

# serato™



# Pitch 'n Time™

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## User Guide

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# System Requirements

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## Hardware

- PowerPC® Macintosh

or

- Pentium PC

## Software

- Pro Tools 5.0 or higher

NOTE: Pitch 'n Time was designed to be used with Digidesign Pro Tools. Although Pitch 'n Time may function with other DAW's that support the AudioSuite architecture, not all functions may look and behave as described here.

# Basics

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## What Pitch 'n Time does

Pitch 'n Time is a high quality time stretching and pitch shifting plug-in for use with Digidesign's AudioSuite architecture. It offers time compression and expansion from a ratio of 1/8 through to 8 x speed, independent of pitch. Together with pitch shifting of up to 48 semitones independent of tempo.

The time-stretching and pitch-shifting functions each have three interchangeable panels, ranging from simple fixed ratios / rate changes to complex tempo and pitch alterations that vary over time. You can even warp the timing of your samples just by placing markers and moving them around.

The tempo and pitch panels can be mixed and matched to suit your application, and with a sufficiently powerful processor previewing may be done in real time.

## Why is Pitch 'n Time an AudioSuite Plug-In and not a real time insert plug-in (TDM or RTAS)?

At the time of writing the Digidesign Audio Engine (DAE) supports four plug-in architectures: TDM, AudioSuite, Real-Time AudioSuite (RTAS) & HTDM. TDM, RTAS & HTDM are real-time architectures using DSP and/or host-based processing, while AudioSuite is file-based.

The three real-time architectures provide the digital equivalent of "black boxes". One of the fundamental aspects of their design is that they require a plug-in to have a 1:1 input to output ratio, so the number of samples coming out of a plug-in must equal the number of samples being sent in. This behavior is similar to having an external box with audio inputs, outputs and controls. In principle such a box cannot time stretch, since time stretching implies a non 1:1 input to output sample ratio.

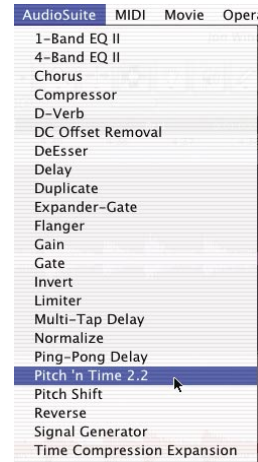
Being file-based, AudioSuite plug-ins have complete random access to the source data and also have no restriction on input to output ratios. This gives a plug-in the freedom to implement such processes as sample-rate conversion, time stretching, and time reversal. AudioSuite is the only Pro Tools plug-in architecture under which Pitch 'n Time can operate effectively.

# Getting Started

## How to launch Pitch 'n Time

1. Bring up the Pitch 'n Time window by selecting it from the AudioSuite menu.

NOTE: This menu is not accessible until you have a session open.



2. The Pitch 'n Time Window should appear with the standard Pro Tools plug-in controls at the top and bottom of the window.

Providing that you have some audio in your session Pitch 'n Time is ready to use.



# The Interface

## Tempo

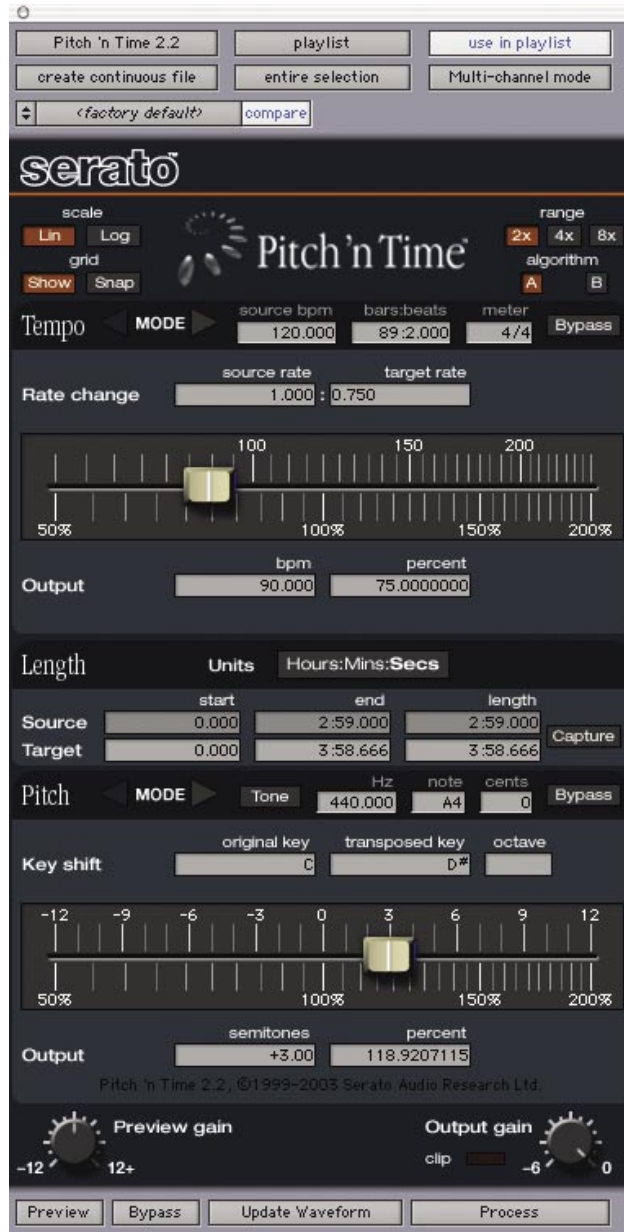
The time-stretch modes are Fixed, Variable and Morphing

