I/O Setup Primer

Version 8.1

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I/O Setup Primer

This *I/O Setup Primer* is designed to help you understand how to configure and use I/O Setup for your Pro Tools system. Whether you are new to Pro Tools or a long-time Pro Tools user, read through this document to gain a clear understanding of I/O Setup and related session interchange issues.

Changes to I/O Setup in Pro Tools 8.1

💡 *If you are updating your version of Pro Tools to version 8.1, review this section to understand what has changed in I/O Setup. If you are new to Pro Tools, you might want to skip ahead to "Configuring I/O Setup" on page 3.*

In Pro Tools 8.1, changes to the I/O Setup have been made in order to solve session interchange issues (such as maintaining studio settings on different Pro Tools systems) and to provide better overall workflows for session interchange. In lower versions of Pro Tools, I/O settings are recalled from the Pro Tools session document, so studio settings corresponding to your hardware could potentially change each time a session is opened. This can result in a temporary loss of monitor paths. In Pro Tools 8.1, I/O settings can be recalled from the system. This means that your studio settings can be maintained when opening sessions created on other Pro Tools systems.

Busses

Pro Tools 8.1 provides two types of busses:

- Internal Mix Busses
- Mapped Output Busses

Internal Mix Busses

Internal mix busses in Pro Tools 8.1 are the same as those in lower versions of Pro Tools. Use internal mix busses to route audio signal from track outputs and sends to other track inputs. Common uses for internal mix busses include effects sends and returns (such as bussing sends from audio tracks to an Auxiliary Input track for plug-in effects processing) and bus recording.

Mapped Output Busses

Output busses route audio from track outputs and sends to output paths that are routed to physical outputs on your audio interfaces. Any available bus can be mapped to any of the available output paths of the same channel width.

Because Bus settings are saved with and recalled from the session, when moving sessions between Pro Tools systems, the output bus routing from tracks and sends in the Pro Tools mixer is maintained.

> 💡 *To better understand how output busses work in I/O Setup, consider how an analog console works. In Pro Tools, the output bus is equivalent to a console's bus system. The output bus as defined on the left side of the Bus page in the Pro Tools I/O Setup is analogous to the outputs on a console's patchbay. The Mapping to Output selector is like the patch cords used to patch into the studio's various audio feeds, which in turn are like the physical output paths in Pro Tools.*

Output Page

With Pro Tools 8.1, in the Output page of the I/O Setup, you can create any number of output paths of various channel widths that are routed to physical outputs on your audio interfaces—including overlapping output paths—but you cannot create sub-paths for output paths as you can in lower versions of Pro Tools. Note that you can create sub-paths for output busses that can be mapped to output paths on the Bus page.

Overlapping Paths

Pro Tools 8.1 lets you create multiple input and output paths that can share the same physical output channel. This can be especially useful if you are working with multiple monitoring configurations of different channel widths. Typically, you will use overlapping output paths where you would use sub-paths for outputs in Pro Tools 8.0 or lower. (With Pro Tools 8.1, sub-paths are not available in the Output page, but they are available in the Input, Bus, and Insert pages.)

For example, you may want to switch monitoring between discrete surround (such as 5.1) and basic stereo, but without having to have two completely different sets of monitors. To be able to switch between the two, you can create a 5.1 output path that maps to output channels 1–6 (L, C, R, Ls, Rs, LFE) and also have a stereo output path that maps to output channels 1 and 3 (L, R).
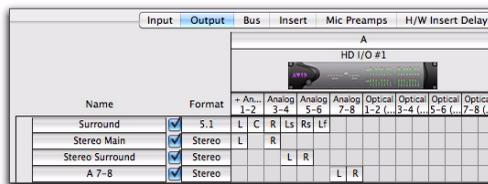
Overlapping output paths

Note that overlapping paths must overlap completely. For example, you can have a 5.1 path mapped to channels 1–6 and a stereo path mapped to channels 1 and 3 because the stereo path is "contained" by the 5.1 path. As another example, you can have two separate stereo paths assigned to channels 1–2, but you cannot have one stereo path assigned to channels 1–2 and the other assigned to 2–3 since they only partially overlap.

> 💡 *If a session created in Pro Tools 8.1 contains overlapping output paths with a larger path created above smaller paths in the Output page of I/O Setup, the smaller paths are converted to sub-paths of the larger path when opened in lower versions of Pro Tools. However, if a session created in Pro Tools 8.1 contains overlapping output paths where a smaller path appears above a larger path in the Output page of the I/O Setup, the larger path will be made inactive when opened in lower versions of Pro Tools.*

I/O Settings

In Pro Tools 8.1, the Import Settings button lets you import the settings for only the currently viewed page of the I/O Setup. For example, if you are viewing the Input page and import I/O Settings, only the settings for the Input page are imported. This helps avoid overwriting your custom I/O Settings on other pages. In lower versions of Pro Tools, importing I/O Settings always imports settings for all pages in the I/O Setup.

[SHIFT] Option-click (Mac) or Alt-click (Windows) the Import Settings button to import settings to all pages of I/O Setup.

When exporting I/O Settings from the I/O Setup dialog, the settings from all pages of the I/O Setup are exported.

If you choose to customize the I/O Setup, export the current I/O Settings as a backup first.

System Settings vs. Session Settings

In Pro Tools 8.1, the Input, Output, Insert, Mic Preamps, and H/W Insert Delay settings are "system" settings. These settings are stored both with the system and the session file can be recalled from either. Consequently, these settings are not necessarily overwritten when opening a session created on another Pro Tools system depending on whether or not the Sessions Overwrite Current I/O Setup When Opened option is enabled (see "Sessions Overwrite Current I/O Setup When Opened" on page 5).

In lower versions of Pro Tools, these settings would always be recalled from the session, which would result in any custom I/O settings configured for your system being overwritten by the settings stored with the session file when opening sessions created on other systems.

Busses are always saved with and recalled from the session in Pro Tools 8.1 and in lower versions. Since busses are specific to the mixer configuration in Pro Tools, you want to retain your bussing when you open a session on any system.

Configuring I/O Setup

The I/O Setup provides a graphical representation of the signal routing for internal mix bussing, output bussing, hardware inserts, and the physical inputs and outputs for each connected audio interface in the form of a *crosspoint matrix*. The Pro Tools I/O Setup lets you route physical ports on Pro Tools audio interfaces to Input and Output channels (audio signal paths) in Pro Tools sessions. In the I/O Setup, the controls for assigning Pro Tools Input and Output channels to the physical inputs and outputs on Pro Tools audio interfaces mirror the controls in the Hardware Setup—changes made in one dialog are always reflected in the other.

The I/O Setup lets you create, edit, and delete Pro Tools input, output, insert, and bus *audio signal paths*. The I/O Setup dialog also provides important audition, meter, and surround monitoring settings.

See the Pro Tools Reference Guide for detailed information about I/O Setup options.

