antares

Auto-Tune Realtime

World Standard Professional Pitch Correction

User Manual

Contents

1: Introducing Auto-Tune Realtime

What is Auto-Tune Realtime?

Auto-Tune Realtime is a tool for correcting intonation and creatively modifying the intonation of a performance.

Auto-Tune Realtime provides world professional standard Auto-Tune pitch correction, optimized for tracking and live performance with ultra-low latency.

How Auto-Tune Corrects Pitch

Auto-Tune 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, Auto-Tune will adjust the pitch toward the target scale tone.

What Type of Audio is Appropriate for Auto-Tune?

Auto-Tune is intended for use with a well-isolated, monophonic sound source such as a single voice, or a single instrument playing one pitch at a time. Multiples voices or instruments recorded onto the same track, or single instruments that are playing multiple pitches at the same time, cannot be accurately pitch corrected using Auto-Tune. Noise content, or breathiness in vocal performance can sometimes also lead to tracking errors. However, this can often be remedied by adjusting the Tracking parameter (See Ch. 2 for an explanation of the Tracking parameter)

Some History

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 the intervening years, Auto-Tune has established itself as the worldwide standard in professional pitch correction. Now, with Auto-Tune Realtime, we're proud to bring that technology to the UAD platform.

2: General Controls

Input Type

Auto-Tune Realtime offers a selection of processing algorithms optimized for a variety of audio types.

Options include : Soprano, Alto/Tenor, Low Male, and Instrument. For more accurate pitch detection and correction, choose the input type that best describes your audio.

Tracking

In order to accurately identify the pitch of the input, Auto-Tune Realtime requires a periodically repeating waveform, characteristic of a solo voice or solo instrument. The Tracking control determines how much variation is allowed in the waveform for Auto-Tune Realtime to still consider it periodic.

In most cases, the Tracking control should be left at its default value of 50. A noisier signal or a vocal performances that is unusually breathy may require a more 'relaxed' setting (higher Tracking value). If artifacts such as clicks or pops are introduced by the processing, try setting the Tracking to a 'choosier' setting (lower Tracking value).

Select Pitch Reference

Auto-Tune Realtime provides the ability to pitch correct stereo tracks while maintaining phase coherence between the two channels.

When using Auto-Tune Realtime on a stereo track, both channels should feature the same source material (e.g. the same vocal performance recorded with two microphones). Click the appropriate button to select which of the two channels will be used as a pitch reference. If one channel is cleaner or better isolated than the other, select that channel as the pitch reference.

Key

This control lets you select the key of the track you plan to process. The Key parameter is used in combination with the Scale parameter to determine the set of notes that the performance will be tuned to.

Scale

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

If you're not certain of the scale or key of your track, setting the Scale parameter to Chromatic will cause Auto-Tune Realtime to always tune to the closest pitch in the 12-tone chromatic scale. See Chapter 9 for more information about the available scales.

Scale Detune

The Detune parameter allows you to change the pitch standard of Auto-Tune Realtime from the default A = 440Hz. This is useful when working with an instrument or track that uses a different reference frequency. Values are specified in both cents and Hertz. The range of adjustment is -100 cents to +100 cents.

Options

The Options button opens the Options Window, where additional settings can be found. See Chapter 8 for more information about the Options Window.

Bypass

The Bypass button temporarily bypasses the Auto-Tune processing. Use this to compare the unprocessed audio with the output of Auto-Tune Realtime.

Pitch Change Meter

The Pitch Change Meter shows you how much the pitch is being changed, measured in cents.

For example, if the blue indicator bar has moved to the left to -50, it indicates that the input pitch is 50 cents too sharp and Auto-Tune is lowering the pitch by 50 cents to bring the input back to the desired pitch.

Hold: Clicking and holding the word “Hold” while Auto-Tune 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.

3: Pitch Correction Functions

Retune Speed

Retune Speed controls how rapidly the pitch correction is applied to the incoming sound. The units are milliseconds. A zero setting will cause immediate changes from one pitch to another, and will completely suppress any vibration.

For the Auto-Tune Effect, set the Retune Speed to zero. A setting between 10 and 50 would be more typical for more natural sounding pitch correction. Larger values allow through more vibrato and other interpretive pitch gestures, but slow down how rapidly corrections are made.

