Avid® 3D

Reference Guide

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Avid 3D Reference Guide • 0130-06297-01 • June 2004

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Using This Guide

Congratulations on your purchase of the Avid 3D software. You can use Avid 3D to create, customize, and animate 3D content, visual effects, text and titling for your productions.

The documentation describes the features and hardware of all models. Therefore, your system might not contain certain features and hardware that are covered in the documentation.

This guide is intended for all Avid 3D users, from beginner to advanced. It contains detailed interface, command and parameter information for all aspects of the Avid 3D software.

Symbols and Conventions

Avid 3D documentation uses the following symbols and conventions:

Symbol or Convention	Meaning or Action
	A note provides important related information, reminders, recommendations, and strong suggestions.
	A caution means that a specific action you take could cause harm to your computer or cause you to lose data.
	A warning describes an action that could cause you physical harm. Follow the guidelines in this document or on the unit itself when handling electrical equipment.
>	This symbol indicates menu commands (and subcommands) in the order you select them. For example, File > Import means to open the File menu and then select the Import command.
▶	This symbol indicates a single-step procedure. Multiple arrows in a list indicate that you perform one of the actions listed.
Margin tips	In the margin, you will find tips that help you perform tasks more easily and efficiently.
Italic font	Italic font is used to emphasize certain words and to indicate variables.
`Courier Bold font`	Courier Bold font identifies text that you type.
Bold font	Bold indicates a user interaction.
Ctrl+*key* or *mouse action*	Press and hold the first key while you press the last key or perform the mouse action. For example, Shift+Alt+C or Ctrl+drag.

If You Need Help

If you are having trouble using Avid 3D:

1. Retry the action, carefully following the instructions given for that task in this guide. It is especially important to check each step of your workflow.

2. Check for the latest information that might have become available *after* the documentation was published in one of two locations:

   - If release notes are available, they ship with your application.

   - If ReadMe files are available, they are supplied in your Avid application folder. ReadMe files are also available from Help.

   Release notes and ReadMe files are also available from the Knowledgebase.

3. Check the documentation that came with your Avid application or your hardware for maintenance or hardware-related issues.

4. Visit Avid Online Support at www.avid.com/support. Online support is available 24 hours per day, 7 days per week. Search the Knowledgebase to find answers, to view error messages, to access troubleshooting tips, to download updates, and to read/join online message-board discussions.

5. For Technical Support, please call 800-800-AVID (800-800-2843).

   For Broadcast On-Air Sites and Call Letter Stations, call 800-NEWSDNG (800-639-7364).

Accessing the Online Library

The *Avid 3D Online Library* contains all the product documentation in PDF format as well as a selection of movies for getting started. Avid recommends the movies as your first resource for learning how to use your application.

You will need Adobe® Acrobat® Reader® installed to view the documentation online. You can download the latest version of the Reader from the Adobe® Web site.

To access the documentation from the Online Library:

1. Insert the Online Library into the drive.

2. Double-click the **Mainmenu** file.

How to Order Documentation

To order additional copies of this documentation from within the United States, call Avid Sales at 800-949-AVID (800-949-2843). If you are placing an order from outside the United States, contact your local Avid representative.

Avid Educational Services

For information on courses/schedules, training centers, certifications, courseware, and books, please visit www.avid.com/training or call Avid Sales at 800-949-AVID (800-949-2843).

Chapter 1
Commands and Interface Reference

Main Window Overview

The Avid 3D interface is made up of control panels and four viewports, many of which can be resized.

Viewports
Let you view the contents of your scene in different ways. You can resize, hide, and mute viewports in any combination.

Library panel
Contains objects, materials, textures, images, and video clips you can use to create your scene. This panel is also home to the scene explorer.

Title bar
Displays the name of the open project and scene.

Menu bar Provides access to primary project and editing commands.

Control bar
Displays buttons for one-click access to camera, transformation, and editing controls.

Lower interface controls

Tools and Options panel
Provides tools for modifying and animating elements in your scene, as well as setting user preferences and display and output options.

Menu Bar

The menu bar is the horizontal bar at the top of the main window that displays menus containing commands that are general to Avid 3D. These include general operations such as managing files, editing, and getting help.

Location: At the top of the main window.

File Menu

Create and open projects; create, open, close, and save project scenes; import and export models and scenes, and exit.

Location: Menu bar

Option	Description
New Scene	Creates a new scene. Acts as a "delete all" command: The current scene is removed from the workspace and a new empty scene is created. By default, the empty scene is named "Untitled." When you select this command, you are prompted to save and close the current scene.
Open	Opens a browser that lets you locate and load an existing scene. When you select this command, you are prompted to save and close the current scene.
Save	Saves your scene and all rendering properties and options as a scene file using the current scene file name.
	If you have not previously saved your scene ("Untitled"), a browser is displayed in which you can specify a scene name. A scene is saved with an .scn extension to the Scenes folder of the current project folder.
Save As	Opens a browser that lets you save your scene to a different name. A scene is saved with an .scn extension to the Scenes folder of the current project folder.
New Project	Creates a new project. This command opens the New Project dialog box where you can set a name and location for your project folder. Scenes are always associated with a particular project.

Option	Description
Project Manager	Opens the Project Manager dialog box, which displays a list of available projects and scenes. You can select an existing project from the list, delete projects, and add projects to the list that may exist elsewhere in your system or network.
	If you choose a project to work on, you can either choose a scene you want to load or create a new scene. You are prompted to save and close the current project and scene before the next project and scene are loaded.
Source Paths	Opens the Inspect Source Paths property editor, where you can verify your scene's links to external files and, if necessary, modify them.
Import Model	Opens a browser that lets you import an exported SOFTIMAGE|XSI or Avid 3D model. Exported models are identified by their .emdl extensions.
Import dotXSI File	Imports elements from a dotXSI (.xsi) file.
Import EPS File	Imports curves from an encapsulated PostScript file (.eps).
Export Model	Opens a browser for exporting a selected model. Exported models are saved to the Models folder under the project with the .emdl extension.
Recent Scenes	Lists scenes you have worked on recently. Select a scene to open it.
Recent Models	Lists models you have imported recently. Select a model to import it into the current scene as a non-referenced model.
Exit	Closes the Avid 3D program. You are prompted to save changes to your current scene before exiting.

Edit Menu

Perform common editing and organizational tasks on selected elements within your scene.

Location: Menu bar

Option	Description
Repeat	Repeats the last repeatable command.
	The name of the menu item indicates which command will be repeated. Certain categories of commands cannot be repeated:
	• Selection commands. This allows you to apply a command to selected elements, then select other elements and repeat the command.
	• Interactive manipulation, for example, using the transform tools (V, C, X) or the Move Point tool (M). However, transformation values entered numerically in the Local Transform property editor or on-screen parameters can be repeated.
	• Viewing commands, such as toggling the display type in a viewport.
	• Playback and timeline commands, such as changing frames.
	• Camera navigation and viewing commands, such as orbiting, zooming, and framing.
	When the last command can't be repeated, **Edit > Repeat** will repeat the previous command instead.
	Note that you can also repeat the last command from a specific menu button by middle-clicking on the menu button.
Undo	Cancels the last action that was performed. You can perform multiple undo's.
Redo	Reapplies the action you previously canceled with the Undo command.
Cut	Removes the current selection and copies it to the Clipboard.
Copy	Duplicates the current selection and copies it to the Clipboard.
Paste	Inserts a copy of the Clipboard contents, replacing the current selection (if any) with the contents of the Clipboard.
Select All	Selects all elements in the current scene.

Layouts Menu

Switches between a single and dual-screen layout.

Location: Menu bar

Option	Description
Avid 3D Main - Single	Displays Avid 3D on a single screen.
Avid 3D Main - Autohide	Hides the library and tools and options panels when they are not in use. Move the mouse pointer to the right edge of the screen to display a panel.
Avid 3D Main - Dual	Displays Avid 3D on two side-by-side screens.

Help Menu

Access to Online Help, which contains information on commands, properties, and the interface; access to the Softimage and Avid web sites, where you can perform web searches and send technical questions to Avid Customer Support by e-mail.

Location: Menu bar

Option	Description
Avid® 3D Help	Opens the Online Help window's Contents tab, which displays help topics listed by category. This window also has an Index tab for alphabetical topic searches, and a Search tab for full-text searches.
Softimage Home Page	Opens your web browser to the Softimage home page.
Avid Home Page	Opens your web browser to the Avid home page.
About Avid 3D	Provides product information, including version number.

Control Bar

The control bar gives you quick access to many commands that are in the form of buttons. Many of these buttons have associated menu commands or shortcut keys.

The control bar includes buttons for navigating in the viewports, transforming scene elements, selecting scene elements and their various components, duplicating and deleting scene elements, undoing and redoing edits, and opening the multi-purpose editor for editing properties.

Location: Above the viewports at the top of the main window.

Button	Tool	Description
	Frame Selection	Zooms instantly into or out from selected elements in your scene.
	Frame All	Zooms instantly into or out from all elements in your scene.
	Reset Camera	Resets the view to its original viewpoint and pan & zoom state.
	Orbit Camera	Pivots a camera, spotlight, or user view around its point of interest.
	Dolly Camera	Dollies toward or away from the center of a viewport.
	Pan Camera	Moves the camera horizontally or vertically without changing its depth.
	Zoom Camera	Zooms into or out of the scene.
	Scale	Changes the size of selected elements.
	Rotate	Rotates (changes the orientation) of selected elements.
	Translate	Moves (positions) selected elements.
	Select	Selects objects.

Button	Tool	Description
	Select Point	Selects points on selected objects.
	Select Polygon	Selects polygons on selected objects.
	Create and Manage Polygon Clusters	Creates, selects, and deletes clusters of polygons on selected objects.
	Duplicate	Creates copies of selected objects.
	Delete	Removes selected elements from the scene.
	Undo	Cancels the last action that was performed. You can perform multiple undo's.
	Redo	Reapplies the action you previously canceled with the Undo command.
	Multi-Purpose Editor	Opens or closes the display of the multi-purpose editor.

Lower Interface Controls

This area of the interface gives you access to the timeline and playback controls; basic keyframe animation controls; and preview and rendering controls, as well as a status line for information.

Rendering and Preview Controls
Let you set up and create rendered output of your scene.

Timeline
Displays the current position of your animation in time and lets you move manually between

Playback controls
Let you play back animated scenes.

Animation controls
Let you set, remove, edit and navigate between keyframes.

Mouse/status line
Displays the current functions of your three mouse buttons as well as status and error messages when applicable.

Timeline

The timeline comprises a ruler, a playback cursor (vertical red bar), a range control, and start and end frame boxes. The timeline represents the length of an animation scene and is used to display the current playback position, set the current position for keyframing properties, and manually move forward or backward to a different part of the animation.

Start frame   Playback cursor   Ruler   Timeline range   End frame
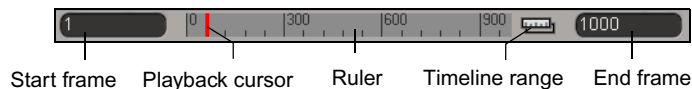
Time is displayed in frames, seconds, or milliseconds, depending on the option you set in the Time Format Options (see).

By default, the first and last frame of the scene is displayed in the start and end frame boxes at either end of the timeline. You can view a specific section of time by changing the frame number in either of these boxes. The current frame/time, as indicated by the position of the playback cursor, is displayed in the current framed/time box in the playback controls.

When you click the Loop button in the playback controls, yellow markers appear in the timeline, showing the frame range of the loop.

Location: Below the viewports at the bottom of the main window.

Playback Cursor

A red vertical bar on the timeline indicating the playback position, it displays the various frames in a scene.

You can drag the playback cursor manually, or you can play back animation using the playback commands. When you play back an animated scene, the cursor moves along the timeline.

- Dragging the playback cursor changes the frame. The current frame box displays the current frame at which the cursor is located.
- Middle-click+dragging the playback cursor moves to the selected frame but does not update the viewports until you release the button. This means you can quickly drag to the required frame while avoiding lengthy refresh time.
- Right-click+dragging the playback cursor also moves to the selected frames without updating the scene. The cursor and frame number in the current frame box turn green. To refresh the scene, click the cursor. This is useful for copying keys from one frame to another.

Location: Timeline

Ruler

Displays the time scale for your animated scene and is used as a guide when setting keyframes or defining rendering tasks.

The time scale can display in frames, seconds, and milliseconds, depending on the option you set in the Time Format Options (see "Options Panel" on page 55).

Location: Timeline

Start Frame Box

Indicates the beginning of the current animated scene.

You can set the start frame value to begin at any point in your scene's timeline. This value is used by the playback commands and controls (such as Play and Go to First Frame).

This value is expressed in frames, seconds, or milliseconds, depending on the settings you set in the Time Format Options (see "Options Panel" on page 55).

Location: Left end of timeline

End Frame Box

Indicates the end of the current animated scene.

You can set the end frame value to end at any point in your scene's timeline. However, the value in the end frame box must be greater than the value in the start frame box for the animation to play. This value is used by the playback commands and controls (such as play and go to last frame).

This value is expressed in frames, seconds, or milliseconds, depending on the settings you set in the Time Format Options (see "Options Panel" on page 55).

Location: Right end of timeline

Timeline Range

Allows you to see and adjust the range relative to the overall animation.

Click this icon (or Alt+click on the timeline) at the right end of the timeline to display the range control. Then do any of the following:

- Drag on the left, right, or middle handles to adjust the playback's in/out time.
- Click+drag in the range's middle to slide the time range.
- Click this icon again (or Alt+click on the timeline) to return to the timeline display.

Location: Right end of timeline

Playback Controls

Controls how the animation and audio in the scene is played back. You can play the scene forward, stop playback, go to the first frame and last frame, go to the previous or next frame, and set real-time playback.

Location: Below the timeline at the bottom of the main window.

Button	Tool	Description
	Previous Frame	Moves you back in the scene by one frame.
	Next Frame	Moves you forward in the scene by one frame.
	Go to First Frame	Returns the playback cursor to the first frame of the scene. The first frame of your scene is set according to the value in the Start frame box at the beginning of the timeline.
	Play Backward	Toggles between playing the scene animation in reverse and stopping it. • Left-clicking the Play Backward button plays the animation backward from the last frame on the timeline. • Middle-clicking the Play Backward button plays the animation backward from the current frame.
	Play Forward	Toggles between playing the scene animation forward and stopping it. • Left-clicking the Play button plays the animation forward from the first frame on the timeline. • Middle-clicking the Play button plays the animation forward from the current frame.
	Go to Last Frame	Returns the playback cursor to the last frame of the scene. The last frame of your scene is set according to the value in the End frame box at the end of the timeline.

Button	Tool	Description
	Loop Animation	Continuously repeats the scene animation in one continuous loop. The frame numbers in the start frame and end frame boxes set the range for the loop. When you click the Loop button, yellow markers appear on the timeline showing the frame range of the loop. To change the range, drag the yellow markers to different frames.
	Audio	Toggles between playing and muting any audio files. Audio is active by default (button is gray). When the audio is muted, the button is highlighted.
35	Current Frame Box	Displays the current frame number or time position in the sequence. As you move the playback cursor, the time/frame box displays the frame or time position at which the cursor is located. You can also enter a specific frame number in this box to go to that frame.
All RT	All/RT	Toggles between playing back the animated scene frame by frame (All) or in real time (RT).

Animation Controls

You can use the various command buttons to animate properties and objects such as lights and cameras. You can set and delete keys, and quickly move through keys.

Autokey button ──── auto   Key button

Previous and next key buttons
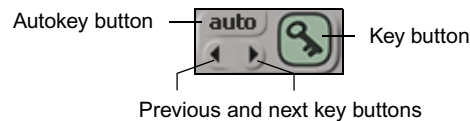
Location: Below the timeline at the lower-right of the main window.

Autokey (auto) Button

Toggles autokey mode on and off. In autokey mode, keys are generated automatically for individual parameters as you change settings.

When autokey mode is on, the button is highlighted in red.

Location: Animation controls

Previous/Next Key Button

Moves to the previous or next keyframe for a selected object's parameters, marked or not.

*   If the selected object has marked parameters, the buttons move between the keys for those parameters.
*   If nothing is marked, the buttons move between keys for all parameters of the selected object.

Location: Animation controls

Key Button

Sets or removes keys on the marked parameters at the current frame:

*   If there is no key at the current frame, clicking the Key button sets a key.
*   If there is a key at the current frame, clicking or middle-clicking the Key button removes that key.

The color of the button shows the status of the marked parameters at the current frame:

*   **None**: There is no fcurve animation on the marked parameters.
*   **Red**: There is a key on the current values at the current frame.
*   **Green**: There is no key at the current frame, but the current values are as determined by the function curve.
*   **Yellow**: The current values are different from those determined by the function curve.

Location: Animation controls

Preview and Output Controls

Provides different options for previewing and rendering your work. You can create a render region to preview part of your scene while you work, or render all of your scene at different levels of quality. The higher the quality settings, the longer it takes to render.

Location: Lower interface controls

Button	Tool	Description
	Render Low-Quality	Opens the Render Options dialog box with the Render Type and Quality parameters set for a low-quality image. These settings are best for previewing your work, and images render quickly.
	Render High-Quality	Opens the Render Options dialog box with the Render Type and Quality parameters set for a high-quality image. These settings are best for a final or near-final render.
	Preview Render	Renders only the current frame, using the Render High-Quality settings.
	Render Region	Activates render region mode and lets you draw a region in any of the displayed viewports. You create the render region by dragging the mouse pointer across the viewport. As soon as you release the mouse button, the region is drawn and whatever is displayed in that region is rendered.
	Open Flipbook	Launches the standalone flipbook, which lets you view and convert still images and video clips.
	Inspect Render Options	Opens the Render Options dialog box.

Flipbook

The standalone flipbook displays a series of cached images for checking animation sequences or still images. You can load video files (AVI, QuickTime, or AAF/MXF), a series of images that have been saved as .pic files, or single images (GIF, JPEG, TIFF, etc.). This view provides a set of playback controls.

To display the flipbook:

1. Click the **Open Flipbook** button in the preview and output controls.

2. In the Open Images dialog box that appears, specify the path and **File name** of the images you want to load—click the browser button (**...**) to open the browser.

3. Set the options in the dialog box, then click OK to load the image sequence and open the flipbook window.

   The flipbook window is resized if the loaded image is larger than the current size.

Flipbook Command Bar

These commands let you load, export, and set up how the flipbook is played back.

Option	Description
File	
Open Images	Opens the Open Images dialog box, where you can specify which image or video file you want to load as well as set up how you want to play it back. You can also press Ctrl+O to open this dialog box.
Export	Opens the Export dialog box, where you can select how to export the currently cached sequence in a number of formats, such as AVI, SOFTIMAGE, QuickTime, etc. You can also press Ctrl+E to open this dialog box.
Clear Flipbook	Clears the flipbook window of the current cached images.
Exit	Closes the flipbook window. You can also press Alt+F4.