Opening the I/O Setup Dialog

The I/O Setup dialog can be opened and configured whether or not a Pro Tools session is open.

To open the I/O Setup dialog:

1 Make sure your audio interfaces are enabled and configured properly in the Hardware Setup dialog.

2 Choose Setup > I/O.
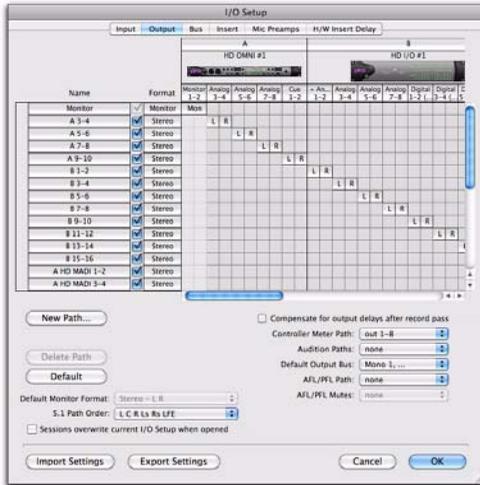
I/O Setup dialog for a Pro Tools|HD system with HD OMNI and HD I/O shown

Closing the I/O Setup Dialog

To close the I/O Setup dialog and save changes:

■ Click OK.

When you click OK, Pro Tools checks several settings for routing validity (to prevent feedback loops) and notifies you if there is a problem (see "Valid Paths and Requirements" on page 21).

To close the I/O Setup dialog without saving changes:

■ Click Cancel.

I/O Settings Pages

The I/O Setup dialog provides tabs to access different pages for configuring I/O Settings.

To open any specific I/O Settings page:

■ Click the corresponding tab at the top of the I/O Setup dialog.

Press Command+Left or Right Arrow keys (Mac) or Control+Left or Right Arrow keys (Windows) to move though the different pages of the I/O Setup dialog.

I/O Setup provides the following pages for configuring I/O Settings:

Input Configure input path names, formats, and source channel (analog or digital). Multichannel input paths (stereo or greater) can have any number of sub-paths. You can also have overlapping Input signal paths. Input names, channel widths, and physical input mappings are stored with both the system and the session, and can be recalled from either.

Output Configure output path names and formats. You can have overlapping Output paths. Output names, channel widths, and physical output mappings are stored with both the system and the session, and can be recalled from either.

Bus Configure internal and output bus path names and formats, and map output buses to output paths (as defined on the Output page). Multichannel busses (stereo or greater) can have any number of sub-paths. Bus names and channel widths are saved with and recalled from the session. Output bus paths to output channel mappings are automatically generated depending on the defined session output bus paths and the available system output paths.

Insert Configure insert path names, formats, and destinations (audio interface channels). You can have overlapping insert paths. Insert names, channel widths, and physical input and output mappings are stored with both the system and the session, and can be recalled from either.

Mic Preamps Map PRE outputs to an audio interface's inputs to establish communication between Pro Tools and PRE. PRE channel mappings are stored with both the system and the session, and can be recalled from either.

H/W Insert Delay Set the amount of Delay Compensation (in milliseconds) for each external device. These times will be used by the Delay Compensation Engine to time align input paths when the hardware insert is in use and Delay Compensation is enabled. The H/W Insert Delay settings are stored with both the system and the session, and can be recalled from either.

Default I/O Settings

Pro Tools comes with default I/O Setup settings to get you started. You should only need to open the I/O Setup if you want to remap the default I/O paths or if you change your system hardware (for example, adding an expansion card to HD I/O, or adding or removing an audio interface). Also, after customizing the I/O Setup, you can always return to the default settings for an I/O Settings page by clicking the Default button.

SHIFT *Option-click (Mac) or Alt-click (Windows) the Default button to set all pages of I/O Setup to the default settings.*

Sessions Overwrite Current I/O Setup When Opened

This option determines whether or not the Input, Output, Insert, Mic Preamp, and H/W Insert Delay settings (as currently configured on your system) will be overwritten by any I/O Settings stored with a session when you open the session. These settings are always stored with the session as well as with the system:

◆ When the Sessions Overwrite Current I/O Setup When Opened option is disabled, Pro Tools recalls these settings from the system. The output bus paths of the session automatically remap to the system output paths according to certain criteria (see "Criteria for Automatically Remapping Output Busses" on page 22).

◆ When the Sessions Overwrite Current I/O Setup When Opened option is enabled (default), Pro Tools recalls these settings from the session rather than the system. The output bus paths of the session remain mapped to the output paths saved with the session.

The Sessions Overwrite Current I/O Setup When Opened option is available in the Input, Output Bus, and Insert pages of the I/O Setup. Enabling or disabling this option in one page affects all of the other pages as well.

When to Enable (or Disable) the "Sessions Overwrite Current I/O Setup When Opened" Option for Optimal Session Interchange

When exchanging sessions among different systems running Pro Tools 8.1, it is generally recommended that the Sessions Overwrite Current I/O Setup When Opened option be disabled. This maintains your custom system settings and Pro Tools automatically remaps session output busses to the system output paths when opening sessions created (or edited and saved) on other systems.

When exchanging sessions with systems running lower versions of Pro Tools, it is generally recommended that the Sessions Overwrite Current I/O Setup When Opened option be enabled. In this case, any custom settings saved with the session that do *not* match your system may need to be reconfigured in the I/O Setup.

☼ *Enable the Sessions Overwrite Current I/O Setup When Opened option for legacy Pro Tools behavior (versions lower than 8.1). Note that this option is enabled by default.*

Input and Output Signal Routing

To better understand the routing of audio signals to and from Pro Tools audio interfaces and the Pro Tools mixer, consider the following two examples.

Signal Path Routing for Audio Input

Figure 1 on page 7 shows the signal path from the physical analog input of an HD OMNI audio interface, and then through the Pro Tools audio input path to the Input of an audio track in the Pro Tools mixer:

1 The physical inputs on your audio interface that are available to Pro Tools are set on the Main page of the Hardware Setup (this selector is mirrored in the Input page of the I/O Setup).

2 Main input paths and sub-paths are routed (patched) to physical inputs using cross-point matrix mapping in the I/O Setup. In this example, audio input is routed from HD OMNI physical inputs Analog 1–2 to Pro Tools Input channels A 1–2.

