

DigiRack Time Shift Plug-in

Version 7.2



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PN 9329-55380-00 REV A 07/06

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chapter 1

Introduction

The DigiDesign® DigiRack Time Shift plug-in for time-compression/expansion and pitch shifting is an AudioSuite plug-in for Pro Tools|HD®, Pro Tools LE™, and Pro Tools M-Powered™ systems.

DigiRack Time Shift is ideal for music production, sound design, and post-production applications. Use it to manipulate audio loops for tempo matching and formant correct pitch shifting. DigiRack Time Shift also provides high quality time compression and expansion algorithms for post-production pull up and pull down conversions.

 *For more information on using plug-ins in Pro Tools, see the DigiRack Plug-ins Guide.*

DigiRack Time Shift Features

- ◆ High-quality time compression/expansion
- ◆ Easy to read display fields for viewing audio region start and stop times for both processed and unprocessed files in multiple timebase formats
- ◆ Flexible algorithms for monophonic, polyphonic, or rhythmic audio
- ◆ Varispeed mode for linked time and pitch shifting
- ◆ Multichannel phase-coherent processing for multichannel and multi-input phase coherent processing
- ◆ High-quality TCE processing from 25.00% to 400% of the original speed (or from 4 times to 1/4 of the original duration), and pitch shifting from 2 octaves below to 2 octaves above the original pitch
- ◆ Supported on Pro Tools HD, Pro Tools LE, Pro Tools M-Powered, and Avid DNA systems

System Requirements

To use Digidesign plug-ins you need one of the following:

- ◆ A Digidesign-qualified Pro Tools|HD system, Pro Tools LE system, or Pro Tools M-Powered system
- ◆ A Digidesign-qualified Pro Tools system and a third-party software application that supports the Digidesign AudioSuite plug-in standard
- ◆ A qualified Avid Xpress, Avid Xpress DV, or Avid DNA system

For complete system requirements visit the Digidesign Web site (www.digidesign.com).

Compatibility Information

Digidesign can only assure compatibility and provide support for hardware and software it has tested and approved.

For a list of Digidesign-qualified computers, operating systems, hard drives, and third-party devices, refer to the Digidesign Web site (www.digidesign.com).

Register Your Plug-ins

If you purchase a plug-in online from the Digi-Store (www.digidesign.com) using Internet Activation, you are automatically registered.

If you purchase a plug-in boxed version, check the enclosed Digidesign Registration Information Card for information about how to register online.

Registered users will receive periodic software update and upgrade notices.

Please refer to the Digidesign Web site (www.digidesign.com) or the Digidesign Registration Information Card for information on technical support.

Working with Plug-ins

Refer to the *DigiRack Plug-ins Guide* for information on working with plug-ins, including:

- Inserting real-time plug-ins on tracks
- Processing with AudioSuite plug-ins
- Using Clip indicators
- Navigating the Plug-in window
- Adjusting parameters
- Automating plug-ins
- Using the Librarian

Conventions Used in This Guide

All Digidesign guides use the following conventions to indicate menu choices and key commands:

Convention	Action
File > Save	Choose Save from the File menu
Control+N	Hold down the Control key and press the N key
Control-click	Hold down the Control key and click the mouse button
Right-click (Windows)	Click with the right mouse button

The following symbols are used to highlight important information:



User Tips are helpful hints for getting the most from your Pro Tools system.



Important Notices include information that could affect your Pro Tools session data or the performance of your Pro Tools system.



Shortcuts show you useful keyboard or mouse shortcuts.



Cross References point to related sections in the Pro Tools Guides.

About www.digidesign.com

The Digidesign Web site (www.digidesign.com) is your best online source for information to help you get the most out of your Pro Tools system. The following are just a few of the services and features available.

Registration Register your purchase online. See the enclosed registration form for details.

Support Contact Digidesign Technical Support or Customer Service; download software updates and the latest online manuals; browse the Compatibility documents for system requirements; search the online Answerbase or join the worldwide Pro Tools community on the Digidesign User Conference.

Training and Education Study on your own using courses available online or find out how you can learn in a classroom setting at a certified Pro Tools training center.

Products and Developers Learn about Digidesign products; download demo software or learn about our Development Partners and their plugins, applications, and hardware.

News and Events Get the latest news from Digidesign or sign up for a Pro Tools demo.

To learn more about these and other resources available from Digidesign, visit the Digidesign Web site (www.digidesign.com).

