Chapter 30: Space

Space is an AAX format convolution reverb plug-in that is available in DSP, Native, and AudioSuite formats. Space was designed to be the ultimate reverb for music and post-production applications. By combining the sampled acoustics of real reverb spaces with advanced DSP algorithms, Space offers stunning realism with full control of reverb parameters in mono, stereo, and surround formats.

Space supports 44.1 kHz, 48 kHz, 88.2 kHz, and 96 kHz sample rates.

Space works with mono, stereo, and mono-to-stereo formats. With Pro Tools HD, Space also supports Quad, 5.0, mono-to-Quad, stereo-to-Quad, mono-to-5.0, and stereo-to-5.0 multichannel formats.

Space plug-in

Space Feature Highlights

Space features let you create the best reverb effect in the shortest possible time.

Reverb Features

- Mono, Stereo, Quad, and 5.0–channel output support
- Multiband EQ
- Independent wet/dry and decay levels
- Separate reverb early and late levels and length
- Control of early size, low-cut, and balance
- Pre delay and late delay controls
- Precise control of low, mid, and high decay crossover
- Adjustable waveform reverse, displayed in beats per minute
- Waveform processing bypass

Interface Features

- Full waveform view, zoom, and channel high-light functions
- On-screen input and output metering with clip indicators
- Impulse response information display

Impulse Response (IR) Loading and Organization Features

- Scrollable IR browser makes finding impulse responses easy
- Browser supports user-defined IR groups on any local drives
- Browser keyboard shortcuts
- IR favorites function
- Automatically recognizes common IR formats for one click loading
- Quick browser buttons allow rapid IR loading and preview

Automation and Ease of Use Features

- Snapshot mode supports rapid changes between ten predefined reverb scenes
- Picture preview mode allows you to view image files stored with impulse responses
- Impulse responses stored directly in Pro Tools presets and sessions for easy session sharing
- New impulse responses can be copied to system and loaded without closing Space
- iLok support for quick and easy relocation to other Pro Tools systems

Surround and Post-Production Features

- Full input and output surround metering on screen at all times
- Separate front, center, and rear levels
- Independent front and rear decay
- Snapshot mode ideal for post automation requirements
- Seamless snapshot switching
- Automatic phantom channel creation

IR Library

- A wide variety of both real and synthetic reverb spaces and effects
- Mono, stereo, and surround formats
- All reverb impulse responses stored in WAV file format

Space Overview

The following sections provide information on the concepts of reverb and convolution reverb.

Reverb Basics

Reverberation is an essential aspect of the sound character of any space in the real world. Every room has a unique reverb sound, and the qualities of a reverb can make the difference between an ordinary and an outstanding recording. The same reverb principles responsible for the sound of a majestic, soaring symphony in a concert hall also produce the booming, unintelligible PA system at a train station. Recordings of audio in the studio context have traditionally been captured with a minimum of real reverb, and engineers have sought to create artificial reverbs to give dry recorded material additional dimension and realism.

The first analog reverbs were created using the 'echo chamber' method, which consists of a speaker and microphone pair in a quiet, closed space with hard surfaces, often a tiled or concrete room built in the basement of a recording studio. Chamber reverbs offered a realistic, complex reverb sound but provided very little control over the reverb, as well as requiring a large dedicated room.

Plate reverbs were introduced by EMT in the 1950s. Plate reverbs provide a dense reverb sound with more control over the reverb characteristics. Although bulky by modern standards, plate reverb units did not require the space needed by a chamber reverb. Plate reverbs function by attaching an electrical transducer to the center of a thin plate of sheet metal suspended by springs inside a soundproof enclosure. An adjustable damping plate allows control of the reverb decay time and piezoelectric pickups attached to the plate provide the return reverb signal to the console. An alternative and less expensive analog reverb system is the spring reverb, most commonly seen in guitar amplifiers beginning in the 1960s. Similar to the plate reverb in operation, the spring reverb uses a transducer to feed the signal into a coiled steel spring and create vibrations. These are then captured via a pickup and fed back into an amplifier.

Since the advent of digital audio technology in the 1980s, artificial reverberation has been created primarily by digital algorithms that crudely mimic the physics of natural reverb spaces by using multiple delay lines with feedback. Digital "synthetic" reverb units offer a new level of realism and control unavailable with older analog reverb systems, but still fall short of the actual reverb created by a real space.

Components of Reverb

Reverberation sound in a normal space usually has several components. For example, the sound of a single hand clap in a large cathedral will have the following distinct parts. The direct sound of the hand clap is heard first, as it travels from the hand directly to the ear which is the shortest path. After the direct sound, the first component of reverb heard by a listener is reflected sound from the walls, floor, and ceiling of the cathedral. The timing of each reflection will vary on the size of the room, but they will always arrive after the direct sound. For example, the reflection from the floor typically occurs first, followed by the ceiling and the walls. The initial reflections are known as *early reflections*, and are a function of the reflective surfaces, the position of the audio source and the relative location of the listener.

A small room may have only a fraction of a second before the first reflections, whereas large spaces may take much longer. The elapsed time of the early reflections defines the perceived size of the room from the point of view of a listener. Space offers various controls over early reflection parameters.