3 Input paths and sub-paths are routed to track inputs in the Pro Tools mixer by selecting the path (or sub-path) from the Track Input selector. In this example, input sub-path A1 is routed to the input of audio track "Audio 1."
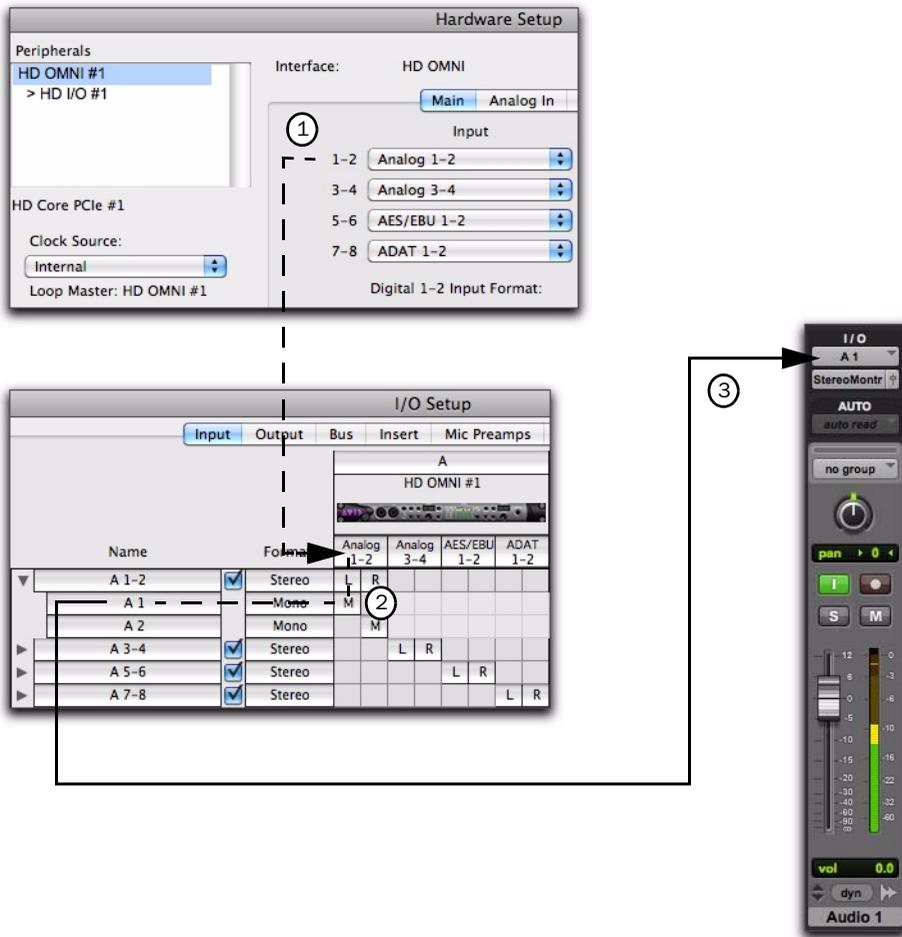
Figure 1. Input signal path from an HD OMNI to the Pro Tools mixer as mapped in I/O Setup

Signal Path Routing for Audio Output

Figure 2 below shows the signal path from the output of an audio track, through an output bus mapped to an output path that is routed to a physical output on an HD I/O audio interface:

1 Audio is played back from disk and routed from the Track Output to Output Bus "B 1–2."

2 The Output Bus is defined on the Bus page of the I/O Setup. On the Bus page of the I/O Setup, the Output Bus "B 1–2" is mapped to Output "B 1–2," which is defined on the Output page of the I/O Setup.

3 On the Output page of the I/O Setup, the cross-point matrix routes the output path (to which the bus output is mapped) to physical outputs on your audio interfaces.

4 The physical outputs on your audio interface that are available to Pro Tools outputs are set on the Main page of the Hardware Setup (this selector is mirrored in the Output page of the I/O Setup as shown here).
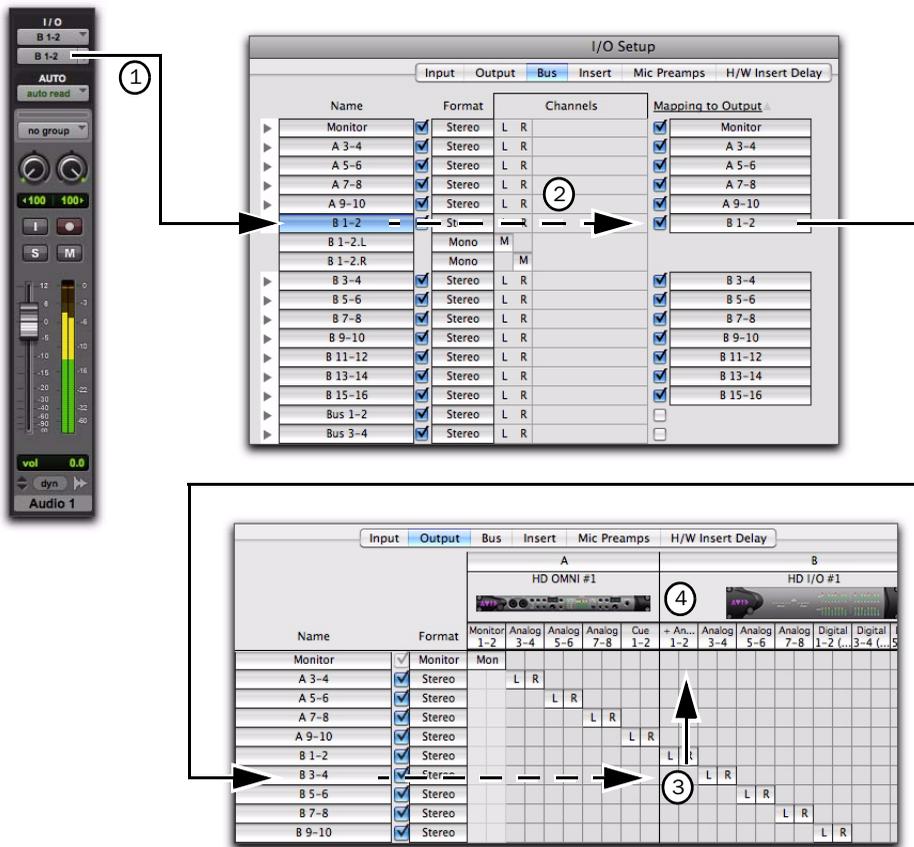
Figure 2. Output signal path from an audio track to a physical output as mapped in I/O Setup

Customizing I/O Settings

When you first install and configure your Pro Tools system, observe the following procedures for customizing I/O Setup.

If you are using an HD OMNI in your Pro Tools|HD system, be sure to configure the Monitor page of the Hardware Setup for HD OMNI before configuring the I/O Setup. For more information, see the HD OMNI Guide.

To customize I/O Settings:

1 Open the I/O Setup (Setup > I/O).

2 In the I/O Setup, click the Input tab:

- Create input paths and sub-paths with appropriate widths and mappings to physical inputs that match your studio configuration (see "Creating New Paths" on page 12).
- If desired, rename input paths and sub-paths to match your studio configuration.

3 Click the Output tab:

- Create output paths with appropriate widths and mapping to physical outputs that match your studio configuration.
- If desired, rename output paths to match your studio configuration. Use standard industry terminology whenever possible, such as "Main," "Cue A," "Cue B," and so on. This will facilitate session interchange with other Pro Tools systems (see "Recommended Output Path Naming Schemes" on page 15).

