

# **SoundCode Stereo<sup>TM</sup>** **Stereo Down Mixing Plug-In for** **Pro Tools<sup>TM</sup>**

## **Plug-In Users Guide** **Version 1.0 for Pro Tools HD/LE Systems on** **Macintosh OS X And Windows XP/ Vista**

**Created By Neyrinck**  
San Francisco, CA USA  
[www.neyrinck.com](http://www.neyrinck.com)  
[info@neyrinck.com](mailto:info@neyrinck.com)

**Technical Support (USA)**  
[www.neyrinck.com](http://www.neyrinck.com)  
[support@neyrinck.com](mailto:support@neyrinck.com)

**Product Information (USA)**  
[www.neyrinck.com](http://www.neyrinck.com)  
[info@neyrinck.com](mailto:info@neyrinck.com)

### **Copyright**

This guide is copyrighted ©2008 by Neyrinck with all rights reserved. Under copyright laws, this guide may not be duplicated in whole or in part without the written consent of Neyrinck.

### **Trademarks**

“DIGIDESIGN”, “PRO TOOLS”, “PRO TOOLS HD”, “PRO TOOLS LE”, and “PRO TOOLS M-POWERED” are trademarks or registered trademarks of Avid Technology, Inc.

### **Disclaimers**

Product features, specifications, system requirements and availability are subject to change without notice.

# Table Of Contents

Chapter 1	Introduction <ul style="list-style-type: none"><li>Welcome</li><li>System Requirements</li><li>Important Sample Rate Information</li></ul>
Chapter 2	Installation <ul style="list-style-type: none"><li>Installing SoundCode Stereo</li><li>Authorizing SoundCode Stereo</li><li>Removing Expired Plug-Ins</li></ul>
Chapter 3	Stereo Down Mix Equations
Chapter 4	SoundCode Stereo Overview
Chapter 5	The SoundCode Stereo Plug-In
Chapter 6	Monitoring Surround Projects With A Stereo Interface

# Chapter 1

## Introduction

---

### Welcome To SoundCode Stereo

SoundCode Stereo is an RTAS plug-in that down mixes a surround mix to a stereo mix for Pro Tools HD and Pro Tools LE surround compatible systems with the Complete Production Toolkit.

#### ***SoundCode Stereo Features:***

- Support for all Pro Tools surround formats: LCR, LCRS, Quad, 5.0, 5.1, 6.0, 6.1, 7.0, and 7.1.
- Volume, mute, and phase invert controls for logical channel groups: L-R, C, Ls-Rs, Cs/S, Lc-Rc.
- Support for Pro Tools automation to implement dynamic down mixing.
- Down mix volume control.
- Metering with adjustable peak hold, reference level, and response controls.

- Mute and phase invert controls available to diagnose phase issues.

---

### System Requirements

To use SoundCode Stereo, you need one of the following Digidesign-qualified Pro Tools systems:

- Pro Tools HD running Pro Tools 7.0 or later.
- Pro Tools LE running Pro Tools 8.0 or later with the Complete Production Toolkit.

#### **Important Sample Rate Information**

SoundCode Stereo will operate at 44.1, 48, 88.2, 96, 176.4 and 192 kHz sample rates.

# Chapter 2

## Installation

---

### Installing SoundCode Stereo

Installers can be downloaded from the Neyrinck website ([www.neyrinck.com](http://www.neyrinck.com))

Installation steps are essentially the same, regardless of the bundle, package, or system you purchase.

#### Installation

To install SoundCode Stereo:

1. If Pro Tools is running, Quit Pro Tools.
2. Locate and open (double-click) the plug-in installer.
3. Follow the instructions presented by the installation software.
4. When installation is complete, click Quit.

When you open Pro Tools, you will be prompted to authorize your new plug-in.

---

### Authorizing SoundCode Stereo

SoundCode Stereo requires an

authorized iLok USB Key to be connected to your computer when using Pro Tools. The iLok authorization needs to be obtained online and downloaded onto your iLok USB Key. You will need an iLok.com account to complete the process. If you do not yet have an iLok.com account, visit [www.ilok.com](http://www.ilok.com) to set up an account for free.

*The iLok USB Smart Key is not supplied with your plug-in or software option. You can use the one included with certain Pro Tools systems or purchase one separately.*

---

### Removing Expired Plug-Ins

If you let a demo version of a plug-in expire, you should remove it from your system. Otherwise, each time you open Pro Tools you will be prompted with a message that the plug-in has expired.