## Pitch

The pitch-shift modes are Fixed, Variable and Varispeed

## Length

Shows the start, end and output length of your selection



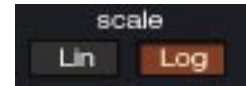
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## General Controls

### Graphical scale options

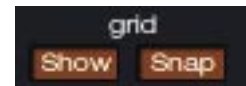
Lin / Log

This selects the vertical scale for all automation graphs. The interpolation between handles is not affected by this setting on the variable time-stretch panel, so in log mode lines will appear bent. The variable pitch-shift panel alters its interpolation to match this setting, so lines are always straight.



Show

Turns grid lines display on and off for all graphical views.



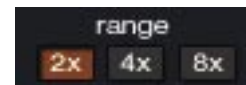
Snap

When editing handles, this makes them snap them to grid lines.

### Extra options

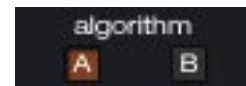
#### Range

At the top of the plug-in three buttons 2x, 4x and 8x let you control the editable range of Pitch 'n Time.



#### Algorithm

At the top of the plug-in two buttons A and B let you bias the Serato Intelligent Sound™ algorithm towards more tonal sounds (e.g. pipe organ) or more transient sounds (e.g. drums).



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General Controls, continued...

### Preview options

**Tone** At the top of the fixed pitch-shift panel you can select and play a reference tone along with the preview, to facilitate tuning by ear. The note to play and detuning can be also be entered here, or the frequency can be entered in Hertz.



**Gain** At the bottom of the panel two control knobs control the volume level of preview mode and the output or process gain. Any gain change of the process gain control is applied when you press Process.

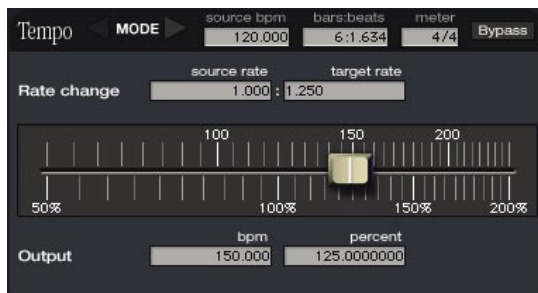




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## Fixed Time-stretch Panel

The simplest way to control tempo, the fixed time-stretch panel, lets you accurately slow down or speed up your selection by a single stretch factor.



The amount of time stretch is displayed below the slider in terms of the output BPM (an input BPM must be specified for these units to make sense), or as a percentage of the original tempo. Moving the slider changes the ratio or the new value may be entered directly into either the BPM or Percent field.

The ratio fields let you specify the time stretch factor by entering source and target rates. An ideal use for this feature is time-stretching to convert between two frame rates; Just enter the source and destination frame rates, and press process. A selection of preset frame conversion rates is also supplied with Pitch 'n Time, accessible via the plug-in preset menu (see the Pro Tools plug-in section at the rear of the manual).