4 If you plan on using hardware inserts, click the Insert tab:

- Create insert paths with appropriate widths and mappings to physical inputs and outputs matching your studio configuration.
- If desired, name insert paths to match your studio configuration.
- Click the H/W Insert Delay tab and enter the correct insert delay in milliseconds for each input/output pair that you are using for hardware inserts. (For information about measuring latency with hardware inserts, see the *Pro Tools Reference Guide*.)

5 If you are using one or more PRE peripherals, click the Mic Preamps tab and configure it accordingly (see the *PRE Guide)*.

6 Click the Bus tab.

7 Create internal mix bus and output bus paths and sub-paths as desired. Ensure that output busses are mapped to the valid output paths (see "Output Busses" on page 22).

8 Click OK.

You should not have to open the I/O Setup again unless you add or remove hardware from your system. However, you may have to reconfigure I/O Setup when working with sessions from other Pro Tools systems, especially if the Sessions Overwrite Current I/O Setup When Opened option is enabled.

Routing Hardware I/O to Pro Tools Input and Output Channels

The I/O Setup lets you define which physical inputs and outputs on your audio interfaces are routed to available input and output channels in Pro Tools. The Input and Output selectors in the I/O Setup work like a patchbay to route any of the physical inputs or outputs of your audio interfaces to input and output audio paths for the Pro Tools mixer. The Input and Output selectors in the I/O Setup Input and Output pages mirror the Input and Output selectors in the Hardware Setup.

The Monitor path for HD OMNI is fixed and cannot be changed in the I/O Setup. Configure the Monitor path for HD OMNI in the Monitor page of the Hardware Setup.

HD MADI Inputs and Outputs are fixed and cannot be changed.

To configure I/O routing in I/O Setup:

1 Choose Setup > I/O.

2 Click the Input or Output tab to display the corresponding path type.

3 Click the Input or Output selector for the desired interface channel pair, located below each audio interface icon.

4 Select a physical port pair (such as Analog 7–8), to route to a Pro Tools channel pair (such as A 7–8) in the Path Name column on the left.
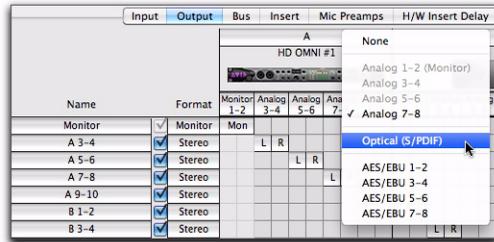
Figure 3. I/O Channel selector pop-up menu

5 Repeat the above step for each additional channel pair you want to change.

6 Click OK to save changes and close the I/O Setup.

Routing a Pro Tools Output Pair to Multiple Destinations

Pro Tools channel pairs can be routed to multiple outputs on audio interfaces using the I/O Setup. For example, if you assign Pro Tools Output pair 1–2 to both Analog 1–2 and Analog 3–4 interface outputs, when you send a signal to Pro Tools Outputs 1–2, that signal will be routed simultaneously to both pairs of physical outputs on the audio interface.

This lets you send the same signal (such as a stereo pair, a stem mix, or a multichannel mix) to multiple destinations (such as multiple mastering devices).

The only limit to output choices is the number of outputs available in your system.

To route a Pro Tools output channel pair to multiple audio interface output ports:

1 Choose Setup > I/O.

2 Click the Output tab.

3 Click the Output selector for an interface channel pair, just below an audio interface icon (see Figure 3 on page 10).

4 From the pop-up menu, select a physical port pair (such as Analog 1–2) to map to the corresponding Pro Tools channel pair (such as A 1–2) in the Path Name column on the left.

5 Control-click (Mac) or Start-click (Windows) the same Output selector and select an additional output pair from the same pop-up menu.

The output name updates with a plus sign ("+") prefix to indicate that multiple output ports are selected. In the pop-up menu, each physical port pair assigned to that Pro Tools output pair is indicated by a check mark.

6 Repeat the above steps to select additional output destinations.

7 Click OK to save changes and close the I/O Setup.

Pro Tools Signal Paths

A signal path is a logical grouping of multiple inputs, outputs, or busses that has a single name and (channel) format. The I/O Setup lets you define and name paths according to the configuration of your studio and the needs of each session.

Main Paths and Sub-Paths

Paths in Pro Tools tracks and I/O Setup include *main paths* and *sub-paths*.

Main Paths *Main* paths are logical groupings of inputs, inserts, busses, or outputs. For example, a master stereo output path will include both its left and right channels.

Sub-Paths A *sub-path* represents a signal path within a main path. For example, a default stereo output bus path consists of two mono sub-paths, left and right. Mono tracks and sends can be routed to either mono sub-path of the stereo output bus path.

It is especially useful to define and name sub-paths for complex mixing setups, such as a 5.1 Surround mix.

Paths Available to Tracks in Sessions

In sessions, audio is routed using the track Input, Output, Insert, and Send selectors. These selectors let you assign audio inputs and outputs for tracks and sends, and hardware inserts for. Paths comprise the lists of available audio signal routing choices in track Input, Output, Insert and Send selectors.

Paths in the I/O Setup

The signal routing path choices available in a session are defined in the I/O Setup.
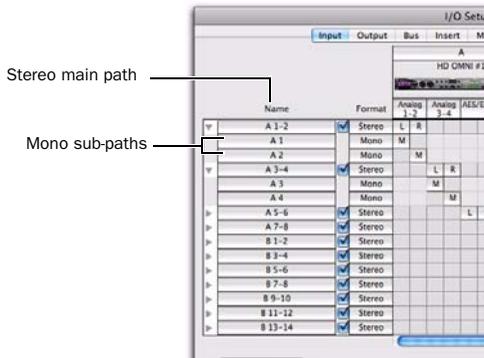
Main and sub-paths in I/O Setup

Path Configurations and I/O Settings

Each Pro Tools session retains its path configurations as I/O Settings.

Each Pro Tools system can have a different path configuration, determined by:

- Whether it is a Pro Tools|HD, Pro Tools LE, or Pro Tools M-Powered system.
- On Pro Tools|HD systems, the number and types of audio interfaces.
- On Pro Tools|HD systems, and Pro Tools LE systems with Complete Production Toolkit, the installed Mixer plug-in (Stereo or Surround).

Bus I/O Settings are saved with the session and are loaded automatically when the session is opened. Input, Output, and Insert I/O Settings are saved both with the system and with sessions and can be recalled from either.

Unavailable items (including hardware, paths, or required resources) remain in the session as inactive items (see "Making Paths Active or Inactive" on page 20).

When you create a new session, you can specify which I/O Settings to use (for example, the "Last Used" settings, or one of any custom I/O Settings files).

📄 *You can save and import I/O Settings files in the I/O Setup (see "Importing and Exporting I/O Settings Files" on page 24).*

Creating New Paths

The I/O Setup lets you create new paths with custom names, format, and channel mapping. Custom path names appear in a session's track Input, Output, Insert, and Bus selectors.

