



Producing in the Home Studio with Pro Tools

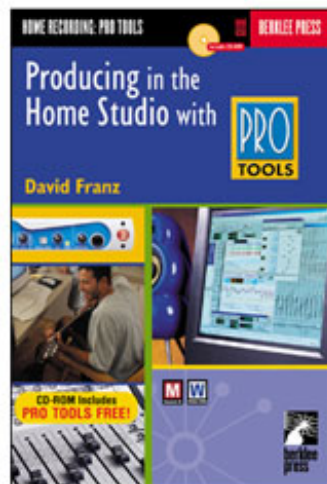
New Pro Tools Home Recording Book by David Franz

Producing in the Home Studio with Pro Tools is an exciting new book written by David Franz in collaboration with Digidesign and Berklee Press. In this book, Franz covers everything from recording to editing to mixing to mastering providing an excellent way for beginners and intermediates to get the most out of Pro Tools LE.

Produce an Album at Home

Producing in the Home Studio with Pro Tools offers beginners and intermediates alike an easy-to-read, well thought-out book to help tackle the task of producing a demo at home using Pro Tools LE.

Great for beginner and intermediate Pro Tools LE users, *Producing in the Home Studio with Pro Tools* offers multiple tips and tricks and plenty of beautiful illustrations for easy reference helping you to really tap into the power of Pro Tools LE.



Get the Most Out of Pro Tools LE

Producing in the Home Studio with Pro Tools is designed for beginner and intermediate Pro Tools LE users, but will no doubt offer the seasoned veteran a host of interesting topics and ways to really get the most out of Pro Tools LE.

Includes Pro Tools FREE and More

Pro Tools FREE is also included in *Producing in the Home Studio with Pro Tools*, providing newcomers to Pro Tools and audio engineering and production in general a great way to get started on the right foot. Also included are demo versions of several Digidesign and Development Partner Plug-Ins as well as sessions created by the author to illustrate key concepts.

"David has written an excellent book. His advice to the young producer and engineer is really great stuff. With loads of real world tips and techniques he walks the reader through all the steps of pre-production, production, mixing and mastering, with a very logical and easy to grasp approach. Above all, he keeps the reader focused on the big picture by always balancing the technical aspects with what's most important the music."

Charles Dye

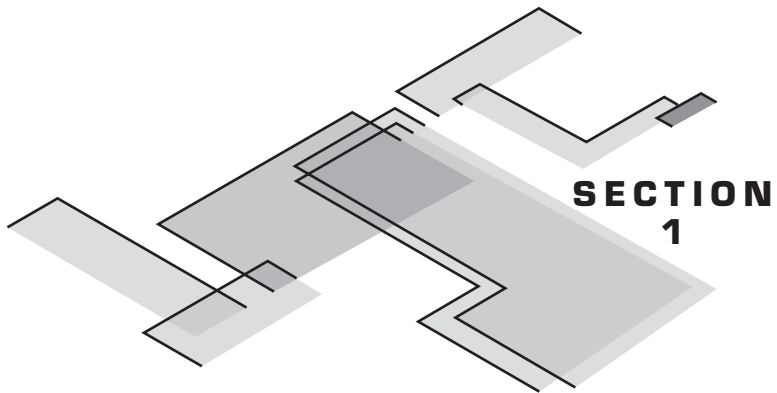
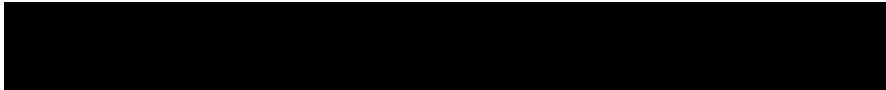
*Two-Time Grammy Nominated Engineer / Mixer / Producer
Ricky Martin / Sammy Hagar / Julio Iglesias / Jon Bon Jovi*

Producing in the Home Studio with Pro Tools is available in the US and Canada through your local **Digidesign dealer**. You can also purchase it through the Digidesign online store at **store.digidesign.com** or through Berklee Press at **www.berkleepress.com**

Read Chapter 1 in the following pages of this document

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**SECTION
1**

GETTING STARTED

In this chapter:

- **Documentation to read**
- **Setting up your equipment**
- **The ins and outs of signal flow**
- **Smart speaker placement and acoustics**

Congratulations . . . you have Pro Tools! You're now a member of a rapidly expanding community of musicians around the world who use this state-of-the-art software to compose, record, and produce their music. This book was written to help you get the most out of Pro Tools, introduce the arts of digital recording and editing, and start you down the path toward improving your productions.