To remove an expired plug-in: Open the Plug-Ins folder on your Startup drive (Library/Application Support/Digidesign on OS X or `c:\ProgramFiles\Common\Digidesign\DAE\PlugIns` on Windows XP). Drag the expired plug-in to a different location.

## Chapter 3

# Stereo Down Mixing Equations

---

### Down Mix Equations

Stereo down mixing can be expressed as two mathematical equations, one for the left channel and one for the right channel. The equation is a scaled sum of the surround channel inputs being mixed together. For example:

$$L_o = L + .707 * L_s + .707 * C$$

$$R_o = R + .707 * R_s + .707 * C$$

SoundCode Stereo implements these down mix equations:

$$L_o = (LR \text{ Level}) * L + (C \text{ Level}) * C + (L_s R_s \text{ Level}) * L_s + (L_c R_c / S \text{ Level}) * L_c / C_s + (LFE \text{ Level}) * LFE$$

$$R_o = (LR \text{ Level}) * R + (C \text{ Level}) * C + (L_s R_s \text{ Level}) * R_s + (L_c R_c / S \text{ Level}) * R_c / C_s + (LFE \text{ Level}) * LFE$$

### What Sounds Best Is Best

There is not a standard stereo down mix equation that is correct for all applications. The best equation is the one that sounds the best. However, there might be an appropriate down mix equation for your application that depends on many factors. Be sure to understand your delivery requirements so that the down mix equations are set appropriately.

### ITU-R BS.775

The ITU has published a document that recommends certain down mix equations. The document is identified as ITU-R BS.775. SoundCode Stereo comes with Pro Tools presets that allow you to set the down mix according to the IT recommendations.

### Dolby Digital Metadata

Dolby Digital is a technology that discretely encodes surround audio as a digital bit stream. It is used by DVD and Digital Video Broadcast (DVB) systems. The bit stream also carries information about the audio and that information is called metadata. The metadata can include down mix equation information. The equation information can be used by a DVD player or a DVB set-top box

to provide a stereo down mix if the system is not connected to a surround speaker system. Dolby Digital does not provide for complete equation flexibility, though. The center channel can be mixed at these levels: -INF, -6.0 dB, -4.5 dB, -

3.0 dB, -1.5 dB, 0.0 dB, 1.5 dB, and 3.0 dB. The rear surround channels can be mixed at these levels: -6.0 dB, -4.5 dB, -3.0 dB, -1.5 dB. The front left and right channels are always mixed at a level of 0.0 dB.

# Chapter 4

## SoundCode Stereo Overview

---

### **Integrated Stereo Down Mixing**

SoundCode Stereo makes it simple to add down mix processing to a Pro Tools session for many types of applications. SoundCode Stereo is an RTAS plug-in that can simply be inserted on a Pro Tools track. Because it is a plug-in, it is compatible with powerful Pro Tools features such as control surface operation, automation, and preset management.

### **Down Mix Compatibility Checking**

SoundCode Stereo can be used to check how a surround mix will down mix to stereo. SoundCode Stereo features a “Down Mix” control that can be used to enable/disable down mixing while mixing with a surround speaker system. When enabled, the surround mix is down mixed to stereo and output on the left and right channels of the surround speaker system. Also, SoundCode Stereo can be used to feed a dedicated, alternate stereo speaker system.

### **Stereo Program Delivery**

SoundCode Stereo can be used to down mix a surround mix to stereo

for stereo mix delivery. Many broadcaster’s require both surround mixes and stereo mixes. SoundCode Stereo makes it simple to do so.

### **Edit On Any Pro Tools System**

SoundCode Stereo makes it easy to edit surround audio projects using a Pro Tools system connected to a stereo speaker system. Just insert SoundCode Stereo on the surround mix bus and all audio channels will be mixed to stereo so an editor hears everything with just two speakers or headphones.

### **Pro Tools LE Monitoring**

The Pro Tools Complete Production Toolkit allows Pro Tools LE to open Pro Tools HD surround projects. But Pro Tools LE hardware such as M-Box Micro can only output two audio channels. SoundCode Stereo can be used by Pro Tools LE systems to make a stereo monitor mix when working with surround projects. For more information, read chapter 6, *Monitoring Surround Projects With A Stereo Interface*.

