Listen carefully to the point in your audio where the Data File Status indicator lights red. Very much like a VU meter's clip light, not every instance will result in an audible problem. If you can't hear anything wrong, you can safely ignore it.
- Decrease the amount of time compression by a tiny bit. If you're right on the edge of your computer's capability, an extremely small change can eliminate the problem.
- Temporarily simplify your session (mute other tracks, bypass other plug-ins) and render or bounce or your time edits to a new track.
- Since data access depends on everything going on at any particular time in your session, for cases that are on the edge of your computer's capability, it's possible that the Data File Status indicator might light red on one pass, but not on another. It's always worthwhile just playing the track again to see if Data File Status red indication was a one-time anomaly.
- Buy a faster computer. If you've been looking for an excuse to upgrade, the Data File Status indicator may be your ticket to that hot new Mac or PC you lust after.



Track Pitch + Time

The process of tracking pitch and time is very much like that of simply tracking pitch alone. The only difference is that in addition to normal pitch tracking, Auto-Tune 8 also makes a recording of the actual audio to be processed.

To track pitch and time, locate the desired audio and press the Track Pitch + Time button. (If you are using Auto-Tune 8's Internal clock, you may (depending on your host) need to click the Reset button to reset the clock position to 00:00:0.) The Track Pitch + Time button will flash blue and red to indicate that Auto-Tune is in Track Pitch + Time mode.

Next, start playback of the audio. A graphic representation of the pitch and its amplitude envelope will be drawn to the display as the audio plays. When all of the audio you want to correct has played, stop playback. You will exit Track Pitch + Time mode and, if you have Auto-Scroll enabled, 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.

In addition, the central horizontal axis of the Envelope Display will turn red to indicate the range of audio that has been recorded and is available for time shifting.



NOTE: If you are using Auto-Tune 8's Internal Clock, after stopping playback in your host, you must click the clock Reset button to stop Auto-Tune 8's transport and return you to the beginning of your tracked region.

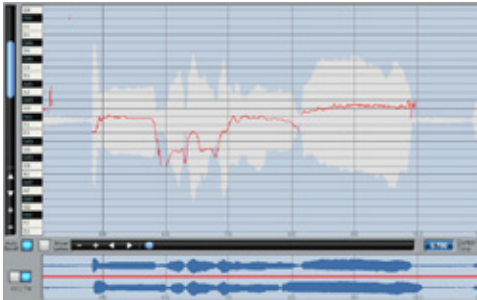


ANOTHER NOTE: Although tracking time does not involve the Buffer Size setting in the Options dialog, tracking pitch (which happens simultaneously) does. Consequently, if the length of the audio to be processed exceeds the currently set Buffer Size (or your start point lies beyond the current buffer area), tracking of both pitch and time 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 after performing the Track Pitch + Time function. Auto-Tune 8 uses the Tracking setting during both the Track Pitch + Time function and while correcting pitch. Changing the Tracking setting after Tracking Pitch + Time, but before correcting, may result in unpredictable pitch modifications or strange artifacts.*

The Pitch Graph Display



In the process of time shifting, the articulation and transient profile of your audio is typically more relevant than its pitch contour. For that reason, you can choose to have the amplitude envelope of the tracked audio be displayed as a background element of the Pitch Graph Display. This makes it much easier to accurately select the desired regions for time shifting and to select the individual points in time to shift.

To display the amplitude envelope, check “SHOW ENVELOPE IN MAIN GRAPH” in the Options window

The Envelope Graph Display



In addition to its traditional functions, in Auto-Tune 8 the Envelope Graph Display provides key visual feedback on the time shifting process. Here’s how:

Tracked Time Indication

The display’s horizontal axis will turn red to indicate the ranges of audio that have been time-tracked, so you will always know which ranges are available for time editing. This indication is always visible, whether time control is currently enabled or not.

Time Control Enabled Indication

When Time Control is active (via the Time Control Enable button described below), the display is divided horizontally into two envelope graphs, the original and edited. When Time control is not active, only a single envelope (the original audio’s envelope) is displayed

Real-Time Time Shift Display

To help you visualize the affects of your edits, whenever time control is enabled the display will show both the original audio (in the lower portion of the graph) and the time-shifted audio (in the upper portion). As you make time shift edits in the main Pitch Graph Display, you will see the upper envelope update in real time. This makes it extremely easy to visualize your time edits in the context of the original audio.

Time Control Functions

The Time Control section provides time edit control functions that are independent of the pitch edit controls described earlier.

The Enable Button

The Enable function is an easy way to quickly compare the effect of all of your current time edits to your original audio.

When this button is blue, time shifting is active. You will hear all of your current edits and are free to make new edits. When it is gray, time shifting is inactive. You will hear only your original audio and no time editing is possible. Click the button to toggle its state.



IMPORTANT NOTE: Using this button to disable time control does not delete any of your previous edits, it simply disables them. If you subsequently re-enable time control, all of your edits will once again become active.

The Undo Button

The Undo button becomes active whenever you make any time edit. Clicking the Undo button once will undo the most recent edit. If you have made multiple edits, you can continue to click Undo to undo additional edits 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 time edit Undo. Clicking the Redo button once will redo the most recent undone edit. If you have executed multiple undos, you can continue to click Redo to redo additional edits up to the limit that you set in the Options dialog.

The Clear All Button

Clicking the Clear All button clears all time edits from the track, essentially restoring the timing of the original audio.



NOTE: Unlike the Clear All function described in the Pitch Editing Tools section, the Time Control Clear All function does not delete any tracked data, only time edits.



ANOTHER NOTE: Also unlike the Clear All function described in the Pitch Editing Tools section, the Time Control Clear All function is undoable, so there's no dire warning message when you click it. If you inadvertently clear all your edits, don't panic. Just click the Time Control Undo button and all will be well again.

Time Edit Tools

Auto-Tune 8's time manipulation functions provide an enormous amount of power over the timing of your audio. But, along with power and flexibility, one of our key design objectives was to make the time shifting process extremely easy to use.

To that end, we've designed all of that power into two context-sensitive editing tools that simply do what you need them to do when you need them to do it. As a result, Auto-Tune 8's time manipulation process is smooth and intuitive, never breaking your creative flow with the need to switch tools or remember some command key to temporarily change function.

Here are the details:

The Move Point Tool



The Move Point Tool allows you to select a range of audio and then move a point within that range forward or backward in time, compressing and expanding the audio around it.

The Move Point Tool is context sensitive. That is, it changes function (from selection to moving) depending on what lies beneath it on the screen. As you move the tool around the screen, its cursor icon will change to indicate its current function.

The Move Point Tool is typically used to edit a note, word, or phrase in which you want to correct the timing of one point while leaving other key points unchanged. Examples might include:

- A note, word, or phrase that begins at the correct time, but ends either early or late.
- Conversely, a note, word, or phrase that begins early or late, but ends at the correct time.