Correction Style

The Correction Style control lets you select either the classic Auto-Tune style pitch correction or our new Flex-Tune technology, which provides pitch correction while preserving a singer's expressive vocal gestures.

When Correction Style is set to zero, Auto-Tune Realtime is always pulling every note toward a target scale note. When Flex-Tune is engaged, it only applies correction as the performer approaches the target note. As you move the control toward higher values, the correction area around the scale note gets smaller, and more expressive variation is allowed through.

Humanize

One situation that can be problematic for pitch correction is a performance that includes both short and long sustained notes. The problem is, that in order to get the short notes in tune, you would need to set a fast Retune Speed, but this can cause sustained notes to sound unnaturally static.

The Humanize function differentiates between short and sustained notes, and lets you apply a slower Retune Speed just to the sustained notes.

Start by setting Humanize to zero, and adjust the Retune Speed until the shortest problem notes in the performance are in tune. If sustained notes sound unnaturally static, increase the Humanize setting until they sound more natural.

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.

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 set all scale notes to Bypass and still use the Natural Vibrato function to adjust vibrato depth.

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.

Once the target note has been identified, Auto-Tune will 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.

With Targeting Ignores Vibrato engaged, Auto- Tune's vibrato identification algorithm recognizes the pitch variations as vibrato holds the target note constant.

4: The Auto-Tune Vocal Effect

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

What is it?

The Auto-Tune Effect is what is technically known as "pitch quantization." Instead of Allowing all the small variations in pitch and gradual transitions between notes that are a normal part of the human singing voice, the Auto-Tune Effect limits each note to its exact target pitch and forces instantaneous transitions between notes.

How to do it

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

1. Set the Retune Speed to zero.
2. Choose the correct scale.

That's pretty much it really.

However, there are some possible variations. Here's a more detailed approach:

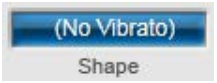
1. Start by setting Retune Speed to 0.
2. Set the Key and Scale to the key and scale of your track.
3. Play your track. If you like the result, you're done.
4. If you're not happy with the result, try one or more of the following:
   - Edit the scale notes. Depending on the specific vocal line, adding or removing scale notes can give you 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: Create Vibrato Functions

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

While vibrato is often perceived to be just a variation in pitch, analysis shows that variations in amplitude (loudness) and formant resonances can also be involved. Auto-Tune Realtime includes a number of vibrato functions to allow the creation of much more convincing vibratos.

Shape



Selects the shape of the vibrato.

The choices are:

No Vibrato: 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.

Variation

Sets the amount of random variation that will be applied to the Rate and Amount parameters. Useful for humanizing the vibrato by adding random "errors." The range is from 0 (no variation) to 100 (maximum variation).

Onset Delay

Sets the amount of time in milliseconds between the beginning of a note and the onset of vibrato. The range is from 0 to 1500ms (1.5 seconds).

Onset Rate

Sets the amount of time in milliseconds between the end of the onset of vibrato and the point at which the vibrato reaches the full values set in the Pitch, Amplitude and Formant Amount settings. The range is from 0 to 1500ms (1.5 seconds).

Pitch Amount

Sets the amount that the pitch changes. The range is from 0 (no change) to 100 (maximum change).