The time delay between the direct sound and the first reflection is usually known as *pre-delay*. Space lets you adjust pre-delay. Increasing the pre-delay often changes the perceived clarity of audio such as vocals.

Reflections continue as the audio reaches other surfaces in a space, and they create more reflections as the sound waves intermingle with one another, becoming denser and changing in character depending on the properties of the room. As the room absorbs the energy of the sound waves, the reverb gradually dies away. This is known as the *reverb tail* and may last anywhere up to a minute in the very largest of spaces.

The reverb tail will often vary at different frequencies depending on the space. Cavernous spaces often produce a booming, bassy reverb whereas other spaces may have reverb tails which taper off to primarily high frequencies. Space allows for equalization of the frequencies of the reverb tail in order to adjust the tonal characteristics of the reverb sound.

A reverb tail is often described by the time it takes for the sound pressure level of the reverb to decay 60 decibels below the direct sound and is known as *RT60*. Overall, Space lets you adjust the decay as desired. For surround processing, decay can be adjusted for individual channel groups.

Space Convolution Reverb

Convolution reverb goes beyond traditional analog and synthetic digital reverb techniques to directly model the reverb response of an actual reverb space. First, an *impulse response* (IR) is taken of an actual physical space or a traditional reverb unit. An IR can be captured in mono, stereo, surround, or any combination. The IR, as displayed by Space, clearly shows the early reflections and the long decay of the reverb tail.

Impulse Response sample

Space uses a set of mathematical functions to convolve an audio signal with the IR, creating a reverb effect directly modeled on the sampled reverb space. By using non-reverb impulse responses, Space expands from reverb applications to a general sound design tool useful for many types of audio processing.

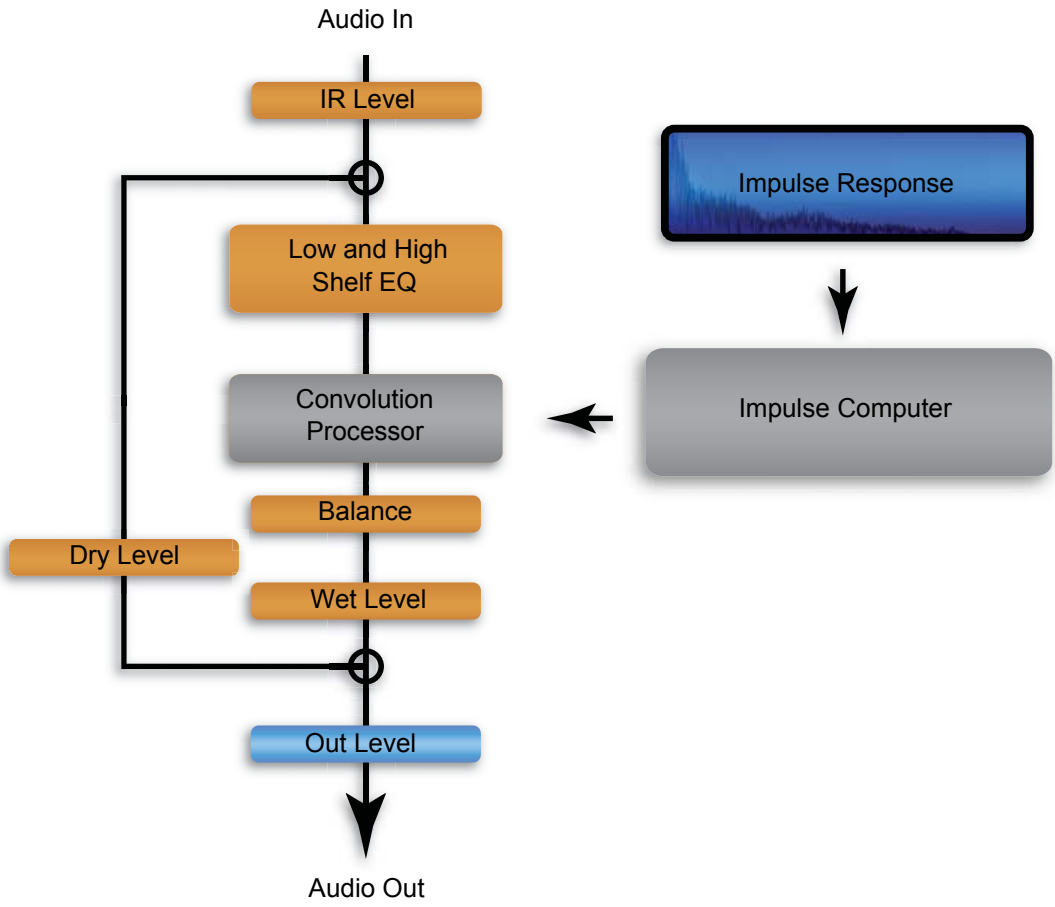
The downside of traditional software based convolution reverbs has been the heavy CPU processing requirement, which can result in convolution reverbs with unacceptable latency. Many early software convolution reverbs did not offer adequate control over traditional reverb parameters such as Pre Delay, EQ, or decay time.

Space redefines reverb processing in Pro Tools by offering zero and low latency convolution with the full set of controls provided by traditional synthetic reverbs.

Space System Design

Space uses advanced DSP algorithms to deliver convolution reverb processing.