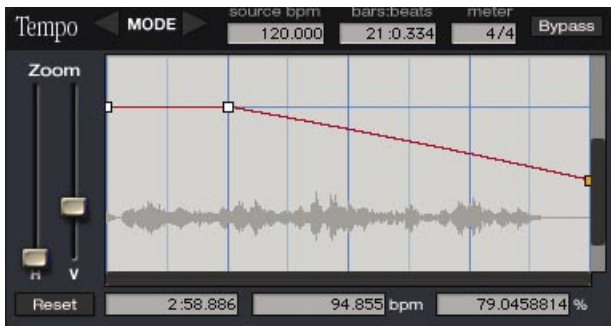
This panel also includes fields to assist with BPM calculations. These are:

- Source BPM:** This field shows the original tempo of the current selection in Beats Per Minute. If the tempo of the selection is defined within Pro Tools then this field is filled in automatically (if no value has been entered manually). When the input BPM is entered, the Bars & Beats field is calculated automatically.
- Bars & Beats:** This field shows the length of the current selection in Bars and Beats, if known. Entering this length will cause the plug-in to calculate the BPM of the selection.
- Meter:** Entering the current time signature assists the plug-in with interpreting the Bars & Beats field, by nominating how many beats each bar contains.

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## Variable Time-stretch Panel

This panel offers a more sophisticated interface to the time-stretching function of Pitch 'n Time, by providing an editable tempo automation graph. This panel is accessed by clicking the triangular Mode arrows.



Here you can see someone adding a ritardando to a constant tempo recording

The most important part of this view is the coloured line. This shows how the speed of playback will vary over time. The small boxes on top of the line are handles, and these let you specify the tempo you want at a particular time. Most handles are white, but the currently selected handle is shown in orange. The time, BPM and percentage change of the selected handle is shown in the three fields below the graph.

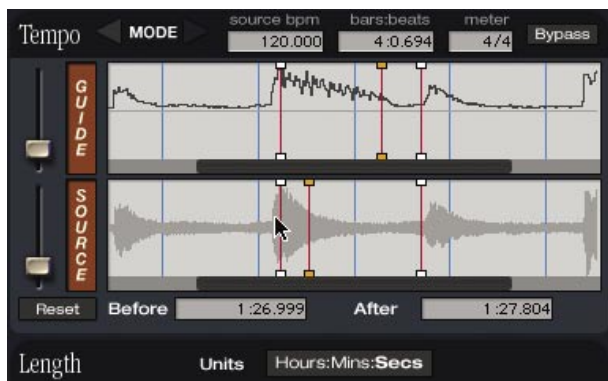
To select or move a handle, click within its box. To create a new handle, click anywhere on the line where there isn't already a handle. To delete a handle option-click it, drag it outside the graph, or move it on top of one of the handles to either side. The line always shows how the tempo will vary smoothly between the handles you have set. Clicking Reset will remove all changes.

By pressing the Update Waveform button (at the bottom of the plug-in) you can have Pitch 'n Time display a waveform overview as a visual aid behind the automation graph. Note: for large selections this can take a while to create.

Tempo automation can be as simple as a ramp from 120 to 130 bpm or as complex as you wish. To help with detailed editing of automation data, the graphical editing modes of Pitch 'n Time include both horizontal and vertical zoom. These zoom sliders can be found to the left of the graph, and always zoom in on the currently selected handle. The size of the scroll bars vary to reflect how much of the entire graph is visible.

## Morphing Time-stretch Panel

This is the third time-stretching panel (again accessed by clicking the Mode arrows), and provides a time-varying time-stretch facility. This panel is useful if you need to control *when* things happen, rather than how quickly. Just drop markers on the audio and move them where you want them to go. Pitch 'n Time stretches and squashes the audio to fit! There are two graphs on the morphing panel, the lower of these (SOURCE) shows the selection and markers before processing. The upper graph (GUIDE) shows where the markers will go after processing. The output graph also has a guide waveform overview. The guide waveform is available as a visual reference and appears beneath the output waveform, which is shown as a dark outline. You will need to click Update Waveform at the bottom of the plug-in to import a waveform as a guide.



Here a note has been lengthened without altering the surrounding notes

There are buttons labeled GUIDE and SOURCE next to the graphs. Whichever one is pressed in controls which waveform overview will be updated when the Update Waveform button is pressed. So to load a guide waveform in, press GUIDE and then Update Waveform. To load the waveform for your source, just make sure SOURCE is pressed in and press Update Waveform. It is recommended that you load your guide waveform first, to avoid any confusion.