- A note, word, or phrase that both begins and ends at the correct times, but whose internal articulation you would like to edit.


Using the Move Point Tool is a two step process:


1. Select the audio range you wish to operate on.
2. Select the point within that range that you want to shift and move it forward or backward as desired.

The Move Point Tool operates as a combination I-beam selection tool and time shifting tool as follows:

- Whenever the cursor is over an area that is not located in an existing range selection (either because there is no current range selection or because it is outside the area of an existing range), it appears as an I-beam and clicking and dragging the mouse will select a new range.
- Whenever the cursor is over an area that IS located in an existing range selection, it changes to the Move Point cursor and clicking on a point and dragging performs a time shift, moving the selected point and compressing and expanding the audio within the selected range.
- Whenever the cursor is over an area where audio has not been tracked by the Track Pitch + Time function, the cursor changes to the universal “No” icon to indicate that time shifting is not possible at that point.

 **NOTE:** When in selection mode (i.e., when the cursor icon is the I-Beam), the resulting selection is applicable to time shifting only. Selections for the purpose of pitch correction are made by the dedicated I-Beam tool described earlier in this chapter.

 **ANOTHER NOTE:** You will find that the envelope display in the Pitch Edit Graph provides a useful reference for selecting the initial range and exactly the right point to move.


 **YET ANOTHER NOTE:** When selecting and moving a point, the vertical position of the cursor has no effect. Only the horizontal position counts.

Examples of Using the Move Point Tool

The quickest way to become familiar with the time edit tools is to run through the tutorials in Chapter 4. But if you’re not currently near your computer, the following examples should give you a good idea of how you’ll typically use the Move Point Tool in your projects.

For a note, word, or phrase that begins at the correct time, but ends either early or late:

1. Use the Move Point Tool to select a range that extends from the exact beginning of the note, word, or phrase past its end.

 **NOTE:** How far past the end you select depends a lot on what follows the note, word, or phrase to be edited. If there is silence, select as much of the silence as you need to be able to move the endpoint to its desired location. If there is more audio, keep in mind that in order to move your endpoint, you will also end up stretching or compressing some of the following audio. The exact selection amount will vary depending on the nature of your audio. Undo is your friend.

2. Within the range selected in Step 1, place the cursor exactly on the end of the note, word, or phrase and move it to the desired location.

For a note, word, or phrase that begins early or late, but ends at the correct time, simply use Steps 1 and 2 as described above, but select a range that extends from the end of the note, word, or phrase to before its beginning. Then select the exact beginning and move it to the desired location

For a note, word, or phrase that both begins and ends at the correct times, but whose internal articulation you would like to edit:

1. Use the Move Point Tool to select a range that extends exactly from the beginning of the note, word, or phrase to its end.
2. Select the point within the range that you would like to edit and move it to the desired location.



The Move Region Tool

The Move Region tool is designed for moving notes, words, or phrases in their entirety while preserving the timing of the moved element.



NOTE: For clarity, in the following descriptions, a “range” is defined as the overall range of audio that you will be working with, while a “region” refers to the audio within that range that you wish to move.

As with the Move Point Tool, you first select a range of audio. Then, instead of moving a single point, you select the region within your initial selection that you want to move. You then move that region, again compressing and expanding the audio around it.

The Move Region Tool is also context sensitive. It changes function (from initial range selection to region selection to moving) depending on what lies beneath it on the screen. As you move the tool around the screen, its cursor icon will change to indicate its current function.

Using the Move Point Tool is a three step process:

1. Select the audio range you wish to operate on.
2. Select the region within that range that you wish to move.
3. Click anywhere within that region and move it forward or backward as desired.

The Move Region Tool operates as a combination I-beam selection tool and time shifting tool as follows:

- Whenever the cursor is over an area that is not located within an existing range selection (either because there is no current range selection or because it is outside the area of an existing range), it appears as a standard (single) I-beam and clicking and dragging the mouse will select a new range.

- Whenever the cursor is over an area that IS located within an existing range selection, but NOT located within a previously defined region, the cursor appears as a double I-beam and clicking and dragging the mouse will create a new region within the existing range.
- Whenever the cursor is over an area that is located in a previously defined region, it changes to the Move Region cursor and clicking and dragging anywhere within the region will move the region in the desired direction, while compressing and expanding the areas between the ends of the region and the boundaries of the enclosing range.
- Whenever the cursor is over an area where audio has not been tracked by the Track Pitch + Time function, the cursor changes to the universal “No” icon to indicate that time shifting is not possible at that point.



NOTE: When selecting and moving a region, the vertical position of the cursor has no effect. Only the horizontal position counts.

An Example of Using the Move Region Tool

As mentioned above, your best bet is the tutorial in Chapter 4, but here’s a quick example of using the Move Region Tool:

1. Use the Move Region Tool to select a range that extends far enough beyond either end of the note, word, or phrase (i.e., the region) you want to edit to allow you to move it to its desired location.



NOTE: How far past the ends of the region you select depends a lot on what comes before and after it. If there is silence, select as much of the silence as you need to be able to move the region to its desired location. If there is more audio at either end, keep in mind that in order to move your region, you will also end up stretching or compressing some of the adjacent audio. The exact selection amount will vary depending on the nature of your audio. Once again, Undo is your friend.

2. When you place the Move Region Tool cursor within the range selected in step 1, it will turn into the double I-Beam Select Region cursor. Use the Move Region Tool to select the region that you wish to move.
3. When you place the Move Region Tool cursor within the region selected in step 2, it will turn into the Move Region cursor. Click and hold anywhere within the selected region and move it forward or backward in time as desired.

Tracked Data Management

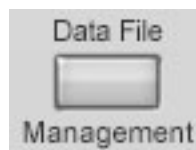
To help manage the recorded audio data required for time shifting, Auto-Tune 8 provides a convenient Data File Management dialog that allows you to establish or move the location of the data files, rename the folder where they're stored, as well as delete them if they are no longer necessary.

The File Management System will also alert you if the data files are not where Auto-Tune 8 expects them to be and will provide information to help you find them.

Before getting to the details, here are some basic principles for managing your tracked audio data files:

- Most important: Unless you have a clear reason for doing so, do not move or rename any of Auto-Tune 8's data files or the folders they are stored in without using the Data File Management Dialog described below. That is, don't just find the files on your computer and manually change their names or move them to another location. This will cause Auto-Tune 8 to lose track of them. You will still be able to use the Data File Management Dialog to find them again, but it will be an unnecessary annoyance.
- If you will be moving your project to a different computer, you must copy all of the data files used by all instances of Auto-Tune 8 in the project and move them as well.
- If you will be making an archival copy of your project, copy all of the project's Auto-Tune 8 data files and save them with the archive.