Option	Description
View	
Channel	Displays a menu of channels you can view separately: red, green, blue, or alpha. All Channels are selected by default. You can also press the R, G, B, A, or C (all channels) keys to display the respective channels.
Zoom	Displays a menu of zoom factors you can set to view the current images: 50, 100 (default), 200, or 400% of the image size.
Correct Aspect Ratio	Stretches the image so that non-square pixels appear correctly on the computer monitor, which has square pixels. For example, NTSC images have a pixel ratio of 0.9, meaning the pixels are not square.
Play Real-Time	Plays the image sequence in real time. For example, if you have a 5-second loop, it takes exactly 500 seconds to loop the sequence 100 times. You can also press the T key to activate real time.
Ping-Pong	Plays the image sequence in ping-pong style. This reverses the direction of a looped playback at the first and last frames of the sequence.
Background Color	Opens the color editor in which you can set the background color of the flipbook.
Disable Redraw Vertical Sync	Disables synchronizing the redraw to the vertical retrace of the display monitor (if the graphics hardware supports this) so that you can achieve higher frame rates at the expense of visual quality.
Image Format	Lets you change the image format for the images loaded in the flipbook: Automatic, RGB, or RGBA. RGBA may give better performance on newer hardware systems.
Tools	
Rate	Opens a dialog box in which you can select a playback rate: NTSC, PAL, film, etc. You can also press Ctrl+R to open this dialog box.
Go to Frame	Opens a dialog box in which you can enter the frame you want to display. You can also press Ctrl+G to open this dialog box.

Option	Description
Increase Rate	Increases the playback rate by one frame per second. You can adjust the playback rate by 1 fps (frame per second) increments within the range of 24 and 30 fps.
Decrease Rate	Decreases the playback rate by one frame per second.
Help	
Command Line Options	Displays the command line options you can specify when running the flipbook as a standalone program. The basic syntax for running a flipbook is: **flip <sequence_name>.<ext> <start> <end> [step] [rate] [options]**
About	Shows the copyright information for the flipbook.

Flipbook Playback Controls

Button	Option	Description
◀	Previous Frame	Moves you back in the animation sequence by one frame.
▶	Next Frame	Moves you forward in the animation sequence by one frame.
◀◀	Go to Start	Goes to the first frame of the animation sequence.
◀	Play Backward/Stop	Plays the animation sequence in reverse from the current frame. Click again to stop or press the down-arrow key.
▶	Play Forward/Stop	Plays the animation sequence forward from the current frame. Click again to stop. You can also press the up-arrow key to play and the down-arrow key to stop.
▶▶|	Go to End	Goes to the last frame of the animation sequence.
↻	Loop Animation	Continuously repeats the animation sequence in one continuous loop.

Open Images Dialog Box

To display: Choose **File > Open Images** in the flipbook window.

Option	Description
File name	File name of the images to load. Click the (...) button to open the browser and search for the images
Type	
Images/Movies	Loads a single image or the complete image sequence of the file that you are loading.
Sequence	Loads a specific range of frames in the image file you are loading. Include the **Step** (frames to be skipped, for example 2 skips every other frame) and the playback **Rate** (NTSC, PAL, etc.).
Number Padding	Adds numbers to the frame numbers so you can match up image sequences. The default syntax is **[fn].#[ext]**, where **fn** is the base file name, **ext** is the file format extension, and **#** is the frame number.
Zoom Factors	
Shrink on load	Divides the image resolution by a value that you specify. For example, if you enter 2, the images are loaded at half the original resolution. The values must be integers.
Magnify on display	Multiplies the image resolution by a value that you specify. For example, if you enter 2, the images are loaded at twice the original resolution. The values must be integers.
Keep images in memory	Caches the images in memory so that they can be played back in real time.
Preload before playing	Loads the entire image sequence into memory instead of loading frames on demand.
Play Real Time	Plays the image sequence in real time. For example, if you have a 5-second loop, it takes exactly 500 seconds to loop the sequence 100 times. When you select this option, RT is activated on the playback controls below the timeline and you can see the frame rate displayed.

Export Dialog Box

To display: Choose **File > Export** in the flipbook window.

Option	Description
File name	File name of the images to load. Click the (...) button to open the browser and search for the images
File Type	Exports the file in a number of formats, including AVI, QuickTime, etc.
Codec	The codec (compressor/decompressor) to use when creating movie files.
Source Range	Range of frames to export.
Movie Settings	
Audio File	Exports an accompanying audio file with the images. Click the (...) button to open the browser and search for the audio file.
Image Settings	
Number padding	Adds numbers to the frame numbers to allow you to match up image sequences. The default syntax is **[fn].#[ext],** where **fn** is the base file name, **ext** is the file format extension, and **#** is the frame number.
Destination Frame Offset	Adds the number of frames you specify to the destination images. For example, you can offset the image sequence before using another tool.

Library Panel

The library panel is where you find objects, textures, image and video clips, camera effects, and more—most of the raw material you will be using to create scenes in Avid 3D.

The library panel is found on the right side of the Avid 3D interface. It is divided into tabs that contain libraries of objects, rigs, clips, particles, and other elements that can be used as building blocks for Avid 3D scenes.
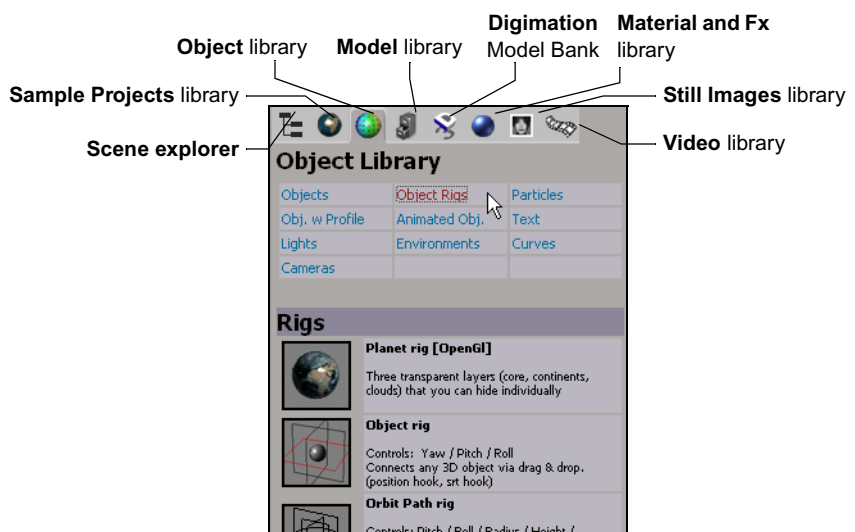
Getting content into your scene is simply a matter of dragging an item from a library into a viewport or onto a node in the multi-purpose editor. However, the type of content you want to use and how you want to apply it determines how you should drag and drop. The following is a general guide to Avid 3D's drag and drop rules:

- To add objects, scenes, rigs, and environment effects, drag an item onto an empty spot in a viewport.

- To add materials and textures to objects, drag an item onto the object.

- To add light or camera effects, do one of the following:

  ▶ Drag an item onto a specific light or camera.

  ▶ Drag an item into a viewport. The effect is added to all applicable lights, or to the active camera.

- Some rigs use placeholder objects intended for objects you can add later. Drag an item onto the placeholder to replace it.

📄 *When dragging and dropping items from the library, a status bar appears in the active viewport and provides information appropriate to the location of your mouse pointer.*

You can also drag and drop files from a Windows explorer or Web browser into Avid 3D.

Scene Explorer

The scene explorer displays the contents of your scene as a list of nodes. You normally use the explorer as an adjunct while working in Avid 3D to find or select elements. For example, the scene explorer is a useful tool to help you select hidden elements in a scene. You can also rename elements using the scene explorer.

To open the scene explorer, click the Scene Explorer tab in the library panel.

1. Click the Scene Explorer tab in the library panel to open the scene explorer.

2. Click an item to display those types of elements in the tree panel below.

3. Click an item to select it. Selected items are highlighted.

Rename the selected item by pressing F2 and entering a new name.

Sample Projects Library

Contains a collection of ready-made scenes containing different elements. You can drag and drop these into an empty area of any viewport. These scenes are a good basis from which you can create your own scene by modifying its elements.

If you load a sample scene onto an existing scene, you are prompted to save or cancel your existing scene. You cannot merge the scenes together.

Object Library

Contains collections of different types of objects that you can drag and drop into an empty area of any viewport. These objects are the building blocks from which you can create a scene. After you have brought these objects into the scene, you can manipulate and modify them as you like.

Many of these objects have areas to which you can map a 2D texture. The areas are indicated by the default rainbow-colored texture.

Button	Option	Description
	Objects	Displays a collection of 3D primitive objects that you can drag and drop into a viewport.
	Objects with Profiles	Displays a collection of 3D objects that have a profile; you can drag and drop them into a viewport.
		Profile objects are based on one or more profile curves that have been revolved or extruded. You can edit the objects' shapes by modifying their profile curves in the profile editor.

Button	Option	Description
	Lights	Displays a collection of light objects and rigs that you can drag and drop into a viewport.
	Cameras	Displays a collection of camera objects and rigs that you can drag and drop into a viewport.
	Object Rigs	Displays a collection of object rigs that you can drag and drop into a viewport. Object rigs are objects that have been created with control handles for specialized functions. For example, the book rig allows you to set the number of pages in the book, how far its front and back covers open, and how the pages turn.
	Animated Objects	Displays a collection of animated objects that you can drag and drop into a viewport.
	Environments	Displays a collection of "world spheres" with interior textures that you can drag and drop into a viewport. The spheres are large enough to surround most scenes, and the textures provide the illusion of a surrounding environment.
	Particles	Displays a collection of particle systems that you can drag and drop into a viewport. These systems include the particle cloud, particle type, particle emitter object, and, in some cases, forces.
	Text	Displays a collection of 3D text objects that you can drag and drop into a viewport.
	Curves	Displays a collection of curves that you can drag and drop into a viewport. These are often used for putting objects on a motion path to animate them.

Model Library

Contains various ready-made 3D object models that you can drag and drop directly into an empty area in any viewport. Many of these objects already have surfaces and textures applied to them, which you can see using the Textured or Textured Decal display types in the viewport.

As well, many of them also have areas to which you can map a 2D texture, such as the PC Laptop or TV Flatscreen models. The areas are indicated by the default rainbow-colored grid texture.

Digimation® Model Bank™

Contains various 3D object models from Digimation that you can drag and drop directly into an empty area in any viewport. By clicking **Buy More!** in this bank, you can easily contact Digimation to purchase more model banks.

The Digimation Model Bank is available only if you selected to install it when you installed Avid 3D.

Material & Fx Library

Contains preset surface materials and other effects that you can drag and drop onto an appropriate object (objects, particles, lights, or cameras) or into a scene (environment maps). Most presets only work with specific targets. For example, you can drag and drop materials only onto a 3D object in a viewport, or drag and drop particle types only onto particles in a viewport.

If a material has reflectivity or transparency, you will need to draw a render region around the object on which it's applied to see the results.

Button	Option	Description
	Objects	Displays a collection of surface materials that you can drag and drop onto a 3D object to define what the object looks like.
		Text surface materials can be dropped only onto text objects.
		Particle types can be dropped only onto particles. These change the look of the particles without changing the particle emission.
	Lights	Displays a collection of light effects that define how a light object casts light. Dragging a light effect into a viewport applies the effect to all available lights; dragging a light effect onto a light object applies it only to that light.
	Scene	Displays a collection of environment materials, camera effects, and toon (cartoon-style) camera effects that you can drag and drop into an empty area in the viewport to change what the scene looks like. You can also drag the camera and toon effects onto the active camera.

Still Images Library

Contains 2D images and textures that you can drag and drop onto a 3D object. 2D images and textures are mapped onto 3D objects, like wrapping paper. If the 3D object has a cluster on it, you can choose to map the image only to that cluster instead of the whole object.

Button	Option	Description
	Flat Pictures	Displays a collection of 2D images that you can drag and drop onto a 3D object or a defined cluster on it.
		Sprites let you change the look of the particles (drag and drop them onto particles in a viewport)—for example, you could replace fireworks sparks with bubbles or stars.
	Surfaces	Displays a collection of 2D surface images that you can drag and drop onto a 3D object or a defined cluster on it. Many of these images are meant to be repeated and tiled. As well, there are many black-and-white images that are useful for bump mapping.
	Reflections	Displays a collection of 2D surface images that you can drag and drop onto a 3D object or a defined cluster on it. These images are designed to be used as reflection maps.

Video Library

Contains video and audio clips that you can drag and drop onto a 3D object (video) or into the scene (audio). You can also apply the video clips as a texture on a 3D object, such as on a TV or computer screen.

Option	Description
Samples	Displays a collection of video and audio samples that you can drag and drop into the background of any viewport.

Option	Description
Incoming	Displays all video and audio clips exported to the **\Data\AVID3DMEDIA\XPressPro** folder within Avid 3D's install directory. You can drag and drop these into the background of any viewport.
Outgoing	Displays all still images and video clips that you have rendered out to the **\Data\AVID3DMEDIA\Render_Pictures** folder within Avid 3D's install directory. You can drag and drop these into the background of any viewport.

Tools and Options Panel

The tools and options panel is where you can access many tools used for different tasks in a scene, such as transforming elements, animating, or deforming objects. As well, you can access a number of options to set up your scene, such as for the display in the viewports or output options to determine how to render your scene.
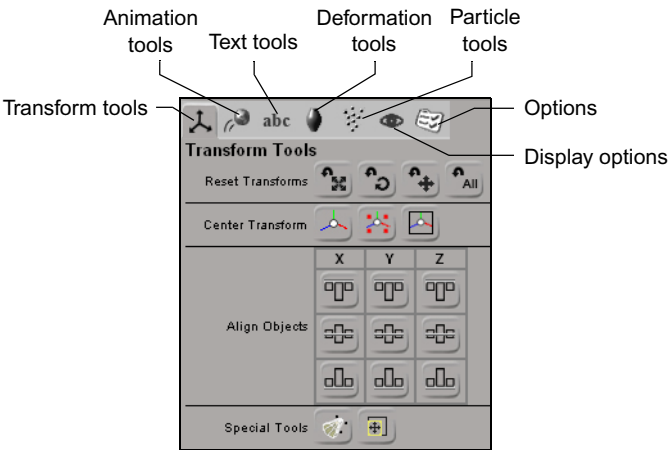
Location: Lower-right area of the main window.

Transform Tools Panel

The transform tools panel contains tools that let you translate, rotate, and scale objects in your scene. It also includes a number of buttons that let you specify how objects are transformed.
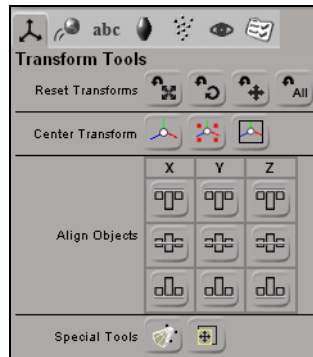
Location: Inside the tools and options panel, lower-right area of the main window.

Button	Option	Description
	Reset Scaling	Sets the selected object's scaling to (1, 1, 1) in its parent's coordinate system.
	Reset Rotation	Sets the selected object's rotation to (0, 0, 0) in its parent's coordinate system.
	Reset Translation	Sets the selected object's translation to (0, 0, 0) in its parent's coordinate system.
	Reset All Transforms	Resets the selected object's scaling, rotation, and translation.
	Center Transform Mode	Toggles center transform mode, which lets you translate or rotate an object's center using the transform tools.
	Move Center to Selected Points	Moves the selected object's center to the averaged coordinate value of the selected points.

Button	Option	Description
	Move Center to Object Bounding Box	Moves the selected object's center to the geometric center of the object's bounding box.
	Align Maximum	Aligns the tops of all selected objects' bounding boxes with the object whose bounding box bottom has the highest axis value. Select which of the X, Y, or Z axes to use for aligning the objects.
	Align Middle	Aligns all selected objects according to the average midpoint of all their bounding boxes. Select which of the X, Y, or Z axes to use for aligning the objects.
	Align Minimum	Aligns the bottoms of all selected objects' bounding boxes with the object whose bounding box bottom has the lowest axis value. Select which of the X, Y, or Z axes to use for aligning the objects.
	Spotlight Cone	Activates the spotlight cone tool that lets you manipulate different aspects of the selected spotlight.
	Texture Projection	Activates the texture projection tool that lets you manipulate the texture projection control objects on an object.

Animation Tools Panel

The animation tools panel contains tools that let you animate objects and edit the animation in different ways, such as by putting objects on paths, constraining them, using math presets, or creating function curves. There are also tools that let you select and key the camera.
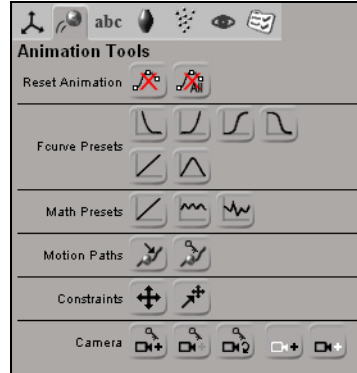
Location: Inside the tools and options panel, lower-right area of the main window.

Button	Tool	Description
	Remove Animation	Removes the animation from all marked parameters.
	Remove All Animation	Removes animation from all parameters on the selected object.
	Decelerating Curve	Creates an fcurve for the selected parameter that decreases the speed of the animation.
	Accelerating Curve	Creates an fcurve for the selected parameter that increases the speed of the animation.
	Ease In Curve	Creates an fcurve for the selected parameter that accelerates and then gradually decelerates as it approaches the parameter's maximum value.

Button	Tool	Description
	Ease Out Curve	Creates an fcurve for the selected parameter that accelerates and then gradually decelerates as it approaches the parameter's minimum value.
	Linear Curve	Creates an fcurve for the selected parameter that increases its value at a constant (unchanging) rate.
	Gaussian Curve	Creates an fcurve for the selected parameter that eases into its maximum value, then eases out to its minimum value.
	Constant Speed	Applies a math preset to an object that keeps its animation speed at a constant rate.
	Sine Wave	Applies a math preset to an object that creates an undulating motion.
	Jitter	Applies a math preset to an object that creates a random, jittery motion (noise).
	Set Object on Motion Path	Sets the selected object on a motion path. When you click this button, you are prompted to select the curve you want to use as the path.
	Save Path Key	Saves the translation keys of the selected object as a motion path.
	Position Constraint	Constrains the position of the selected object to another object. When you click this button, you are prompted to select the object to which you want to constrain the selected object.
	Direction Constraint	Constrains the direction (orientation) of the selected object to another object. When you click this button, you are prompted to select the object to which you want to constrain the selected object.
	Save Key on Active Camera and Interest	Sets keys for the position of the camera and its interest in viewport B.
	Save Key on Active Camera Position	Sets keys for the position of the camera in viewport B.
	Save Key on Active Camera Zoom and Roll	Sets keys for the zoom and roll animation of the active camera in viewport B.