Chapter 1 will help you set up your home studio. If you're already happy with your setup you can skip the bulk of what follows, but be sure to check out the discussion on speaker placement and acoustical treatment at the end of the chapter.

BEFORE YOU READ THIS BOOK

Pro Tools Free Users

For those of you using Pro Tools Free, consult the PDF documentation that came with the software for installation procedures. Digidesign recommends not using Pro Tools Free with Digi hardware, but rather, with third-party devices offering standard Windows 98 driver or Macintosh Sound Manager support. In fact, Pro Tools Free will not work with most Digi hardware. Thus, your studio setup will be slightly different than the ones suggested for Digi 001 and ToolBox XP users.

Software Specs	# of Audio Tracks	# of MIDI Tracks	Inputs/Outputs	# of Inserts & Sends	RTAS Plug-In Support	AudioSuite Plug-In Support
Pro Tools Free	8	48	2	5	Most*	Most*
Pro Tools LE	24	128	AMIII: 4 001: 18	5	Yes	Yes

Fig. 1.1. There are simple yet significant differences between Pro Tools LE and Pro Tools Free. (*For the latest plug-in compatibility information for Pro Tools Free, refer to the Digi Web site.)

Pro Tools LE Users

In the box that held your Digi 001 or ToolBox XP is the *Quick Start Guide* for each of these products. If you haven't read at least chapters 1 and 2 (for Macintosh) or 1 and 3 (for Windows), you should – they'll help you get your 001 or ToolBox up and running. Reading chapter 4 of the *Quick Start Guide* will help you set up your studio. You should also consult the "Read Me" files that came with your software, and Digidesign's Web site (www.digidesign.com) for late-breaking technical issues and updates. Once you've done these things, come back to this chapter for more information about where to plug in your gear and how to get the most out of your setup.

Throughout the rest of the book, unless specifically noted I'll refer to Pro Tools LE and Pro Tools Free simply as Pro Tools.



If you have Pro Tools LE already installed on your computer, do not install Pro Tools Free. Pro Tools LE will not launch and will have to be re-installed to function properly.

CONNECTING YOUR STUDIO

After you have the Digi 001 and its PCI card installed and connected, the ToolBox's Audiomedia III card or a third-party audio device installed, and you've installed your Pro Tools software, what's the next step? Plug in the rest of your gear, of course! Some of you may have just a microphone and a MIDI keyboard. Others may have a small rack of gear and a couple of instruments. Those who are blessed have racks and racks of gear and many acoustic, electric, and MIDI instruments. For those in the last category this chapter may be of help but also consult chapter 8, "Advanced Studio Setup," for more information on larger rigs.

The Basic Setup

- 001, keyboard and/or guitar, mic, computer, home stereo
- Audiomedia III card, keyboard and/or guitar, mic, computer, home stereo, mic pre-amplifier or small mixer