- Each instance of Auto-Tune 8 that is used for time shifting will have its own data folder. So if, for example, you have instances of Auto-Tune 8 on five separate tracks in your project, you will have five data folders associated with that project which must be copied if the project is moved or archived.
- Be sure to use the Data File Management Dialog's ability to rename data file folders to make it easy to identify the project and track the data is associated with. This will save much time and hassle when you need to copy them for moving or archival purposes.
- Practice good data housekeeping. Once you no longer need particular data (because you've bounced or frozen a track or have finished and archived a project), use the Data File Management Dialog to delete it. This will prevent the messy build-up of large, useless files on your computer.



The Data File Management Button

Click this button to display the Data File Management dialog.

If Auto-Tune 8 is unable to find previously recorded audio data at the location it expects, the Data File Management button will flash red to alert you to this problem. If this happens, click the button and the Data File Management dialog will appear with information that should help you locate the data (assuming it's still around to be located).

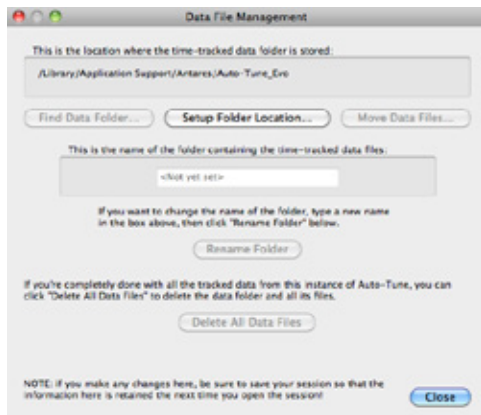
The Data File Management Dialog

The various data management options available in the Data File Management Dialog are dependent on whether or not you have already tracked any audio using the Track Pitch + Time function and on whether or not Auto-Tune 8 has encountered any problem accessing data at an expected location. We'll look at each of these situations in turn.

Before Tracking any Audio

If you instantiate Auto-Tune 8 on a track and use the Track Pitch + Time function to track some audio, a data folder for that instance will be automatically created at the default location for your computer and all data files created by that instance will be written to that folder. If that works for you (as it usually will), you needn't take any other action. Just track and edit.

If, however, you specifically want to select a different folder location (if, for example, you know you will be moving your project and want to have the data folder in the same location as your project file), call up the Data File Management Dialog before tracking any audio. You will see the following:



At the top of the dialog window you will see the default data folder location for your computer. To select a different location:

- Click the “Setup Folder Location...” button (initially, all other buttons are disabled). A navigation window will appear.
- Navigate to your desired location and click Choose. An alert message will confirm that you have changed the folder location.
- Your new location will now be displayed at the top of the dialog window and the other dialog buttons will become active.
- Optionally, rename the data folder as described in the next section.

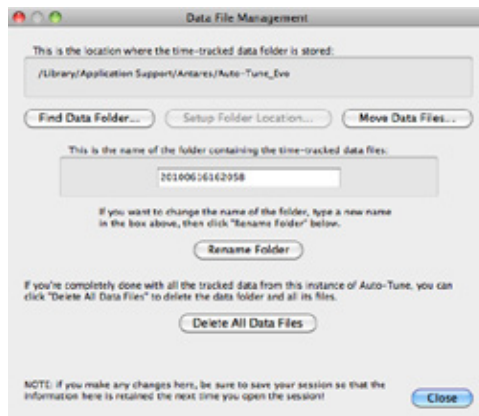
- Click “Close” to dismiss the Data File Management Dialog.
- Save your session. (If you close your session without saving, your new folder location will not be retained the next time you open the session.)



NOTE: While the “Setup Folder Location...” function is only available before tracking any audio, if you initially track audio to the default folder location and later decide that you’d like to have it at a different location, you can, at any time, simply use the “Move Data Files...” function described in the next section.

After Tracking Audio

Once you have tracked some audio using the Track Pitch + Time function, calling up the Data File Management Dialog will result in something like this:



Here’s what you can do:

Find Data Folder...

This function is typically used in a situation where Auto-Tune 8, for some reason, is unable to find data files where it expects to find them. That situation is covered below in the “If There’s a Problem” section.

There is, however, an extremely unlikely but not entirely impossible situation where Auto-Tune 8 thinks it is pointing at the correct data folder, but actually isn’t. This would most likely be the result of manually copying and/or renaming data files and/or folders (yet another reason for not doing that).

The symptoms of this situation are pretty unmistakable. When you play your track, you will hear audio from another place in the track, from another track, or from an entirely different session.

To correct the problem, click the “Find Data Folder...” button, dismiss the resulting alert, and navigate to the correct data folder.

Move Data Files...

To move the folder containing the data files to a new location:

- Click the “Move Data Files...” button. An alert message will appear (more about that in a bit). Assuming that you click “OK,” a navigation window will appear.
- Navigate to your desired location and click Choose. An alert message will confirm that you have changed the folder location.
- Your new location will now be displayed at the top of the dialog window.

About that alert message: Assume for a moment that you have created “Session 1” and tracked some audio in Auto-Tune 8. You save Session 1 and then do a “Save As...” to save a copy of Session 1 as “Session 1A.”

At this point, both sessions are pointing at the same data folder. If, while in Session 1A, you move the data files, the next time you open Session 1, it will not find its data where it expects at the original location and will generate an error. In this case, you can simply use the “Find Data Folder...” function to point Session 1 at the new folder location.

Rename Folder

When Auto-Tune 8 creates a data folder, it gives it an initially incomprehensible-looking 14-digit default name that actually defines the date and time of its creation. The format is:

YYYYMMDDHHMMSS

So, getting out your secret decoder ring, a file named 20100910163309 will have been created at 4:33:09 PM on September 10, 2010.

For ease of data housekeeping, we recommend that you rename your data folders in such a way as it will always be clear which sessions and which tracks they belong to. Examples might include:

MyProject Track 3

MyProject Lead Vocal

To rename a data folder, simply type the new name in the folder name field and click the Rename Folder button.

Delete All Data Files

It is important to note that deleting an instance of Auto-Tune 8 (after bouncing or freezing a processed track) will not automatically delete any associated data files. Similarly, deleting an entire session (after archiving it, for example) will not delete any data files associated with instances of Auto-Tune 8 in the session.

As a result, if you take no action, data files that are no longer necessary will build up on your computer, needlessly taking up disk space.

You can, of course, delete such files manually, but doing so always carries the risk of accidentally deleting the wrong files (especially if you haven’t clearly renamed them as recommended above).