To create a new path:

1 Choose Setup > I/O.

2 Click the Input, Output, Insert, or Bus tab to display the corresponding path type.

3 Click New Path.

4 In the New Path dialog, specify the number of new paths you want to create, the channel width for each path, and the path name.

New Paths dialog

5 Do any of the following:

- To add more paths, click the Add Row button.

☐ *Add a new path by pressing Command+N (Mac) or Control+N (Windows), or by pressing Command+Plus (+) (Mac) or Control+Plus (+) (Windows) on the numeric keypad.*

– or –

- To remove a path, click the Remove Row button.

☐ *To remove the last path from the New Path dialog Command+Minus (–) (Mac) or Control+Minus (–) (Windows).*

6 Enable (or disable) the New Paths options Add the Default Channel Assignments and Auto-Create Sub-paths as desired.

7 Click Create.

8 Map the path to a specific audio interface (Input, Output, and Insert pages only) in the Grid column. See "Channel Mapping" on page 20.

9 Repeat the previous steps to configure all path types (Input, Output, Insert, or Bus).

10 Click OK to save changes and close the I/O Setup. If there are any identically named paths, you will be instructed to correct them before the I/O Setup will close. For more information, see "Valid Paths and Requirements" on page 21.

New Paths Dialog

The New Paths dialog lets you create new paths on the Input, Output, Bus, and Insert pages of the I/O Setup.
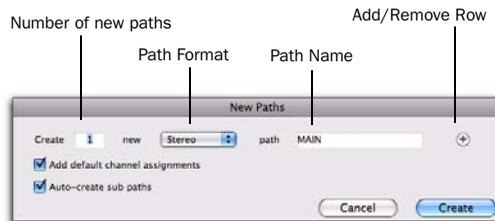
New Paths dialog

New Path Row Settings

Number of New Paths Enter the number of new paths you want to create (or a certain type, like "Bus").

Path Format Select the channel width from the Path Format selector.

Path Name Enter the path name. If you are creating more than one path, the number of each new path created will be appended to the path name (for example, Bus 1, Bus 2, Bus 3, and so on).

Add/Remove Rows Click the Add Row button to add more paths, or click Click the Remove Row button to remove paths.

Move Row Icon Click and drag a Move Row icon up or down to reorder paths.

Move Row Icon Click and drag a Move Row icon up or down to reorder paths.

Move Row icon

Move Row icon in the New Paths dialog

Add Default Channel Assignments Option

For input, output, and insert paths, enable (or disable) the Add Default Channel Assignments option to have Pro Tools automatically assign individual output channels (from the first available channel to the maximum number of channels available). If the number of new paths of a certain width exceeds the number of available channels, Pro Tools wraps around and starts over at channel 1.

Auto-Create Sub-Paths Option

For input, bus, and insert paths, enable (or disable) the Auto Create Sub-Paths option to have Pro Tools automatically create the default set of sub-paths for the path format (channel width).

Default Sub-Paths

Main Path	Sub-Paths	Sub-Path Name
Mono	N/A	N/A
Stereo	2 mono	*<main path name>* followed by channel designation .L and .R
LCR	1 Stereo (LR), 3 Mono (one for each channel)	Stereo: *<main path name>*.LR Mono: *<main path name>*.L, .C, .R
LCRS	1 Stereo (LR), 4 Mono (one for each channel)	Stereo: <main path name> .LR Mono: <main path name>.L, .C, .R, .S
Quad	1 Stereo (LR), 4 Mono (one for each channel)	Stereo: <main path name> .LR Mono: <main path name>.L, .R, .Ls, .Rs
5.0 – 6.0 – 7.0	1 Stereo (LR), 5–7 Mono (one for each channel)	Stereo: *<main path name>*.LR Mono: *<main path name>*.L, .C, .R, .Ls, .Rs, and so on
5.1 – 6.1 – 7.1	1 Stereo (LR), 6–8 Mono (one for each channel)	Stereo: *<main path name>*.LR Mono: *<main path name>*.L, .C, .R, .Ls, .Rs, and so on, and LFE

Creating New Sub-Paths

You can create sub-paths for main paths in the Input, Bus, and Insert pages of the I/O Setup.

To create a new sub-path:

1 Select the page of the I/O Setup where you want to create sub-paths (such as the Input page).

2 Select the Main path for which you want to create sub-paths.

3 Click New Sub-Path.

4 Name the new sub-path.

5 Select the Format for the new sub-path (such as Mono).

6 Click in the channel mapping matrix to map the new sub-path channels to available main path channels.
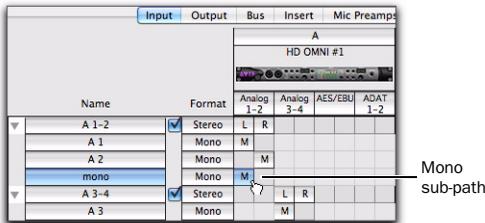
New mono Input sub-path for Main path A 1-2

Recommended Output Path Naming Schemes

Generally, you will want to use standard naming schemes for output paths in your Pro Tools sessions. This facilitates session exchange between different Pro Tools systems.

Here are some examples of standard industry naming schemes:

- Main A, Main B
- Studio A, Studio B
- Stereo A, Stereo B
- Meter
- Monitor
- Aux A, Aux B
- Cue A, Cue B, Cue C, Cue D, Cue E, Cue F, Cue G, Cue H, Cue I, Cue J
- Dial Main, Dial A, Dial B, Dial C, Dial B, Dial E
- Efx Main, Efx A, Efx B, Efx C, Efx D, Efx E
- Music Main, Music A, Music B, Music C, Music D, Music E

Editing Paths

The I/O Setup lets you edit or customize signal path definitions.

Paths can be:

- Restored to default configurations
- Renamed, for easier identification after changing or renaming audio interfaces
- Selected and reordered to change menu order in track selectors
- Selected and deleted
- Remapped to or from different sources or destinations
- Deactivated (or reactivated) to manage unavailable or unnecessary I/O resources

In addition, you can import and export your I/O Setup configurations as I/O Settings files, as well as set default path parameters (see "Working with I/O Settings Files" on page 23).

The following table lists the available attributes for each path type.

Path options by type

Path Type	Path Options (Attributes)
Input	Names, formats, and source channel (analog or digital audio interface)
Output	Names, formats, and destination (audio interface output channel or internal send bus)
Insert	Names, formats and destination (audio interface channels)
Bus	Names and formats

Path interface names can also be renamed and configured as defaults, which can be restored.

Restoring Default Paths and Path Names

You can set an I/O Setup path type to its default path configuration at any time. When restoring the default path, Pro Tools does the following:

- Creates new default paths up to the capacity of your system's available audio interfaces and resources.
- Resets selected path names to matching or corresponding paths in the current I/O Setup configuration. For example, if you replace an audio interface on a Pro Tools|HD system, you can click the Default button to update your I/O Setup definitions with the new hardware configuration.