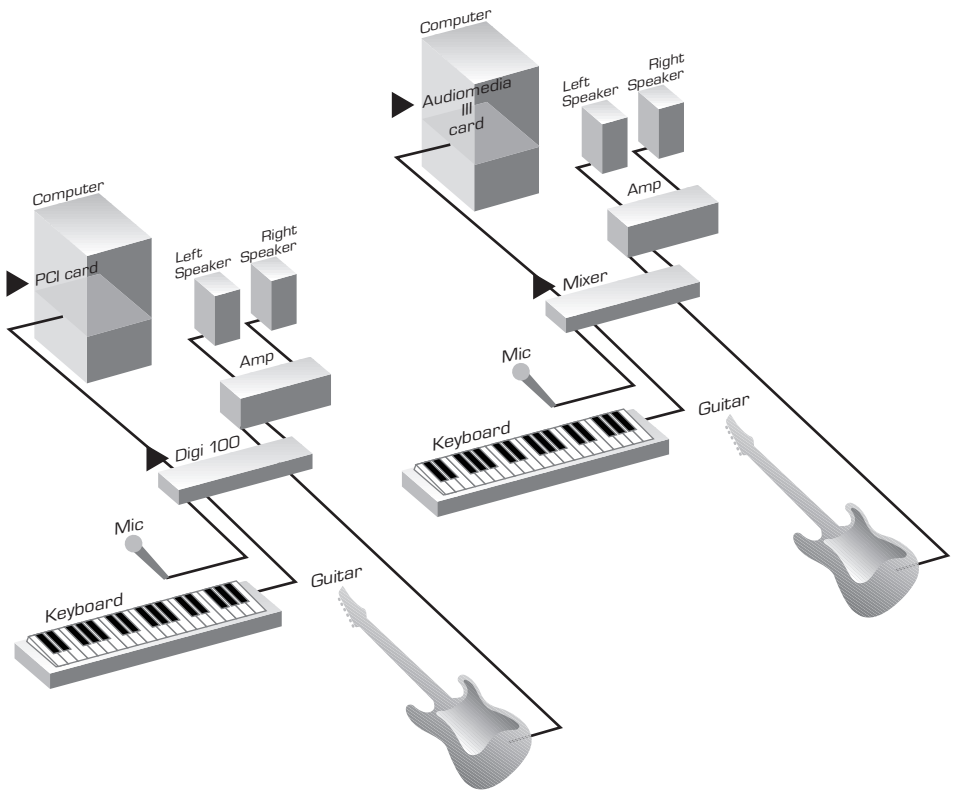


Fig. 1.2. Even "basic" setups can be incredibly powerful in tandem with digital recording tools.

Because Pro Tools software has advanced mixing capabilities and the Digi 001 has eight inputs and outputs, you really don't need an outboard (external) mixer to use the 001, though there might be benefits depending on how you like to work. You can also use ToolBox XP and Pro Tools Free without an outboard mixer. See the discussion on inputs and outputs later in this chapter.

If you're using home stereo speakers as studio monitors, I recommend connecting the monitor outputs from the 001 or the audio outputs from your Audiomedia III card to your home stereo amplifier on an open line-in jack. For example, I've connected my 001 monitor outs to the VCR input on my stereo amp so I can still listen to my CD, tape, and record players without having to reconnect them. The Vol knob on the front of the 001 controls the monitor volume to your stereo. Set the level of this knob close to the output of your CD or tape player, so if you switch between devices the levels will be matched and you won't get any ear-splitting surprises.

Most home stereos use RCA connectors, however the 001 has 1/4" outputs. This means you'll need to buy a pair of 1/4"-to-RCA adapters (or cables) to monitor your 001 through your home speakers. These are available at most audio dealers, and ToolBox XP comes with a stereo RCA cable for this purpose.

Using your home stereo for monitoring can work very well, but watch out if you apply a lot of equalization.

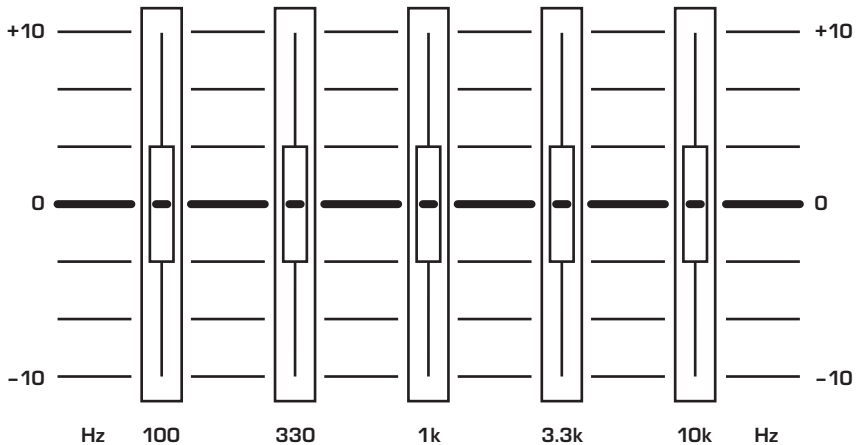


Fig. 1.3. If there's a graphic EQ in your monitoring chain, you'll probably want to "zero" all of the settings while recording and mixing.

You may have a graphic EQ built into your amplifier, or even a stand-alone unit. You might consider flattening the settings (by positioning the EQ levels to 0dB boost/cut) to hear exactly what your mix sounds like on non-equalized systems. Also, home stereos often have preset EQ settings for increased low- and high-end response. In fact, some systems have settings that make your music sound like it's coming from a different ambient space (e.g., a jazz hall or sports arena). I recommend turning off all of these features (bass boost, surround, and EQ presets) and setting everything to normal. This will ensure that you're listening to an accurate representation of your music – the way it really sounds in Pro Tools.