Installation

Installing DigiRack Time Shift

To install DigiRack Time Shift:

- 1 Download the installer for your computer platform from the Digidesign Web site (www.digidesign.com).
- 2 Make sure the installer is uncompressed (.ZIP on Windows or .SIT on Macintosh).
- 3 Double-click the DigiRack Time Shift Installer application.
- 4 Follow the on-screen instructions to complete the installation.
- 5 When installation is complete, click Finish (Windows) or Quit (Macintosh).

The DigiRack Time Shift Installer installs the Time Shift plug-in in the following location:

- Program Files/Common Files/Digidesign/DAE/Plug-Ins folder (Windows)
- or –
- Library/Application Support/Digidesign/Plug-Ins folder (Macintosh).



The DigiRack Time Shift plug-in does not need to be authorized.

Removing DigiRack Time Shift

If you need to remove the DigiRack Time Shift plug-in from your system, follow the instructions below for your computer platform.

Windows

To remove the DigiRack Time Shift plug-in:

- 1 From the Start menu, choose Settings > Control Panel and double-click Add or Remove Programs.
- 2 Select the Time Shift plug-in from the list of installed applications and click the Change/Remove button.
- 3 Follow the on-screen instructions to remove the plug-in.
- 4 When removal is complete, click OK to close the window.

Mac OS X

To remove the DigiRack Time Shift plug-in:

- 1 Locate and open the Plug-Ins folder on your Startup drive (Library/Application Support /Digidesign/Plug-Ins).
- 2 Drag the Time Shift plug-in to the Trash, or to the Plug-Ins (Unused) folder.

chapter 3

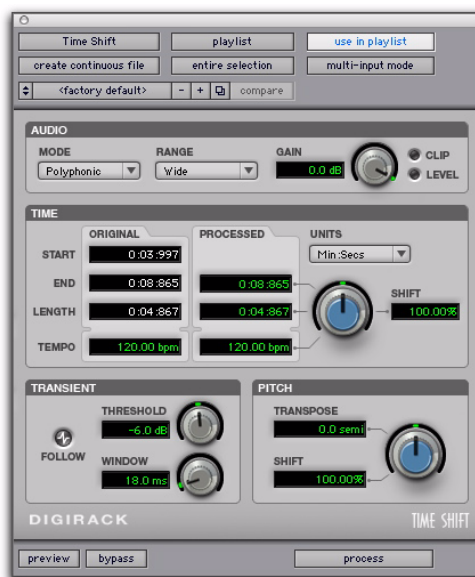
DigiRack Time Shift Plug-in Parameters

DigiRack Time Shift

DigiRack Time Shift provides high quality time compression and expansion (TCE) algorithms and formant correct pitch-shifting. DigiRack Time Shift is ideal for music production, sound design, and post-production applications. Use it to manipulate audio loops for tempo matching or to transpose vocal tracks using formant correct pitch shifting. You can also use it in audio post-production for pull up and pull down conversions as well as for adjusting audio to specific time or SMPTE durations for synchronization purposes.

 For more information on using AudioSuite plug-ins, see the *DigiRack Plug-ins Guide*.

DigiRack Time Shift Displays and Controls



DigiRack Time Shift plug-in

The interface for DigiRack Time Shift is organized in four parts: Audio, Time, Formant or Transient, and Pitch.

Audio Use the controls in the Audio section to select the most appropriate time compression and expansion algorithm (mode) for the type of material you want to process, and to attenuate the gain of the processed audio to avoid clipping.

Time Use the controls in the Time section to specify the amount of time compression or expansion you want to apply.

Formant or Transient Use the controls in the Formant or Transient section to adjust either the amount of formant shift or the transient detection parameters depending upon which mode you have selected in the Audio section. The Formant section is only available when Monophonic is selected as the Audio Mode. The Transient section is available with slightly different controls depending on whether Polyphonic or Rhythmic is selected as the Audio Mode.

Pitch Use the controls in the Pitch section to apply pitch shifting. Pitch shifting can also be formant correct if you select the Monophonic audio setting.

Audio

The Audio section of DigiRack Time Shift provides controls for specifying the type of audio you want to process and gain attenuation of the processed signal to avoid clipping.



DigiRack Time Shift plug-in, Audio section


Mode

The Audio Mode pop-up menu determines the type of TCE and pitch shift algorithm for processing audio: Monophonic, Polyphonic, Rhythmic, or Varispeed.

Monophonic Use for processing monophonic sounds (such as a vocal melody).