If there are matching paths available with the new system configuration, existing paths will be updated to include new or to exclude removed audio interfaces (Pro Tools|HD systems).

To restore default paths and path names:

1 Choose Setup > I/O.

2 Click the Input, Output, Insert, or Bus tab to display the corresponding path type.

3 Click Default.

Pro Tools creates all possible stereo main paths. Mono sub-paths are also auto-created for every stereo main path. These default path names appear in a session's track Audio Input and Output Path selectors.

☼ *With Pro Tools|HD systems, to optimize DSP resources, it is best to create mono subpaths for output and internal mix busses, rather than mono main paths.*

4 Click OK to save changes and close the I/O Setup.

Resetting Busses

(Pro Tools HD and Pro Tools LE with Complete Production Toolkit Only)

Pro Tools supports up to 128 mix busses. However, versions lower than Pro Tools HD 7.x and Pro Tools TDM 6.9 provide only up to 64 or 32 busses respectively. When you open a session that was created with Pro Tools LE or a lower version of Pro Tools TDM on a current version of Pro Tools HD (or Pro Tools LE with Complete Production Toolkit), only the number of busses supported on the original system are initially available. You can reset the number of available busses to match your system's full capabilities.

To revert to the default bus configuration for your system:

1 Open the I/O Setup.

2 Click the Bus tab in the upper left.

3 From the pop-up menu to the right of the Default button, select one of the following:

- All Busses
- Output Busses
- Internal Busses

4 Click Default.

⚠ *Setting busses to the default setting will rename all busses to their default name.*

5 Click OK to save changes and close the I/O Setup.

Active Busses

The Bus page of the I/O Setup displays the number of active busses. If the number of active busses exceeds the number of available busses (128), the display turns red. Delete or disable any active busses in excess of the available number of busses to be able close the I/O Setup and save your settings. When creating new sessions, Pro Tools creates only 64 busses by default.

Renaming Paths

Path names can be customized in the I/O Setup.

💡 *I/O paths can also be renamed directly from the Edit or Mix window by Right-clicking the Input or Output selector and choosing Rename.*

To rename a path in the I/O Setup:

1 Double-click the path name.

2 Type a new path name.

3 Click OK to save changes and close the I/O Setup.

Renaming Interfaces

Audio interface names can be customized in the I/O Setup. With Pro Tools HD only, the I/O Setup then bases default Input and Output path names on the custom names.

To rename an audio interface in the I/O Setup:

1 Double-click the label above an interface.
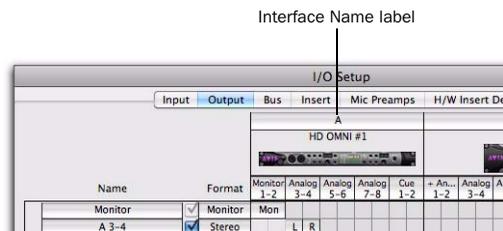
Interface Names

2 Type a new interface name.

3 Click OK to save changes and close the I/O Setup.

Selecting Paths

Individual and multiple paths can be selected in the I/O Setup Path Name column. Selected paths and sub-paths can be reordered higher or lower in the Path Name column to change their menu order in track Input, Output, Insert, and Bus selectors. Paths can also be deleted. Sub-paths follow their main paths when they are moved in the I/O Setup.

To select a main path or sub-path:

▪ Click the path name.
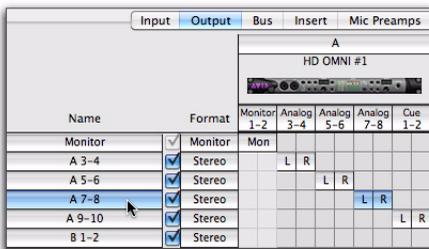
Selecting paths in the I/O Setup

To select a range of paths:

1 Click the path name.

2 Shift-click an additional path name.

All paths between the first selected path name and the additional path name will also be selected.

To select or deselect noncontiguous paths, do one of the following:

▪ Command-click (Mac) or Control-click (Windows) path names that are un-highlighted to select them.

– or –

▪ Command-click (Mac) or Control-click (Windows) path names that are highlighted to deselect them.

To select all paths and sub-paths:

▪ Option-click (Mac) or Alt-click (Windows) any path name that is un-highlighted.

To deselect all paths and sub-paths:

▪ Option-click (Mac) or Alt-click (Windows) any path name that is highlighted.

Reordering Paths

Selected paths and sub-paths can be reordered to be higher or lower in the Path Name column.

To reorder paths in the I/O Setup and Track selectors:

1 Drag one or more selected path names up or down to a new location in the list.

2 Click OK to save changes and close the I/O Setup.

Path Order

Path order in the I/O Setup (from top to bottom) determines the order in which paths appear in track Input, Output, Send, and Insert (for hardware inserts) selectors. Additionally, path order is important when exchanging sessions between different Pro Tools systems.

Path Ordering and Session Interchange

When exchanging sessions between systems with different hardware configurations, Pro Tools follows certain criteria for remapping the output busses of the session to the output paths on the system (see "Criteria for Automatically Remapping Output Busses" on page 22).

Additionally, when exchanging sessions between systems with different versions of Pro Tools depending on path order:

◆ If a session created in Pro Tools 8.1 contains overlapping paths with a larger path created above smaller paths in the I/O Setup, the smaller paths are converted to sub-paths of the larger path when opened in lower versions of Pro Tools.

◆ If a session created in Pro Tools 8.1 contains overlapping paths where a smaller path appears above a larger path in the I/O Setup, the larger path will be made inactive when opened in lower versions of Pro Tools.

Sorting Bus Paths

The Bus page provide controls to sort busses by Name (ascending or descending), by Format (ascending or descending), or by Mapped to Output status.
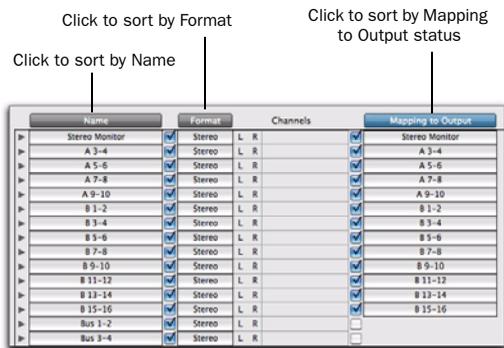
Sorting bus paths in the I/O Setup

To sort bus paths by Name:

1 In the Bus page, click the Name column header.

2 Click the Name column header again to toggle between ascending and descending sort order.

To sort bus paths by Format:

1 In the Bus page, click the Format column header.

2 Click the Format column header again to toggle between ascending and descending sort order.

To sort bus paths by Mapping To Output status:

■ In the Bus page, click the Mapping To Output column header.

Deleting Paths

Path definitions can be deleted from the I/O Setup to reflect changes to your hardware setup, or to clean up track selector menus by removing unwanted or unnecessary path definitions. After deleting a path, any tracks or send assignments to that path are reset to No Output.