To use a microphone, electric guitar, or other instruments with magnetic pickups, simply plug the XLR or 1/4" cable into a mic/line input on the front of the 001. To plug these devices into the Audiomedia III card, you'll need a piece of gear that has a mic preamplifier (or "preamp"), such as a mixer. A **preamplifier** boosts the mic signal to *line level*, the required level that the inputs to the Audiomedia III card can accept.

Line-level instruments with 1/4" cables (e.g., keyboards, preamps and mixer outputs) can be plugged directly into the front or back of the 001. However, because the Audiomedia III card has RCA inputs, 1/4"-to-RCA converters should be used for direct inputs to the card. Otherwise, you can run line-level instruments into a mixer that has RCA outputs connected to the Audiomedia III card. In addition, both the Audiomedia III and the 001 have digital two-channel S/PDIF inputs, and the 001 also has an eight-channel optical (also referred to as "lightpipe") input. Advanced studio setups (including digital inputs and outputs) are discussed further in chapter 8.

OH YEAH? WHAT'S IN YOUR STUDIO?

My current studio can be described as a mid-level setup—falling somewhere between the basic setup described previously and a fully decked-out system. I have a Mackie 16-channel mixer (1604-VLZ Pro), Mackie HR824 monitors, a Line 6 Guitar Pod Pro, a Line 6 Bass Pod Pro, a General MIDI keyboard (Yamaha PSR-410), a small MIDI sound module (Roland JV 1010), a home stereo system with several pairs of speakers, a Macintosh G4 computer (27 gig hard drive, 256 megs of RAM), a PreSonus Digimax, a headphone amplifier, and several pairs of headphones. I also have numerous Shure microphones, a Line 6 Flextone II XL guitar amp, an acoustic drum set, an electric guitar, an acoustic guitar, and an electric bass. (Information about Shure, Mackie, PreSonus, and Line 6 and their products is included in "Appendix D.")

Self-powered monitors (like the Mackie HR824s) have amplifiers built into them, thus you don't need to run them through an amplifier as you would for your home stereo speakers. You can connect self-powered monitors directly to the outputs of the 001, or to an outboard mixer. Even if you're using self-powered monitors, I suggest also connecting the 001 to your home stereo. This way you can listen to your mixes through at least two different sets of speakers for comparison. In my home studio, I have a set of Mackie powered monitors (HR824s), a set of Fisher home stereo speakers, and a set of Sony boombox speakers. With the flip of a button or two, I can switch between sets of speakers, making it easier to create a mix that sounds good on multiple systems. (More information on the importance of using several sets of speakers for mixing can be found in chapter 12.)

To set up your studio like this, connect your home stereo to the monitor outputs of the 001 and your mixer to the main outputs of the 001. If your home stereo amp has speaker A and B outputs, connect two different sets of speakers. If not, your mixer may have several stereo output options. My Mackie 1604-VLZ Pro has main outs, tape outs, submix outs, control room outs, direct outs, and a mono output, all of which can send audio to other sets of speakers if configured correctly.