Markers are shown as vertical lines with handles at the top and bottom. The selected marker's handles are shown on both graphs in orange, and the corresponding input and output times are displayed at the bottom of the panel. Markers can be selected and moved in either graph by clicking anywhere on the line. Option-clicking a marker deletes it, as does dragging it outside the graph. New markers can be created by clicking anywhere except on an existing one. Clicking Reset will remove all markers.

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## Length Panel

No matter which time-stretching mode you are in, the length panel is always visible. It shows the start, end and length of your selection both before and after processing. You can change the output values at any time by typing into the appropriate field. When you do, the current time stretch panel is altered to match.



### Length / Position units

Select from the pop-up menu at the top of the length panel between the following display options:

**Samples** These are the smallest units of audio that Digital Audio Workstations work with. The largest value allowed in these fields is  $2^{31}-1 = 2,147,483,647$  samples, or approximately 13 1/2 hours of audio at a sample rate of 44,100 samples per second.



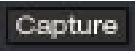
**Hours:Mins:Secs** Display lengths in hours, minutes and seconds, in the format HH:MM:SS. Hours and minutes will not be displayed if the length is less than one hour or one minute respectively. The default units are seconds when entering values, but colons can be used to quickly enter larger values. For instance, typing "1:" enters 1 minute, and typing "2::" enters 2 hours.

**Time code** Uses SMPTE time code.

**Feet+Frames** This refers to lengths of film in feet and frames, where 1 foot = 16 frames, and there are 24 frames in 1 second of audio. This relationship is independent of the SMPTE frame rate for the session.

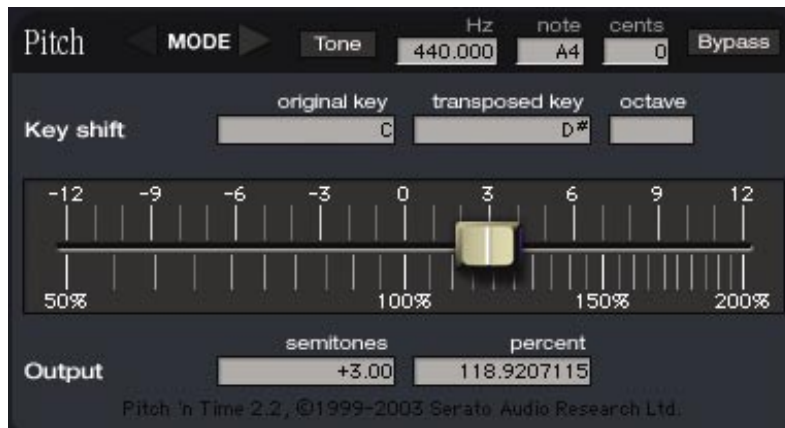
Length Panel, continued...

This panel also features the “Capture” button, which can be used to easily match sample lengths. When pressed, the capture button memorizes the length of the current selection. As soon as a second region is selected, the current time-stretch panel is automatically adjusted to create the output length that was memorized. (See the Production Examples section for further explanation).



## Fixed Pitch-shift

This pitch-shift panel works similarly to the fixed time-stretch panel, applying a simple, single pitch shift factor, displayed beneath the slider in both semitones & cents (1/100ths) and percentage frequency change.

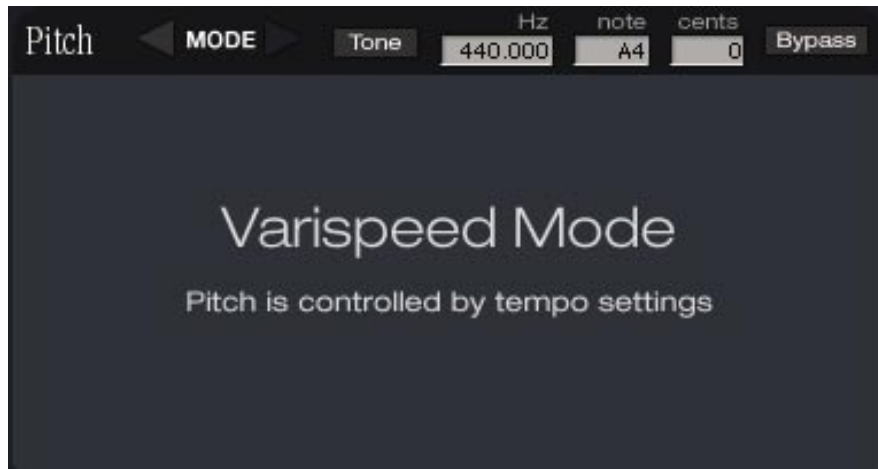


The two fields above the pitch slider provide a simple way to transpose your selection. Just enter the key of the source (by typing the key and optionally typing a ‘#’ for a sharp and/or a ‘b’ for a flat) and the new key you would like; the plug-in calculates the required pitch shift.