# Chapter 5

## The SoundCode Stereo Plug-In

### Overview

The SoundCode Stereo Plug-In is an RTAS plug-in that can be inserted on any surround audio or auxiliary track that has three or more audio channels. There are two plug-in types to choose from when inserting SoundCode Stereo on a surround track. The first type has an output stem format that matches the input stem format. The second type has a stereo output stem format and thus will “convert” a surround track to have a stereo output. The type you will choose depends upon your application.

### Matched Input And Output Stem Formats

SoundCode Stereo features a plug-in type that can be inserted on a track so that the number of input channels and output channels is the same. These plug-ins are listed in the Pro Tools plug-in insert popup list. They are named:

- SoundCode Stereo (LCR-to-LCR)
- SoundCode Stereo (LCRS-to-LCRS)
- SoundCode Stereo (Quad-to-Quad)
- SoundCode Stereo (5.0-to-5.0)
- SoundCode Stereo (5.1-to-5.1)
- SoundCode Stereo (6.0-to-6.0)
- SoundCode Stereo (6.1-to-6.1)
- SoundCode Stereo (7.0-to-7.0)
- SoundCode Stereo (7.1-to-7.1)

### Stereo Output Stem Format

SoundCode Stereo features a plug-in type that can be inserted on a track and will convert the track to stereo output. These plug-ins are listed in the Pro Tools plug-in insert popup list. They are named:

- SoundCode Stereo (LCR-to-Stereo)
- SoundCode Stereo (LCRS-to-Stereo)
- SoundCode Stereo (Quad-to-Stereo)
- SoundCode Stereo (5.0-to- Stereo)
- SoundCode Stereo (5.1-to- Stereo)
- SoundCode Stereo (6.0-to- Stereo)
- SoundCode Stereo (6.1-to- Stereo)
- SoundCode Stereo (7.0-to- Stereo)
- SoundCode Stereo (7.1-to- Stereo)

### SoundCode Stereo User Interface

The SoundCode Stereo user interface is shown here:



## Logically Grouped Channels

The SoundCode Stereo user interface simplifies the down mixing interface by logically grouping left and right-paired channels and providing a single level, mute, and phase-invert control for the pair.

## Description and Use Of Controls

### L R Level

### C Level

### Ls Rs Level

### Cs Level

### Lc Rc Level

### LFE Level

Each logical down mix input can be adjusted to mix a variable amount of the input to the down mix. The range is  $-\infty$  to +3 dB. Some of these input controls may not be visible if the input is not applicable to the surround format being down mixed.

### L R Mute

### C Mute

### Ls Rs Mute

### Cs Mute

### Lc Rc Mute

### LFE Mute

Each logical input can be muted to remove it from the down mix.

### L R Phase-Invert

### C Phase-Invert

### Ls Rs Phase-Invert

### Cs Phase-Invert

### Lc Rc Phase-Invert

### LFE Phase-Invert

Each logical input can be phase-inverted in the down mix.

### Level

This control adjusts the overall down mix level.

### Down Mix

This control is only available with plug-ins that have an output stem format the same as the input stem format. When enabled, the stereo down mix is applied to the left and right output channels. When disabled, the inputs are passed through, but the mute and phase-invert controls are still active.

# Chapter 6

## Monitoring Surround Projects With A Stereo Interface

---

### Overview

The SoundCode Stereo Plug-In allows a Pro Tools LE user with a stereo I/O interface such as Mbox 2 Micro and the Complete Production Toolkit to open, edit, and save surround-based projects. This chapter suggests how to use SoundCode Stereo with stereo I/O interfaces.

### Complete Production Toolkit For Pro Tools LE

The Complete Production Toolkit option for Pro Tools LE adds surround capability to Pro Tools LE. Any Pro Tools I/O interface can be used. If a stereo interface such as Mbox 2 Micro is used, you can use SoundCode Stereo to down mix the surround audio to stereo for monitoring.

### Adapting A Surround Project

You can follow these steps to adapt a surround-based project that uses a surround output so that it can be monitored in stereo.

1. Go to File>Save As to save a copy of the session if desired.
2. In I/O Setup, create a new 5.1 bus

3. Create a 5.1 aux track
4. Insert the SoundCode Stereo 5.1/Stereo plug-in on the aux track
5. Set the aux track's input to the new 5.1 bus, and its output to the Main Stereo outputs
6. Change the output of all tracks which are routed to a 5.1 output (which is disabled) to the 5.1 bus. (This will not remove any automation on the tracks).