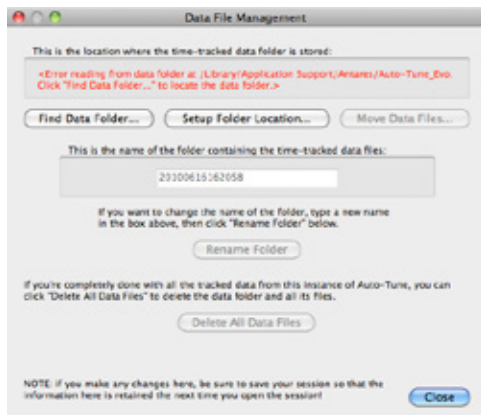
A better practice is to get into the habit of using the Delete All Data Files function as the last thing you do before deleting an instance of Auto-Tune 8 or deleting an entire session (in which case you should use it in each instance of Auto-Tune 8 in the session).

Simply click the Delete All Data Files button, confirm that you’re sure, and you’re done.

When you have finished all your Data Management tasks, click “Close” to dismiss the dialog and immediately save your session. (If you close your session without saving, your changes will not be retained the next time you open the session.)

If There's a Problem

As mentioned above, if Auto-Tune 8 is unable to find previously recorded audio data at the location it expects, the Data File Management button will flash red to alert you to this problem. If this happens, click the button and you will see something like this:



As you will note, the dialog includes the location at which it expected to find the data folder, along with the name of the folder it expected to find there.

Find Data Folder...

Assuming that the folder hasn't been deleted (presumably accidentally), you will be dealing with one of the following situations:

- The folder was moved to a new location, either manually or by the "Move Data Files..." function used from another copy of the session that pointed to the same folder.
- The folder was renamed, again either manually or by the "Rename Data Folder" function used from a copy of the session that pointed to the same folder.
- A combination of the above two, i.e., the folder was both moved and renamed.

In any of these cases, the solution is to point Auto-Tune 8 at the correct folder, wherever it is and whatever it's currently named. To do that:

- Click the Find Data Folder... button. A navigation window will appear.
- Navigate to the correct data folder and click Choose. An alert message will confirm that you have selected the correct folder (or tell you if the selected folder is not the correct folder).
- The correct folder location and folder name will now be displayed in the Data File Management dialog and all should be well.

Setup Folder Location...

If the worst has happened and the correct data folder has actually been permanently deleted, you will have to re-track your audio and remake any previous edits. To do that:

- Click the "Setup Folder Location..." button. Dismiss the resulting alert. A navigation window will appear.
- Navigate to your desired location and click Choose. An alert message will confirm that you have set the new folder location.
- Optionally, rename the data folder.

After either finding the existing data folder or creating a new one, click "Close" to dismiss the dialog and immediately save your session. (If you close your session without saving, your changes will not be retained the next time you open the session you will once again encounter the dreaded flashing red Data Management button.)

4: Auto-Tune 8 Tutorials



This chapter introduces you to how Auto-Tune 8 works by guiding you through a number of brief tutorials.

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

If you purchased a packaged version of Auto-Tune 8, you will find the required files in the “Tutorial Audio” folder on the installation DVD.

If you purchased your copy of Auto-Tune 8 via download, you will have to separately download the Tutorial Audio files from the same web page from which you downloaded Auto-Tune 8.

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 8, it provides a very clear example of what each of the main Auto-Tune 8 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 8 to be an insert effect on that track.
3. Set Auto-Tune 8 to Automatic Mode.
4. Set the Key to “A” and the Scale to “Major.”
5. Set the Retune Speed to zero.
6. Set Correction Style to 0 (Classic).
7. 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 8 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. Set Correction Style to 0 (Classic).
3. Play “A2-A3-A2 sweep” again.

You will now hear the effect of not correcting the E. During the time that Auto-Tune 8 would normally be tuning the input to E, Auto-Tune 8 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 8 makes instantaneous pitch changes. The setting of 30 is slower. Auto-Tune 8 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: Flex-Tune

This tutorial will guide you through the use of Flex-Tune using the same “A2-A3-A2 sweep” file.

Begin the tutorial by doing the following (if you haven’t already from the previous tutorial):

1. Load or import “A2-A3-A2 sweep” into a track of your host program.
2. Set up Auto-Tune 8 to be an insert effect on that track.
3. Set Auto-Tune 8 to Automatic Mode.
4. Set the Key to “A” and the Scale to “Major.”
5. Set the Retune Speed to zero.
6. Set the Correction Style to 0 (Classic).
7. In the Edit Scale Display, click the Remove buttons next to the notes B, D, F# and G#.
8. Play “A2-A3-A2 sweep.”

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

9. Set the Correction Style to a Flex-Tune setting of 10.
10. Play “A2-A3-A2 sweep” again.

With a setting of 10, the correction range around each scale note is quite wide. You will hear each note of the A Major triad instantly tuned as the sweep enters the correction range, but as the sweep moves out of the correction range, you will hear it transition to the next note without correction.

11. Set the Correction Style to a Flex-Tune setting of 55.
12. Play “A2-A3-A2 sweep” again.

At this setting, the correction range around each scale note is quite narrow. Consequently, each scale note will be tuned to only briefly as the sweep passes through the narrow correction range and will transition to the next note without correction as it leaves each correction range.

Tutorial 3: 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 8 to be an insert effect on that track.
3. Set Auto-Tune 8 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 8. Set “wide_vibrato” to loop continuously and put your host program into Play mode. Watch the blue Detected Pitch indication on Auto-Tune 8’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 8 from Bypass. Watch the Detected Pitch indication and listen to the result. As you will hear, whenever Auto-Tune 8 thinks G# or F# is the target pitch, it will move the input closer to those notes, in effect making the situation worse.

- Now, leaving all other settings the same, click Targeting Ignores Vibrato. With Targeting Ignores Vibrato engaged, Auto-Tune 8'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:

- Still using "wide_vibrato," set up Auto-Tune 8 as described in Steps 1-5 above.
- Set Retune Speed to 0.
- Make sure Targeting Ignores Vibrato is Off.
- Set Auto-Tune 8 to Graphical Mode.
- Click the Track Pitch button and play wide_vibrato through Auto-Tune 8. A red curve representing the pitch contour of wide_vibrato will be drawn to the screen as the file plays.
- Stop playback and click the Track Pitch button again to stop the tracking function.
- 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 8 identifies G# or F# as the target pitch.
- Set Auto-Tune 8 back to Automatic Mode.
- Set Targeting Ignores Vibrato to On.
- Return once again to Graphical Mode.
- Click Import Auto (there is no need to track pitch again, as the red pitch curve is still present in the Pitch Graph).
- 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 4: 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:

- 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.
- Set up Auto-Tune 8 to be an insert effect on that track.
- Set Auto-Tune 8 to Automatic Mode.
- Set the Key to "C" and the Scale to "Chromatic."
- Set the Input Type to Low Male Voice
- Set Retune Speed to a value of 24.
- Set "wide_vibrato" to loop continuously and put your host program into Play mode.
- Set Natural Vibrato to 12 and note the effect on the vibrato. Set Natural Vibrato to -12 and note the effect on the vibrato.
- 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 5: Transpose and Formant Control