To delete a main path or sub-path:

1 In the I/O Setup, select the path you want to delete.

2 Click Delete Path.

3 Click OK to save changes and close the I/O Setup.

To delete all paths:

1 Option-click (Mac) or Alt-click (Windows) any path name.

2 Click Delete Path.

3 Click OK to save changes and close the I/O Setup.

Making Paths Active or Inactive

Pro Tools paths can be Active (on) or Inactive (off, or unavailable). Paths can be globally activated or deactivated in the I/O Setup. Making a signal path inactive will turn off the signal path on any and all tracks currently assigned to it.

Pro Tools also sets unavailable paths to inactive. Paths can be unavailable when hardware or other system resources are unavailable, such as when opening a session saved on a different system.

Tracks can also be made active or inactive. For information, see the *Pro Tools Reference Guide*.

To globally activate or deactivate a path:

1 Choose Setup > I/O.

2 Select a path type using the tabs at the top of the window.

3 Set the Active/Inactive control for the path.
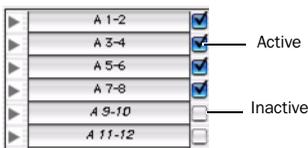
Active and inactive path settings in I/O Setup

Inactive tracks that were assigned to the path display in italics in the track path selectors.

4 Click OK to save changes and close the I/O Setup.

Display of Active and Inactive Paths in I/O Setup

Unhighlighted (Italics) Indicates the path is inactive.

Highlighted (Non-Italics) Indicates the path is active.

Highlighted (Italics) Indicates the path is active, but there are not enough system resources available.

Channel Mapping

Paths must be mapped to a specific audio interface, or to bus channels in the Grid. Paths can be mapped when they are created, and remapped at any time.

To map channels:

1 Select (or create) a main path or sub-path.

2 Select the channel Format (such as Stereo).

3 In the row for the selected path, click in the Grid column under an audio interface and channel.
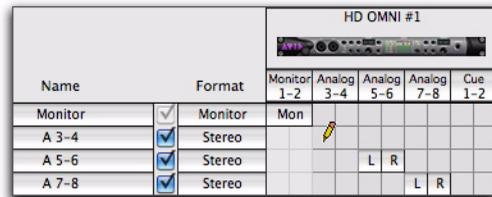
Mapping channels

Other channels for the path type, if any, fill to the right. For example, when mapping a new stereo path, clicking in the path row under output channel 1 fills both channel 1 and 2 (left to 1, right to 2).

4 Click OK to save changes and close the I/O Setup.

Channel Mapping and Surround Mixer

(Pro Tools HD and Pro Tools LE with Complete Production Toolkit Only)

When mapping multichannel paths, the left channel (L) is mapped first to the clicked Grid box, and remaining channels fill immediately to the right according to the default path order. Because some multichannel mixing formats use unique track layouts, Pro Tools lets you set the default format in the I/O Setup.
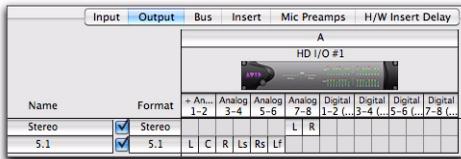
Customized output paths for a 5.1 mix

Remapping Channels

You can move the individual assignments to different channels, to reorder the path's definition (for example, changing a multichannel map to L-R-C-LF-LS-RS).

To remap channels in a path:

■ Drag the channel to the new location in the Grid. Other channel assignments move (shuffle) to accommodate dragged channels.

Channel Shuffling

Moving a signal from right to left results in a shuffle of other signals after the new destination channel. Moving a signal from left to right shuffles any and all signals after the new destination channel and leaves the previous channel empty.

⚠ *Changing a path's format erases any current channel mapping.*

Sub-Paths Follow Main Paths

When a main path is remapped, its sub-paths (if any) will remap automatically to maintain consistent routing. For example, remapping a stereo path to different hardware outputs results in any of its sub-paths moving with it.

Valid Paths and Requirements

While configuring the I/O Setup, certain rules apply for path definition and channel mapping. All paths must be valid before the I/O Setup configuration can be applied.

Though it is possible to set up invalid mappings in the Channel Grid, Pro Tools will not accept an I/O Setup configuration unless all paths meet the path definition and channel mapping requirements, as follows:

Minimum Path Definitions All paths must have a name, be of a specific format, and have a valid I/O mapping.

Valid Paths Channel mapping follows certain rules regarding overlapping paths.

- There can be no partial overlaps between any two output paths.
- A newly-created output path must either be completely independent of other mapped outputs (not mapped to any other available I/O interface/channels), or it must be an overlapping path or sub-path completely contained within a larger path (for example, an LCR sub-path within a larger 5.1 path).

Valid overlap (complete)

Invalid overlap (partial)

Valid and invalid output paths

Output Busses

Pro Tools audio outputs—from tracks and sends—are routed to *output busses*, which in turn are mapped to Pro Tools output paths. Pro Tools output paths are then routed to physical outputs on your Pro Tools audio interfaces. Output busses are in addition to the 128 available internal mix busses.

The advantage of this is that when you take a session from one system to another, track and send output assignments are maintained within the session and automatically re-map to the available Pro Tools Output channels on the new system where possible.

Criteria for Automatically Remapping Output Busses

Pro Tools checks for the following matching criteria in order to automatically re-map the output busses when opening a session from another Pro Tools system:

- System ID
- Path name and format
- Path format only
- Path order and format

Configuring Output Busses

Before creating custom output busses, be sure to configure the Output page with the desired number of output paths with the correct channel widths for your needs.

To create a new output bus and map it to an output path:

1 If necessary, on the Output page of the I/O Setup, create an output path of the corresponding channel width for the output bus you want to create.

2 On the Bus page of the I/O Setup, click New Path.

💡 *You can click the Default button to create automatically assigned output busses for each defined output path.*

3 In the New Paths dialog, specify the number of new paths you want to create, the channel width for each path, and the path name.

New Paths dialog

4 Click Create to create the new paths.

Unmapped "MAIN" output bus

5 If necessary, enable Mapping To Output for the output path.

6 If necessary select the desired output path from the Mapping To Output selector.

Mapping the "MAIN" output bus to output path "A 1–2"

To map all output busses of the same format to an output path:

■ Option-click (Mac) or Alt-click (Windows) any Mapping To Output selector and select the desired output path (mono or stereo).

All mapped output busses of the same format (such as stereo) are all assigned to the same output path. For example, you can assign all stereo output busses to output path A 1–2.

To map all output busses of the same format to an output path:

1 Do one of the following:
- Shift click to select contiguous Output busses.

  – or –

- Command-click (Mac) or Control-click (Windows) to select noncontiguous Output busses.

2 Option-Shift click (Mac) or Alt-Shift-click (Windows) the Mapping To Output selector for one of the selected Output busses and select the desired output path (mono or stereo).