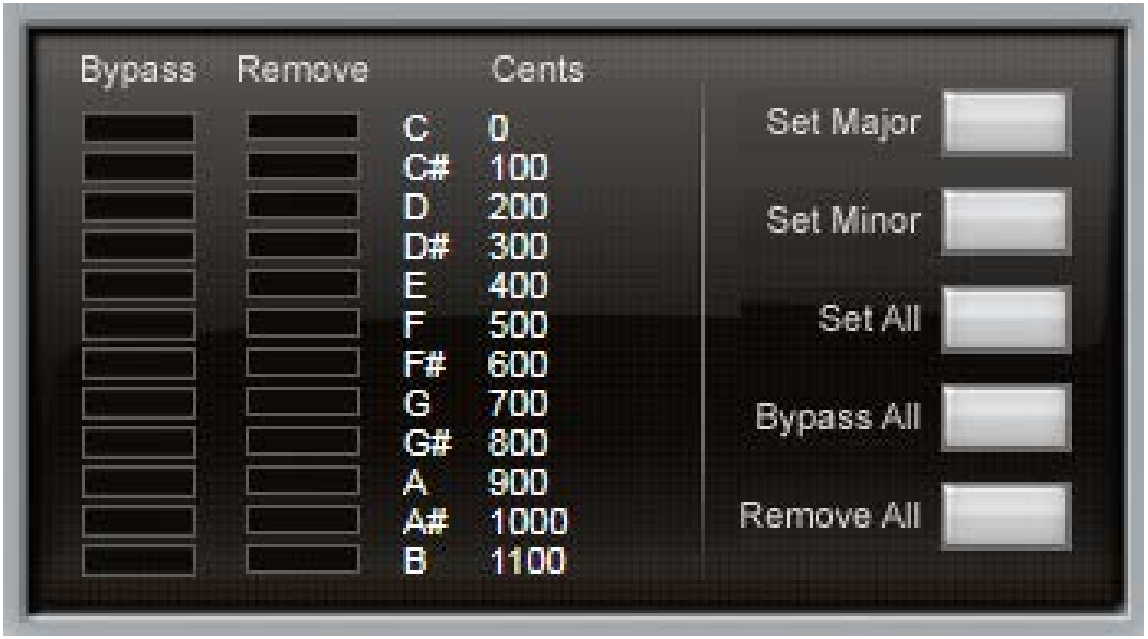
Amplitude Amount

Sets the amount that the loudness changes. For the most realistic vibrato, the amount of amplitude change should be substantially less than pitch change. The range is from 0 (no change) to 30 (maximum change).

Formant Amount

Sets the amount that the resonant timbre changes. The range is from 0 (no change) to 100 (maximum change).

6: The Edit Scale Display and Keyboard



The Edit Scale Display is used to create custom scales or to modify any of the preset scales selected in the Scale menu

The Edit Scale Display shows each note of the currently selected scale in the currently selected key. Beside each note name are two buttons: a Bypass button and a Remove button.

If neither of these buttons are lit, Auto-Tune Realtime treats this note as a normal scale note (when the input pitch is close to a note, Auto-Tune Realtime will correct the pitch to that note.)

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.

Remove

If the Remove button is lit, the note is removed from the current scale. Notes that are near the removed note will instead be tuned to the next closest note in the scale.

Set Major/Set Minor

When any scale that includes more than seven notes 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.

Set All

Clicking the Set All button sets all notes in the current scale to scale notes. This function can be used to reset an edited scale to its default state.

Remove All

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

Bypass All

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

The Keyboard

The Keyboard 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.

The Keyboard is only active for scales with exactly twelve notes. It will be grayed out when any other scale is selected.

The color of the keys of the Keyboard indicate their current state:

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

Keyboard Mode

In Momentary mode, keyboard edits are only active for as long as the mouse is held down on a key.

In Latch Mode a key changes its state when it's clicked , and retains that state until it's clicked again.

7: MIDI Functions

Learn Scale From MIDI

The Learn Scale From MIDI function allows you to play a melody from a MIDI keyboard or MIDI track and let Auto-Tune Realtime construct a custom scale containing only those notes that appear in the melody.

To use the Learn Scale From MIDI function, be sure that your MIDI source is routed to Auto-Tune Realtime, and then click the Learn Scale From MIDI button. Any notes that you play will then be added to the scale.