This tutorial will demonstrate Auto-Tune 8's pitch shifting, formant correction and throat modeling capabilities. We will use the "hidin_vocal.wav" and "hidin_accomp.wav" audio files

Begin the tutorial by doing the following:

1. Load or import the audio files onto two tracks in your host program.
2. Set up Auto-Tune 8 to be an insert effect on "hidin_vocal.wav" and select Automatic Mode.
3. Select Ab minor as the Key and Scale, "alto/tenor" as the Input Type, set the Retune Speed to 20 and the Correction Style to 0.
4. Play the audio file.
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

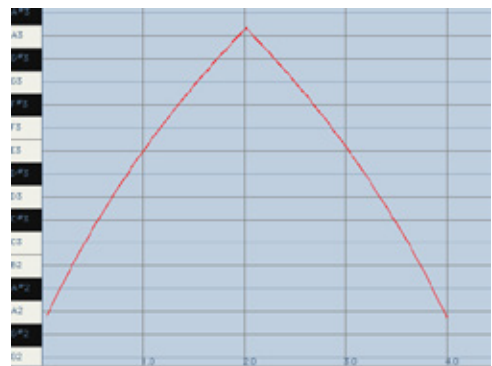
This tutorial will introduce you to the basic Graphical Mode functions, again using the "A2-A3-A2 sweep" file from Tutorial 1.

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 8 to be an insert effect on that track.
3. Set Auto-Tune 8 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 8. 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.

Tutorial 7: Precision

This tutorial is actually more of a demonstration to show the extraordinary precision with which Auto-Tune 8 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 8.)

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 8 to each of the two tracks and select Automatic Mode for each of them.
3. In each Auto-Tune 8, set the Retune slider to 0.
4. In each Auto-Tune 8, set the Key pop-up to B-flat.
5. Do whatever your host application requires to bypass both instances of Auto-Tune 8.
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!

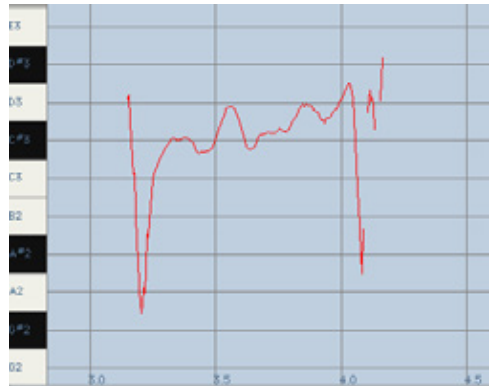
7. Now enable Auto-Tune 8 on each of the tracks and play the files again.

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

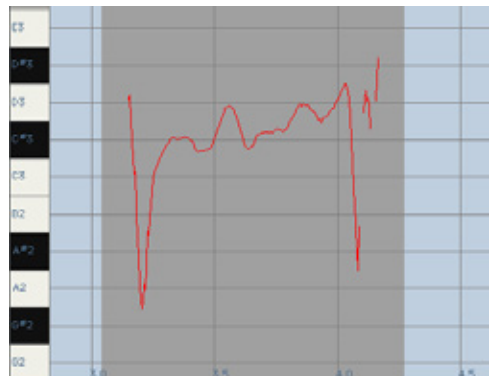
Tutorial 8: Make Curve Function

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

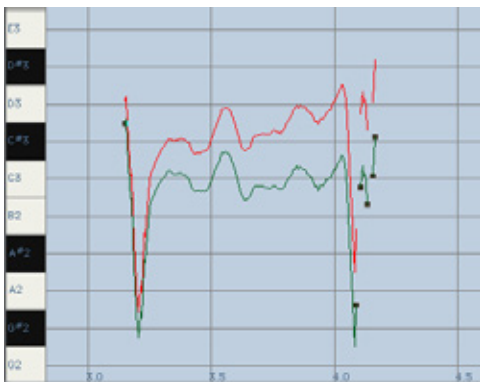
1. Setup to process the file "Crowd All" through Auto-Tune 8.
2. Select Graphical Mode.
3. Press the Track Pitch button.
4. Play the "Crowd All" file.
5. Select the Magnifying Glass Tool and drag out a box on the Pitch Graph that encloses the red curve for the "-gether" part of the last word, "together." 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:



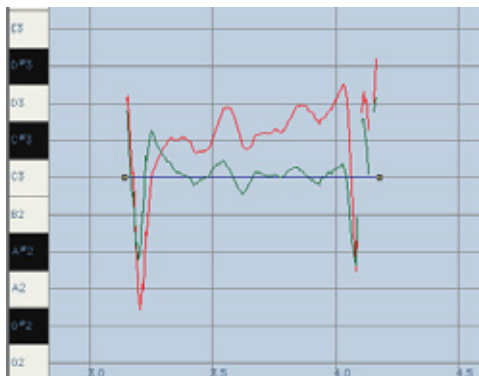
- Click the Make Curve button. Auto-Tune 8 will compute a new blue curve object from the existing pitch data as well as a green output curve that reflects the default Curve Retune Speed. (The new curves may be difficult to see at first because they may exactly overlay the red curve.) Click the I-Beam Tool on the background of the Pitch Graph to cancel the area selection.
- 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.
- 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:



- 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.

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



- 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.

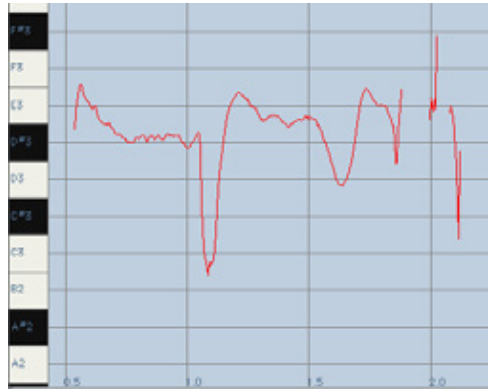
As this tutorial has demonstrated, the following two techniques provide successful approaches to Graphical Mode pitch correction:

- 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.

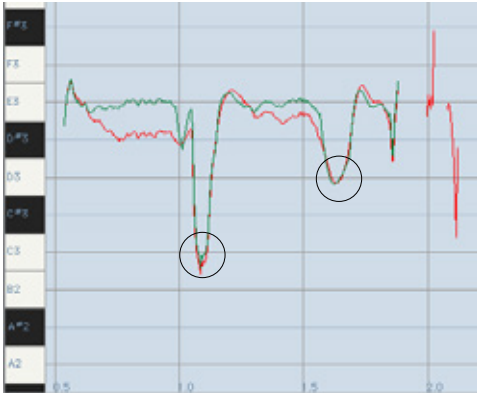
1. Setup to process the file “Crowd All” through Auto-Tune 8.
2. Set the Key and Scale to C Major. Select Automatic Mode and set the Retune Speed to the default of 20.
3. Select Graphical Mode.
4. Press the Track Pitch button.
5. Play the “Crowd All” file.
6. Select the Magnifying Glass Tool and drag 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 8 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 8 will compute new blue and green curves from the existing pitch data:



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 8's Notes correction objects and how they are used for pitch correction and selective pitch shifting.