Button	Tool	Description
	Select Active Camera	Selects the active camera in viewport B.
	Select Active Camera Interest	Selects the active camera interest in viewport B.

Text Tools Panel

The text tools panel provides tools that let you create and modify text.

Location: Inside the tools and options panel, lower-right area of the main window.

Button	Tool	Description
abc	Create Single-Line Text Block	Creates a new text object that can span a single line.
abc def ghi	Create Multi-Line Text Block	Creates a new text object that can span multiple lines.
a	Create Text Rig	Breaks the selected text object into separate objects for each character, and sets up an offset rig. Animate the scaling, rotation, and translation of the first character for "follow-the-leader" animation.
	Apply Angle Bevel (30 Degrees)	Applies a bevel with a 30-degree angle profile to the selected text or logo.

Button	Tool	Description
	Apply Angle Bevel (45 Degrees)	Applies a bevel with a 45-degree angle profile to the selected text or logo.
	Apply Angle Bevel (60 Degrees)	Applies a bevel with a 60-degree angle profile to the selected text or logo.
	Apply Rounded Bevel	Applies a bevel with a rounded edge profile to the selected text or logo.
	Apply Rounded Bevel - Incut	Applies a bevel with a rounded incut profile to the selected text or logo.
	Apply Squared Bevel	Applies a bevel with a square edge profile to the selected text or logo.
	Apply Squared Bevel - Incut	Applies a bevel with a square incut profile to the selected text or logo.
	Apply Early Pulse Bevel	Applies a bevel with a pulse (lip) profile to the selected text or logo.
	Toggle Front Bevel	Turns the beveling on the front of the selected text or logo on or off.
	Toggle Back Bevel	Turns the beveling on the back of the selected text or logo on or off.

Deformation Tools Panel

The deformation tools panel is where you apply deformations to change the shape of geometric objects.
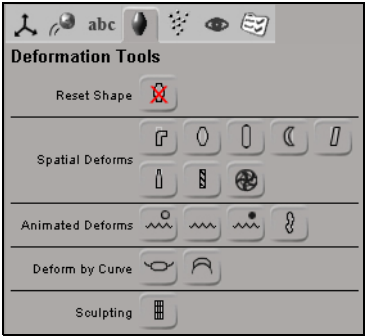
Location: Inside the tools and options panel, lower-right area of the main window.

Button	Tool	Description
	Reset Shape	Removes any deformation applied to the selected objects.
	Bend Deform	Bends the selected objects along one axis.
	Bulge Deform	Pushes the points of the selected objects outward along the length of one axis.
	Push Deform	Moves the points of the selected objects perpendicularly to the surface.
	QuickStretch Deform	Makes the selected objects flex, stretch, and yield in response to motion.
	Shear Deform	Pulls the ends of the selected objects in opposite directions.
	Taper Deform	Gradually scales the selected objects along one direction.
	Twist Deform	Progressively rotates the selected objects along one direction.
	Vortex Deform	Rotates the points of the selected object about its center, tapering off along the radius.
	Circular Wave	Applies an animated wave deformation that radiates outward in a circle to the selected objects.
	Planar Wave	Applies an animated wave deformation that moves laterally to the selected objects.
	Spherical Wave	Applies an animated wave deformation that radiates outward in a sphere to the selected objects.
	Shape Jitter	Moves the points of the selected objects randomly over time.
	Deform by Curve	Warps one of the selected object's axes along a curve. You are prompted to pick a curve.

Button	Tool	Description
	Deform by Curve - Rim	A variation of Deform by Curve where the object is rotated around the curve by 90 degrees.
	Lattice	Creates a lattice that you can use to warp the selected objects.

Particle Tools Panel

The particle tools panel is where you create and apply particles, forces, and obstacles in your scene.
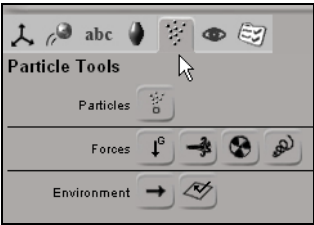
Location: Inside the tools and options panel, lower-right area of the main window.

Button	Tool	Description
	Create Particles	Creates particles that emit from a selected object. You can use any type of object as a particle emitter, including an animated object.
	Gravity	Creates a gravity force and applies it to the selected particles.
	Wind	Creates a wind force and applies it to the selected particles.
	Fan	Creates a fan force and applies it to the selected particles.
	Turbulence	Creates a turbulence force and applies it to the selected particles.

Button	Tool	Description
→	Apply Force	Applies an existing force to the selected particles. Clicking this button starts a picking session: pick the force you want to apply by clicking on its control object in a viewport. Right-click to end the picking session.
✅	Apply Obstacle	Applies an obstacle to the selected particles to create collisions. Clicking this button starts a picking session: pick one or more objects in the viewport that will act as obstacles for the particles. Right-click to end the picking session.

Display Options Panel

The Display Options panel contains tools that let you determine what's displayed or hidden in the viewport.
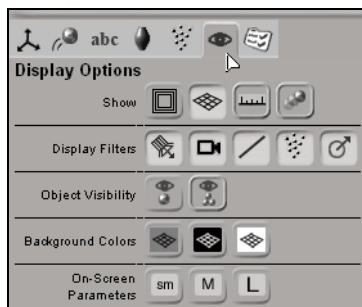
Location: Inside the tools and options panel, lower-right area of the main window.

Button	Tool	Description
▣	Show/Hide Safe Area	Toggles the display of the safe area in the user or camera views in the viewports.
◈	Show/Hide Grid	Toggles the display of the grid in the viewports.
ᴸᴸᴸ	Show/Hide Rulers	Toggles the display of rulers in the Front, Top, and Right views in the viewports.

Button	Tool	Description
	Show/Hide Ghost Animation	Toggles the display of ghosted images for animated objects in the viewports.
	Show/Hide Lights	Toggles the display of all light objects in the viewports.
	Show/Hide Cameras	Toggles the display of all camera control objects in the viewports.
	Show/Hide Curves and Motion Paths	Toggles the display of all curves or animation paths in the viewports.
	Show/Hide Particles	Toggles the display of all particles in the viewports.
	Show/Hide Control Objects and Rig Handles	Toggles the display of all control objects (such as forces and particle clouds) and rig handles in the viewports.
	Show/Hide Selected Objects	Toggles the display of selected objects in the viewports. When hidden, the object remains visible in the scene explorer so that you can select it there.
	Show All Objects	Displays all hidden objects in the viewports.
	Set Background Color to Gray	Sets the background color of the viewports to gray (default).
	Set Background Color to Black	Sets the background color of the viewports to black.
	Set Background Color to White	Sets the background color of the viewports to white.
	Set Small Font Size	Sets the font size to small for the on-screen parameters displayed in viewport B.
	Set Medium Font Size	Sets the font size to medium (default) for the on-screen parameters displayed in viewport B.
	Set Large Font Size	Sets the font size to large for the on-screen parameters displayed in viewport B.

Options Panel

The options panel contains tools that let you set up preferences for different aspects of working in Avid 3D, from rendering and time properties to data management and the function curve editor.
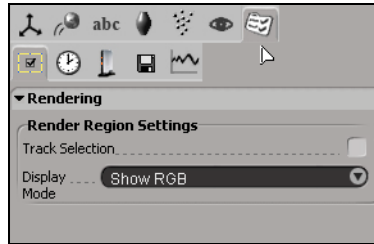
Location: Inside the tools and options panel, lower-right area of the main window.

Button	Tool	Description
	Render Region Options	Lets you set up the render region as you like for previewing your scene. See "Rendering Property Editor" on page 187 for information.
	Time Format Options	Lets you set up the frame rate and format, as well as other timing options, for your scene. See "Time Property Editor" on page 160 for information.
	Mojo Options	Lets you set up Avid 3D to output to an Avid Mojo while you work. See "Display Property Editor" on page 80 for information.
	Data Management Options	Lets you set up the autosave and backup options for your scene. See "Data Management Property Editor" on page 79 for information.
	Function Curve Editor Options	Lets you set up the function curve editor as you like for editing your animation. See "Fcurve Editor Property Editor" on page 156 for information.

Viewports

When you open Avid 3D, the four windows you see are the viewports where you view and work on your scene. You can choose different kinds of views: User, Top, Front, Right, camera views, and display types (shaded, wireframe, textured, etc.). Any viewport can display any type of view.

Views menu
Provides a variety of specialized ways in which to view your scene.

Display Types menu Specifies how visible items in the viewports are displayed.

Resize button
Resizes viewports to full-screen, horizontal, or vertical layouts.

Letter Identifier button
Identifies the viewport and, when selected, alternates between displaying and hiding (muting) viewport contents.

Letter Identifier Button

Letters (A, B, C, and D) help simplify the way viewports are referenced. The letter A refers to the upper-left viewport, B is the upper-right, C is the lower-left, and D is the lower-right viewport.

Location: Left end of viewport menu bar

To speed up the refresh rate of a viewport, you can use the letter identifiers to mute (hide/deactivate) displays:

• **Mute mode**: To mute, or gray out, a viewport, middle-click its letter. Its letter disk turns red. Middle-click again to redisplay the viewport.

- **Solo mode**: To display only one viewport, left-click its letter; all other viewports become grayed out and their letter disks turn red, while the letter disk you've clicked on turns green. Left-click again to redisplay all viewports.

To switch between mute and solo modes:

▸ Right-click a letter for a menu.

Views Menu

You can select camera viewpoints and orthographic views, as well as spotlight viewpoints.

If your viewport currently fills the screen, you can display more than one view type simultaneously by setting the viewport window to quarter-view using the resize icon on the right end of the menu bar. You can also toggle between the previous and current view in a viewport by middle-clicking the colored bar.

Location: Colored part of viewport menu bar

Option	Description
Camera	Displays your scene in a viewport from the viewpoint of a particular camera and lists the cameras available in the scene. These cameras are the only "real" cameras in your scene: all other views are orthogonal points of view and are not associated with an actual camera.
Spotlight	Sets the view in the viewport relative to the chosen spot light. The point of view is set according to the direction of the light cone defined for the chosen spot light. You can look through the spot light at its interest.
	The submenu lists the names of all the spot lights defined in your scene.
	Zooming, panning, dollying, and orbiting will move the viewing spot light.
User	User-defined view that shows objects in a scene from a virtual camera's point of view. Can be either perspective or orthogonal, and can be placed at any position and at any angle within the global 3D coordinate system. You can orbit, dolly, zoom, and pan in this view.

Option	Description
Top	An orthogonal view that sets the camera perpendicular to the XZ plane.
Front	An orthogonal view that sets the camera perpendicular to the XY plane.
Right	An orthogonal view that sets the camera perpendicular to the YZ plane.

Display Types Menu

Commands for different display types for viewing your scene within the viewports. Default setting is Wireframe. You can also toggle between the previous and current display type in a viewport by middle-clicking the menu.

Option	Description
Bounding Box	Reduces all scene objects to simple cubes. This speeds up the redrawing of the scene because fewer details are calculated in the screen refresh.
Wireframe	An image made up of the edges of objects and drawn as lines resembling a model made of wire. Displays tracing features such as edges or contour lines without removing invisible or hidden parts or fill surfaces.
Depth Cue	Gradually fades wireframe objects in proportion to their distance from the current point of view, to give a visual indication of depth.
Hidden Line Removal	Displays only the edges of objects that are facing the camera. Lines that are hidden from view by the surface in front of them are not displayed as they would otherwise be in a "see-through" wireframe.
Constant	Ignores the orientation of surface normals and instead considers them to be pointing directly toward the infinite light source. All the object's surface triangles are considered to have the same orientation and be the same distance from the light.
	Results in an object that appears to have no shading at all. This is particularly useful when you want to work in textures, as there are no attributes to interfere with the texture's definitions.

Option	Description
Shaded	Displays a quick-shaded (hardware shaded) view of your scene that closely approximates its realistic "look" but does not show shadows, reflections, or transparency. You can view icons for objects such as the lights and cameras.
Textured	Displays textures and special material attributes such as transparency, reflectivity, and refraction.
Textured Decal	Textured viewing mode where all textures are displayed in a bright, constant illumination, unaffected by lighting and shadows. The net effect is a general "brightening" of your textures and an absence of shadow. This allows you to see a texture on any part of an object regardless of how well that part is lit.
OpenGL	Displays all realtime shader attributes for objects that have been textured using realtime shaders. Unshaded objects or objects using mental ray shaders are displayed as they would be in Textured viewing mode.

Resize Viewport Icon

Click this button to maximize the viewport so that it fills the entire screen (full view). If the viewport is already maximized, clicking this button divides the viewport into quarter views. In full-screen view, the scene appears centered in the viewport on a gray background.

Location: Right end of viewport menu bar

Option	Description
Left-click	Toggles between a quarter-view (the four viewports) and full view.
Middle-click	Toggles between a quarter-view and a landscape view (horizontal).
Ctrl+middle-click	Toggles between a quarter-view and a portrait view (vertical)
Right-click	Displays a pop-up menu for configuring the viewports.
Maximize	Displays the viewport in full view.

Option	Description
Restore	Returns the viewport to its previous setting.
Horizontal	Displays the viewports in landscape view.
Vertical	Displays the viewports in portrait view.
Reset Size	Displays the viewports in quarter view.
Reset All	Restores the default viewport display.

Multi-Purpose Editor

The multi-purpose editor lets you edit properties of any type of scene element. You can also open the profile and function curve editors from here. The multi-purpose editor appears as a floating window. You can resize the window by dragging its borders, and move it around the interface by clicking and dragging on its title bar.

To open the multi-purpose editor, click the **Multi-Purpose Editor** button on the control bar.
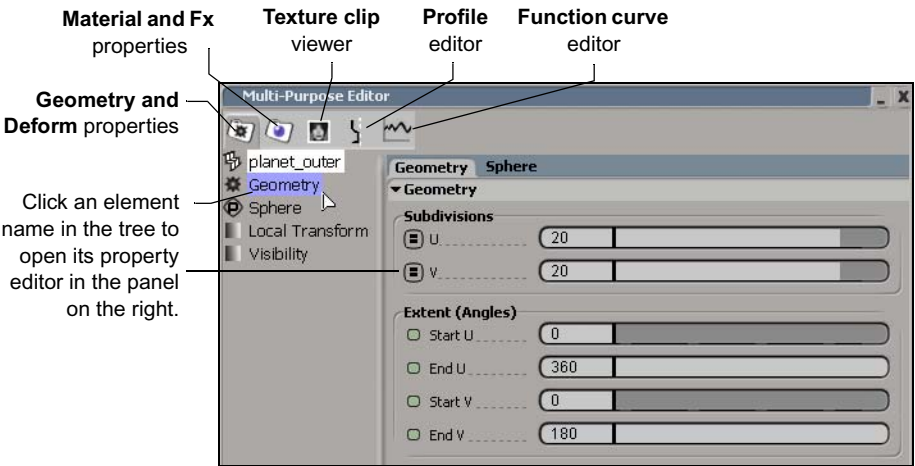
Geometry and Deform Properties

The Geometry and Deform Properties tab provides access to all of an element's properties, except for its color and surface attributes. You can view, edit, and animate an object's name, geometry, transformations, constraints, deformations, and much more.

To view an element's properties:

1. Select the element in the viewport or from the scene explorer.

2. If it is not already visible, open the multi-purpose editor by clicking the Multi-Purpose Editor button in the control bar.

3. Click the Geometry and Deform Properties tab. The element's nodes are listed in the tree.

4. Click a property's node to display its property editor in the panel on the right.

Material and Fx Properties

The Material and Fx Properties tab provides access to all the properties related to an object's appearance—from materials and textures to effects such as glows and lens flares. You can also access properties related to scene-wide attributes such as ambient color and environment maps. You can view, edit, and animate these properties.

To view an element's material and fx properties:

1. Select the element in the viewport or from the scene explorer.

2. If it is not already visible, open the multi-purpose editor by clicking the Multi-Purpose Editor button in the control bar.

3. Click the Material and Fx Properties tab. The element's nodes are listed in the tree.

4. Click a property's node to display its property editor in the panel on the right.

Texture Clip Viewer

The Texture Clip Viewer tab lists all of the images and video clips used for the selected element's textures.

To view an element's textures:

1. Select the element in the viewport or from the scene explorer.

2. If it is not already visible, open the multi-purpose editor by clicking the Multi-Purpose Editor button in the control bar.

3. Click the Texture Clip Viewer tab. All of the element's 2D textures will be listed in the tree.

4. Click texture node to display the texture image in the panel on the right. If the selected texture is a video clip, the panel will update the image depending on the current frame on the timeline.

Profile Editor

The profile editor allows you to modify the profile curves used to generate revolved and extruded objects.

Displays the selected profile curve.

Use the camera tools in the control bar of the main window to orbit, dolly, pan, zoom, roll, frame, and reset the camera. Press G to toggle the grid on or off.

Lists all profile curves available on the selected object.

Click to select a profile for editing.
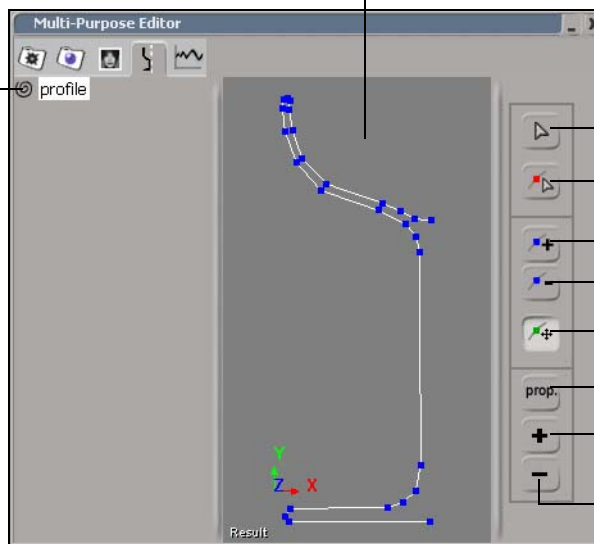
Select Object tool

Select Points tool

Add Point tool

Delete Point tool

Move Point tool

Toggle proportional mode

Increase proportional radius

Decrease proportional radius

Function Curve Editor

Where you can edit the animation of the currently selected element using a number of different editors. You can set preferences for the function curve editor in the Fcurve Editor property editor.