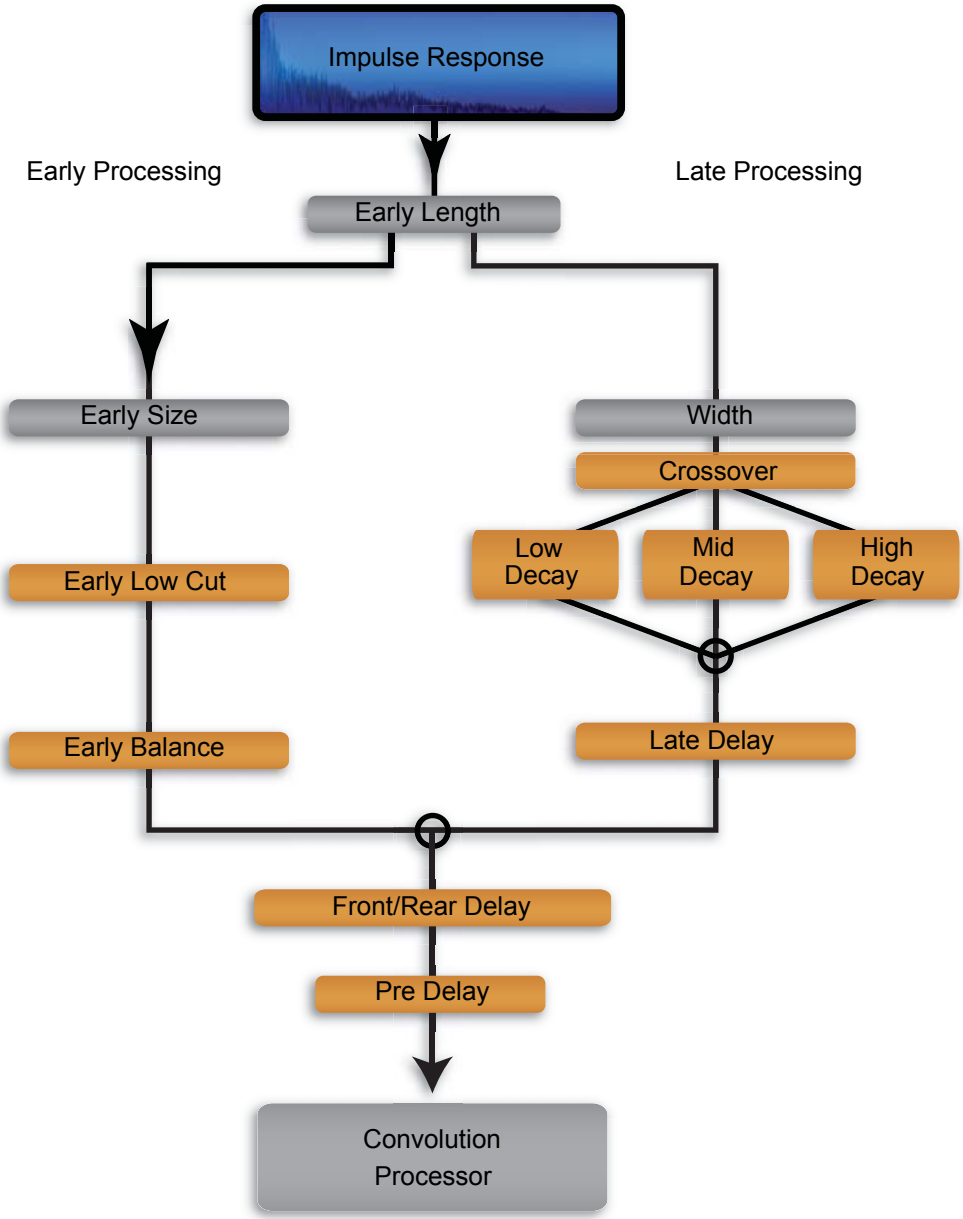
The following figure shows the internal system design of Space and demonstrates how Space processes the audio signal.



Space internal system design

The impulse computer is an internal module of Space that provides extensive control over the currently loaded impulse response waveform. When you adjust the parameters shown below, the IR is automatically recalculated by the impulse computer and reloaded into the convolution processor.

The following figure shows the internal functions of the impulse computer as it processes the waveform and loads it into the convolution processor.



Space internal functions of the impulse computer

Impulse Response (IR) and Space

This section covers aspects of impulse response (IR) and Space.

IR Processing Control Lag

Adjusting some controls in Space requires the impulse computer to recalculate the waveform and reload it into the convolution processor. This operation uses DSP and host processing capacity. When this occurs, some control lag may be experienced. This should be kept in mind if controls are being automated in real time during a session.

How Impulse Responses Are Captured

An IR of an actual physical space is captured using a combination of an impulse sound source and capture microphones. The sound source is used to excite the physical space to create a reverb, and can be a starter pistol or a frequency tone played through a speaker. The microphones can be placed in various configurations. The resulting IR is then processed to create a digital representation of both the physical space, potentially colored by the sound source and the type of microphone used.

Similarly, an IR of a hardware effects unit can be captured by sending a test pulse through the unit and capturing the result digitally. In addition to reflecting reverb or delay characteristics, an IR also reflects tonal character and can be used for a variety of effects beyond pure reverb applications.