For this tutorial, we will use the "dont_give_up_vocal.wav" and "dont_give_up_accomp.wav" audio files.

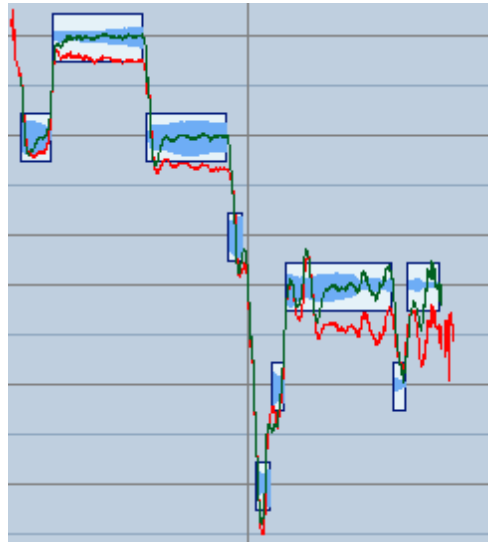
1. Load or import the audio files onto two tracks in your host program.
2. Set up Auto-Tune 8 to be an insert effect on "dont_give_up_vocal.wav" and select Graphical Mode.
3. Select D Major as the Key and Scale and "soprano" as the Input Type.
4. Press the Track Pitch button.
5. Play the project and track the first 17 seconds of the track (until right after the word "remain"). Stop the transport to exit the tracking function. Assuming Auto-Scroll is enabled, the display will scale to include all of the tracked audio.

Notice that the singer (who made us promise to tell you that she did this on purpose at our request) is generally flat throughout.

6. Click the "Make Notes" button.

Play the project. Note that the default settings for the Number of Note Objects and Retune Speed do a good job of correcting the pitch for most of the phrase. However, the final syllable of "remains" goes so flat that some additional adjustment is necessary.

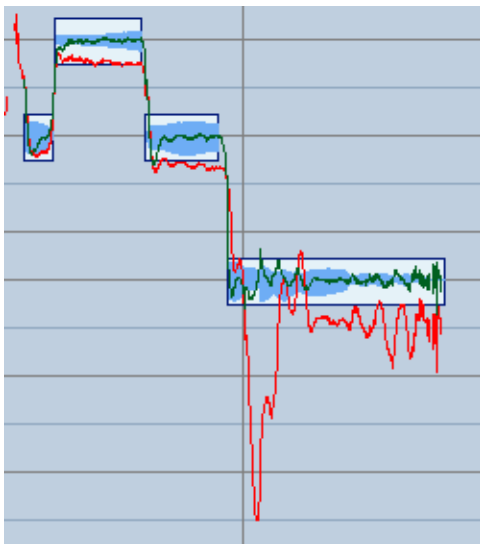
At this point, it should look like this:



The first thing we need to do is correct the dip in pitch before the final C#3. We could do this by selecting each of the two low Note Objects (A2 and B2) and individually moving them up to C#3, but it's easier just to expand the existing C#3 object.

7. Select the Arrow tool and move the cursor over the left end of the long C# note so that the cursor turns into the length adjustment cursor (little horizontal left-and-right arrows). Drag the left end of the note until it just butts up against the end of the previous D3 Note Object.
8. Since there's also a large dip in pitch towards the very end of the word, move the Arrow cursor over the right end of the long C#3 note and drag it to the right until it extends over the entire remaining waveform (to a cursor position of about 16.870 seconds).

The section should now look something like this:



9. Play the project. You'll note that the transition into the final syllable is now much smoother, but the original was so flat that the default Retune Speed of 50 is not fast enough to correct the attack of the final note.
10. Still with the Arrow tool selected, click on the final C#3 to select it. Now adjust the Retune Speed for the desired correction (start with a value of 10 or 50). 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 attack in tune, while still allowing enough of the singer's original natural variation.

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 C#3 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 one semitone to D3. Play the file and listen to the melodic change. (If you have "PLAY AUDIO FOR SELECTED NOTE OBJECT" checked in the Options window, you'll hear the pitch of the Note Object as you select and move it.)
12. For a melodic variation, select the Scissors tool and click on the now D3 note at the 16.052 second point to cut it into two notes.
13. Select the Arrow tool again and drag the lefthand half of the note back down to C#3. Play the file and listen to the result.

As should be clear, Note Objects offer almost unlimited flexibility in pitch correction and melodic editing.

Tutorial 11: Time: Error Correction

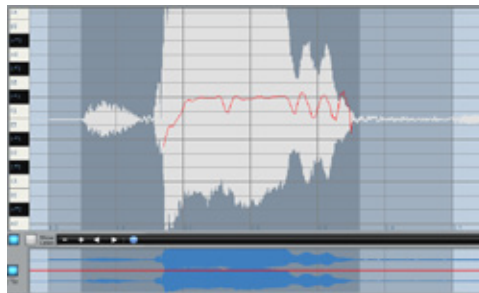
In this tutorial we'll use Auto-Tune 8's Move Point and Move Region functions to correct timing errors in a lead vocal track. While you can use Auto-Tune 8's bars and beats scale as a reference for correction, we've also included a harmony track with proper timing that will let you try correcting by ear.

The Move Region Tool

1. Load or import the audio files "Time_vocal" and "Time_accomp" into two separate tracks in your host and set your host's tempo to 110 BPM. Listen to the tracks to become familiar with them.
2. Set up Auto-Tune 8 as an insert effect on the "Time_vocal" track and select "Alto/Tenor" as the Input Type.
3. Select Graphical Mode and select Bars + Beats as the Time Display mode.
4. Press the Track Pitch + Time button.
5. Start playback and track "Time_vocal." Stop the transport to exit the tracking function. Adjust the zoom and scroll controls to focus on the first two bars (there is one bar of silence at the beginning of the tracks).
6. Note that the vocalist comes in early with the first word, "Time." Since this word is isolated (i.e., there's silence after it), we'll use the Move Region tool to move it into its proper place.
7. Select the Move Region Tool and select the initial range from the beginning of the third beat of the first measure to the end of the second measure. The precise boundaries of this selection are not critical, as long as there are a few beats of silence before and after the note to be moved. (You can check out the graphic below for reference.)

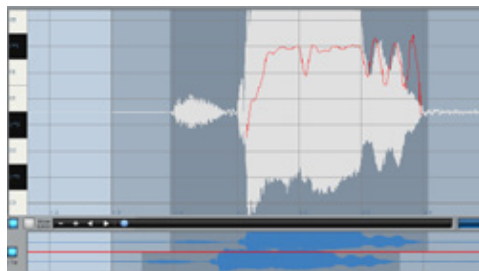
8. Use the Move Region tool to select the region to be moved. Using the envelope display as reference, select the the region from the beginning of the breath before the note (at time position 1:3.9) to the end of the note's decay (at time position 2:3.62).