Polyphonic Use for processing complex sounds (such as a multipart musical selection).

Rhythmic Use for processing percussive sounds (such as a mix or drum loop).

 *Rhythmic mode uses transient analysis for time shifting. If you select audio with no apparent transients, or set the Transient Threshold control to a setting above any detected transients, DigiRack Time Shift assumes a “virtual-transient” every three seconds to be able to process the file. Consequently, the file should be 20 bpm or higher (one beat every three seconds) to achieve desirable results. For material that has no apparent transients, use Monophonic or Polyphonic mode.*

Varispeed Use to link time and pitch change for tape-like pitch and speed change effects, and post-production workflows.

Range

The Audio Range pop-up menu determines the frequency range for analysis: Low, Mid, High, or Wide. For low-range material, such as a bass guitar, select Low. For mid-range material, such as male vocals, select Mid. The high range control is for material with a high fundamental frequency, such as female vocals. For more complex material that covers a broad frequency spectrum, select Wide.

In Polyphonic mode, Wide is the default setting and is usually best for all material when using the Polyphonic audio type.

In Monophonic mode, Mid is the default setting and usually matches the range of most monophonic material.

The range pop-up menu is unavailable in Rhythmic mode and Varispeed mode.

Gain

The Audio Gain control attenuates the input level to avoid clipping. Adjust the Gain control from 0.0 dB to -6.0 dB to avoid clipping in the processed signal.

Clip Indicator

The Clip indicator indicates clipping in the processed signal. When using time compression or pitch shifting above the original pitch, it is possible for clipping to occur. The Clip indicator lights when the processed signal is clipping. If the processed signal clips, undo the AudioSuite process and attenuate the input gain using the Gain control. Then, re-process the selection.

Level Indicator

The Level indicator displays the level of the output signal using a plasma LED, which uses the full range of plasma level metering colors.

Time

The Time section of DigiRack Time Shift provides controls for specifying the amount of time compression or expansion as well as the timebase used for calculating TCE. Adjust the Time control to change the target duration for the processed audio.



DigiRack Time Shift plug-in, Time section

Original Displays the Start and End times, and Length of the edit selection. Times are displayed in units of the timebase selected in the Units pop-up menu.

Processed Displays the target End time and Length of the processed signal. Times are displayed in units of the timebase selected in the Units pop-up menu. You can click the Processed End and Length fields to type the desired values. These values update automatically when adjusting the Time control.

Tempo Displays the Original Tempo and Processed Tempo in beats per minute (bpm). You can click the Original Tempo and Processed Tempo fields to type the desired values. The Processed Tempo value updates automatically when adjusting the Time control.

Unit Select the desired timebase for the Original and Processed time fields: Bars|Beats, Min:Sec, Time Code, Feet+Frames, or Samples.

⚠ *DigiRack Time Shift does not receive Bars|Beat and Feet+Frame information from Pro Tools 7.0 or 7.1. Consequently, Bars|Beats and Feet+Frames are displayed as "N/A."*

Shift Displays the target time compression or expansion as a percentage of the original. Adjust the Time control or click the Shift field and type the desired value. Time can be shifted from 25.00% to 400.00% of the original speed (or 4 to 1/4 times the original duration). The default setting is 100.00%, or no time shift. 25.00% results in 4 times the original duration and 400.00% results in 1/4 of the original duration.

The Shift field only displays up to 2 decimal places, but lets you type in as many decimal places as you want (up to the IEEE standard). While the display rounds to 2 decimal places, the actual time shift is applied based on the number you typed. This is especially useful for post-production pull up and pull down factors (see "Post Production Pull Up and Pull Down Tasks" on page 12).


Formant

The Formant section of DigiRack Time Shift lets you shift the formant shape of the selected audio independently of the fundamental frequency. This is useful for achieving formant correct pitch shifting. It can also be used as an effect. For example, you can formant shift a male vocal up by five semitones and it will take on the characteristics of a female voice.

The Formant section is only available when Monophonic is selected as the Audio Type. The Formant section provides a single control for transposing the formants of the selected audio by -24.00 semitones (-2 octaves) to $+24.00$ semitones ($+2$ octaves), with fine resolution in cents. Adjust the Formant Shift control or click the Shift field and type the desired value.