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## Varispeed Pitch-shift Panel

This panel has no controls, and forces the pitch shift to precisely match the time-stretch at any point in time. This recreates a classic varispeed effect, allowing you to make great sounding record/tape speed-up and slow-down effects. To go really slow, use the variable time-stretch panel on a linear vertical scale.

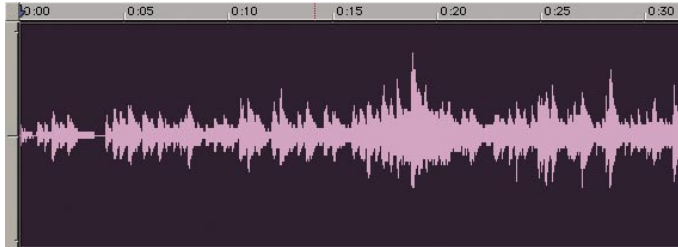


## Production Examples

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### Example 1: Making a finished ad fit the available space.

1. Fully mixed advertisement, must fit 30 second slot, but is 32.673 seconds long.



2. Set length units to seconds.



3. Type "30" into output length field.



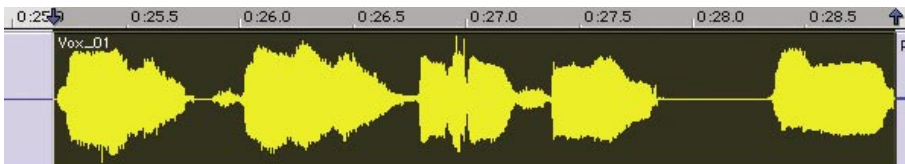
4. Press Process.



## Example 2: Lengthening a note

In this example we're going to extend the sustain of a note that was played too short.

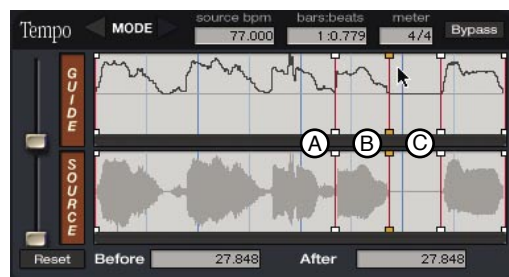
1. Make a selection around the note you wish to lengthen.



2. Scroll over to the Time-Morphing panel by clicking the right arrow then press the Update Waveform button.

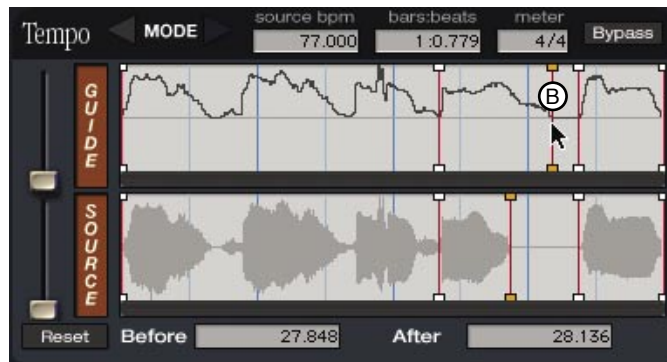


3. Click on the waveform to drop markers at (A) just after the start of the note (B) just before the end of the note and (C) just before the start of the next note.