Toolbar
Contains commands and tools for saving, editing, and viewing animated properties (such as fcurves).
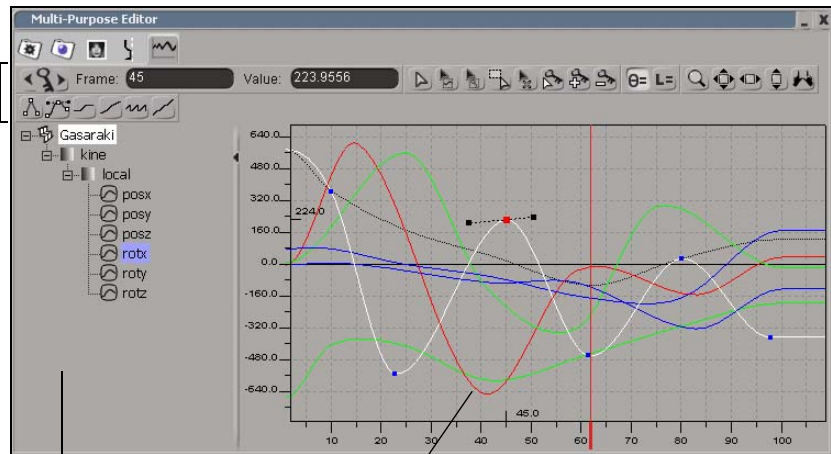
Animation tree
Displays the animatable properties of selected elements.

View area
Displays and allows manipulation of property animation using the graph.

Function Curve Editor Timeline

Shows the current portion of animation in the fcurve graph. Click and drag the playback cursor in the timeline to "scrub" through the animation. When you click in the timeline, a red line (playback cursor) is displayed in the fcurve graph.

As well, you can see and move loop markers in the function curve editor's timeline when you click the Loop button in the playback controls.

Copying Key Values to Another Frame

To copy key values to another frame:

▸ Right-click+drag the playback cursor in the function curve editor's timeline to copy key values from one frame to another.

The playback cursor stays green until you set a key. This is the same as you can do in the main Avid 3D timeline.

Function Curve Graph

A function curve (often called an *fcurve*) shows the change in a parameter's value over time. In the function curve editor, a function curve is represented as a curve with points on a graph, with each point representing a key.

You can edit keys by adjusting the points on a function curve interactively or typing in the desired values directly. You can also add or remove keys, change the slope at each key by moving the point's handles, and more.

The graph's horizontal axis (X) displays the time scale in frames or milliseconds (as set in the user preferences). The vertical axis (Y) displays the values of the animated property. Curves for X, Y, and Z parameters are red, green, and blue, respectively.

To adjust the graph's view:

▶   Determine how function curves are displayed and set grid and ruler options, set the options in the FCurve Editor property editor.

Function Curve Editor Command Bar

When the function curve view is active, the function curve editor contains all the commands, tools, and options required to create, edit, and view a selected property's function curve.

Stretch Keys scales keys using a pivot point.

Region selects rectangular area of fcurves.

Add/Remove Key

Select Key

Select Curve

Edit Key

Select fcurves or keys.

Unified Slope Orientation/Handle Length

Pan and zoom

Zoom

Horizontal/Vertical Pan pans and zooms across or up-and-down.

Frame frames selected keys or fcurves.

Linear/Spline Interpolation of fcurve.

Constant/Gradient Extrapolation and **Cycle/Relative Cycle** set extrapolated and repeated fcurve segments.

📖 *You can hide/display certain buttons on the function curve editor's command bar. To do this, right-click in an empty area of the command bar and toggle the appropriate items on or off.*

Location: Top of function curve editor

Go to Previous/Next Key

Selects the previous or next key on the selected function curve. You can also press the comma (,) key to select the previous key, and the period (.) key to select the next key.

Frame

The location of selected key points or function curves.

- To move a single key point to another frame, type that frame number and press Enter.
- To offset selected key points or function curves, enter the number followed by a + (addition) or - (subtraction) sign (such as 2+).
- To scale selected key points or function curves, enter the number followed by a * (multiplication) or / (division) sign. For example, to double the length of an fcurve, enter 2*.

Value

The value of the selected key points or function curves.

- To change the value of a single key point, type that value and press Enter.
- To change the value of selected key points or function curves, you can also enter the number followed by a + (addition) or - (subtraction) sign (such as 2+).
- To scale the value of selected key points or function curves, enter the number followed by a * (multiplication) or / (division) sign (such as 2*). For example, to divide the value in half, enter 2/.

Tool Icons

Button	Tool	Description
	Select	Selects function curves or keys and allows you to move the keys. To select a curve, click it with the left mouse button. Holding down Shift while clicking other function curves adds them to the selection; holding down Ctrl toggles function-curve selection. To deselect all function curves, click in the empty space in the graph.
	Select Curve	Selects only function curves. You cannot move curves with this tool.
	Select Key	Selects only key points. You cannot move keys with this tool.
	Region	Selects all the key points on the selected function curves within a defined rectangular region. The region's handles can be used to stretch or compress the selected region; dragging the region moves the keypoints.
	Stretch Keys	Stretches selected keys using a pivot anywhere you like within the keys' range.
	Edit Key	Click to select/translate keys, middle-click to add, and right-click to delete keys.
	Add Key	Click to add keys to the selected curve.
	Remove Key	Click to remove a key on the selected curve.
	Unified Slope Orientation	Toggles between keeping the slope handles at a key point together at 180 degrees to each other (when icon is selected) or having the slope handles move freely as you drag each one individually (when icon is not selected).
	Unified Slope Length	Toggles between keeping the length for the slope handles equal on both sides of the key point (when icon is selected) or breaking the slope handles (when icon is not selected), meaning that you can change the handles independently.

Button	Tool	Description
🔍	Zoom	To zoom in, rectangle-select a region to enlarge; to zoom out, Shift+click and drag; to interactively zoom, right-click and drag; to reset the magnification, click in the graph.
⬥	Pan and Zoom	To interactively pan the view, drag the mouse pointer in the graph; to reset the pan, click in the graph. Middle-click to zoom in and right-click to zoom out.
◧	Pan and Zoom Horizontally	Drag to pan only horizontally. Middle-click to zoom in horizontally and right-click to zoom out horizontally.
⬒	Pan and Zoom Vertically	Drag to pan only vertically. Middle-click to zoom in vertically and right-click to zoom out vertically.
⋀	Frame Selection	Frames the selected curves by resetting the pan and zoom so that they fit in the graph.
⋀	Linear Interpolation	Sets the interpolation immediately after the selected key points to linear. If no key points are selected, the entire function curve will be set to linear interpolation. Linear interpolation creates uniform movement, with sudden changes at each key point
⋀	Spline Interpolation	Sets the interpolation immediately after the selected key points to spline. If no key points are selected, the entire function curve will be set to spline interpolation. Spline interpolation accelerates and decelerates to ease into and out of each key point, resulting in a smooth transition. The degree of acceleration and deceleration near a key point is determined by the orientation and length of the slope handles.

Property Editors

To open an element's property editor, select an element and click the Multi-Purpose Editor button in the control bar.

When you select an item in the tree in the left pane of the multi-purpose editor, its property editor appears in the right pane.

Property Page tabs
Switch between sets of grouped
parameters within a property set.

Parameter Set headers
Click the arrow to expand and
collapse the property set.

Property-page controls
For viewing and setting
parameter values for sets
of grouped properties.

Property Page Controls

Color box
Opens color editors from which
you can pick or define the colors
you want to use.

Text boxes
Let you enter values for the
parameters.

Animation button
Shows status of animatable
parameters (whether or not the
parameter is animated). You can
also set and remove keys by
clicking this button.

Sliders
Let you change values by
dragging the bar or arrow
in the slider.

Check box
Toggles the option so that
it's active or inactive. A
check mark appears in
the box when it's active.

Drop-down lists
Let you select one option
from several. Click the
arrow beside the list to
open its menu.

Not all of the options described above are available in every property editor.

Color Properties

There are a number of standard ways of defining color properties for textures, materials, particles, and lighting.

To define a color using the color sliders:

1. Select the color model that best suits your needs. Below the color box, you can click on the color model button to toggle between RGB, HLS, and HSV.

2. Do one of the following to set the color:

   ▶ Click and drag the sliders to change the strength of each channel independently, or type a numerical value directly in the text box beside the sliders.

Color box   Color model   Color sliders
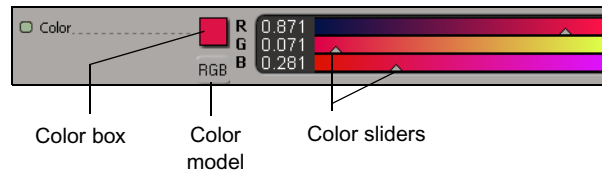
   ▶ To move all three sliders at once, hold the Ctrl key down while dragging the color sliders.

   ▶ For fine-tuning a single color value, hold down the Shift key while dragging the color sliders.

To select a color using the mini color editor:

1. Click the color box next to the color sliders in a property editor.
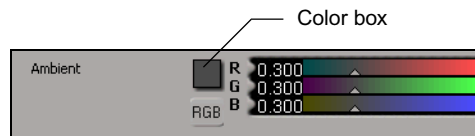
Color box

2. The mini color editor (below) opens:

Color spectrum

Slider bar

Current color box

Changes color model.

Color preview box

Opens the full color editor.

Color picker copies a color from anywhere on the screen.
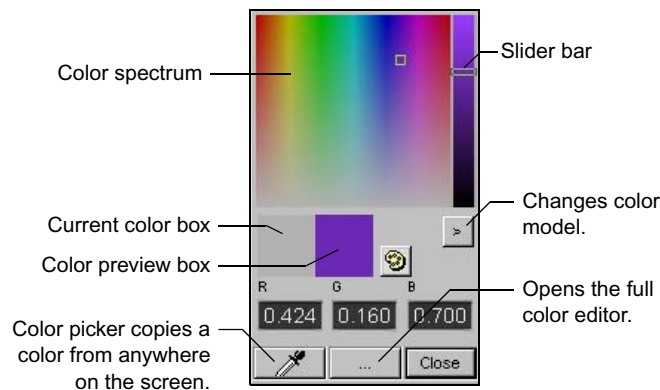
To fine-tune a color using the full color editor:

1. In a property editor, click the color box beside the color sliders to open the mini color editor.

2. In the mini color editor, click the browse (**...**) button. The full color editor opens.

Color Editor

Color area

Slider bar

Color views

Color picker

Current and Preview color boxes

R 178   H 358 ° C 0 %
G 25   S 85 % M 85 %
B 30   V 69 % Y 83 %
K 30 %

OK   Cancel
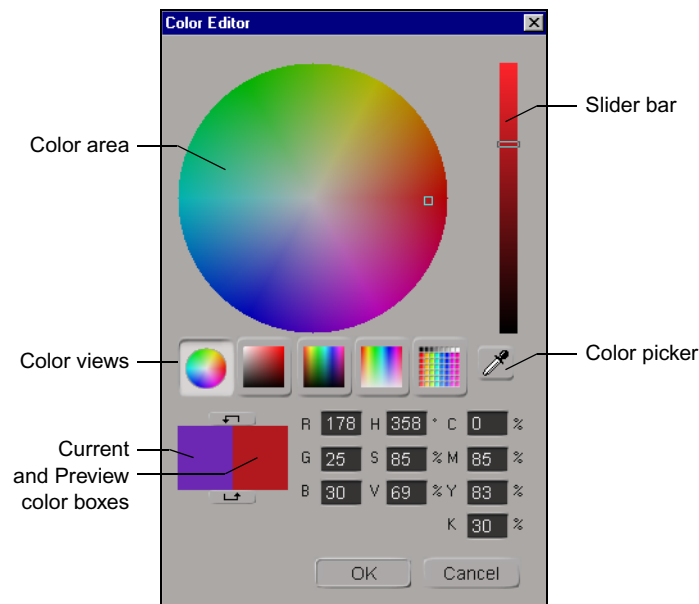
Browser

The browser is a type of window specifically used to:

- Search (browse) through scene databases, project directories, video and audio clip libraries, and other repositories whose files are required to build a project.

- Import scene files from databases as well as load scene and project files.

- Perform file management tasks such as moving, copying, renaming, and deleting files.

Browser toolbar — / Path controls

Tree view   Contents view
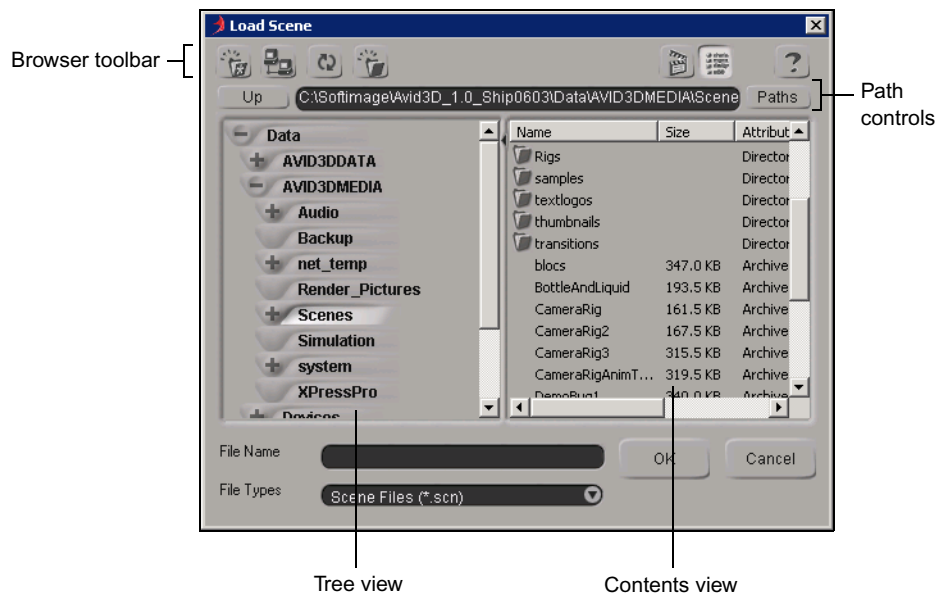
The Tree View

The browser's tree view is a hierarchy of folders and subfolders that contain files belonging to the scenes, objects, properties, or presets that you use to build a project. When you select an item from the tree, its contents (if any) are displayed in the list view of the browser.

You can view items in the tree view by expanding or collapsing folders.

To move up a level in the browser tree view, do one of the following:

▶   Click the **Up** button in the browser toolbar.

▶   Press the Backspace key.

To create a new folder:

1. Click on the **New Folder** button in the browser toolbar.

2. Type a name in the text box that appears and click OK.

Viewing Folder Contents

The browser's contents view displays the files of a folder selected in the tree view. You can display these files either as thumbnails or in detail mode, which includes file name, size, and comments.

To view folder files in thumbnail mode:

Click the Thumbnail button to view folder files as thumbnails.

To view folder files in detail mode:

Click the Details button to view
folder contents in detail mode.
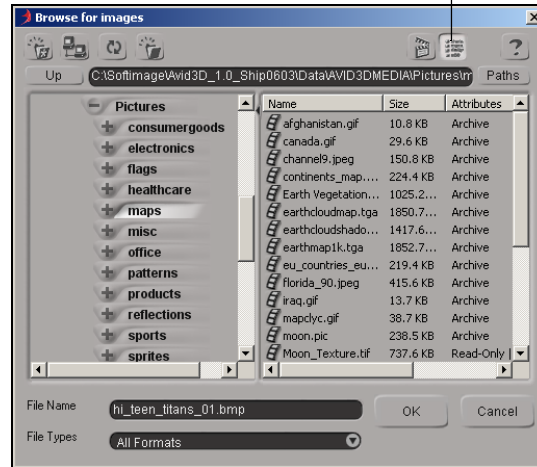
To edit the Contents view:

Click this arrow to show/hide the Contents view.

Drag the split bar right or left to resize the browser's right and left panes.
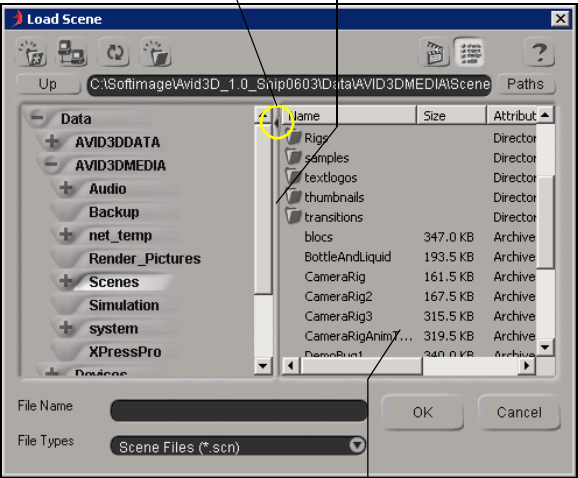
In detail mode, right-click anywhere in the Contents view...

...to add, move and rearrange columns in the Add/Remove Columns dialog box (below).
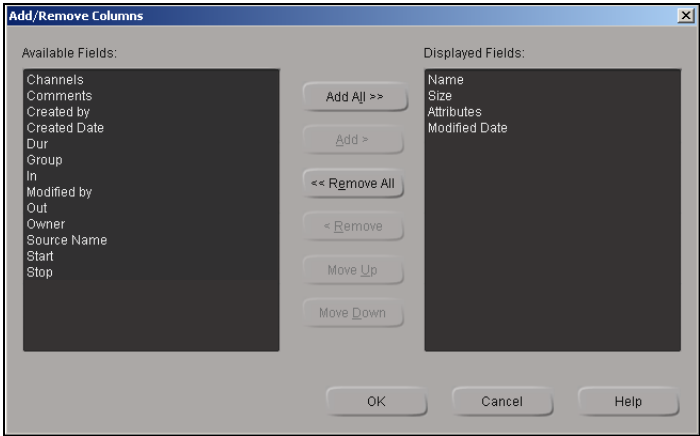
Setting Favorites

Favorites give you quick access to a folder without having to remember where the file is located. The Favorites button lets you mark a direct path to a folder of interest on any local, network, or external disk to which your workstation is connected.

To add a favorite to the list:

1. In the browser tree, navigate to the folder that you want to add as a favorite.

2. Click the **Favorites** button in the browser toolbar.

3. Choose the Add to Favorites command in the menu that appears.

The new favorite is added to the Favorites list at the bottom of the menu, and the browser updates to set the favorite folder at the top of the tree.

To select a favorite:

• Click the **Favorites** button and select a favorite from the list that appears at the bottom of the menu. Your selection is displayed in the browser.

To delete a favorite:

• Click the **Favorites** button, choose the Remove Favorite command, and select a favorite from the submenu that you want to delete. The favorite path is deleted from the list. The folders or files are not affected.