Only the selected mapped output busses of the same format (such as stereo) are all assigned to the same output path. For example, you can assign only the selected stereo output busses to output path A 1–2.

To automatically map all output busses of the same format to unique ascending output paths (cascading):

■ Command-Option-click (Mac) or Control-Alt-click (Windows) the Mapping to Output selector of the top-most output path and select the first output path.

All mapped output busses of the same channel format are automatically assigned to unique output path assignments in ascending order. For example, for stereo output paths, output bus A 1–2 is assigned to output path A1–2, A 3–4 to A 3–4, A 5–6 to A 5–6, and so on.

Working with I/O Settings Files

I/O Settings can be managed when transferring sessions, and when developing I/O Setup configurations over the course of multiple sessions and projects.

I/O Settings Files

When creating a new session, you can set the session's I/O Setup configuration by selecting an available I/O Settings file. I/O Settings can also be imported before or after you open a session. The following types of I/O Settings are available:

Last Used The most recent I/O Setup configuration is saved as the "Last Used" settings file. See "Last Used I/O Settings" on page 25 for more information.

Factory I/O Settings The Pro Tools Installer provides settings files for factory I/O setups for stereo and surround (Pro Tools HD and Pro Tools LE with Complete Production Toolkit only). See "Audio Interfaces and Session Transfer" on page 26 for more information.

Custom I/O Settings The current I/O Setup configuration can be edited and saved as a custom I/O Setting using the Export command in the I/O Setup. See "Importing and Exporting I/O Settings Files" on page 24.

Default I/O Settings at First Launch

The first time you launch Pro Tools and create a session, you can choose the default Stereo Mix or Surround Mix settings, depending on your system and installation choices. See "Audio Interfaces and Session Transfer" on page 26.

Importing and Exporting I/O Settings Files

You can export and import I/O Setup configurations as I/O Settings files. This lets you save settings for different projects, import settings for reconfiguring I/O Setup, and manage path definitions and signal routing setups.

Exporting I/O Settings

To export and save an I/O Setup configuration as a custom I/O Settings file:

1 Configure the I/O Setup settings as desired.

2 Click Export Settings.

3 Name and save the settings file.

To start sessions with a blank or empty I/O Setup, you can create and export an I/O Settings file in which all definitions have been deleted.

Importing I/O Settings

I/O Settings can be imported before or after you open a session. I/O Settings are only imported for the current page of the I/O Setup. For example, if you are viewing the Output page and import I/O Settings, only the settings for the Output page are imported. This helps to avoid overwriting your custom I/O Settings on other pages.

When you import I/O Settings, you can choose to delete any unused path definitions before importing the new paths, or leave unused path definitions intact and add the new paths to the current I/O Setup configuration.

You can also import I/O path and assignment names, as well as other session data, from a different session by using the Import Session Data command (File > Import > Session Data).

To import I/O Settings:

1 Click the tab for the page of the I/O Setup for which you want to import settings.

2 Click Import Settings.

SHIFT *Option-click (Mac) or Alt-click (Windows) the Import Settings button to import settings to all pages of I/O Setup.*

3 Select an I/O settings file in the Import Settings dialog and click Import.

4 A dialog appears asking whether you want to delete existing paths. Do one of the following:

- Click Yes to remove any unused paths and add the imported paths to the current I/O Setup configuration. Any I/O assignments and automation data associated with the unused paths are also deleted.

– or –

- Click No to add the imported paths to the current I/O Setup configuration.

If the import results in overlapping paths, the new paths will appear in the I/O Setup as Inactive. See "Making Paths Active or Inactive" on page 20.

After importing I/O Settings, you can then reassign path routing definitions in the I/O Setup by remapping, renaming, and deleting paths. See "Output Busses" on page 22.

Last Used I/O Settings

If any changes are made to the I/O Setup, these changes are saved to the Last Used settings file when the I/O Setup is closed (by clicking OK).

Changes to I/O Setup are saved along with the current session (if one is open). Custom I/O Settings files will not contain recent changes unless you export an updated settings file.

The Last Used setting is available as a choice when creating a session or when importing I/O Settings in the I/O Setup.

Factory I/O Settings

Pro Tools provides I/O Settings files for Stereo and Surround mixing. These files provide generic main and sub-path definitions for either mixing format.

Factory I/O Settings are available as a choice when creating a session or when importing I/O Settings in the I/O Setup.

Stereo Mix Settings File

The Stereo Mix settings file consists of all possible stereo and mono paths for your session.

Using the "Stereo Mix" settings file has the same effect as clicking Default for every individual tab in I/O Settings. See "Output Busses" on page 22 for details.

Specifically, the Stereo Mix settings file creates the maximum number paths of each type, as determined by the available system's I/O Setup and hardware configuration.

Surround Mix Settings File

(Pro Tools HD and Pro Tools LE with Complete Production Toolkit Only)

The Surround Mix provides additional, surround-specific Output and Bus settings files. See "Surround Mix Settings File" on page 25 for more information.

Custom I/O Settings

Custom I/O Settings files can be created by changing I/O Setup controls and then exporting the I/O Setup configuration (see "Exporting I/O Settings" on page 24). Custom I/O settings are available as a choice when creating a session or when importing I/O Settings in the I/O Setup.

Audio Interfaces and Session Transfer

Pro Tools systems store the *type* and *order* of audio interfaces connected and active when the session was last saved. When opening a session on a system with different audio interfaces, the I/O Setup may need to be updated.

Unavailable I/O

When opening a session, Pro Tools checks to see if the hardware configuration has changed since the session was last saved. If the current hardware configuration differs from that saved in the session, paths associated with the unavailable I/O are made inactive. However, output busses saved with the system are mapped automatically to the available output paths on the system (see "Output Busses" on page 22).

Remapping

Remapping occurs when a session's original I/O Setup does not match that of the current system and session paths are remapped to match the current hardware configuration.

Systems of equivalent I/O capability are remapped directly. For example, a session tracked to a Pro Tools|HD system through two HD I/O audio interfaces would include 32 input paths spread across the two 16-channel interfaces. The session is taken to a second Pro Tools system that has a HD I/O audio interface (a 16-channel I/O unit) and a 192 I/O 16 x 8 (with 16 analog inputs) connected to its Expansion Port. When the session is first opened on the second system, Pro Tools will map the 32 input paths to the inputs of the two interfaces.

When hardware is unavailable to a session when opened, assignments can either be replaced using the remap option, or opened as Inactive.

📖 *See "Making Paths Active or Inactive" on page 20 for more information.*

Show Last Saved Setup and Show Current Setup

When a session is opened that contains path definitions for unavailable I/O interfaces, the I/O Setup lists those paths in italics.

Clicking the Show Last Saved Setup button displays the audio interfaces used in the original session. This temporary display lets you check the last saved I/O configuration for reference while configuring the session for your system.

Once a session has been opened with unavailable I/O retained, you can then reassign tracks to available I/O paths.

📖 *To redefine the paths, see "Editing Paths" on page 16.*