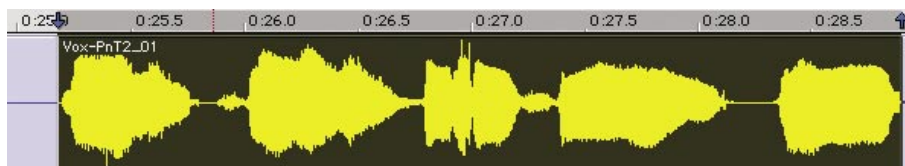




4. Click on marker ② in the top (output) waveform, and drag it to where you want the note to end.



5. Press Process.

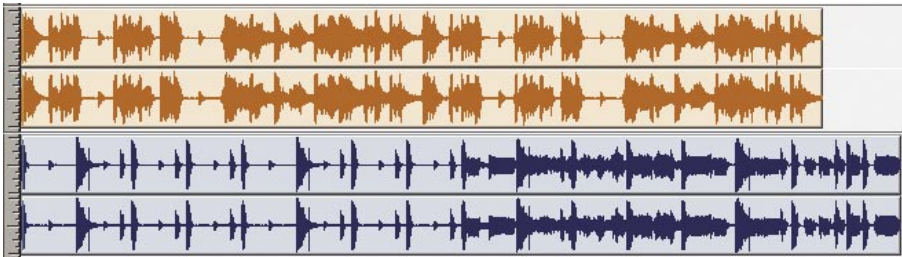


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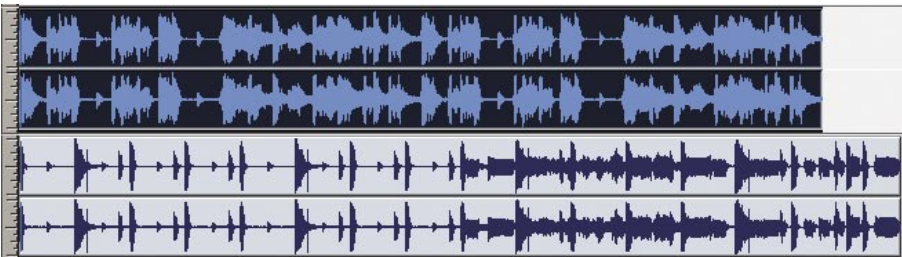
## Example 3: Matching loop tempos

Here we will show how to use the Capture button to match loops to the same tempo.

1. Some loops with differing tempos.



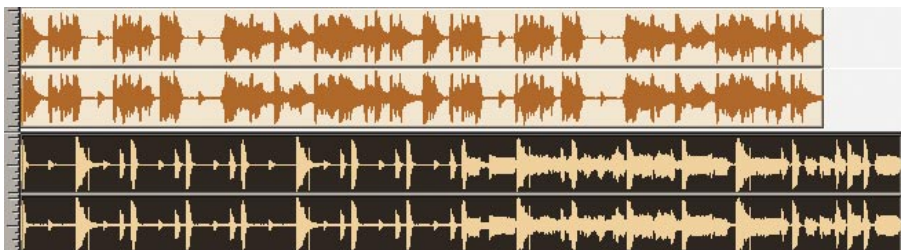
2. Select the loop with the correct tempo.



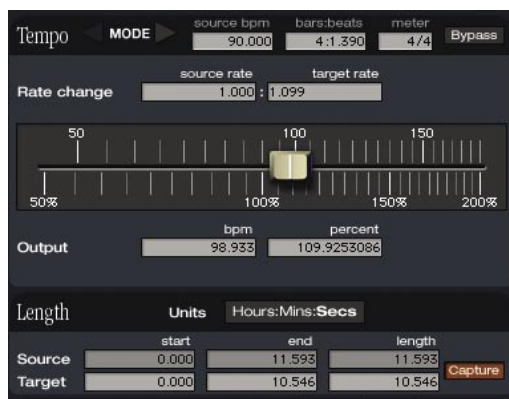
3. Press Capture.

Length	Units			Hours:Mins:Secs
	start	end	length	
Source	0.000	10.546	10.546	Capture
Target	0.000	9.594	9.594	

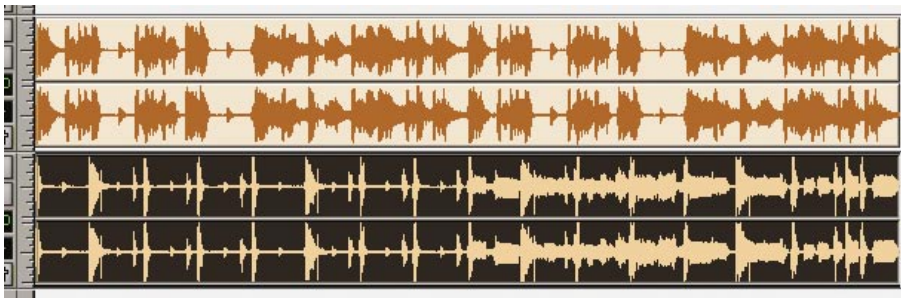
4. Select the loop with the incorrect tempo.