Depending on the capture technique used, the IR may be suitable for use with mono, stereo, surround or a combination of those formats. For example, a capture setup with a single sound source and two microphones is ideal for a mono-to-stereo IR.

Multiple IRs may be taken of a physical space where the sound source has been moved to different physical locations. Each resulting IR may be used to create individual reverbs for separate instruments. This effectively allows an engineer to place each instrument in the reverb sound field as if the instruments were physically arranged in the space.

Space IR Library Installation

You can download IR Libraries from Avid's Space Online IR Library. For more information on downloading and installing IR Libraries from the Space Online IR Library, see "Installing Space IR Packages" on page 196.

Using Third-Party IRs in Space

Space reads a wide range of IR formats automatically, including WAV and AIFF file formats, allowing you to import a variety of IRs. Space supports IR sample rates from 22 kHz up to 96 kHz in bit depths from 16 to 32 bits. In addition, Space supports the display of JPEG format picture files stored with IRs.

To use third-party IR libraries with Space:

1. In the IR Browser, select Edit > Import Other IR Folder.
2. Locate and select the library on your hard drive.
3. Click Choose.

Space Multichannel IR Formats

Space supports IRs in multichannel or multiple mono audio files. IRs with a single input are used for mono or summed stereo processing and can be stored as a single interleaved multichannel file, or as multi-mono files. IRs with stereo inputs used for true stereo processing must be stored as multi-mono files.

The following table shows Space IR channel formats.

Input	Output	Channel Order	File Format
Mono	Mono	—	Mono file
Mono	Stereo	L R	One 2-channel file or two mono files
Mono	Quad	L R Ls Rs	One 4-channel file or four mono files
Mono	5.0	L C R Ls Rs	One 5-channel file or five mono files
Stereo	Stereo	L R	Four mono files
Stereo	Quad	L R Ls Rs	Eight mono files
Stereo	5.0	L C R Ls Rs	Ten mono files

For multi-mono files, Space understands the following filename conventions, based on those used by Pro Tools. The filename format is based on the impulse name plus two suffixes which indicate input and output channels as follows:

Impulsename.inputchannel.outputchannel.type

- Impulsename is the name of the impulse. Mixing multiple IR files with the same Impulsename in the same folder is not supported.
- Inputchannel refers to the number of sources used for the impulse, starting at the number 1. An IR captured in true stereo will usually have two input channels numbered 1 and 2. If there is only one input channel, then inputchannel is optional and can be omitted. Also, instead of using numbers 1 and 2, the inputchannel can be designated as L and R.
- Outputchannel refers to the microphones used to capture the impulse, and corresponds to your studio monitors. outputchannel is designated using the standard L, C, R, Ls and Rs extensions.
- Type is optionally .WAV or AIFF. For best performance, filenames should always be suffixed with type to avoid Space having to open the file to determine audio format.

The following examples show how various multi-mono IR files could be named.

Stereo to Stereo IR

Cathedral.1.L.wav
Cathedral.1.R.wav
Cathedral.2.L.wav
Cathedral.2.R.wav

Stereo to 5.0 IR

Cathedral.1.L.wav
Cathedral.1.C.wav
Cathedral.1.R.wav
Cathedral.1.Ls.wav
Cathedral.1.Rs.wav
Cathedral.2.L.wav
Cathedral.2.C.wav
Cathedral.2.R.wav
Cathedral.2.Ls.wav
Cathedral.2.Rs.wav

Mono to Quad IR

Cathedral.L.wav
Cathedral.R.wav
Cathedral.Ls.wav
Cathedral.Rs.wav

Stereo to Quad IR

Cathedral.1.L.wav
Cathedral.1.R.wav
Cathedral.1.Ls.wav
Cathedral.1.Rs.wav
Cathedral.2.L.wav
Cathedral.2.R.wav
Cathedral.2.Ls.wav
Cathedral.2.Rs.wav

Channel Compatibility and Space

Space works best with IRs that match your current channel configuration. For example, if Space is instantiated in a mono to stereo configuration, stereo IRs will be highlighted in the IR browser. The IR information in the display area shows how many inputs and outputs an IR has. For example, an IR listed as 2 input 4 output is a stereo to quad IR.

If an IR is loaded that doesn't match the current configuration, Space will try to create the best possible match with the IR provided. For example, if a stereo IR is loaded into a mono instantiation of Space, Space will sum the left and right channels in order to mimic a stereo reverb with both channels panned to mono.

If an IR is loaded that is missing a required channel, Space will automatically create a phantom channel for the IR if needed. For example, if a stereo IR is loaded into a quad instantiation, Space will compute left and right surround channels automatically based on the existing channels. If a quad IR is loaded into a 5.0 channel instantiation, Space will compute a phantom center from the front left and right channels. Phantom channels are indicated by comparing the IR information displayed in the display area to the number of channels in use. For example, a 2 input 4 output IR used with a 5.0 output instantiation of Space will automatically have a phantom center channel created.

Space Presets

Space supports the Pro Tools Plug-In Librarian. When an IR file is loaded, all controls remain at their current positions, as the IR file only contains the audio waveform. By default, presets contain both the IR waveform and control settings and can be saved as required so that specific control settings can be retained for future sessions. If you save presets without embedding the IR waveform, be sure that you include the IR waveform with the session when transferring the session between different Pro Tools systems.