At this point, your display should look like this:



9. Still using the Move Region tool, click and hold anywhere in the region selected in Step 8 and move the region to the right until the beginning of the note's main envelope (the part after the initial breath) is lined up exactly on the first beat of measure 2.

Your display should now look like this:



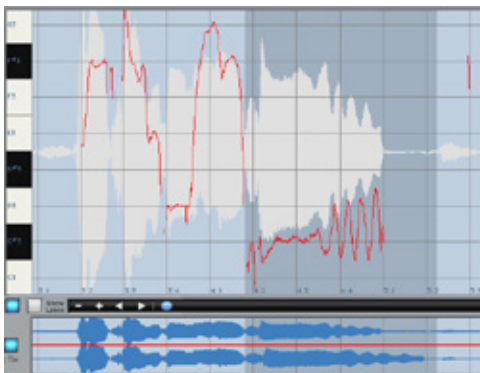
Play back your track and note that the two vocal parts are now perfectly in sync. (You can click the Time Control Enable button to A/B the original and time shifted versions.)

The Move Point Tool: Adjusting an Ending

Moving on in the track, we'll use the Move Point Tool to correct a phrase that starts at the right point but ends late.

1. Adjust the zoom and scroll controls to focus on bars 3 through 5. Play the track and note that the end of the second phrase (the end of the word "illusion"), is sustained too long.
2. Select the Move Point Tool and select the range from the beginning of the last syllable of "illusion" (at time position 4:1.80) to the beginning of the breath before the following note (at time position 5:2.23).
3. Use the Move Point Tool to select the point to be moved. In this case we want to move the very end of the phrase while leaving the beginning in place. Using the envelope display as reference, place the cursor over the very end of the note (at time position 5:2.10). Click and drag to move the end point back to the beginning of measure 5.

Your display should now look like this:



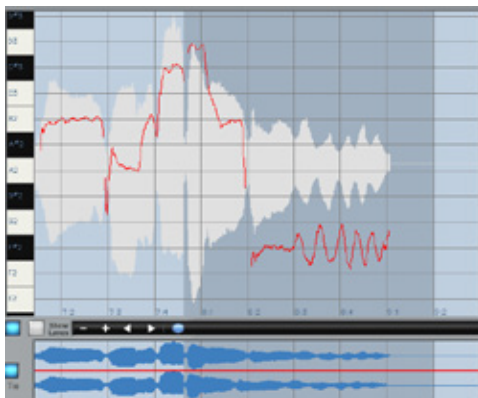
Play back your track and note that once again the two vocal parts are now perfectly in sync.

The Move Point Tool: Adjusting an Internal Syllable

For our final example, we'll use the Move Point Tool to correct a syllable in the middle of a word.

1. Adjust the zoom and scroll controls to focus on bars 7 through 9. Play the track and note that the start of the last syllable in the final word of the track ("delusion"), starts slightly too early.
2. Select the Move Point Tool and select the range from the beginning of the word "delusion" (at time position 7:4.63) to a beat past the end of the track (at time position 9:2.0).
3. In this case we want to move the start of the syllable while leaving the beginning and end of the selected word in place. Using the envelope display as reference, place the cursor over the beginning of the last syllable (at time position 8:1.73). Click and drag to move the end point to the right to time position 8:2.0.

Your display should now look like this:



Play back your track and note that once again the two vocal parts are now in sync.

You've now completely corrected the timing of the track. If you like, click the Time Control Enable button to A/B the original and time shifted versions to remind yourself how far you've come.

Tutorial 12: Time: Creative Editing

In this tutorial we'll use Auto-Tune 8's Move Region function for a creative, rather than corrective, purpose.

1. Load or import the audio file "Bass_riff" (a two-bar bass line) into a track of your host and set your host's tempo to 110 BPM. Listen to the track to become familiar with it. We're going to use the Move Region tool to move the second note of the pattern and change the feel of the bass line.
2. Set up Auto-Tune 8 as an insert effect on the track and select "Bass Inst" as the Input Type.
3. Select Graphical Mode and select Bars + Beats as the Time Display mode.
4. Press the Track Pitch + Time button.
5. Play the "Bass_riff" file and track the two-bar line. Stop the transport to exit the tracking function. Adjust the zoom and scroll controls to focus on the first measure of the bass line.
6. Click the Make Notes button. Although we're only interested in the timing of this example, the Note objects provide a useful visual reference of the bass line.

Our goal here is move the second note, an A#, so that instead of being a pickup note to the third beat, it falls squarely on the second beat, creating a distinctly different feel to the line.

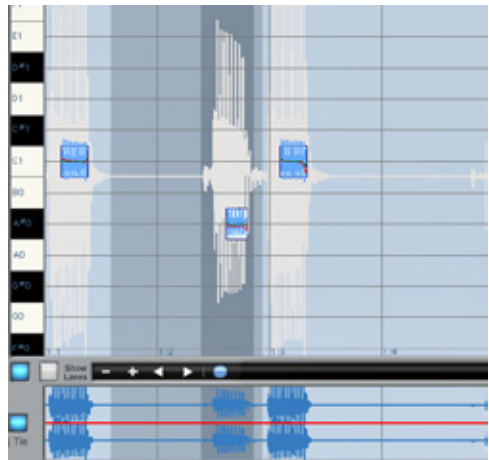
7. Select the Move Region tool and, using the main edit window's envelope display as reference, select the initial range from the end of the first note's decay (at time position 1:1.58) to the end of the A#'s decay (at time position 1:2.93). You can check out the graphic below for reference.

8. Now, we'll use the Move Region tool to select the region to be moved. Again using the envelope display as reference, select the region from the beginning of the A# (at time position 1:2.38) to a bit before end of the A#'s decay (at time position 1:2.86).



NOTE: The reason that we don't select the entire A# is that when we move the note forward in the next step, we want to leave a bit of it for Auto-Tune 8 to stretch into a natural decay leading into the note on the third beat.

At this point, your display should look like this:



9. Still using the Move Region tool, click and hold anywhere in the region selected in Step 8 and move the region to the left until the beginning of the note's main envelope is lined up exactly on beat 2.

Your display should now look like this:



Play back your track and note the new feel. You can click the Time Control Enable button to A/B the original and time shifted versions.

Also note how Auto-Tune 8's time shifting algorithm has turned the small bit of audio at the end of the moved A# into a natural-sounding decay leading into the following C.

5: The Auto-Tune Vocal 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. 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 three key elements to producing the Auto-Tune Vocal Effect in Auto-Tune 8:

1. Set Correction Style to "Classic"
2. Set Retune Speed = 0
3. 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 Correction Style to "Classic" and 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 8's 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 8's 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.