Accessing Files from the Browser Path Controls

The browser's Paths controls let you access files by entering their folder directory path in a text box or by selecting a preset path from a pop-up menu.

To access files from the browser path controls:

Type the folder directory path in the Path text box.

or

Click **Paths** and choose a preset path from the pop-up menu.

Once you have made your selection, the browser's tree updates and displays the path's folders.

Accessing Computers on a Network

When you want to find a file on a network, but don't have the path to it set directly, use the Network Neighborhood to navigate directly to the computer where it's stored.

To locate a computer on the network:

1. Click the **Network Neighborhood** button in the browser toolbar.

2. In the Browse for Computer dialog box that is displayed, select the computer that you want and click **OK**.

   The path to the computer you selected is entered in the Path text box, and its files and folders are listed in the browser.

Chapter 2
Properties Reference

General

Color Editor Dialog Box

The Color Editor dialog box (full color editor) lets you pick colors from a palette or create new colors. To create new colors, you can pick them from the viewing area or from anywhere on the screen. You can also specify the RGB, HSV, or CMYK color model values.

To display: Click on a property page's color box, then click on the browse (...) button in the mini color editor that opens.

Option	Description
Color area	Displays a color area based on the color view you selected.
Slider	Represents the color view you selected. For example, if you selected the Saturation view, then the slider represents the saturation component.
Color views	Displays different views of color and color components.
Color wheel	Displays a color wheel for you to select a color.
Hue	Displays a view of the hue component of the HSV color model.
Saturation	Displays a view of the saturation component of the HSV color model.
Value	Displays a view of the value component of the HSV color model.
Color palette	Displays a color palette for you to select a color.
Color picker	Lets you select a color from the image in the viewer.
Color preview	Displays the previously selected color (left) and the color you are currently selecting (right).
	The bottom arrow resets the color preview to the previously selected color. The top arrow makes the color you selected (right) the current color.

Option	Description
RGB	The RGB (red, green, blue) additive color model. The intensity of each color is represented by a number from 0 to 255. A value of 0 represents no light (black) in a channel and 255 represents maximum light intensity (white) in a channel.
	For example, (0, 0, 50) represents a dark blue, while (0, 0, 255) represents a bright blue. To produce a shade of gray, set all three RGB colors to the same level.
HSV	The HSV (hue, saturation, value) color model.
	Hue refers to the position of a color measured in degrees on the color wheel (red, yellow, green, cyan, blue, or magenta) and the various shades between them. For example, red is 0, cyan is 180, and magenta is 300.
	Saturation refers to the purity of color or the amount of gray in the color. Values: 0 (most-saturated color) to 100 (least-saturated color).
	Value refers to the total amount of light in a color. A value of 0 gives the darkest result (black) and 100 gives the lightest result (white).
CMYK	The CMYK (cyan, magenta, yellow, black) color model. This model simulates the four-color (CMYK) process used in printing.

Data Management Property Editor

Sets file-management options and locations for features such as autosave, project lists, backup, and default paths.

To display: Click the Show All Options tab in the tools and options panel, then click the Data Management Options tab.

Option	Description
Scene File Options	
Enable Autosave	Toggles autosave on or off. Autosave saves the current scene to a file at regular intervals. This can protect you from losing work in the event of a power failure or system failure.

Option	Description
Autosave Interval (Minutes)	The frequency of automatic saves.
Number of Scene Backups	Sets the number of backup scenes to be saved under the project's Backup directory. If **Number of Backup Days to Keep** is a value other than zero, this is the number of backups to keep per day.
Number of Backup Days to Keep	Sets the number of days for which to keep backups. This allows you to restore a backup from a previous day, no matter how many times you saved a scene during the current day. Backups older than the specified number of days are deleted.

Display Property Editor

Controls what views will be output to a monitor via the Avid Mojo.

To display: Click the Show All Options tab in the tools and options panel, then click the Mojo Options tab.

Option	Description
Digital I/O - Output to Mojo	
Monitor Type	Sets the display to the appropriate monitor type: NTSC or PAL.

Option	Description
View Output	Sets which view will be output via the Mojo:

- **Disabled:** nothing is output to the monitor.
- **3D View A:** the display in viewport A is output to the monitor.
- **3D View B:** the display in viewport B is output to the monitor.
- **3D View C:** the display in viewport C is output to the monitor.
- **3D View D:** the display in viewport D is output to the monitor.
- **3D Auto A/B/C/D:** the viewport that has focus is output to the monitor. Click a viewport to give it focus.
- **Render View:** outputs the rendered image from the render preview or the render view when rendering an image to disk.

    The image/frame is not displayed on the monitor until the last tile is rendered.
- The **FX View** option is not implemented in Avid 3D.
- **Image Clip View:** the image clip view, as seen in the Texture Clip Viewer, is output to the monitor.

Environment Map Property Editor

Takes a single image file and maps it to the environment using one of five possible mapping methods. Environment maps are typically used to light a scene with a combination of direct and indirect lighting. You can control the intensity of the image in the background, the intensity of its reflections in the scene, and the intensity of the lighting.

To display: Click the Environment node in the Material and Fx tab of the multi-purpose editor.

Option	Description
Image	Defines an image clip to use as an environment map. Click **Edit** to open a property page for the image clip being presently used. To retrieve a new clip, click **New** and indicate whether you wish to create a new clip or create one from a source.

Option	Description
Environment Mode	Specifies the kind of mapping used by the image. Choose from one of the following:
	• **Spherical:** maps the image spherically around the scene.
	• **Cylindrical:** maps the image cylindrically around the scene.
	• **Cubic Strip:** takes an image in which the faces of a cube are laid out horizontally, side by side, and maps it in a cubic shape around the scene.
	• **Cube Cross:** takes an image in which a cube has been unfolded to look like a cross and maps it in a cubic shape around the scene.
	• **Cube Cross Sideways:** a cubic cross, but rotated 90 degrees.
Intensity	
Background	Controls the degree to which the selected image shows up in the background. Eye rays that hit nothing will evaluate the environment shader making it appear in empty areas of the scene's background.
Reflection	Controls the intensity of the reflections. Higher values will cause bright areas of the image to appear more intense on the surfaces of reflective scene objects.
Image	Controls the intensity of the lighting in the scene from the environment map. Higher values brighten the lighting, while lower values darken it.
Transformation	A transformation matrix that allows you to scale, rotate, and translate the image in X, Y, and Z, to adjust how it is placed around the scene.
Halve/Double all lights intensity	Halves or doubles the intensity of the scene's image-based lighting.

Inspect Source Paths Property Editor

Displays the complete paths and file names of external files (textures, video and audio clips, etc.) referenced by the scene. Use this property editor to update source paths when files are moved or renamed.

File paths are the paths as saved in the scene. The resolved paths are the file paths as seen by the operating system, after having been resolved by Avid 3D. You cannot edit the resolved paths directly.

An entry whose path or file name is no longer accurate will be displayed in red and have an "Invalid" status. You can correct individual entries by double-clicking in the appropriate File Path cell.

To display: Choose **File > Source Paths** from the menu bar.

Option	Description
Browse Selected Path	Opens a browser so that you can navigate to the desired file.
Search and Replace All	Opens the Search and Replace dialog box, where you can update multiple paths or file names simultaneously by replacing the text strings shown in the File Path list.

Mini Color Editor

Pick colors from a palette or create new colors. To create new colors, you can pick them from the image in a viewport or you can specify their HLS, HSV, or RGB color model values.

To display: Click on a property page's color box (to the left of the color sliders). For the full color editor, click on the browse (...) button in the mini color editor.

Option	Description
Color Spectrum	Displays a color spectrum based on the color box you selected from the property page.

Option	Description
Slider	Represents the channel you've selected from the property page. For example, if you selected HSV Saturation, then the slider represents the saturation.
Current-Color/ Color-Preview boxes	Displays the correct color of the shader (left) and the color you are previewing (right).
Palette	Selects a solid color from a pop-up menu.
> (Options menu)	Displays different color input options (HSV, HLS, RGB, numerical, color wheel).
Color Wheel	Displays a color wheel from which you can select a color.
HSV Saturation	Displays a view of the saturation component of the HSV color model.
HSV Hue	Displays a view of the hue component of the HSV color model.
HSV Brightness	Displays a view of the value component of the HSV color model.
HLS	Specifies colors using the HLS (hue, luminance, and saturation) model.
	Hue refers to the position of a color measured in degrees on the color wheel (red, yellow, green, cyan, blue, or magenta) and the various shades between them. For example, red is 0, cyan is 180, and magenta is 300.
	Luminance refers to the total amount of light in a color. A value of 0 gives the darkest result (black) and 255 gives the lightest result (white).
	Saturation refers to the purity of color or the amount of gray in the color. Values: 0 (most-saturated color) to 255 (least-saturated color).

Option	Description
HSV	Specifies colors using the HSV (hue, saturation, value) color model.
	Hue refers to the position of a color on the color wheel (red, yellow, green, cyan, blue, or magenta) and the various shades between them. For example, red is 0, cyan is 180, and magenta is 300.
	Saturation refers to the purity of color or the amount of gray in the color. Values: 0 (most-saturated color) to 255 (least-saturated color).
	Value refers to the total amount of light in a color. A value of 0 gives the darkest result (black) and 255 gives the lightest result (white).
RGB	Specifies colors using the RGB (red, green, blue) additive color model. The intensity of each color is represented by a number from 0 to 255. A value of 0 represents no light (black) in a channel, and a value of 255 represents maximum light intensity (white) in a channel.
	For example, (0, 0 ,50) represents a dark blue, while (0, 0, 255) represents a bright blue. To produce a shade of gray, set all three RGB colors to the same level.
	You can enter values higher than 255 for the R, G, or B channel, although the displayed result will be the same as if the value were set to 255.
Normalized	Normalizes the values so that they range from 0 to 1.
Color picker	Selects a color from the image in the viewer.
...	Opens the Color Editor Dialog Box.

New Project Dialog Box

Where you create a new project, giving it a name and location. The project is stored in the list in your user location.

To display: Select **File > New Project** from the menu bar.

Option	Description
Project Name	Name of the new project.

Option	Description
Location	Specifies a location for the new project.
(...) button	Opens a browser in which you can specify a location for the new project.

Project Manager Dialog Box

The Project Manager is where you open and delete existing project folders, create new project folders and scene files, and manage project lists. A project is a file folder containing subfolders for your scene files and related elements. In Avid 3D, you always work within the structure of a project.

To display: Select **File > Project Manager** from the menu bar.

Option	Description
Select a Project	Select a project from the list. The current project is highlighted. The prefixes indicate which project list file contains each project:
	• [F] indicates that the project is listed in the project file in the factory location.
	• [U] indicates that the project is listed in the project file in your user location.
	• [W] indicates that the project is listed in a project file in a workgroup location.
Sort By	Sort the projects in the above list by **Name**, **Origin** (factory, user, and workgroup), or none (no sorting).
Project Path	The path to the selected project. This is displayed for information only and cannot be modified.
New Project	Opens a dialog box where you can create and name a new project folder.
Set as Default	Sets the selected project folder as default. Whenever the software is restarted, this project is automatically selected.
Project List	
Add Project	Adds an existing project to the project list.

Option	Description
Remove from List	Removes the selected project from the project list. The project is not deleted from the hard disk.
Scan Disk	Searches the specified folders and adds any projects found to the list.
Clear List	Removes all projects from the project list. Projects are not deleted from the hard disk.
Import List	Opens a browser that lets you search for an exported project list file, which contains a list of projects and their associated paths. These project names are added to any existing projects in the project list.
Export List	Creates a text file containing the path and file name of each project currently displayed in the project list. You can then use the Import List button to access and display these projects.
Delete Project	Deletes the selected project. The associated folder and its files are removed from the hard disk.
New Scene	Creates a new scene file within the selected project folder.
Delete	Deletes the selected scene file from the project folder.

3D Objects

Arc Property Editor

To get an arc: Drag the arc curve object from the object library into a viewport.

To display: Select the arc, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Radius	The radius of the arc in distance units.
Start, EndAngle	The start and end positions of the arc in degrees. The arc is drawn from the start angle to the end angle.

Circle Property Editor

To get a circle: Drag the Circle from the object library into a viewport.

To display: Select the circle, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Radius	The radius of the circle in distance units.

Cluster Property Editor

To create a cluster, select some polygons then click the Create/Edit Polygon Clusters button on the control bar.

To display: Select the cluster, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Name	The name of the cluster as it appears in the explorer. If you change this value, the new name appears on the property editor tabs the next time you display these parameters.
Cluster Display Color	
Red, Green, Blue	Sets the display color of the cluster's components when the cluster is not selected. If a component belongs to more than one cluster, it uses the color of the last cluster created.
Sort Order	When clusters with local materials overlap, this value controls the order in which they're drawn. The lower a cluster's sort order value, the earlier it's drawn. Thus the cluster with the highest sort order value is always drawn on top of any other overlapping clusters.
	When you open scenes created using a version of SOFTIMAGE|XSI where sort order was not assigned to clusters, all of the clusters in the scene are assigned a sort order value based on the order in which they were loaded from the file.

Cone Property Editor

Controls the size of a primitive cone.

To display: Select the cone, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Base Radius	The cone base radius, in distance units.
Height	The cone's height in distance units.

Cube Property Editor

Controls the size of a primitive cube.

To get a cube: Drag a cube from the object library into a viewport.

To display: Select the cube, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Length	The length of the sides in distance units.

Cylinder Property Editor

To get a cylinder: Drag a cylinder from the object library into a viewport.

To display: Select the cylinder, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Radius	The radius at the base in distance units.
Height	The height in distance units.

Disc Property Editor

To get a disc: Drag a disc from the object library into a viewport.

To display: Select the disc, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Radius	
Inner	The radius of the disc's hole in distance units.
Outer	The radius of the disc's outside edge in distance units.

Extrusion Property Editor (Curve along Axis)

Creates a surface or polygon mesh by running a profile curve along an axis.

To display: Select the extruded object, then click its Extrusion node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Inputs	
Hide/Unhide	Hides all the inputs for the generated object to simplify the display of your scene in the 3D views, or unhides the inputs when you need to modify them.
Delete (Freezes Op)	Freezes the generator and deletes the inputs. This simplifies the scene once you are satisfied that you won't need to modify the inputs again.
Subdivisions	

Option	Description
Subdivision Type	Determines how you specify the number of subdivisions in the result.
	• **Per Span** uses the "natural" subdivisions as determined by the shapes of the inputs. You can subdivide each segment further using the **U** and **V span** sliders.
	In this case, discontinuities resulting from multiknots in the inputs are preserved in the generated objects.
	• **Absolute** allows you to set the total number of subdivisions using the **U** and **V abs** sliders.
U, V span	The number of subdivisions corresponding to each segment of the inputs, when **Subdivision Type** is **Per Span**.
U, V abs	The total number of subdivisions, when **Subdivision Type** is **Absolute**.
Open/Close	Specifies whether the extruded surface is open or closed in **U** and **V**. These options work only if the corresponding input curves are open. If the input curves are closed, the surface will always be closed in the corresponding direction.
Extrusion	
Start Position, Length	The start and end positions of the extruded surface in distance units. Note that **Start Position** is available only if **Snap to Profile** is off.
From Center	Controls how the profile is aligned with the global center. At 0, the profile's center is aligned on the guide, and at 100 the minimum U boundary is aligned. Values that are between align a point between the center and the minimum U boundary; values below 0 and above 100 extrapolate beyond these points. This option is not available if **Snap to Profile** is on.
Snap to Profile	When on, the extruded surface is created at the position of the profile curve. If it is off, it is created at the global center.
Extrusion Axis	
Local Axis	Controls whether the extrusion occurs along the object's local axes (on) or the scene's global axes (off).

Option	Description
Extrude Along X, Y, Z	These options specify an axis along which to perform the extrusion: X, Y, or Z. When any of these options are on, any guide curve you picked is ignored. When multiple options are on, the extrusion is performed around the corresponding unit vector. For example, if both **Extrude Along X** and **Extrude Along Y** are on, the extrusion is performed around the vector [1, 1, 0].

Extrusion Property Editor (Curve Along Curve)

Creates a surface or polygon mesh by running a profile curve along a guide curve.

To display: Select the extruded object, then click its Extrusion node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Inputs	
Hide/Unhide	Hides all the inputs for the generated object to simplify the display of your scene in the 3D views, or unhides the inputs when you need to modify them.
Delete (Freezes Op)	Freezes the generator and deletes the inputs. This simplifies the scene once you are satisfied that you won't need to modify the inputs again.
Subdivisions	
Subdivision Type	Determines how you specify the number of subdivisions in the result.
	• **Per Span** uses the "natural" subdivisions as determined by the shapes of the inputs. You can subdivide each segment further using the **U** and **V span** sliders.
	In this case, discontinuities resulting from multiknots in the inputs are preserved in the generated objects.
	• **Absolute** allows you to set the total number of subdivisions using the **U** and **V abs** sliders.
U, V span	The number of subdivisions corresponding to each segment of the inputs, when **Subdivision Type** is **Per Span**.
U, V abs	The total number of subdivisions, when **Subdivision Type** is **Absolute**.
Open/Close	Specifies whether the extruded surface is open or closed in **U** and **V**. These options work only if the corresponding input curves are open. If the input curves are closed, the surface will always be closed in the corresponding direction.

Option	Description
Extrusion	
Start, End Pos.	The percentages along the length of the guide at which the extrusion starts and stops. Note that **Start Pos.** is available only if **Snap to Profile** is off.
	Start Pos. determines the first tangent and binormal that will be propagated along the curve. Changing this value changes the initial binormal. Changing **End Pos.** does not have this effect.
From Center	Controls how the profile is aligned on the guide curve. At 0, the profile's center is aligned on the guide, and at 100 the minimum U boundary is aligned. Values in-between align a point between the center and the minimum U boundary; values below 0 and above 100 extrapolate beyond these points. This option is not available if **Snap to Profile** is on.
Snap to Profile	When on, the extruded surface is created at the position of the profile curve. If it is off, it is created at the position of the guide curve.
Rotate Profile	When on, the profile curve is rotated as the tangent of the guide curve changes, following the guide as it turns and twists.
Align Profile to Path	Rotates the profile to align it with the start of the path. If this is off, the profile is not rotated.

Geometry Property Editor (Arc)

Controls the number of points on a primitive arc.

To display: Select the arc, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	The number of segments. Higher subdivision values produce greater resolution and denser, heavier geometry.

Geometry Property Editor (Circle)

Controls the number of points on a primitive circle.

To display: Select the circle, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	The number of segments. Higher subdivision values produce greater resolution and denser, heavier geometry.