There are two important items to note about using presets in Space:

- Space presets do not store information for the Wet and Dry level controls. This is to enable you to change presets without losing level information. Likewise, the Pro Tools Compare function is not enabled for these controls.
- A Space preset only includes the currently selected snapshot.

IR files are audio files only and do not contain information about Space control settings. If you wish to save specific control settings for an IR, you should save them using the Pro Tools Plug-In Librarian or using the snapshot facility of Space.

Space Snapshots

In addition to presets, Space lets you manage a group of settings, called *snapshots*, that can be switched quickly using a single, automatable control. Each snapshot contains a separate IR and settings for all Space controls.

IRs in a snapshot have been pre-processed by the impulse computer and can be loaded instantly into the convolution processor. Snapshots are useful, for example, in post production mixes when the reverb is changed for different scenes via automation as the picture moves from one scene to another.

Embedding IRs in Sessions, Presets, and Snapshots

By default, all IR and snapshot info used by Space (including up to ten IRs) is saved in the Pro Tools session file. Likewise, plug-in presets contain a saved copy of the IR and settings in the currently selected snapshot. Session and preset file sizes will increase as Space stores each IR waveform inside the file. This provides maximum compatibility between different Pro Tools systems without the need for them to have identical IR libraries.

IR embedding can be disabled in Space's Preferences. If IR embedding is disabled, Space stores only a reference to the name of the IR file. When the session is transferred to a different system, Space attempts to load the matching IR file from the Space IR library. For maximum compatibility, ensure that all of the appropriate IR files are available on the new system.

When working with an IR that only exists in a session file, ensure it is saved to a separate snapshot or preset. If the IR is overwritten by loading a new IR and the session is saved, the original IR cannot be recovered without access to the original IR file.

By default, Pro Tools presets or session files created using Space automatically include copies of all relevant IR waveforms. This provides maximum compatibility of session files between different Pro Tools systems.

It is your responsibility to ensure that you observe the copyright on any IR transferred to a third party in this fashion.

Space Controls and Displays

The Space interface is divided into the following sections:

1 Display area (See “Space Display Area” on page 192.)

2 IR Browser (See “Space IR Browser” on page 195.)

3 Primary controls (See “Space Primary Controls” on page 197.)

4 Group Selectors and Controls (See “Space Group Selectors and Controls” on page 198.)

The Space interface

Space Display Area

The display area of Space operates in the following four modes, indicated by the Display Mode selectors at the top right hand corner of the Space window:

- Waveform mode
- Picture Preview mode
- Snapshot mode
- Preferences mode

Display Mode selectors

The Display area changes based on the selected mode.

Info Bar

At all times, the Info bar at the bottom of the display area window shows the following controls and information.

Info bar

Snapshot Menu A pop-up menu allowing quick selection or automation of a snapshot.

IR Name Displays the folder and file name of the currently loaded IR.

Quick Browser Controls The Quick browser controls allow the IR to be quickly changed even when the IR browser is closed, automatically loading each IR sequentially. The Waveform icons step backwards and forwards through IRs and automatically load the IR file. The Folder icons step backwards and forwards through folders. The Quick browser requires an IR to be currently loaded from the IR browser. If no such IR is loaded (for example, the IR in use has been loaded from a preset or session but does not exist in the IR browser), the Quick browser controls are inoperative.

Space Waveform Mode

Waveform mode is selected using the Waveform icon at the top of the Space window.

Waveform mode displays the IR waveform along a horizontal axis marked in seconds and the vertical axis marked in amplitude. The early section of the waveform is highlighted in a lighter color. In addition, the channel selector highlights the current channel in the waveform.

IR information such as sample rate and number of input and output channels is displayed at the bottom right of the waveform.

Display area, Waveform mode

The controls in Waveform mode function as follows:

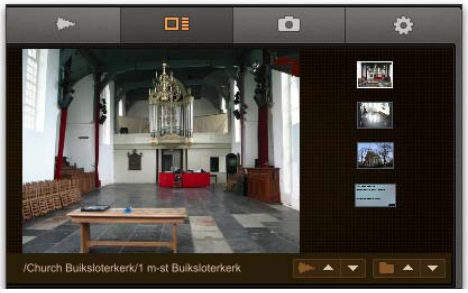
Original Bypasses all waveform processing, allowing the original IR to be auditioned. This control effectively bypasses the processing in the IR computer as shown in the system diagram.

Channel Selectors Displays from one to five channels (in the order Left, Center, Right, Left Surround, Right Surround). Click the desired channel to display the IR waveform for that channel. In Mono mode, no channel selector is displayed.

Zoom Zooms in and out on the time axis for the waveform display.

Space Picture Preview Mode

Picture Preview mode is selected using the Picture Preview icon at the top of the Space window. When selected, Picture Preview mode shows pictures associated with the IR. For an IR provided with Space, this will usually include a photograph of the location, and an image with technical details such as microphones used or an overview of the microphone setup. Thumbnails of images are displayed in the right hand column. In this mode, the IR browser can be used to view the associated pictures without loading the IR itself.