DigiRack Time Shift plug-in, Formant section

 Audio with a fundamental pitch has an overtone series, or set of higher harmonics. The strength of these higher harmonics creates a formant shape, which is apparent if viewed using a spectrum analyzer. The overtone series, or harmonics, have the same spacing related to the pitch and have the same general shape regardless of what the fundamental pitch is. It is this formant shape that gives the audio its overall characteristic sound or timbre. When pitch shifting audio, the formant shape is shifted with the rest of the material, which can result in an unnatural sound. Keeping this shape constant is critical to formant correct pitch shifting and achieving a natural sounding result.

Transient

The Transient section is only available when Polyphonic or Rhythmic is selected as the Audio Type, and provides slightly different controls for each.

When Polyphonic is selected as the Audio Type, the Transient section provides controls for setting the transient detection threshold and for adjusting the analysis window length for processing audio.



DigiRack Time Shift plug-in, Transient section with Polyphonic selected as the Audio Type

When Rhythmic is selected as the Audio Type, the Transient section provides controls for setting the transient detection threshold, and for adjusting the decay rate of the transients in the processed audio when time stretching.



DigiRack Time Shift plug-in, Transient section with Rhythmic selected as the Audio Type

Follow Enables an envelope follower that simulates the original acoustics of the audio being stretched. Click the Follow button to enable or disable envelope following. Follow is only available when Polyphonic is selected as the Audio Type.

Threshold Sets the transient detection threshold from 0.0 dB to -40.0 dB. Disable transient detection by setting the Threshold control to Off (turn the knob all the way to the right). Part of

DigiRack Time Shift's processing relies upon separating "transient" parts of the selection from "non-transient" parts. Transient material tends to change its content quickly in time, as opposed to parts of the sound which are more sustained. Adjust the Threshold control or click the Threshold field and type the desired value.

The default value for Threshold is -6.0 dB. For highly percussive material, lower the threshold for better transient detection, especially with the Rhythmic audio setting. For less percussive material, and for shifting with the Polyphonic audio setting, a higher setting can yield better results. Experiment with this control, especially when shifting drums and percussive tracks, to achieve the best results.

Window Sets the analysis window length for processing audio. You can set the Window from 6.0 milliseconds to 185.0 milliseconds. Adjust the Window control or click the Window field and type the desired value. The Window control is only available when Polyphonic is selected as the Audio Type.

The default for Window size is 18.0 milliseconds and works well for many applications, but you may want to try different Window settings to get the best results. Try larger window sizes for low frequency sounds or sounds that do not have many transients. Try smaller window sizes for drums and percussion. 37.0 milliseconds tends to work well for polyphonic instruments such as piano or guitar. A setting as large as 71.0 milliseconds works well for bass guitar. Settings in the 12 millisecond range work well on drums or percussion.

Decay Rate Determines how much of the decay from a transient is heard in the processed audio when time stretching. When time stretching using the Rhythmic setting, the resulting gaps between the transients are filled in with audio, and Decay Rate determines how much of this audio is heard by applying a fade out rate. Decay Rate is only available when Rhythmic is selected as the Audio Type. Adjust the Decay Rate up to 100% to hear the audio that is filling the gaps created by the time stretching with only a slight fade, or adjust down to 1.0% to completely fade out between the original transients.

Pitch

The Pitch section provides controls for pitch shifting the selected audio. Use the Pitch control to transpose the pitch from -24.00 semitones (-2 octaves) to +24.00 semitones (+2 octaves), with fine resolution in cents.



DigiRack Time Shift plug-in, Pitch section

Transpose Displays the transposition amount in semitones. You can transpose pitch from -24.00 semitones (-2 octaves) to +24.00 semitones (+2 octaves), with fine resolution in cents. Adjust the Pitch control or click the Transpose field and type the desired value.

Shift Displays the pitch shift amount as a percentage. You can pitch shift from 25.00% (-2 octaves) to +400.00% (+2 octaves). Adjust the Pitch control or click the Shift field and type the desired value. The default value is 100% (no pitch shift).

Post Production Pull Up and Pull Down Tasks

Table 4 on page 12 provides information on TCE settings for common post-production tasks. Type the corresponding TCE% (represented to 10 decimal places in Table 4) in the Time Shift field for the corresponding post-production task and the process the selected audio.


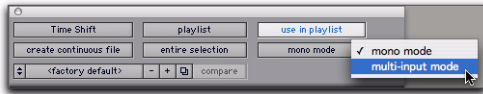
 Use the corresponding DigiRack Time Shift Plug-in Setting for the desired post-production task.