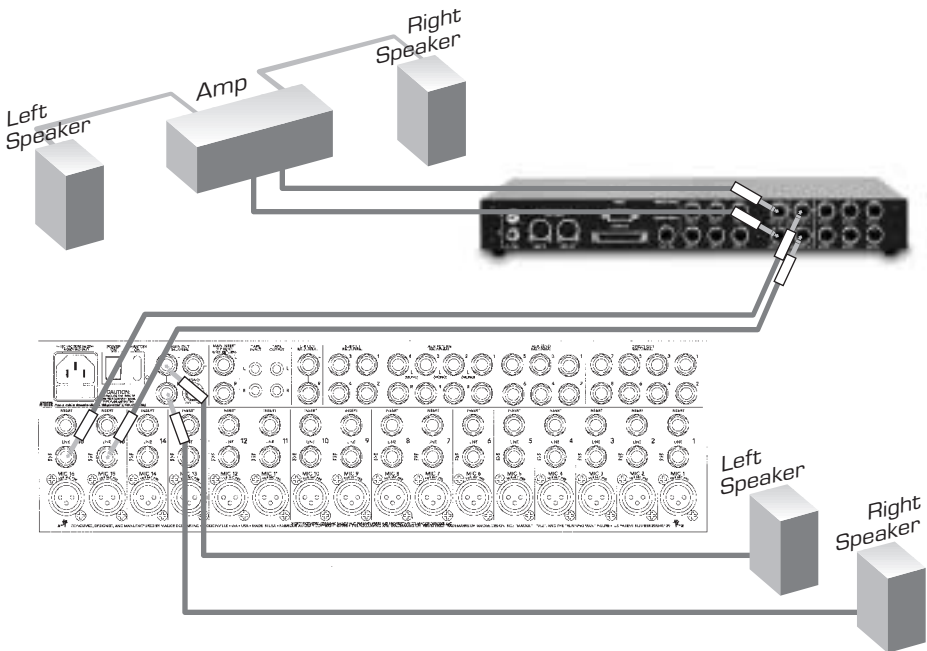


Fig. 1.4. The Digi 001 provides flexible speaker connectivity. Here, the monitor outs are connected directly to a home stereo and the main outs are connected to two inputs on the mixer, allowing you to monitor using two different sets of speakers.

This setup enables me to easily switch between my powered Mackie monitors and two different sets of home speakers. How? When you press the Monitor Mode switch on the 001, this stops the stereo signal from reaching the monitor outs (to my home stereo), but allows it to pass through the main outputs. The main outs (connected to two channels on the mixer) pass signal to the powered speakers. Muting those channels on the mixer and unpressing the Monitor Mode switch swaps the sound output back to my home stereo speakers, which can also switch between two sets of speakers. So in total, I can hear my audio on three different pairs of speakers. (For stereo mixing, make sure you're only listening to one pair of speakers at a time!)

If you want to record more than two microphones at once with the 001 you'll need additional preamps – the outputs of the preamps can be patched to the line inputs of the 001. If you want to record more than eight mikes or instruments at once and you can't access the other 001 inputs (S/PDIF and optical inputs . . . discussed in chapter 8), you'll have to set up a submix of the inputs in your mixer (because there are only eight analog inputs on the 001). A submix combines multiple signals and allows you to use fewer input tracks. For example, if you're recording a guitar amp with three different mikes, you can combine the three mic inputs to one output on the mixer and send that submix to just one track in Pro Tools.

MIDI SETUPS ON THE DIGI 001

Setting up MIDI instruments can be confusing, but the 001 makes connections simple with a one-in/out MIDI interface. If you have a MIDI device, simply connect the MIDI out of your device to the MIDI in of the 001 and the MIDI in of your device to the MIDI out of the 001. If you have multiple MIDI devices, you'll need some sort of MIDI interface to connect and route your MIDI data. The MIDI interface will connect to your computer through a port (e.g., parallel, serial, USB, etc.); it does not connect to the 001.

More information on MIDI, the Windows MIDI driver, and OMS for Macintosh is provided in chapter 5, and chapter 8 explains MIDI interface connections. Also, refer to the extensive OMS documentation for OMS setup on a Macintosh included with your Pro Tools software.

SEPARATE LIVES — PARTITIONING YOUR HARD DRIVE

If you're just getting started with a new computer and don't have an external hard drive for audio, it's a good idea to create two (or more) hard drives from your one existing internal drive. This is called **partitioning** your hard drive, and is done to separate audio files from all of your other files (system software, applications, documents, etc.) so that it's easier to locate them — not only for you, but also for the computer. If a computer has to look all over the place for different files, jumping back and forth between areas on one hard disk, it will slow down and the audio playback and recording performance may suffer. For example, I've separated my 27 gig drive into a 7GB drive (for my applications, documents, etc.) and a dedicated 20GB drive for my audio. Consult your computer's manual to learn more about partitions.

INPUTS AND OUTPUTS

How you approach the signal flow in, out, and through your Pro Tools software is integral to your studio setup. The internal signal routing in Pro Tools software is very flexible, and the number of choices far outnumber what's available in outboard mixers. A **signal path** is the way you route signals through Pro Tools and your gear.

Outboard mixers usually have hard-wired signal paths used specifically for one of the following functions: inputs/outputs, sends, inserts and/or auxiliary routing. In Pro Tools software, outputs can be used for all of these signal paths; they can be assigned to feed aux inputs, send inputs, busses (a **bus** carries several signals on one path), other software inputs, and outboard hardware inputs. You can essentially route any signal anywhere and — if you're not using outboard gear — you won't need any patch cords to do it! You can label, format, and map all Pro Tools inputs, outputs, inserts, and busses to your liking and then save the entire configuration with your session — it's a total recall system. That means you can always pick up right where you left off with a session, even if you don't work on it for months.

The I/O Setup dialog is where you create the routing for your signal paths by assigning track inputs, outputs, inserts, sends, and plug-ins. It can be found by choosing I/O Setup from the Setups menu.