Geometry Property Editor (Cone)

Controls the number of points on a primitive cone.

To display: Select the cone, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V, Base	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.
Extent (Angles)	The **Start** and **End U** parameters let you open the cone. Values are in degrees.
Close Bottom	Caps the bottom of the cone.

Geometry Property Editor (Cube)

Controls the number of points on a primitive cube.

To display: Select the cube, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V, Base	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.

Geometry Property Editor (Cylinder)

Controls the number of points on a primitive cylinder.

To display: Select the cylinder, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V, Base	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.
Extent (Angles)	The **Start** and **End U** parameters let you open the cylinder. Values are in degrees.
Close top end	Caps the top end of the cylinder.
Close bottom end	Caps the bottom end of the cylinder.

Geometry Property Editor (Disc)

Controls the number of points on a primitive disc.

To display: Select the disc, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.
Extent (Angles)	The **Start** and **End U** parameters let you open the disc. Values are in degrees.

Geometry Property Editor (Grid)

Controls the number of points on a primitive grid.

To display: Select the grid, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.

Geometry Property Editor (Sphere)

Controls the number of points on a primitive sphere.

To display: Select the sphere, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.
Extent (Angles)	The **Start** and **End U** parameters let you open the sphere longitudinally. The **Start** and **End V** parameters let you open the sphere latitudinally. Values are in degrees.

Geometry Property Editor (Torus)

Controls the number of points on a primitive torus.

To display: Select the torus, then click its Geometry node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivisions	
U, V	The number of segments in the corresponding directions. Higher subdivision values produce greater resolution and denser, heavier geometry.
Extent (Angles)	The **Start** and **End U** parameters let you open the sphere longitudinally. The **Start** and **End V** parameters let you open the sphere latitudinally. Values are in degrees.

Grid Property Editor

To get a grid: Drag a grid from the object library into a viewport.

To display: Select the grid, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
U, V Length	The length of the grid in each of its two directions, in distance units.

Loft Property Editor

Creates a surface or polygon mesh that spans a series of cross-sectional profile curves.

To display: Select the lofted object, then click its Loft node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Inputs	
Hide/Unhide	Hides all the inputs for the generated object to simplify the display of your scene in the 3D views, or unhides the inputs when you need to modify them.
Delete (Freezes Op)	Freezes the generator and deletes the inputs. This simplifies the scene once you are satisfied that you won't need to modify the inputs again.

Option	Description
Subdivisions	
Subdivision Type	Determines how you specify the number of subdivisions in the result.
	• **Per Span** uses the "natural" subdivisions as determined by the shapes of the inputs. You can subdivide each segment further using the **U** and **V span** sliders.
	In this case, discontinuities resulting from multiknots in the inputs are preserved in the generated objects.
	• **Absolute** allows you to set the total number of subdivisions using the **U** and **V abs** sliders.
U, V span	The number of subdivisions corresponding to each segment of the inputs, when **Subdivision Type** is **Per Span**.
U, V abs	The total number of subdivisions, when **Subdivision Type** is **Absolute**.
Start, End Surface	These parameters apply only when the first or last curve in the loft operation is a curve on a surface; for example, a boundary or isoline.
Continuity at Surface Curve	The continuity between the lofted surface and the original input surface.
	• **(G0) Position:** The lofted surface begins or ends at the position of the surface curve but does not take into account the tangent or curvature of the surface. The result can be a sharp edge between the lofted surface and the input surface.
	• **(G1) Tangent:** The tangent of the lofted surface is aligned with the tangent of the input surface at the boundary. The result is a smooth transition from the lofted surface to the original surface.
	• **(G2) Normal:** The normal of the lofted surface is aligned with the normal of the input surface at the boundary. This results in an even smoother transition between the surfaces.
Scale Factor	Affects the extent of influence of the original input surface's shape on the lofted surface. This parameter does not apply when **Continuity at Surface Curve** is **(G0) Position**.

Option	Description
Tangent Direction Match	Applies continuity between the lofted surface and the original input surface laterally (that is, in V). Again, this parameter does not apply when **Continuity at Surface Curve** is **(G0) Position**.
Open/Close	Specifies whether the extruded surface is open or closed in **U** and **V**. These options work only if the corresponding input curves are open. If the input curves are closed, the surface will always be closed in the corresponding direction.

Revolution Property Editor (Curve Around Axis)

Creates a surface or polygon mesh by revolving a curve around an axis.

To display: Select the revolved object, then click its Revolution node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Inputs	
Hide/Unhide	Hides all the inputs for the generated object to simplify the display of your scene in the 3D views, or unhides the inputs when you need to modify them.
Delete (Freezes Op)	Freezes the generator and deletes the inputs. This simplifies the scene once you are satisfied that you won't need to modify the inputs again.
Subdivisions	
Subdivision Type	Determines how you specify the number of subdivisions in the result.
	• **Per Span** uses the "natural" subdivisions as determined by the shapes of the inputs. You can subdivide each segment further using the **U** and **V span** sliders.
	In this case, discontinuities resulting from multiknots in the inputs are preserved in the generated objects.
	• **Absolute** allows you to set the total number of subdivisions using the **U** and **V abs** sliders.

Option	Description
U, V span	The number of subdivisions corresponding to each segment of the inputs, when **Subdivision Type** is **Per Span**.
U, V abs	The total number of subdivisions, when **Subdivision Type** is **Absolute**.
Open/Close	Specifies whether the revolved surface is open or closed in **U** and **V**. These options work only if the corresponding input curves are open. If the input curves are closed, the surface will always be closed in the corresponding direction.
Revolution	
Start Angle	The angle in degrees at which the revolution starts, with respect to the revolution axis or curve.
Revolution Angle	The angle in degrees through which the revolution sweeps, beginning at the **Start Angle**. When this value is 360°, the revolution sweeps through a complete rotation no matter what the value of the Start Angle.
Revolution Axis	
Local Axis	Controls whether the revolution occurs around the object's local axes (on) or the scene's global axes (off).
Revolve Around X, Y, Z	These options specify an axis along which to perform the revolution: X, Y, or Z. When any of these options are on, any secondary curve you picked is ignored. When multiple axis options are on, the revolution is performed around the corresponding unit vector. For example, if both **Revolve Around X** and **Revolve Around Y** are on, the revolution is performed around the vector [1, 1, 0].

Revolution Property Editor (Curve Around Curve)

Creates a surface or polygon mesh by revolving a curve around another curve.

To display: Select the revolved object, then click its Revolution node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Inputs	
Hide/Unhide	Hides all the inputs for the generated object to simplify the display of your scene in the 3D views, or unhides the inputs when you need to modify them.
Delete (Freezes Op)	Freezes the generator and deletes the inputs. This simplifies the scene once you are satisfied that you won't need to modify the inputs again.
Subdivisions	
Subdivision Type	Determines how you specify the number of subdivisions in the result.
	• **Per Span** uses the "natural" subdivisions as determined by the shapes of the inputs. You can subdivide each segment further using the **U** and **V span** sliders.
	In this case, discontinuities resulting from multiknots in the inputs are preserved in the generated objects.
	• **Absolute** allows you to set the total number of subdivisions using the **U** and **V abs** sliders.
U, V span	The number of subdivisions corresponding to each segment of the inputs, when **Subdivision Type** is **Per Span**.
U, V abs	The total number of subdivisions, when **Subdivision Type** is **Absolute**.
Open/Close	Specifies whether the revolved surface is open or closed in **U** and **V**. These options work only if the corresponding input curves are open. If the input curves are closed, the surface will always be closed in the corresponding direction.

Option	Description
Revolution	
Start Angle	The angle in degrees at which the revolution starts, with respect to the revolution axis or curve.
Revolution Angle	The angle in degrees through which the revolution sweeps, beginning at the **Start Angle**. When this value is 360°, the revolution sweeps through a complete rotation no matter what the value of the Start Angle.
Revolution Axis	The axis around which the profile curve is revolved: • **End Points:** the profile is revolved around a straight line connecting the second curve's endpoints. • **Start Tangent:** the profile curve is revolved around the tangent of the second curve at its U = 0 boundary. • **End Tangent:** the profile curve is revolved around the tangent of the second curve at its U = 1 boundary.

Sphere Property Editor

To get a sphere: Drag a sphere from the object library into a viewport.

To display: Select the sphere, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Radius	The radius in distance units.

Spiral Property Editor

To get a spiral: Drag the spiral from the object library into a viewport.

To display: Select the spiral, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Height	The height in distance units.
Start, End Angle	The start and end positions in degrees. The spiral is drawn from the start angle to the end angle.
Start, End Radius	The distance from the central axis to the start and end points in distance units.

Square Property Editor

To get a square: Drag the square from the object library into a viewport.

To display: Select the square, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Length	The length of the sides in distance units.

Torus Property Editor

To get a torus: Drag a torus from the object library into a viewport.

To display: Select the torus, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Main Radius	The major radius in distance units.
Cross Section Radius	The minor radius in distance units.

Deformations

Bend Op Property Editor

Deforms an object by bending it along one axis.

To apply: Select the objects to be deformed and click the Bend Deform button in the deformation tools panel.

To display: Select the deformed object, then click its Bend Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Direction	
Axis	The axis of the object's local coordinate space that is bent.
Bend Direction	The direction in which the axis is bent, in degrees. For example, if the Y axis is bent in the direction 0°, it bends toward the X axis; if it is bent in the direction 90°, it bends toward the Z axis.
Bend Bottom	Bends the bottom portion of the object, leaving the top undeformed. If this option is not checked, the top portion is bent leaving the bottom portion undeformed.
Amplitude	
Angle	The angle of the bend in degrees. You can type values outside the slider range.
Radius	The radius of an imaginary circle that describes the sharpness of the bend. The bend follows the circumference of this circle.
Deformation Center	
Use Bounding Box Center	Uses the center of the object's bounding box as the deformation center. If this option is not selected, the object's center is used.

Option	Description
Offset X, Y, Z	Offset of the deformation center from either the bounding box center or the object center in distance units in the object's local space. You can type values outside the slider range.

Bulge Op Property Editor

Moves an object's points away from or toward a specified point in space.

| 0 |

To apply: Select the objects to be deformed and click the Bulge Deform button in the deformation tools panel.

To display: Select the deformed object, then click its Bulge Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Deform Along	
X, Y, Z	Specifies whether the points are deformed along each axis in local space. You can toggle individual axes on or off.
Axis	The reference axis around which the profile curve is revolved. Points that are the same distance along this axis are deformed by the same amount.
Amplitude	
Amplitude	The maximum amplitude of the bulge in distance units.
Profile	A function curve that controls how the amplitude of the bulge is modulated according to the distance from the deformation center. You can edit the profile using the mouse and the same keyboard commands as the function curve editor.
Deformation Center	These options specify the point away from which the object's points are deformed.

Option	Description
Use Bounding Box Center	When this option is on, the object's points are deformed away from the center of the object's bounding box. The **Offset** values have no effect.
Offset X, Y, Z	These values specify the deformation center as an offset from the object's local center.

Curve Deform Property Editor

Distorts an object or cluster by mapping its local Y axis onto a curve.

To apply: Select an object and click one of the Deform By Curve buttons in the deformation tools panel. You will be prompted to pick a curve.

To display: Select the deformed object, then click its Curve Deform node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Axis	The local axis of the object that is deformed by the curve.
Scaling Along	
Curve	The scaling factor of the deformation along the direction of the curve.
Normal	The scaling factor of the deformation in the direction of the curve's normal (perpendicular to the tangent of the curve).
Binormal	The scaling factor of the deformation in the direction of the curve's binormal (perpendicular to both the tangent and the normal).
Roll	The rotation of the object or cluster around the curve in degrees. If a deformed cluster appears twisted, try adjusting this value.
Translation	The maximum amplitude of the bulge in distance units.
Curve	The translation offset of the object along the tangent of the curve.

Option	Description
Normal	The translation offset of the object in the direction of the curve's normal (perpendicular to the tangent of the curve).
Binormal	The translation offset of the object in the direction of the curve's binormal (perpendicular to both the tangent and the normal).

Lattice Property Editor (Deformation)

Lattice objects are used to control lattice deformations.

To create a lattice: Select the objects to be deformed and click the Lattice button in the deformation tools panel.

To display: Select the deformed object, then click its Lattice node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.

Lattice Property Editor (Lattice)

Lattice objects are used to control lattice deformations.

To create a lattice: Select the objects to be deformed and click the Lattice button in the deformation tools panel.

To display: Select the lattice, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Subdivision	
X, Y, Z	The resolution of the lattice in each of the three axes. Higher values provide finer control of the lattice deformation.

Option	Description
Interpolation	
X, Y, Z	The interpolation type of the lattice deformation in each of the three axes. Curve provides smoother deformation than Linear.
Pre-Deformed Size	
X, Y, Z	The size of the lattice in distance units. This is used to determine whether a point on a deformed object falls inside the lattice's pre-deformed bounding box and thus gets deformed.

Push Op Property Editor

Moves points perpendicularly to the surface.

To apply: Select an object and click the Push button in the deformation tools panel.

To display: Select the deformed object, then click its Push Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Amplitude	The amount of translation in distance units. Positive values move points outward perpendicularly to the surface, negative values move points inward in the opposite direction, and a value of 0 results in no deformation. You can type values outside the slider range.

QStretch Op Property Editor

Deforms an object dynamically in response to its motion.

To apply: Select an object and click the Quick Stretch button in the deformation tools panel.

To display: Select the deformed object, then click its QStretch Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

The parameters on the Overview property page control how an object deforms in response to four separate aspects of its motion: **Linear Velocity**, **Angular Velocity**, **Linear Acceleration**, and **Angular Acceleration**.

The other tabs give fine control over the deformations caused by each aspect of motion. The parameters are the same on each page.

Overview Property Page

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Flex	Bends back in the direction of motion as if due to wind resistance.
Stretch	Elongates in the direction of motion.
Yield	Bulges as if internal mass was being displaced.

Other Property Pages

Option	Description
Mute	Toggles the entire Qstretch deformation on and off without affecting the values of other parameters. This is the same option as on the Overview tab.
Reference for Lock X/Y/Z	Determines which coordinate system is used when you lock axes: **Global** or **Local**. Local is particularly useful when there is a rotational component to the motion, such as when animating along a path.

Option	Description
Flex	Bends back in the direction of motion as if due to wind resistance. This is the same option as that in the corresponding section of the Overview tab.
Stretch	Elongates in the direction of motion. This is the same option as that in the corresponding section of the Overview tab.
Yield	Bulges as if internal mass were being displaced. This is the same option as that in the corresponding section of the Overview tab.
Ampl.	The sensitivity of the deformation with respect to the motion.
Max.	The maximum amount of deformation in terms of the object's bounding box. With a value of 1, an object could elongate up to twice its original size; with a value of 0.5, it could elongate up to 1.5 times its original size, and so on.
Profile	The profile of the deformation. This parameter applies to **Flex** and **Yield**. • **Curved:** The object bends into a curve as if it were flexible. • **Linear:** The object bends with a linear profile as if it were non-flexible but still subject to shear forces.
Volume	How the object deforms when **Stretch** is on: • **Keep Volume:** As the object elongates in the direction of motion, it becomes thinner in the other directions to preserve the approximate volume. This results in a squash-and-stretch effect. • **Free Volume:** As the object elongates, the other directions are unaffected as if the object had an elastic surface.
Lock X, Y, Z	Prevents the deformation from being applied in the corresponding axis. The reference can be local or global, depending on **Reference for Lock X/Y/Z**.

Shape Jitter Op Property Editor

Randomly displaces points of an object over time.

To apply: Select an object and click the Shape Jitter button in the deformation tools panel.

To display: Select the deformed object, then click its Shape Jitter Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Shape Jitter Op Property Page

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Amplitude	
X, Y, Z	The maximum amount of displacement along each local axis.
Random Values	
Seed	A value used to generate a pseudo-random number. Different values produce different numbers, but the same value always produces the same number. This lets the effect be reproduced exactly if necessary.
Group Vertices By	Divides the points into groups of the specified number and moves each group as a unit. This is useful if an object is composed of several non-contiguous shapes and you want the shapes to move relative to each other but not be deformed internally.
Independent Streams	Random numbers are reused to save memory. In certain cases, this can cause discernible patterns in the motion. To counteract this, increase this parameter; as a general rule, it should be equal to or greater than the cube root of the number of control points. For example, if the object has 1000 control points, this value should be 10 or more.
Deformation	
Frequency	The relative number of shapes over time. High values create a very jittery effect, while low values produce a smoother effect.

Option	Description
Tension	The interpolation in space between shapes. Smaller values produce smoother interpolations. When Tension is 1, the two nearest shapes are interpolated. When Tension is 0, the four nearest shapes are interpolated.
Cumulative	Specifies whether the displacements accumulate over time. When off, points jitter about their original values. When on, points may become further and further displaced from their original values.

Time Control Property Page

Option	Description
Start offset	The first frame for which the jitter begins to affect the object.
End	The last frame for which the jitter affects the object.

Shear Op Property Editor

Slants an object by pulling its ends in opposite directions.

To apply: Select an object and click the Shear button in the deformation tools panel.

To display: Select the deformed object, then click its Shear Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Deform Along	
X, Y, Z	Activates the deformation along the corresponding axis in the object's local coordinate space. Note that if the deformation is applied along the same axis as the Axis parameter, the result is an elongation rather than a slant in that direction.

Option	Description
Axis	The axis of the object's local coordinate space along which to apply the deformation. Points that are on one side of the deformation center with respect to this axis are moved in one direction, and points on the other side are moved in the opposite direction.
Amplitude	
Amplitude	The total amount of lateral displacement from one end of the object to the other, in distance units. Longer objects need a higher amplitude to be slanted at a given angle. You can type values outside the slider range.
Profile	This profile curve controls the fraction of the amplitude (the vertical axis) over the length of the object (0 to 100% on the horizontal axis). Values over 1 produce an exaggerated deformation with a displacement greater then the Amplitude, and negative values produce a displacement in the opposite direction. You can edit the profile using the mouse and the same keyboard commands as the function curve editor.
Deformation Center	Points that are on one side of the deformation center with respect to the Axis parameter are moved in one direction, and points on the other side are moved in the opposite direction.
Use Bounding Box Center	Uses the center of the object's bounding box as the deformation center. If this option is not selected, the object's center is used.
Offset X, Y, Z	Offset of the deformation center from either the bounding box center or the object center in distance units in the object's local space. You can type values outside the slider range.

Taper Op Property Editor

Gradually scales objects along one axis.

To apply: Select an object and click the Taper button in the deformation tools panel.