Display area, Picture Preview mode

Space Snapshot Mode

Snapshot mode is selected using the Snapshot icon at the top of the Space window. Space provides up to ten snapshots that are available at all times. Each snapshot stores a separate IR waveform and all control settings. Snapshots are optimized for quick loading into the convolution processor, and switching between snapshots is considerably faster than loading a new IR. Snapshot mode allows all ten snapshots to be viewed as well as the option to select, rename, copy, paste, and clear snapshots.

The name of the currently selected snapshot is always displayed in the Info bar at the bottom of the display area, and can be automated. This lets you switch reverb settings during playback and is useful for post production sessions where the reverb setting may change as the scene changes.

Display area, Snapshot mode

The active snapshot can be selected in one of two ways. At any time, a snapshot can be selected by using the snapshot menu in the Info bar. Alternatively, when the display area is in Snapshot mode, a snapshot can be selected by clicking the selection area next to the snapshot name.

Select Lets you select which snapshot is currently loaded.

Name Displays the name of each snapshot. By default, snapshots are named “Snapshot 1” through “Snapshot 10.” Snapshots can be renamed by clicking on the snapshot name and entering a new name followed by the Enter key (Windows) or the Return key (Macintosh).

Sample Path Displays the name of the IR selected for each snapshot.

Copy Copies the currently selected snapshot settings into a clipboard.

Paste Pastes the clipboard into the currently selected snapshot. Note that the name of the existing snapshot is not changed by pasting a new snapshot, in order to avoid duplicate snapshot names.

Clear Clears the IR from the currently selected snapshot.

Space Preferences Mode

Preferences mode is selected using the Preferences icon at the top of the Space window. This displays a number of preferences settings for Space.

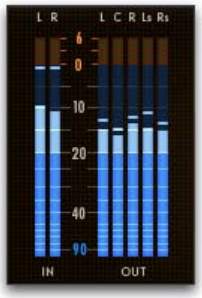
Display area, Preferences mode

Embed IRs in Preset & Session Files Enables or disables the embedding of IR waveforms in presets and session file. By default, this is enabled.

Installed IR Packages Displays a list of installed Space IR packages and their versions.

Space Meters

The Meters display the amplitude of the incoming and outgoing audio signals by channel. The number of meters shown will depend on the number of input and output channels. Input meters may be mono or stereo, and output meters may be mono, stereo, quad, or 5.0 channels. Each meter is marked as either mono, left, right, center, left surround, or right surround. A logarithmic scale marked in decibels and momentary peaks are also displayed on the meter.



Meters, stereo input to 5.0 output shown

The red Clip indicators at the top of the meters indicate clipping on the corresponding channel. When a channel has clipped once, the clip indicator remains lit and additional clips will be shown by a variation in the color of the indicator. The clip indicator for all channels can be cleared by clicking on any clip indicator, or selecting Track > Clear All Clip Indicators in Pro Tools, or pressing Option+C (Mac) or Alt+C (Windows).

Space IR Browser

The IR browser lets you quickly and easily install, locate, and organize IRs on local hard drives. The Load and Edit buttons in the IR browser let you install and import IRs, create Favorites, and change the IR groups displayed.

Space automatically highlights each IR that matches the current channel configuration. For example, when using a Space Stereo to Quad inset, each IR with that configuration is highlighted. Impulses that are not highlighted can still be loaded, and Space tries to adapt the IR to the current channel format (see "Channel Compatibility and Space" on page 189).

IR Browser

An IR can be loaded by double clicking with the mouse, or using the Load button displayed at the top of the IR browser drawer. The currently loaded IR is highlighted with a small dot next to the file name in the browser.

The IR browser can be operated using the following shortcuts. When the IR browser has keyboard focus, a blue highlight is displayed around the edge of the browser window.

IR Browser Shortcuts

Browser Navigation	Arrow Keys
Load IR	Enter (Windows) Return (Macintosh)
Open/close all folders	Alt-click (Windows) Option-click (Macintosh)
Edit menu	Right-click (Windows or Macintosh) Control-click (Macintosh)
Return keyboard focus to Pro Tools	Escape key

The IR browser lets you install and import new IRs. Each IR folder reflects a folder on the hard drive. When importing a new IR folder, a standard file dialog will be displayed to enable the user to choose the folder that contains the desired IR.

The IR browser also provides a Favorites folder, which is a user defined group of links to IRs in the IR browser. Favorites can be sorted in any desired order by dragging and dropping them as required. In addition, folders can be created in Favorites using the 'New Folder in Favorites' function in the Edit menu.

To add an IR file or folder to the Favorites folder:

1. In the IR browser, select the desired IR file or folder.
2. From the IR browser's Edit menu, select Add to Favorites.

Space IR Browser Edit Menu

The IR browser's Edit menu contains the following commands:

Download Space IR Package Opens a Web browser to the Space online IR library.

Install Space IR Package Installs a new IR package downloaded from the Space online library (see "Installing Space IR Packages" on page 196).

Import Other IR Folder Lets you import a new IR folder in common file formats. By default, the new IR is given the same name as the selected folder.

Remove Imported IR Folder Lets you remove the currently selected IR folder.

Rename Imported IR Folder Lets you rename the currently selected IR folder.

Add to Favorites Adds the currently selected IR to the Favorites group at the top of the browser window.

New Folder in Favorites Creates a folder in the Favorites group. Favorite IRs can be dragged and dropped into the folder.