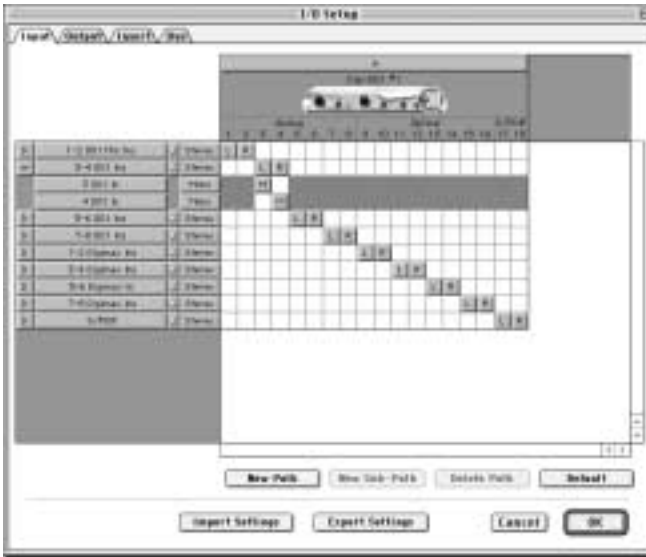


Fig. 1.5. The I/O Setup dialog for the Digi 001. Notice that inputs 3 and 4 are carrying a stereo signal, but can also be split off as individual mono sub-paths.

Audio signals are routed internally in Pro Tools on **paths**. *Main paths* are groupings of inputs, outputs, inserts, or busses and are most often stereo pairs. *Sub-paths* are the components of the group from the main path. For example, inputs 3 and 4 (“3–4 001 Ins,” as seen in Figure 1.5) are connected to the left and right outputs from a synthesizer; “3–4 001 Ins” represents a main path (stereo), while the individual “3 001 In” and “4 001 In” are mono sub-paths of the main path.

You can customize Pro Tools signal paths in the I/O Setup and save them to match your studio configuration. (Notice how I’ve labeled the inputs for my home studio Pro Tools setup in Figure 1.5.) To save an I/O setup, select **Export Settings** from the I/O Setup dialog and name the I/O Settings file. You can then import these settings to other sessions by choosing **Import Settings** in the I/O Setups dialog or by selecting the I/O Settings file in the session parameters when creating a new session. More information on routing is presented later in this book, and you can find more on I/O setup in the *Pro Tools Reference Guide*.

As you can see, Pro Tools software has a flexible mixer. But if you still want to use an outboard mixer you can do so (if using the Digi 001) by assigning all of your tracks to outputs 1–8 and connecting those outputs to eight inputs of your mixer. Or you can keep the audio inside Pro Tools, but use MIDI control surfaces to get that “hands-on” feel (more on this in chapter 8).

GAIN STAGE

Always be aware of the signal path! If you find your input levels are too high or low, check every point in the path and adjust the mixer and software settings to achieve optimal levels. (Consult your mixer manual for assistance in proper gain staging.)

It is important for you to understand the gain stages in your equipment. A gain stage is any amplifier (or attenuator) that boosts (or cuts) the level of an audio signal. On the 001 there's one gain stage: the front panel Gain knobs for inputs 1 and 2. However, the Input Gain window in Pro Tools (shown in Figure 1.6) controls the gain for the other line inputs. To open this window, select Hardware under the Setups menu, then click on Other Options. Adjust the controls as necessary to get high enough levels into Pro Tools. (See chapter 2 for details on getting good recording levels.) Again, because Pro Tools is a total recall mixer these settings – and all other internal Pro Tools gain stages such as fader levels – are saved with every session.

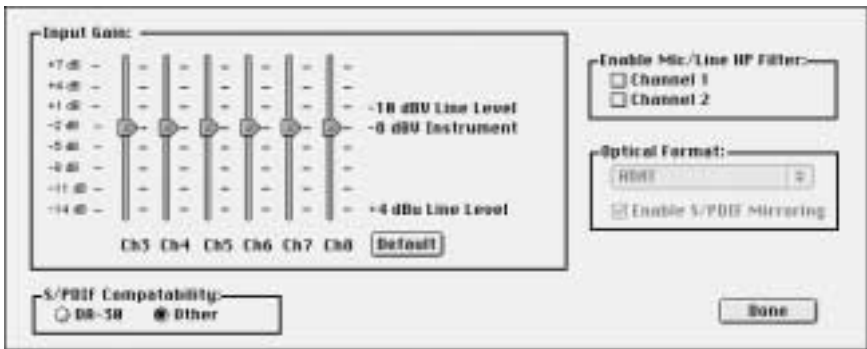
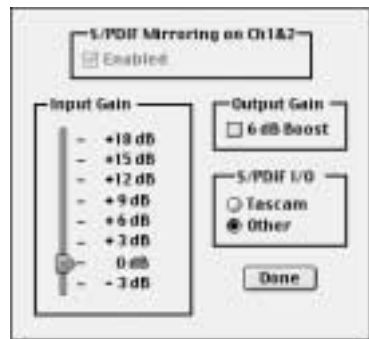