6: The Auto-Tune 8 Scales

The following are brief descriptions of the scales available in Auto-Tune 8:

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): 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 minor mode.

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 known 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.

Index

A

- Adjust Vibrato 41
- All/Tie Buttons 46
- Amplitude Amount 32
- Antares Audio Technologies ii
- Arrow Tool 48
- Audio Feedback of Note Object Pitch 4
- Authorizing Auto-Tune 8 5
- Automatic Mode 8
 - Basics 64
- Automatic Mode Controls 22
 - Create Vibrato Functions 31
 - Edit Scale Display 25
 - MIDI Functions 29
 - Pitch Change Meter 33
 - Pitch Correction Functions 22
 - Sample Rate Display 28
 - Virtual Keyboard 27
- Automatic Mode MIDI Functions 29
- Automatic Update Notification 4
- Auto Scroll 46
- Auto-Tune Vocal Effect 80
 - How to do it 80
 - What is it? 80

C

- Clear All Button 51, 57
- Clock Controls 34
- Common Controls 15
 - Correction Mode 19
 - Formant Correction 18
 - Key Selection 16
 - Low Latency 16
 - Scale Selection 16
 - Select Pitch Reference 16
 - Throat Length 18
 - Tracking 15
- Contemporary Tunings 83
- Continuous Controls 15

- Controls 15
 - Common 15
 - Continuous 15
- Correction Mode 19
- Correction Style 23
- Correct Pitch 36
- Create Vibrato Functions 31
- Curve Tool 48
- Cut And Copy Buttons 52

D

- Data File Management Dialog 60
- Delete All Data Files 62

E

- Editing Modality 47
- Editing Tools 47
 - Editing Modality 47
 - Graphical Tools 47
- Editing Tools Active During Playback 4
- Edit Scale Display 25
- Enable Button 57
- Envelope Graph Display 56
- Ethnic Tunings 82

F

- Find Data Folder 61, 63
- Flex-Tune 10, 66
 - Correction Style 23
- Formant Amount 32
- Formant Correction 13, 18

G

- Getting Started 3
- Graphical Mode 11
- Graphical Mode Controls 34
 - Clock Controls 34
 - MIDI Functions 42
 - Pitch Tracking and Correction Objects 36
- Graphical Tools 47

H

- Hand Tool 51
- Hide or Show Amplitude Envelope in
 - Main Edit Display 4
- Hide or Show Envelope Display 4
- Historical Tunings 82
- Hold Button 33
- How Auto-Tune 8 corrects pitch 8
- How Auto-Tune 8 detects pitch 7
- How To Use This Manual 4
- Humanize 23

I

- I-Beam Tool 51
- Import Auto 37
- Import Auto Function 72
- Increased Maximum Timeline Resolution in
 - Bars + Beats Mode 4
- Installing Auto-Tune 8 5
- Instance ID 29
- Internal Clock Mode 34
- Introducing Auto-Tune 8 6
 - A little bit about pitch 6
 - Background 6
 - Enhanced Amplitude Envelope Display 14
 - How Auto-Tune 8 corrects pitch 8
 - How Auto-Tune 8 detects pitch 7
 - Non-destructive Editing 14
 - Pitch Shifting, Formant Correction and Throat Modeling 12
 - Time Shifting and Correction 13

K

- Keyboard Equivalents 53
- Key Selection 16

L

- Learn Scale From MIDI 29
- License Agreement iii
- Line Tool 47
- Low Latency 16
- Low Latency Mode 3

M

- Magnifying Glass 50
- Make Curve 37
- Make Curve Function 70
- Make Notes 38
- Make Notes From MIDI 43
- Make Notes Function 74
- MIDI Functions 29, 42
- Modern Equal Temperament 82
- Move Data Files 62
- Move Point 76
- Move Point Tool 57, 58, 77
- Move Region 76
- Move Region Tool 59

N

- Natural Vibrato 24
- Natural Vibrato Function 67
- Note Tool 48
- Nudge Buttons 53
- Number of Note Objects 39

O

- Octave As Played/All Octaves 30
- Onset Rate 32
- Options Dialog 19

P

- Paste Button 52
- Pen Tablet Input 53
- Pitch Amount 32
- Pitch and Envelope Graph Displays 44
- Pitch Change Amount Indicator 33
- Pitch Change Meter 33
- Pitch Correction Functions 22
- Pitch Graph Display 56
- Pitch Shifting 12
- Pitch Shifting, Formant Correction and Throat Modeling 12, 28, 53
- Pitch Tracking and Correction Objects 36

R

- Recording MIDI Information 42
- Rename Folder 62
- Retune Speed 9, 40

S

- Sample Rate Display 28, 35
- Scales 8, 82
 - Contemporary Tunings 83
 - Ethnic Tunings 82
 - Historical Tunings 82
 - Modern Equal Temperament 82
- Scale Selection 16
- Scissors Tool 50
- Select All Button 52
- Select Pitch Reference 16
- Setup Folder Location 63
- Show MIDI 43
- Snap To Note Button 52
- So what exactly is Auto-Tune 8 6
- Sync to host transport 34

T

- Targeting Ignores Vibrato 24
- Targeting Ignores Vibrato Function 66
- Target Notes Via MIDI 30
- Technical Support 5
- Throat Length 18

- Throat Length Adjust 42
- Throat Modeling 13
- Time Display Mode 35
- Time Shifting 54
 - Computer Power and the Data File Status Indicator 54
 - Control Functions 57
 - Edit Tools 57
 - Functions 57
 - Limits 54
 - Overview 54
 - Tracked Data Management 60
- Time Shifting and Correction 13
- Time Tools 13
- Time Tracking 13
- Tracked Data Management 60
- Tracking 15
- Track Pitch 36
- Track Pitch + Time 55
- Tutorials 64
 - 1: Automatic Mode Basics 64
 - 2: Flex-Tune 66
 - 3: Targeting Ignores Vibrato Function 66
 - 4: Natural Vibrato Function 67
 - 5: Transpose and Formant Control 68
 - 6: Graphical Mode Basics 68
 - 7: Precision 70
 - 8: Make Curve Function 70
 - 9: Import Auto Function 72
 - 10: Make Notes Function 74
 - 11: Time: Error Correction 76
 - 12: Time: Creative Editing 78

U

- Undo Button 52, 57

V

- Vibrato 10
- Virtual Keyboard 27

W

- What's New in Auto-Tune 8? 3
 - Audio Feedback of Note Object Pitch 4
 - Automatic Update Notification 4
 - Editing Tools Active During Playback 4
 - Hide or Show Amplitude Envelope in Main Edit Display 4
 - Hide or Show Envelope Display 4
 - Increased Maximum Timeline Resolution in Bars + Beats Mode 4
 - Low Latency Mode 3