To display: Select the deformed object, then click its Taper Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Deform Along	
X, Y, Z	Specifies whether or not the deformation is applied along the corresponding axis in the object's local coordinate space. Note that if the deformation is applied along the same axis as the Axis parameter, the object is foreshortened rather than thinned in that direction.
Axis	The axis of the object's local coordinate space along which the Profile is applied.
Amplitude	
Amplitude	The total amount of scaling from one end of the object to the other, in distance units. You can type values outside the slider range.
Profile	This profile curve controls the fraction of the amplitude (the vertical axis) over the length of the object (0 to 100% on the horizontal axis). For any point along the length of the object, the scaling factor is the Amplitude multiplied by the corresponding value of this graph—if the result is negative the object is thinner; if positive the object is thicker. Values over 1 produce an exaggerated deformation with a scaling factor greater than the Amplitude. You can edit the profile using the mouse and the same keyboard commands as the function curve editor.
Deformation Center	
Use Bounding Box Center	Uses the center of the object's bounding box as the deformation center. If this option is not selected, the object's center is used.
Offset X, Y, Z	Offset of the deformation center from either the bounding box center or the object center, in distance units, in the object's local space. You can type values outside the slider range.

Twist Property Editor

To create a twist or vortex deformation: Select the objects to be deformed and click either the Twist or Vortex button in the deformation tools panel.

To display: Select the deformed object, then click its Twist Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Deform Property Page

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Twist Active	Applies a gradual rotation about an axis. This parameter is also available on the Twist Effect tab.
Vortex Active	Varies the angle of rotation based on the distance from the axis, creating a swirl effect. This parameter is also available on the Vortex Effect tab.
Axis	The axis of the object's local coordinate space around which the object's points are rotated.
Angle	The total amount of rotation from one end of the object to the other, in degrees. You can type values outside the slider range.
Deformation Center	
Use Bounding Box Center	Uses the center of the object's bounding box as the deformation center. If this option is not checked, the object's center is used.
Offset X, Y, Z	Offset of the deformation center from either the bounding box center or the object center in distance units in the object's local space. You can type values outside the slider range.

Twist Effect Property Page

Option	Description
Twist Active	Applies a gradual rotation about an axis. This parameter is also available on the Deform tab.

Option	Description
Angle Modulating Profile	This profile curve controls the fraction of the angle (the vertical axis) over the length of the object (0 to 100% on the horizontal axis). For any point along the length of the object, the degree of rotation is the Angle (set on the Deform tab) multiplied by the corresponding value of this graph. Results greater than 1 produce an exaggerated deformation with a rotation greater than the Angle and negative results produce rotation in the opposite direction. You can edit the profile using the mouse and the same keyboard commands as the function curve editor.

Vortex Effect Property Page

Option	Description
Vortex Active	Varies the angle of rotation based on the distance from the axis, creating a swirl effect. This parameter is also available on the Deform tab.
Angle Modulating Radial Profile	This profile curve controls the angle (the vertical axis) over the distance from the axis (0 to 100% in terms of the object's length). For any point along the length of the object, the degree of rotation is the Angle (set on the Deform tab) as modified by the Twist Effect (if on) then multiplied by the corresponding value of this graph. You can edit the profile using the mouse and the same keyboard commands as the function curve editor.

Wave Property Editor

Wave control objects define animated wave deformations.

To create a wave: Select the objects to be deformed and click one of the wave deform buttons in the deformation tools panel.

To display: Select the deformed object, then click its Wave node in the Geometry and Deform Properties tab of the multi-purpose editor.

General Property Page

Option	Description
Type	Determines how the wave propagates from its source:
	• **Circular** produces a circular pattern emanating from a point like a water drop on a pond.
	• **Planar** produces a planar pattern emanating from a line like a wave on the beach.
	• **Spherical** produces a spherical pattern emanating from a point like an explosion.
Displacement Direction	The direction in which the points of affected objects are displaced:
	• **Up** displaces points along the local Y axis of the wave object.
	• **Direction** displaces points in the direction in which the wave is moving.
	• **Normal** displaces each point perpendicularly to the surface.
Periodicity	
In Space	Repeats the shape of the wave's profile between the first and last key points indefinitely.
In Time	Repeats the entire wave effect, including the result of Amplitude and Spread as set in the Wave operator's property editor (not the wave object's). The wave deformation begins again after the End frame set on the Time Control tab of the operator's property editor.
Velocity	The initial speed at which the wave moves in distance units per second.

Option	Description
Acceleration	The rate at which the wave's speed changes in distance units per second squared. Positive values cause the velocity to increase, and negative values cause it to decrease.
Vertical Falloff	
Start/End	Sets a height range over which the wave's effect decreases along the local Y axis of the wave object. Distance is measured from the center of the wave object. Start specifies the height at which the effect begins to decrease; End specifies the height at which the wave has no effect at all; and between 0 and the Start value, the full amplitude is applied.

Profile Property Page

Option	Description
Amplitude Profile	The shape of the wave's cross-section. The amplitude of the deformation at any point is determined by this profile and the value of the Amplitude parameter of the Wave Op deformation of the affected object. The horizontal length of this profile can also be modified and animated with the Spread parameter of the Wave Op deformation.
	You can edit the profile using the mouse and the same keyboard commands as the function curve editor.

Wave Op Property Editor

Control how a wave object affects a deformed object.

To create a wave: Select the objects to be deformed and click one of the wave deform buttons in the deformation tools panel.

To display: Select the deformed object, then click its Wave Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Wave Op Property Page

Option	Description
Mute	Toggles the deformation on and off without affecting the values of other parameters.
Amplitude	A multiplier for the height of the wave profile curve defined on the Profiles tab of the Wave property of the wave control object. This can be used to control decay.
Spread	A modifier for the length of the wave profile curve. Lower values produce longer waves.

Time Control Property Page

Option	Description
Start offset	The first frame for which the wave begins to affect the object.
End	The last frame for which the wave affects the object.

Text and Logos

Curve to Mesh Converter Property Editor

Controls the tesselation, extrusion, bevelling, and other options for text and extruded logos.

To display: Select the text or logo object, then click its Curve to Mesh Converter node in the Geometry and Deform Properties tab of the multi-purpose editor.

Subtopics

Geometry Property Page

Extrude/Bevel Property Page

Geometry Property Page

Option	Description
Step	For **Contour** and **Holes** parameters, higher values produce smoother results that deform well, but increase the geometry.
Contour	The number of edges to generate between each pair of knots on the outer contour curves.
Holes	The number of edges to generate between each pair of knots on the inner hole curves. This option is not available when **Curves Can Intersect** is on.
Offset	Offsets the input curves. Positive values enlarge the curves and negative values shrink them. Values are in distance units.

Option	Description
Create Polygon Clusters	
Per Island/Character	Creates separate polygon clusters for each character.
	The clusters are automatically named Char_1_*x*, Char_2_*x*, and so on, where *x* is the character itself.
	If you change the resulting mesh structure by adding, removing, or moving curves or by changing the text after creating partition clusters, the clusters are not updated automatically. You must click this button again to re-create the clusters.
Per Section Along Depth	Creates five polygon clusters corresponding to the Front, FrontBevel, Extrusion, BackBevel, and Back. These clusters are automatically updated even if you change the mesh structure by changing settings, for example, setting a bevel after clicking this button.
	The clusters are created even if they are empty. For example, if you do not apply a bevel then FrontBevel and BackBevel contain no polygons.
	The clusters span multiple characters. If you explode the mesh after creating these clusters, each mesh object in the exploded hierarchy will have these five clusters.
Explode Mesh into Separate Parts	Creates a hierarchy of polygon mesh objects. There is one object for each character, and all objects are parented under a common null.
Tessellation Method	Controls how the curves' enclosed areas are filled with polygons.
Delaunay	Generates a mesh composed entirely of triangular polygons. This method gives consistent and predictable results, and in particular it will not give different results if the curves are rotated. This method is more precisely known as *constrained Delaunay tessellation*.

Option	Description
Minimum Polygon Count	Uses the least number of polygons possible. For a single contour curve with no holes, this results in exactly one polygon. When holes are present, there are multiple polygons and their shapes are not predictable.
	In general, Minimum Polygon Count creates irregularly-shaped n-sided polygons. For this reason, it is best used when you need to keep the geometry light on simple objects that will not be deformed.
Medial Axis	Creates concentric contour lines along the medial axes (averages between the input boundary curves), morphing from one boundary shape to the next. This method creates mainly quads with some triangles.
Delaunay Options	Various options for refining the tesselation when Method is set to Delaunay.
	• **Minimum Angle** sets the minimum angle for triangles in the tesselation. If a triangle contains an angle that is smaller than this value, it gets replaced by better-shaped ones. Eliminating small-angled triangles gives a more uniform OpenGL shading. However, increasing this value will result in more polygons and heavier geometry.
	• **Maximum Area** sets the maximum area for triangles in the tesselation, in units of 0.01 of a distance unit squared. If a triangle is larger than this value, it gets replaced by smaller ones. This allows the polygon mesh to be deformed more smoothly. However, decreasing this value will result in more polygons and heavier geometry.

Extrude/Bevel Property Page

Option	Description
Extrusion	Controls how the polygon mesh is extruded.
Length	The distance to extrude. A value of 0 gives no extrusion.
Subdivisions	The number of extra vertices along the length of the extrusion.

Option	Description
Direction	The direction in which to perform the extrusion: **Forward** or **Backward**.
Bevel	Controls how the polygon mesh is beveled.
Size	Controls the size of the beveling.
Depth	Controls how much the bevel protrudes in front and in back of the base mesh. The bevel profile is automatically scaled so that the width of its bounding box equals this value. This value is in addition to any extrusion set using the Extrusion parameters.
Height Scaling	Scale factor that modifies the profile curve in the outward direction only. Positive values push the sides out, while negative values push the sides in.
Sides	Specifies which ends to bevel: **Front** and/or **Back**.
Options	
Proportionally Smaller for Holes	Scales the bevel profile applied to holes. This is useful to avoid overlapping geometry when holes are small compared to the bevel size.
Interior	Controls the direction of the bevel.
	• When this option is on, the front and back are beveled outward. As a result, the silhouette matches the original curves but polygons may intersect or interpenetrate in narrow areas when the bevel depth is high.
	• When this option is off, the sides of the tube are beveled outward. In some cases, this may distort the object's outline or cause separate islands of polygons (such as characters in text) to collide with each other.
Create Hard Edges	Activates mitering (sharp edges like at the corners of a picture frame).
Discontinuity Angle	Specifies the angle above which edges are sharp. For a completely faceted polygon mesh object, set this value to 0.

Option	Description
Corner Mitering	
Intersection-based Min Angle: Convex, Concave	The minimum threshold for mitering convex and concave angles in degrees. Angles that are sharper than these values are rounded. A value of 0 is equivalent to turning rounding off.
Roundness Subdivisions	The smoothness of the rounding. Higher values produce smoother arcs with denser geometry. A value of 0 creates a flattened effect like a sawn-off corner.
Profile Curve	Controls the shape of the beveling.
Curve	The shape of the bevel profile curve. To select a preset profile curve, click the browse (**...**) button.
Sampling Step	The number of subdivisions between each pair of knots on the profile curve.

Text Property Editor

Creates and formats text.

To create text: Click either of the Create Text Block buttons or the Create Text Offset Rig button in the text tools panel.

To display: Select the text object, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
File	Manages Rich Text Format (RTF) files.
New	Clears the text entry box.
Open	Select an RTF file to import.
Save	Save the contents of the text entry box as an RTF file.
Save As	Save the contents of the text entry box as an RTF file with a new name.
Edit	Standard editing commands.

Option	Description
Undo	Cancels the last action that you performed.
Cut	Removes the current selection and places it on the Clipboard.
Copy	Duplicates the current selection and places it on the Clipboard.
Paste	Replaces the current selection with the contents of the Clipboard.
Clear	Deletes the current selection.
Font	Specifies font type from a list of those available on your system.
Size	Specifies font size in points.
Style	Specifies font style. Styles available include bold and italic.
Alignment	Specifies text alignment, including left align, center, and right align.
Auto	Updates the text in your scene automatically as you make changes. There is a short delay to make sure you have finished typing before the scene updates. Turn this option off for faster interaction, particularly with dense geometry and beveling.
Apply	Updates the text in the scene manually.
Spacing	Adjusts the spacing between individual characters. Positive values increase spacing and negative values decrease it (use Alt or enter values numerically to set negative values).
	This parameter is available only in the on-screen Text Block parameter set.
Size Ratio	The ratio of points to distance units. Lower values make text bigger and higher values make text smaller.
	This parameter is available only in the on-screen Text Block parameter set.

Lights and Cameras

Ambient Lighting Property Editor

A scene's ambient color is multiplied by an object's ambient color. If the scene ambience is set to black, nothing can alter the ambient color of an object except, of course, a light.

To display: Click the Ambient Lighting node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Ambience	Sets the scene's ambient lighting. Set to dark gray by default.

Camera Property Editor

Controls the basic properties of the selected camera.

To display: Select the camera, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Field of View	The angular measurement of the amount of the scene that can be viewed by the camera at any one time.
Angle	Specifies the angle of the camera in degrees. A wider angle lets you see more of the scene but may cause distortion, particularly when an object is very close to the camera.
Vertical/Horizontal	Specifies whether the Angle value is Vertical or Horizontal.
Projection	Specifies the type of projection from 3D to 2D used by the camera.
Orthographic	Uses an orthographic projection. All camera rays are parallel, and objects do not change size as they change distance from the camera. This projection is useful for pseudo-3D images without true perspective.

Option	Description
Perspective	Uses a perspective projection, simulating depth. Objects appear farther away as they are move away from the camera.
Ortho Height	Sets the zoom of an orthographic camera. The higher the number, the further away the interest appears.

Depth of Field Property Editor

Defines the camera's depth of field by manipulating the radius of the circle of confusion, focal length, and focus plane distance from the camera.

To display: Select the camera, then click the Depth of Field node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Depth of Field Strength	Controls how powerful the depth of field will be, given the defined focal distance.
Focal Distance in Inches	Defines the focal distance from the camera. Used with the Depth of Field Strength parameter above.

Fisheye Property Editor

Simulates a hemispherical (fisheye) lens capable of rendering a 180-degree field of view with characteristic hemispherical distortion typical of real-world fisheye lenses. This effect shader does not attempt to implement some of the less desirable (and less predictable) traits of fisheye lenses, such as chromatic and spherical aberrations; in that sense, this is an "ideal" fisheye lens.

To display: Select the camera, then click the Fisheye node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Distortion	Adjusts the degree of fisheye distortion. A value of 0.0 effectively "flattens" the lens, while a value of 1.0 results in completely hemispherical distortion.
	Distortion is relative to the camera's field of view (FOV). Hence, only if FOV is set to 180 degrees, and Amount to 1.0, will the lens be truly hemispherical.
	You can adjust the camera's field of view from the Camera property editor.
Scale	
X/Y	Adjust the proportions of the image in X and Y.
Uniform	When activated, the X and Y scale values are kept identical, and changing them zooms into or out of the image uniformly. Zooming out reveals an undefined (black) area outside of the area covered by the lens.

Flare Property Editor

Applies a lens flare effect to a light. You can control the brightness and dimensions of the basic flare effect, its "star," and its glow.

To display: Select the light, then click the Flare node in the Material and Fx Properties tab of the multi-purpose editor.

Subtopics

Effect Property Page

Flare Property Page

Glow Property Page

Star Property Page

Effect Property Page

Option	Description
Enable	Toggles the lens flare effect on and off.

Flare Property Page

Option	Description
Flare File	Displays a dialog box from which you can select a flare type.
Brightness	Controls the brightness of the flare.
Size	Controls the size of the flare.
Aspect Ratio	Specifies the ratio between the flare's width and height.

Glow Property Page

Option	Description
Glow	Applies a glow or halo within the flare effect.
Brightness	Controls the overall brightness of the flare's glow.
Size	Defines the size of the halo.
Falloff	Defines the halo's attenuation from the center of the flare.

Star Property Page

Option	Description
Stars	Specifies whether the operator creates a star-flare effect.
Brightness	Controls the brightness of the star effect.
Number of Rays	Controls the number of rays per star.

Option	Description
Length	
Length	Defines the length of the star's ray.
Jitter	Controls the seemingly random variations in the star ray's lengths.
Thickness	
Thickness	Defines the thickness of the star's ray.
Jitter	Controls the seemingly random variations in the star's ray's thickness.
Angle	
Auto Rotate	The star effect automatically rotates as the flare's lights are moved.
Rotation	Specifies the rotation of the flare's star effect.
Twinkle	This parameter controls the random flickering of the star over time.

Glow Property Editor

Applies a 2D glow to the selected object. The glow is a post-process effect and, therefore, will be applied once the render is complete. You can define the color, size, and look of the glow.

To display: Select the light, then click the Glow node in the Material and Fx Properties tab of the multi-purpose editor.

Glow Property Page

Option	Description
Glow Color	
Color	Defines a color for the glow effect. You can switch between the RGB, HSV, and HLS color channels.
Use Object's Color	The glow shader uses the object's diffuse and ambient colors as the glow's color.

Option	Description
Opacity	Controls how transparent the glow effect is. A low value makes the object's color more visible; a higher value renders the glow opaque (non-transparent).
Intensity	Closely linked with the Opacity parameter, Intensity affects the saturation of the glow's color. A high Opacity and Intensity value creates a black, non-transparent glow.
Glow Options	
Exclude Object from Glow	Does not allow the glow effect to obscure the object.
Shrink (pixels)	Shrinks the glow inward, into the selected object.
Use Depth	Enables a depth-buffer algorithm for the glow. Objects in front of the glowing object(s) will then obscure parts of the glow properly. Due to the inherent imprecision of the tag channel, a slight under- or overlap may occur on the object's edges.
	📄 *Tip: Leaving this parameter off increases rendering speed.*
Use Object Intensity	The glow takes the intensity of the underlying object into account when adding the glow. If both the object intensity and the glow intensity are less than 1, the result will also be less than 1.

Size Property Page

These options let you define the glow's size and falloff.

Option	Description
Glow Size	
Size	Defines the size of the glow. The glow's center is that of the object or group to which it is applied.

Option	Description
Minimum Level	Controls the precision of the glow. An algorithm searches outward from the object: as the algorithm moves outward, its level drops.
	📖 *Tip: If the value is too high, the edge of the glow will become visible. Lower the value a little until the edge isn't visible. This parameter can make a big difference to the scene's rendering time.*
Falloff	
Exponential	When on, the glow uses an exponential (inverse square) falloff. Only one falloff type can be defined at a time.
Linear	When on, the glow uses a linear falloff. Only one falloff type can be defined at a time.

Noise Property Page

To add realism to a glow, use these options to create a random-like noise to the glow effect.