Fig. 1.6. The 001's Hardware Setup (Input Gain) is used to control the input gain for channels 3–8. If you're using the Audiomedia III card the window's a bit different.

If you have an outboard mixer it's important to understand the gain stages on it, too. A mixer will have a preamp gain control (usually a rotary knob located near the input area) and a mixer channel gain control (usually a vertical fader located at the bottom of each channel's input/output module). Additionally, a mixer has a master fader and possibly some submix, auxiliary, and control room gain controls. Depending on how you set your mixer to interface with your 001 or Audiomedia card, you may use some or all of these gain stages.



SURROUND MIXING USING THE DIGI 001

Although Pro Tools LE does not officially support surround sound panning, you can still set up a surround speaker system using the 001 to create surround sound mixes. The only thing you really can't do is some of the crazy panning available in Pro Tools TDM systems. Information on surround configurations is presented later in the chapter and in the *Pro Tools Reference Guide*, and information on surround mixing using the 001 is presented in chapter 12.

SETTING UP YOUR LISTENING ENVIRONMENT

When setting up your home studio, one of the most important things to consider is where to place your monitors (i.e., speakers). Whether you'll be listening through one pair of speakers, switching between multiple pairs, or using a surround sound setup, there are some accepted configurations.

Standard Stereo Systems

When listening to two speakers, your goal is to hear the optimal stereo image. Also called the **phantom image**, this occurs in the middle of two speakers placed at equal height from the floor. To hear the phantom image your head should be on the **median plane**, an imaginary line equidistant from each speaker (see Figure 1.7). Ideally your head and the two speakers should form an equilateral triangle – the distance between you and each speaker is the same, and equal to the distance between the two speakers. In this setup you'll perceive the sound coming from the area directly between the two speakers. (The way I have my studio set up it often seems like the sound from my speakers is actually coming from my computer monitor, which is placed directly between them.) Additionally, if at all possible try to keep your speakers away from walls, which (along with the floor and ceiling) have a tendency to magnify bass frequencies.

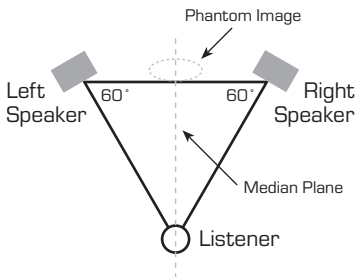


Fig. 1.7. Properly placed stereo monitors should form an equilateral triangle with the listener.

The reason you should be equidistant from the speakers is that you want the sound from each speaker to reach your ears at exactly the same time, or you may experience the precedence effect. The **precedence effect** (or Haas effect) occurs when the listener is off the median plane (by as little as six inches), which shifts the phantom image toward the speaker closest to the listener. As a result, the sound from the closer speaker arrives at the listener's ear first, which may fool them into thinking it's louder. If you're basing a mix on this kind of false imaging, you may have to redo the entire thing!

To create the proper listening setup I recommend using a tape measure to accurately position your speakers. First sit down where you'll normally be listening in your studio, then use the tape measure to approximate an equal distance from your head or chest to a spot on your left and right sides where your speakers could be placed. A good distance is 3–4 feet, which is the same distance the speakers should be apart from each other. In fact, the closer you are to your speakers, the less the room acoustics will color the sound. (This is called **near-field monitoring**, and is the most common approach for mixing.)

Next place your speakers at equal height from the floor in your approximated positions. If possible, the speaker height should correspond to your sitting height (or at least be pointed to that height). Angle the speakers at approximately 60 degrees toward the median plane. Finally, sit down again, use the tape measure, and precisely position the speakers to achieve the equilateral triangle setup. Now listen to some music and find out if you hear the phantom image. Try moving back and forth along the median plane and moving your head side-to-side. Can you hear the difference?