Rename Favorites Folder Lets you rename the currently selected Favorites folder.

Remove from Favorites Removes the currently selected IR from the Favorites group. This function only removes the link in the Favorites group and does not remove the original IR file from the system.

Reset to Default IR Library Resets Space to the default library. This also removes any user imported IR folder, but does not affect the Favorites folder, or IR packages installed from the Space online IR library.

Rescan for Files Forces Space to check the hard drive for new IRs. This is typically required if new IR files have been copied to the hard drive. Using the Rescan for Files command loads new IRs into Space without needing to close Space or the Pro Tools session.

⚠ *Space may pause briefly while it scans the hard drives to locate IRs or if all folders are opened at once. The amount of time taken is proportional to the number of folders and IRs scanned.*

Installing Space IR Packages

Additional IR packages for Space are available for registered users to download from the Space Online IR Library at:

www.avid.com/tlspace/impulselibrary/

These package files are supplied in a lossless compressed format.

To install a Space IR package:

1. In the Space IR browser, select Download IR Package from the Edit menu. Your default Web browser launches and loads the Avid Space Online IR Library website.
2. Click Download
3. Log in using your email address and password. You may need to create a new account if you have not yet registered Space.

⚠ *To download IR packages from the Space Online IR Library, you must first register with Avid and create an online profile.*

4. Click Continue.
5. Click Download for the IR package you want.
6. In Space, select Install Space IR Package from the Edit menu.

7 In the resulting dialog, locate and select the file you downloaded.

8 Click Choose.

9 Click Install to install the IR package. A window is displayed with the results of the installation.

The IR browser in Space updates to include the new IR.

If a problem occurs with the IR installation, Space displays an error message. Review the log file stored in the Space IR library for further details. Each IR package has a version number, and Space warns you if an IR package has already been installed.

The details of all installed IR packages can be reviewed using the Show Packages option in Preferences mode.

Space Primary Controls

The primary control group is visible at all times and allows control of key reverb parameters. This includes the wet and dry levels of the audio passing through Space.

Space primary controls

Reset Resets all Space parameters except Wet, Dry, and Input and Output Level.

Wet Controls the level of wet or effected reverb signal, from –inf dB to +12 dB.

Dry Controls the level of dry or unaffected reverb signal, from –inf dB to +12 dB.

Decay Controls the overall decay of the IR waveform and is displayed as a percentage of the original. When Decay is adjusted, the waveform is recalculated in real time.

Space Group Selectors and Controls

Space presents reverb controls in five different groups. Each group is activated by selecting the corresponding selector.

Group Selectors

Space Level Controls

The Levels group provides control of the overall input and output of the reverb, including individual controls for early and late reflections, and independent front, rear, and center levels for surround outputs.

Level controls (5.0 shown)

Input Cuts or boosts the input signal level from –inf dB to +12 dB.

Output Cuts or boosts the output signal level from –inf dB to +12 dB.

Early Cuts or boosts the levels of the early reflections from –inf dB to +12 dB.

Late Cuts or boosts the levels of the late reflections from –inf dB to +12 dB.

Front/Rear/Center In quad and 5.0 channel output modes, Space provides additional controls to attenuate or boost the Front (left and right), Rear (left and right), and Center (5.0 only) signal levels from –inf dB to +12 dB. In 5.0 output mode, the level of the center channel is affected by both the Front and Center controls.

Space Delay Controls

The Delays group provides controls for the delay timings of the reverb. When changes are made to any control in the Delays group, the IR waveform is recalculated and displayed in the Waveform display.

Delay controls (5.0 shown)

Pre Delay Adjusts length of the Pre Delay from –200 to +200 ms. The Pre Delay is the time between the direct sound and the first reflection. Increasing the Pre Delay often changes the perceived clarity of audio such as vocals. Pre Delay adjusts the delay of the overall impulse and affects both the Early and Late portions of the IR equally.

Pre Delay can be set to negative values to allow for subtle or radical changes to the reverb. For example, a small negative Pre Delay setting can be used to eliminate the early portion of an IR. A large negative Pre Delay setting lets you use the very end of a reverb tail for creative sounds not possible with standard reverbs.

Late Delay Adjusts length of the Late Delay from zero to +200 ms. The Late Delay is the time between the Early Reflections and the Late Reflections or tail of the reverb.

Increasing the Late Delay control from zero allows the reverb tail to be delayed so that it does not start immediately after the early portion of the IR. As Late Delay is increased, the reverb tail starts later in time and makes the reverb space sound larger. Large amounts of late delay can be used to achieve creative effects not possible with standard reverbs.

Front/Rear/Center Delay In quad and 5.0 channel output modes, adjusts length of the Front, Rear, and Center Delays independently from zero to +200 ms.

Space Early Section Controls

The Early group controls the character of the early portion of the IR and the early reflections. The primary control is Early Length which defines the size of the early portion of the IR waveform. When loading an IR from an audio file, Space relies on the user to define which part of the IR is the early portion of the waveform. By default, the Early length is set to 20 ms.

Early controls

The early portion of the IR waveform is highlighted in the Waveform display. If Early length is set to zero, then the Early setting have no effect on the audio. Otherwise, when changes are made to any control in the Early group, the IR waveform is recalculated and displayed in the Waveform display.