Table 4. Most commonly used TCE settings in Post workflows

Post workflow plug-in setting	TCE% (to 10 decimal places)	Frames
Pal to Film -4%.tfx	96.0%	25 to 24/30
PAL to NTSC -4.1%.tfx	95.9040959041%	25 to 23.976/29.97
Film to PAL +4.1667%.tfx	+104.1666666667%	24/30 to 25
Film to NTSC -0.1%.tfx	99.9000999001%	24/30 to 23.976/29.97
NTSC to Pal +4.2667%.tfx	+104.2708333333%	23.976/29.97 to 25
NTSC to Film +0.1%.tfx	+100.10%	23.976/29.97 to 24/30

AudioSuite Input Modes

DigiRack Time Shift supports the Pro Tools AudioSuite Input Mode selector for use on mono or multi-input processing.



AudioSuite Input mode selector

Mono Mode Processes each audio region as a mono file with no phase coherency maintained with any other simultaneously selected regions.

Multi-Input Mode Processes up to 48 input channels and maintains phase coherency within those selected channels.

AudioSuite Preview

DigiRack Time Shift supports Pro Tools AudioSuite Preview and Bypass. For more information on using AudioSuite Preview and Bypass, see the DigiRack Plug-ins Guide.

⚠ *AudioSuite Preview and Bypass are unavailable with DigiRack Time Shift in Pro Tools 7.0 and 7.1.*

AudioSuite TCE Plug-in Preference

The DigiRack Time Shift plug-in's high quality time compression and expansion algorithms that can be used with the Pro Tools TCE Trim tool.



TCE Plug-in option in Processing Preferences page

⚠ *DigiRack Time Shift is not available with the TCE Trim tool in Pro Tools 7.0 and 7.1.*

📖 *Refer to the Pro Tools Reference Guide for more information about the TCE Trim tool.*

To select DigiRack Time Shift for use with the TCE Trim tool:

- 1 Choose Setup > Preferences.
- 2 Click the Processing tab.
- 3 From the TC/E Plug-in pop-up menu, select DigiRack Time Shift.
- 4 Select the desired preset setting from the Default Settings pop-up menu.
- 5 Click OK.

Processing Audio

DigiRack Time Shift lets you change the time and pitch of selected audio independently or concurrently.



Normalizing a selection before using DigiRack Time Shift may produce better results.

To change the time of a selected audio region:

- 1 Select AudioSuite > Pitch Shift > Time Shift.
- 2 Select the Audio Mode appropriate to the type of material you are processing (Monophonic, Polyphonic, or Rhythmic).
- 3 In Monophonic or Polyphonic mode, select the appropriate Range for the selected material (Low, Mid, High, or Wide).
- 4 If compressing the duration of the selection, attenuate the Gain control as necessary.
- 5 If using Monophonic mode, adjust the Formant Shift control as desired.
- 6 If using Polyphonic or Rhythmic mode, adjust the Transient controls as desired.
- 7 Make sure Pitch Shift is set to 100% (unless you also want to change the pitch of the selection).
- 8 Adjust the Time Shift control to the desired amount of time change. Time change is measured in terms of the target duration using the selected timebase or as a percentage of the original.
- 9 Click Process.

To change the pitch of a selected audio region:

- 1 Select AudioSuite > Pitch Shift > Time Shift.
- 2 Select the Audio Mode appropriate to the type of material you are processing (Monophonic, Polyphonic, or Rhythmic).
- 3 In Monophonic or Polyphonic mode, select the appropriate Range for the selected material (Low, Mid, High, or Wide).
- 4 If transposing the pitch of the selection up, attenuate the Gain control as necessary.
- 5 If using Monophonic mode, adjust the Formant Shift control as desired.
- 6 If using Polyphonic or Rhythmic mode, adjust the Transient controls as desired.
- 7 Make sure Time Shift is set to 0% (unless you also want to change the duration of the section).
- 8 Adjust the Pitch Shift control to the desired amount of pitch change. Pitch change is measured in semitones (and cents) or as a percentage of the original.
- 9 Click Process.

To change the time and pitch of a selected audio region:

- 1 Select AudioSuite > Pitch Shift > Time Shift.
- 2 Select Varispeed from the Audio Mode pop-up menu.
- 3 Adjust either the Time Shift or Pitch Shift control to match the desired amount of time and pitch change in terms of a percentage of the original.
- 4 Click Process.



Using the Monophonic, Polyphonic, or Rhythmic modes, you can adjust both the Time Shift and Pitch Shift controls independently before processing.

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