If you think you've placed your speakers correctly but still don't hear the phantom image, your speakers may be out of phase. Fortunately, this is an easy fix. If you're running speakers through an amplifier with positive (+) and negative (-) connections, make sure your speaker wire is attached correctly; that is, negative connector on the amp to negative connector on the speaker, and positive to positive. If this doesn't fix the problem, your speaker *cables* could be wired out-of-phase so try different ones. Correctly connecting your speakers with properly wired cables should eliminate speaker phase problems.

Surround Sound Systems

Unlike stereo (two-speaker systems), surround sound systems consist of five or more speakers. However, some of the same principles from two-speaker stereo apply. For instance, all speakers should be equidistant from the listener (the subwoofer is an exception to this, see explanation below). There's also a median plane and a phantom image in a surround sound

system; the amount of musical material presented in the front and back speakers can move the phantom image along the median plane.

Most surround sound systems include a subwoofer, though there's no subwoofer shown in Figure 1.8. Because of their low frequency, bass audio signals are difficult to localize spatially so precise placement of the subwoofer typically does not affect the phantom image. In most surround sound setups, however, the subwoofer is placed on the floor beneath and between the center and one of the front speakers.

There are many surround sound formats with different speaker placements and track layouts discussed in the *Pro Tools Reference Guide*. Although Pro Tools LE does not support true multi-channel mixing, there are other cool ways to mix for surround systems using the 001, covered in chapter 12.

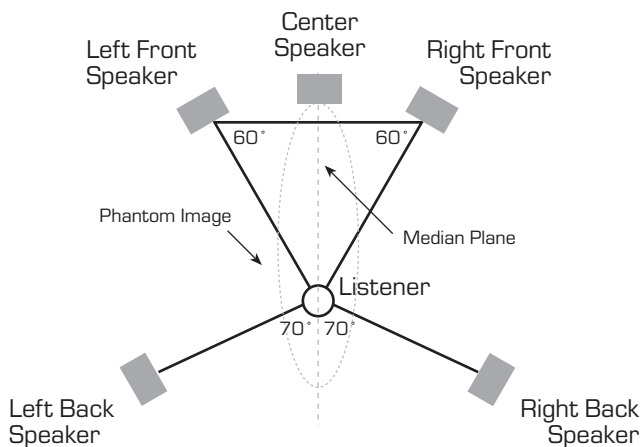


Fig. 1.8. A 5.1 surround speaker configuration (without the subwoofer, which is what the “.1” stands for). In this configuration, notice the back speakers are approximately 70 degrees off the median plane.

THE ACOUSTIC TREATMENT

Once your equipment and speakers are set up, you should consider the acoustical treatment of your room(s). Every room has its own sound, which has to do with its shape, the materials on the walls, floor, and ceiling, and the objects in the space. Each of these factors affect the way sound waves travel and how they're reflected or absorbed. For example, tiled bathrooms sound more “live” (i.e., they have more sound reflections, or reverb) than “dead” bedrooms with absorptive curtains and carpeting.

When setting up your studio, test the room(s) where you'll record and listen to your tracks for the rooms' acoustical properties. Snap your fingers and talk aloud in different areas (you might want to make sure nobody's around when you do this). Listen for strange flutter echoes in those spots, and play some of your favorite music to listen for any frequency boosts/cuts in different areas (e.g., bass boosts in the corners). Finally, listen for noise within the studio like computer fans and hard drives, and for outside noise like traffic, neighbors, etc.

There are many things you can do to "treat" problems found while conducting your listening tests. Put diffusers, bass traps, or specially designed absorptive materials (like Auralex Studiofoam) in spots that have unwanted frequency boosts/cuts or echoes. These also help soundproof your room, to keep sound from both coming in and getting out. Also place absorptive materials (a) on hard surfaces to deaden the room and (b) around anything that's noisy. Do everything you can to isolate your studio from outside noise, like double-paning or covering windows and sealing door jambs. Finally, you can remove or add objects in your room (such as furniture) to change its overall sound.

In most home studios it's best to create a "dead" environment for recording and listening. That way you have control over the sounds you record because you can always *add* "liveness" by inserting effects (reverb, delay, etc.), but it's hard to remove too much from an already recorded track.

Okay. Your gear is set up and plugged in, your speakers are placed properly, and your room is acoustically treated. . . . Your studio is ready for action. Go start making some great music with Pro Tools! ●