Early controls indicated in IR waveform

Length Adjusts the length of the Early reflections from zero to 500 ms. When set to zero, other controls in the Early group have no effect on the audio. The Early Length control adjusts the point in the impulse where the early portion ends and the late portion or tail begins.

For the most realistic reverb results, Early Length should be adjusted while viewing the waveform display. The early portion of a reverb IR is typically seen as a series of discrete spikes at the beginning of the waveform. Early Length can however be adjusted to any value to explore other creative possibilities.

Size Changes the size of the Early reflections, from 50% to 200%. Early Size expands or contracts the reflections in the early portion of the IR (as specified by the Early Length control). Reduce the Early Size to give the space a smaller, tighter sound. Increase the Early Size to give the space a larger, roomier sound.

Lo Cut Early Lo Cut controls the frequency of a highpass filter applied to the early portion of the IR (as specified by the Early Length control). The default setting of zero disables the highpass filter. As the control is set to a higher value, the corner frequency of the highpass filter is increased. Use this control to reduce boom and low frequency cancellations that can happen when mixing the reverb output with a dry signal.

Balance Early Balance controls the left/right gain balance of the early portion of the IR (as specified by the Early Length control). Adjust the Balance to control the apparent position of the reverb input in the stereo image. A negative value reduces the right channel gain. A positive value reduces the left channel gain.

⚠ *When loading an IR from an audio file, Space relies on the user to define which part of the IR is the early portion of the waveform. If the Early Length is set to zero, controls in the Early group will not affect the IR.*

Space Reverb Section Controls

The Reverb group offers a low and high shelf EQ in addition to width and balance controls. The EQ operates prior to convolution processing.

Reverb controls

Lo Freq Adjusts the frequency of a low frequency filter from 20 to 500 Hz.

Lo Gain Cuts or boosts the frequency set in Lo Freq from –15 dB to +15 dB.

Hi Freq Adjusts the frequency of a high frequency filter from 500 Hz to 20 kHz.

Hi Gain Cuts or boosts the frequency set in Hi Freq from –15 dB to +15 dB.

Width Increase or reduces the stereo spaciousness of the reverb. Use this control to tailor the reverb's character in a mix. Keep in mind that an IR that has little stereo separation to begin with may have limited results.

Balance Controls the balance of the reverb output. Use this control to balance a reverb from an IR that has been captured without a centered stereo image, or for creatively controlling the character of the reverb in a mix.

Reverse Reverses the IR waveform and controls the total length. As the IR waveform is recalculated, it is re-displayed in the Waveform display. The value shown is measured in Beats Per Minute to let you easily match the tempo of the music.

If the waveform is reversed using the Reverse control, effected audio may continue to play for several seconds after the transport is stopped or audio input finishes.

Space Decay Section Controls

The Decay group controls allow the user to control the decay of the low, mid, and high frequency portions of the IR. Use the controls to tailor the reverb's character for a mix or for creative possibilities not found in traditional reverb processors.

Decay controls

Low Decreases or increases the rate at which low frequencies decay.

Low Xover Adjusts the frequency point that divides the IR into low and mid frequency portions.

Mid Decreases or increases the rate at which mid frequencies decay.

High Xover Adjusts the frequency point that divides the IR into mid and high frequency portions.

High Decreases or increases the rate at which high frequencies decay.

Front/Rear In quad and 5.0 channel output modes, Front and Rear independently control the decay for front and rear channels.

Using Space

This section addresses some common scenarios in which Space can be used during a Pro Tools session.

Using Space Presets

Space ships with a selection of factory presets for different reverb sounds. The presets are designed to give a sample of the various IRs available from the Plug-In Presets selector in conjunction with various reverb settings. However, the presets do not cover the entire IR library.

Using Space on an Effect Send

When Space is used on an Aux Input track as an effects send, the Dry control should be set to –inf dB.

Automating Space Snapshots

Snapshot automation is a powerful method of changing the reverb parameters without having to individually automate each parameter.

To automate Space Snapshots:

1. Insert Space on a track.
2. Select Snapshot mode.
3. Load an IR into each Snapshot and make any desired changes to specific Space controls.
4. Name each Snapshot as desired.
5. Click Auto.
6. Add Snapshot to the list of automated controls.
7. Select Space > Snapshot from the automation menu for the track.
8. Draw the desired automation on the track with the Pencil tool. The names displayed in the automation track will match the names entered for each Snapshot.

Space IR Library Categories

Space includes an extensive impulse response library, divided into the following categories.

Category	Description
Halls	Halls and auditoriums
Churches	Churches and chapels
Rooms	Large and small rooms
Chambers	Traditional studio reverb chambers
Plates	Classic electromechanical reverb plates
Springs	Classic electromechanical reverb springs
Digital Reverbs	Classic and contemporary digital reverb units
Post Production	Post production impulses
Tiny Spaces	Small reverbs from everyday objects
Pure Spaces	A selection of Pure Space impulses in multiple categories
Effects	Non-reverb effects for sound design in multiple categories
• Colors	Sound coloring and positioning
• Cosmic	Spacey smears and washes
• Impressions	Smears and washes that evoke an image
• Industrial	Heavy machinery
• Periodic table	Better living through chemistry