5. Notice that the controls auto update to show time stretch needed.

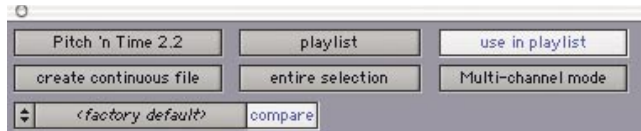


6. Press Process.

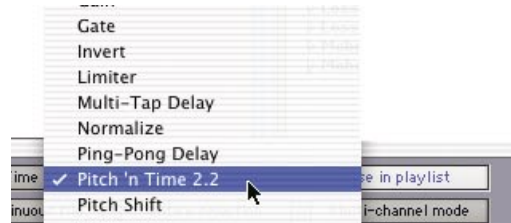


# Pro Tools Plug-In Controls

The top of the plug-in window contains several options that control the behavior of AudioSuite plug-ins.



This pop-up menu displays the current AudioSuite plug-in and is used to switch between installed plug-ins.

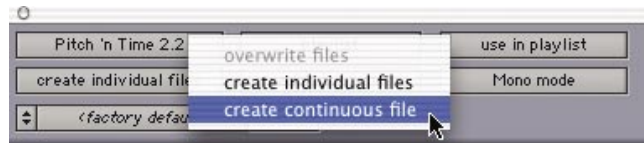


There are two different ways of selecting the source of the audio to be processed by an AudioSuite plug-in, depending on what you wish to achieve. With *playlist* selected as the source, whatever audio is selected within the Pro Tools Edit Window is fed into the plug-in. This could include several regions, and/or several copies of the same region, but cannot include regions that do not appear in the Edit Window. If a region appears more than once, it is fed through the plug-in more than once. When *region list* is the source, the regions selected in the Pro Tools region list are fed through the plug-in. This can include regions that do not appear in the Edit Window.



use in playlist

Pitch 'n Time always works non-destructively. That is, it always creates a new region file and never overwrites the source. The use in playlist button controls whether the processed audio should automatically be used in the Edit Window in place of the source. With this option selected with playlist as the source, only the audio selected in the Edit Window is replaced. However if use in playlist is selected with region list as the source, every occurrence of the source region in the Edit Window is replaced - potentially a dangerous operation.



The create continuous file option is only available when playlist is selected as the source. In this mode the entire selection within the Edit Window is treated as a single region. All of the audio - including the silent gaps between regions - is fed into the plug-in, and a single audio region created to hold the output from the plug-in.

Conversely the create individual files option causes each selected region to be processed in turn, and corresponding regions are created from the output. When create individual files is used with playlist selected as the source, Pitch 'n Time re-spots the new regions to new locations to match the selected time stretch.



Multi-channel mode enforces phase coherency between all the selected tracks, up to the AudioSuite limit of 48 channels. Use this feature only when absolutely necessary, as enforcing phase coherency unnecessarily can be detrimental to the sound quality.



Pro Tools allows you to save your favourite plug-in settings for later retrieval. This button contains both a menu for saving your favorite settings, and a pop-up of any you have saved previously. At any time when you would like the current settings remembered, pull down the menu and choose Save Settings As... Type in a descriptive name and choose save.



If the current settings do not match the most recently selected preset, the compare button will illuminate and the preset name will be italicized.

Pitch 'n Time also comes supplied with preset frame conversion rates which can be accessed by using this button. (See earlier in the manual for further explanation on frame rate conversions and Pitch 'n Time).

## Appendix A - Keyboard Controls

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- Holding the option key and clicking on a slider will reset that control to its default value.
- Holding down the command key and clicking on a slider will move the slider in “fine” mode. The slider moves 20 times slower than the pointer.
- Pressing the tab key will advance from one entry field to the next. If the contents of the field have been altered the new value will be accepted by the plug-in. Pressing shift-tab moves backward through the available fields.
- After typing a value in a field, pressing return will enter the value into the plug-in and deselect the entry field. Alternatively, pressing enter on the numeric key pad will enter the value, but will leave the entry field active to allow continued editing of fields from the keyboard.
- Holding down the ctrl key and tapping the up and down arrow keys will alter the pitch shift by plus and minus one semitone, respectively.
- Pressing ctrl-z presses the selection capture button.

## Appendix B - Troubleshooting / FAQs

For up to date information on troubleshooting and frequently asked questions please visit our website:

<http://www.serato.com/>

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