Target Notes Via MIDI

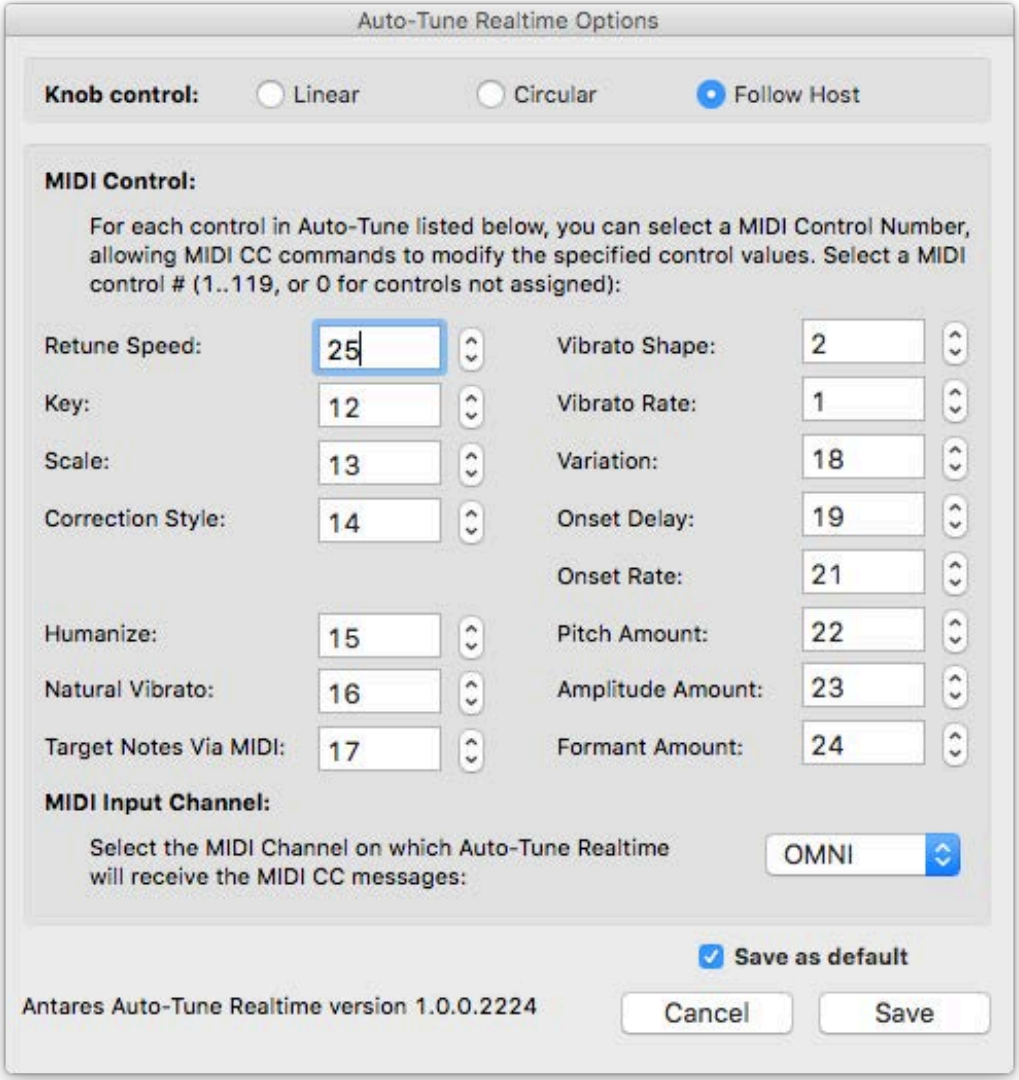
In this mode, Auto-Tune Realtime continuously monitors its MIDI input for Note On messages. At any instant, the scale used for correction is defined by all MIDI notes that are on.

To use the Target Notes Via MIDI function, be sure that your MIDI source is routed to Auto-Tune Realtime, and then click the Target Notes Via MIDI button.

Octaves as Played/All Octaves

This control allows you to choose whether incoming MIDI notes will affect all octaves or just the notes in the specific octaves in which they are played. This applies to both of the MIDI functions (Learn Scale from MIDI and Target Notes via MIDI).

8: Options Window



Knob Control

Lets you select how you want to control the knobs in the Auto-Tune Realtime interface.

Linear: Click the knob and drag up or to the right to turn the knob clockwise.

Circular: Click the knob and drag in a circular motion to turn the knob.

Follow Host: Some host applications will also allow you to choose linear or circular knob behavior, and pass that information along to plug-ins. Choosing Follow Host will cause Auto-Tune Realtime to follow the behavior of the host application. If no message is received from the host about this, the knobs will default to linear.

MIDI Control Assignments

These controls let you assign MIDI controllers to various Auto-Tune Realtime controls for real-time MIDI control of performance parameters from a MIDI keyboard or other MIDI control surface (Refer to your host application's manual for details on how to route MIDI to a plug-in).

For each available control, you can select a MIDI controller in the range of 0 to 119. Alternatively, you can select "N/A" (Not Assigned) to exempt a particular control from any MIDI control.

MIDI Input Channel

This lets you select the MIDI channel to which Auto-Tune Realtime responds. The choices are channels 1–16 or Omni (all channels). Additionally, you can select OFF, which turns off MIDI control, regardless of whether any controls are mapped in the section above.

Save as Default

When this box is checked, any changes you make to the various Options settings are saved as defaults for all future instances of Auto-Tune Realtime.

9: The Scales

The following are brief descriptions of the scales available in Auto-Tune Realtime.

Modern Equal Temperament

These first three equal-tempered scales are the common scales found in Western tonal music, including popular music.

Major: a seven-tone equal tempered major scale.

Minor: a seven-tone equal tempered minor scale.

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.

Werckmeister III: a twelve-tone well-tempered scale. This scale was an early attempt (about Bach's time) to allow an instrument to be played in any key.

Vallotti & Young: a twelve-tone well-tempered scale designed to allow arbitrary keys.

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

Non-Western Tunings

Indian: A 22-tone just scale.

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

Pelog: A seven-tone Indonesian scale also used in gamelan 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 Experimental Tunings

19 Tone Equal Temperament: Divides the octave into 19 equal parts. Thirds and sixths more closely resemble those found in just intonation than 12-tone equal temperament. Perfect fifths are narrower than those found in twelve-tone equal temperament.

24 Tone Equal Temperament: Also known as the quarter tone scale, this scale idivides the octave into 24 equal parts. Does not offer a significant advantage over 12-tone equal temperament in terms of approximating just intervals.

31 Tone Equal Temperament: Divides the octave into 31 equal parts. Offers an excellent approximation of the just harmonic seventh interval often found in a cappella vocal music, such as barbershop.

53 Tone Equal Temperament: Divides the ovtave into 53 equal parts. The 53-tone scale has good approximations of just major and minor thirds, and fifths and fourths.

Partch: Harry Partch is considered the father of modern microtonality. This 43-tone just scale was devised by him and used in his compositions and instruments.

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 several just 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 maintains purity of the just intervals 3/2 and 4/3 and also approximates 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.

10: Tutorials

These tutorials make use of two audio files which can be downloaded here:
http://www.antarestech.com/downloads/ATRT_Tutorial_Audio.zip

Tutorial 1: Pitch Correction Basics

This tutorial will guide you through the basic pitch correction 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, it provides a very clear example of what each of the main pitch correction controls do.

Do this:

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. Create an instance of Auto-Tune Realtime on that track.
3. 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 Realtime 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 Realtime would normally be tuning the input to E, it instead enters bypass mode and passes the input through uncorrected

Now try this:

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 Realtime makes instantaneous pitch changes. The setting of 30 is slower. Auto-Tune Realti 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. 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 sounds 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:

1. Load or import "A2-A3-A2 sweep" into a track of your host program.
2. Create an instance of Auto-Tune Realtime on that track.
3. Set the Key to "A" and the Scale to "Major."
4. Set the Retune Speed to zero.
5. Set the Correction Style to 0 (Classic).
6. In the Edit Scale Display, click the Remove buttons next to the notes B, D, F# and G#.
7. 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. 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 Targeting Ignores Vibrato function.

Begin the tutorial by doing the following:

1. Load or import “wide_vibrato” onto a track in your host program. This is a recording of a male voice singing a sustained “G” with a pronounced vibrato. Play the track so that you are familiar with the original audio.

2. Create an instance of Auto-Tune Realtime on that track.

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 Realtime. Set “wide_vibrato” to loop continuously and put your host program into Play mode. Watch the blue Detected Pitch indication on Auto-Tune Realtime's 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 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.

9. Now, leaving all other settings the same, click Targeting Ignores Vibrato. With Targeting Ignores Vibrato engaged, Auto- Tune's vibrato identification algorithm recognizes the pitch excursions as vibrato and continues to use “G” as the target pitch.