Option	Description
Amplitude	Defines the strength of the noise. Noise is subtracted from the full glow's intensity. The higher the value, the more chaotic the pattern.
Scale	Defines the size of the noise. When increased, the variations are slower across the surface.
Noise Space	**Object Space:** Centers the noise on the object's center. If the object moves, the glow moves with it.
	World Space: Centers the noise with the scene origin (0,0,0). If the object moves, it appears to swim through its glow.

Light Property Editor

Settings for general properties of the selected light. Every light also has an accompanying light shader property (usually named **soft_light**).

To display: Select the light, then click its node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Light Type	Displays what type of light you are working on. The Light Type can be changed at any time. Your choices are:
	Point: Casts rays in all directions from the position of the light. This is similar to a regular light bulb, whose light rays emanate in all directions from the bulb.
	Infinite: Simulates light sources that are infinitely far from objects in the scene. There is no position associated with an infinite light, only a direction. All objects are lit by parallel light rays.
	Spot: Casts rays in a cone, simulating a real spotlight. Useful for lighting a specific object or area.
Cone Angle	Sets the angle in degrees of the cone **for a spotlight only**.
Exponent	Used to determine exponential light falloff. Range is from 0.01 to 10. Low values make the light fall off more slowly than high values.
Light Contribution	Determines what type of lighting a light projects. By default, a light produces both diffuse and specular lighting.
Specular	Projects specular light. If Diffuse is off, the light appears harsh and brighter.
Diffuse	Projects diffused light. If Specular is off, the light appears much softer.

Rig Controls Property Editor (Light Rig)

When you create a new scene, a default light rig is created at the same time. The light rig has two circular paths: the *inner path* and *outer path*. The inner path constrains three spotlights to it, and the outer path constrains the spotlights' interests to it.

The three spotlights are defined as follows:

• A **key** light, which is the main source of light from the rig.

• A **back** light, which highlights the edges of your objects.

• A **fill** light, which illuminates the shadows created by the key light.

To display: Select an element in the rig, then click the RigControls node in the Geometry and Deform Properties tab of the multi-purpose editor.

Key, Fill, Back Light Property Pages

Option	Description
Enable	Turns the key, fill, or back light on or off.
Type	Lets you select a light type: point, infinite, or spot.
Rotate	Sets the angular position of the light along the rig's outer path.
Up & Down	Sets the distance of the light above or below the rig's outer path, in distance units.
Dolly	Sets the distance the light dollies forward or backward, in distance units.
Key, Fill, Back Interest	The light's interest is represented in the viewport by a red arrow. By default, the arrow intersects with the rig's inner path at its center. Interest settings are only applicable to spotlights and directional lights.
Up & Down	Sets the distance of the interest above or below the rig's inner path, in distance units.
Dolly	Sets the distance the interest dollies, in distance units.
Specular	Projects specular light. If Diffuse is off, the light appears harsh and brighter.

Option	Description
Diffuse	Projects diffused light. If Specular is off, the light appears much softer.
Color chip	Displays the light's color. Click the color chip to display the Mini Color Editor.
RGB, HLS, HSV	Toggles between the RGB, HLS, and HSV color models.
	The RGB color model uses red, green, and blue to specify colors. The intensity of each color is represented by a number from 0 to 1.
	The HLS color model uses hue, luminance, and saturation to specify colors. The value of each setting is represented by a number from 0 to 1.
	The HSV color model uses hue, saturation, and value to specify colors. The value of each setting is represented by a number from 0 to 1.
Brightness	Adjusts the brightness or luminance of the light.
Shadow	Sets the amount of the shadow the light casts, from 0 (darkest) to 1 (lightest).
Enable	Toggles the light's ability to cast shadows on or off.
Cone	Sets the angle in degrees of the cone **for a spotlight only**.
Hot Spot	Sets the angle in degrees of the interior cone **for a spotlight only**. The interior cone defines where the light remains at its brightest.
Falloff	Toggles falloff on or off. Using the Start and Stop values described below, falloff limits the effect of distant objects that are unlikely to have a significant impact on the surface color of scene objects. This increases rendering speed and reduces memory usage.
Start/Stop	When falloff is on, these specify the Start and Stop values described above. These values affect final gathering rays as follows:
	• Final gathering rays whose lengths are less than or equal to the Start value are used normally.
	• Final gathering rays whose lengths are greater than the Stop value are ignored.
	• Final gathering rays whose lengths are between the Start and Stop values are attenuated with a linear falloff.

Light Paths Property Page

Option	Description
Whole Rig	
Up & Down	Translates the entire light rig along the global Y axis.
Rotate	Rotates the entire light rig around the global Y axis.
Inner Path/ Outer Path	
Up & Down	Translates the light rig's inner or outer path along the global Y axis.
Scale	Sets the radius of the light rig's inner or outer path, in distance units.

Light Rig Partial Property Editor (Light Rig)

Sets the sizing and vertical positioning of the default light rig.

To display: Select the light rig's inner path, then click the Light Rig Partial node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Overall Height	Sets the height of the light rig's center in distance units.
Inner/Outer Height	Sets the height of the light rig's inner and outer paths relative to the light rig's center.
Overall Rotation	Sets the rotation of the entire light rig around the global Y axis.
Inner/Outer Radius	Sets the radius of the light rig's inner and outer paths in distance units.

Key/Fill/Back Light Property Editor (Light Rig)

Settings for general properties of the rig's lights. For more specific properties, select a light.

To display: Select the light rig's inner path, then click the light's node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Enable	Toggles the key, fill, or back light on or off.
Height	Sets the height of the light relative to the inner path in distance units.
Rotation	Sets the rotation of the light around the inner path's local Y axis.
Dolly	Sets the radial distance of the light from the path in distance units.
Brightness	Adjusts the brightness or luminance of the light.

Light Shader Property Editor

Settings for the color attributes of the selected light. The default light shader name is **soft_light**.

To display: Select the light, then click the light shader's node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Colors	
Color	Sets the intensity of each color channel. The specific color channels depend on the selected color model. The slider values range from 0 to 1, but you can enter higher values.
Intensity	Controls the intensity of the selected color.
Spread	
Angle	Sets the angle (in degrees) of the decreasing light around the spot-light cone.

Option	Description
Shadows	Controls how shadows are cast by the selected light.
Enabled	Activates the creation of raytraced shadows.
Umbra	Switches on the transparency factor for the umbra (the main shadow where light is completely blocked by an object). This controls how the shadow blends with the material on which the shadow is cast. A value of 0 gives a complete, black shadow, and a value of 1 gives no shadow.
Light Attenuation	The Attenuation or falloff options control how light intensity decreases over distance. Values for the Start Falloff and End Falloff options are measured in distance units. These options work only with point and spot lights.
Light Falloff	Activates the fading of light intensity over distance.
Mode	Specifies how Falloff is calculated over the specified distance.
	Use Light Exponent: Uses an inverse square algorithm to calculate the fading of light intensity between the start and end points. The farther light travels from the start point, the more rapidly it loses its intensity. This provides a more sudden transition to 0 (end).
	Linear: Uses a linear algorithm to calculate the fading of light intensity between the start and end points. The intensity of light diminishes at a constant rate between start and end points. This provides a smoother and more gradual transition to 0 (end).
Start Falloff	Specifies the point at which the light intensity starts to decrease in all directions.
End Falloff	Specifies the point at which the light intensity reaches 0.

Volumic Property Editor

Defines the look and effects of a volumic light.

To display: Select the light, then click the Volumic node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Volumic	
Enabled	Activates a volumic effect on the light to which the property is assigned.
Volumic Settings	
Reflectance	Controls the reflectance emitted by a volumic light.
Min Distance	Defines the minimum distance from the light source that the volumic effect will be visible.
Shard	
Enabled	When on, the light produce rays, or shards, of light.
Intensity	Defines the intensity of the light shards. A very high value resembles sun rays poking through clouds.
Scaling	Defines the size of the beams/rays.
Rotation	The shard effect automatically rotates as the light source is moved.

Z-Depth Property Editor

Renders an RGB image according to the surface's distance from the camera. The color increases from black to white as the distance is increased.

To display: Select the camera, then click the Z-Depth node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Maximum Depth	Defines the maximum depth at which the shader calculates the Z-depth. The start distance is the camera location. Beyond the maximum depth, everything is white (unless Invert is on).
Invert	Blends from white to black instead of black to white.

Materials and Textures

Image Source Property Editor

Sources are read-only files used to create clips. Only their name can be edited and the original image file is never affected.

To display: Select the textured element, then click the texture node in the Material and Fx Properties tab of the multi-purpose editor.

General Property Page

All of the following parameters, with the exception of File Name and Frame Rate, cannot be edited and displayed only for reference.

Option	Description
File Name	Displays the explicit path to where the source file is saved. If **Rel** is on, the path is relative to the active project directory. If **Abs** is on, the path is absolute. You can type a different path or use the browse (**...**) button to change locations. Valid names are displayed in white, invalid names are red, and read-only files are gray.

Option	Description
X, Y Res.	Displays the source's X and Y resolution.
Frame Rate	Defines the frame rate at which the sequence of images is played. The default value is 29.97 fps (frames per second).
Frames	Displays the total number of frames the source contains.

Info Property Page

Option	Description
Name	Defines the source's name. This name can be edited without affecting the original image file.
Sequence Info	All of the following parameters, with the exception of Frame Rate, cannot be edited and displayed only for reference.
Frame Rate	Defines the frame rate at which the sequence of images is played. The default value is 29.97 fps (frames per second).
Frames	Displays the total number of frames the source contains.
First/Last Frame	Identifies the first and last frames in the sequence.
Source Info	All of the following parameters cannot be edited and displayed only for reference.
X, Y Res.	Displays the source's X and Y resolution.
Channels	Displays the number of channels the source file contains.
Bits/Pixel	Displays the bit format of the source.
Pixel Ratio	The ratio of the pixel height to width.

Video Property Page

All of the following parameters cannot be edited and displayed only for reference.

Option	Description
Is Movie Format	This option is selected if the source is a video file.
Number of Layers or Tracks	Displays the number of layers or tracks in the clip. This is useful when your source is a layer or track-based file such as AAF.
	When you create clips from sources with multiple layers or tracks, a clip is created for each layer or track. All of the created clips share the single source.
Video Field Type	When the source is a video sequence, this parameter displays information about its field order. One of the following will be displayed:
	• **None:** the source is not a video sequence, and has no fields.
	• **Lower Field First / Even (NTSC and DV Formats):** the fields use even dominance.
	• **Upper Field First / Odd (PAL and HD Formats):** the fields use odd dominance.

Material Property Editor

Controls the ambient, diffuse, and specular RGB colors, as well as RGB reflectivity, translucency, and transparency. The default material name is **Phong**.

To display: Select the element, then click the material's node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Diffuse	Sets the diffuse color of the light. The diffuse color usually contributes the most to an object's overall appearance and it can be considered the "main" color of the surface.

Option	Description
Ambient	Sets the ambient color of the light. The ambient color appears on areas that are shielded from light but are still visible due to an ambient light, which is a non-directional light that pervades the entire scene.
Specular	Sets the specular color of the light. The specular color is the color of shiny highlights on the surface. It is usually set to white or to a brighter shade of the diffuse color. The size of the highlight depends on the defined **Specular Decay** value.
Specular Decay	Defines the rate at which the specularity decays outward.
Transparency	
Enable	Switches on transparency. When off, no transparency is possible on an object.
Frost	Determines the smoothness of the surface.
	0 = glossy; the higher the value the more diffuse, or "frosted," the effect.
Samples	Specifies the number of times the light ray is sampled. Low sample rate for a grainy; high for smooth.
Index of Refraction	Controls the bending of light through a transparent material. Defines the index of refraction, which varies according to the nature of the material. (The refractive index of water is roughly 1.33, and that of vodka is about 1.36.)
	Default = 1 (the refractive index of air), which allows light rays to pass through a transparent material without distortion.
Reflection	
Enable	Switches on reflection. When off, no reflections are possible on an object.
Gloss	Determines the smoothness of the surface. 0 = glossy; the higher the value the more diffuse, or "frosted," the effect.
Samples	Specifies the number of times the light ray is sampled. Low sample rate for grainy; high for smooth.

Texture Map Property Editor

Defines the texture map and its parameters.

To display: Select the textured element, then click the object or cluster texture node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Texture Image	
Image Clip Name	Name of the picture or video file to be used as the texture map.
Window and Playback Controls	Displays the selected image. Use the playback controls to play, pause, loop, and stop an image sequence.
Edit	Modifies parameters of the selected image.
New	Loads a new image.
Copy Alpha to RGB	Determines if the texture's alpha channel will be used for transparency. **Enable** uses the texture's alpha channel. **Alpha Strength** sets the degree to which alpha channel affects the image, from 0 to 1.
Bump Mapping	
Enable	Switches on the bump mapping parameters.
Use Alpha	Uses the texture's alpha channel to achieve a bump map.
Factor	Defines how "bumpy" the bump map will be. A negative value inverts the bump inward; a positive bump map factor bumps outward.
Step	Controls the U, V, and Z steps of a bump map. Use this parameter to "smooth" bumps or make them more jagged.
Alternate	
U, V	Specifies whether every other copy of the repetition should be reversed so that the successive copies of the texture are alternated.

Option	Description
Repeats	
Texture repeats	Contains the repetition factor in U, V, and W. A value of 2, for example, shrinks the texture so that it fits twice in a [0..1] interval.

Texture Support Property Editor

Defines or edits the type of texture projection applied to an object, using the selected texture support.

To display: Select the texture support, then click the Texture Support node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Projection Method	**Planar:** Defines a planar projection on the selected object.
	Cylindrical: Defines a cylindrical projection on the selected object.
	Spherical: Defines a spherical projection on the selected object.
	Lollipop: Defines a lollipop projection on the selected object. This is similar to a spherical projection, but the "pinch point" is on the bottom of the object (like the wrapper of a lollipop).
	Spatial: Defines a spatial projection on the selected object.
	Cubic: Defines a cubic projection on the selected object.
Projection Plane	**XY, XZ, YZ:** Determines which projection plane your projection method uses to project a texture.
Swap UV	U and V exchange positions on the object's surface.

Time Control Property Editor

Specifies the timing of animated video clips used as textures.

To display: Select the textured object, then click the Time Control node in the Material and Fx Properties tab of the multi-purpose editor.

General Property Page

Option	Description
Source Clipping	
In/Out	The first and last frames of the source that is used by the clip. Adjust these values to trim a clip so that it begins or ends partway through the duration of the source.
Time Reference	
Start Offset	The frame where the clip starts, in the local time of the source.
Scale	The scaling of the clip in time. Increasing this value speeds up the relative time of the clip, decreasing the duration.
Info	These values are automatically calculated from other parameters and cannot be modified directly.
Duration	The length of the clip. This value is automatically calculated from other parameters and cannot be modified directly.
End Time	The last frame of the clip. This value is automatically calculated from other parameters and cannot be modified directly.
Cycle Id	The cycle ID at the current frame. The original clip has a cycle ID of 0. If the clip is set to extrapolate after with a cycle or bounce, the first cycle after the original clip has an ID of 1, the next cycle has an ID of 2, etc. If the clip is set to extrapolate before with a cycle or bounce, the cycle immediately before the original clip has an ID of -1, etc.
Resulting In and Out	The first and last frames of the clip after offset, scaling, and extrapolation.

Extrapolation Property Page

These options determine how a clip contributes to the animation outside of the frames on which it is defined.

The **Extrapolation Before** options determine what happens before the clip, and the **Extrapolation After** options determine what happens after the clip.

Option	Description
Type	The type of extrapolation:
	• **No contribution** results in no extrapolation. Use this to delete an extrapolation.
	• **Hold** results in the first or last values being held for the number of frames specified by **Time to Hold**.
	• **Cycle** repeats the clip for the number of times specified by **Cycles**.
	• **Bounce** repeats the clip forward, then backward, and so on for the number of times specified by **Bounces**.
Hold	The number of frames to hold the first or last values. Set the **Type** to **Hold**, then enter a value here.
Cycles	The number of times to repeat the clip. Set the **Type** to **Cycle**, then enter a value here.
Bounces	The number of times to play the clip forward and backward. Set the **Type** to **Bounce**, then enter a value here.

Warp Property Page

These options let you apply a timewarp to the clip. A timewarp changes the relationship between the local time of the clip and the time of its parent while taking into account other things like scales, cycles, etc.

A timewarp is a function curve associated with the time control property of a clip.

Option	Description
Do Warp	Activates the timewarp for the clip. Modifications to **Warp FCurve** have no effect unless this option is on. You must first select this option to make the warp fcurve available for editing.
Clip Warp	Activates the timewarp for the whole duration of an extrapolated clip (cycled or bounced); that is, the warp is not repeated with each cycle or bounce. You must select **Do Warp** for this option to be active.
Warp FCurve	Creates a timewarp by setting keys that map the clip's local time (X axis) to the parent clip's time (Y axis).
	Make sure to unlock the keys on the warp fcurve by selecting the curve, then right-clicking on it and choosing Keys > Unlock All Keys.
	You can edit the function curve using the mouse and the same keyboard commands as the animation editor, or right-click in the graph or on a selected function curve to display a contextual menu of commands. When you edit the curve, a ghosted copy of the original curve is kept as a reference.

Toon Shader Property Editor

A toon shader camera effect renders ink contours over the image. Ink can be drawn between different materials, objects, or where there are great discrepancies in distance or direction, for example.

If you want to know how this works and don't scare easily, here's an explanation: Contours are detected using a stratified adaptive stochastic super-sampling technique. This means that for each primary-ray sample normally fired to compute an image, the shader fires additional rays into the scene until various conditions are met (that is, until a contour is detected); Quasi-Monte-Carlo (QMC) methods are used to compute the direction of each additional ray. At the intersection of one of these rays with a surface, some information about the intersection point, such as the surface direction or its distance from the camera, is stored for later analysis. After each additional ray is fired, the information gathered at its intersection is compared with that stored for the nominal ray. If a contour is detected, sampling ceases and a user-specified contour-color is composited over the image.

Ultimately, you've turned your computer into an expensive, hi-tech pen.

To display: Select the camera, then click the toon shader node in the Material and Fx Properties tab of the multi-purpose editor.

Appearance Property Page

Basic ink attributes, such as thickness ("spread") and color.

Option	Description
Ink Only	Renders ink only.
Color	Ink color and alpha. Ink is composited according to its alpha, so an alpha less than 1 results in underlying surfaces being partially visible through the contours.

Option	Description
Compositing	Choose from a variety of available transfer modes for controlling the compositing of ink over underlying surface color:

- **Normal:** Normal is the default. It simply takes the foreground.

- **Add:** The foreground is added to the background. Thus, no foreground is visible if the foreground is black. This is useful for compositing such that the foreground appears to glow.

- **Multiply:** Multiplies the foreground by the background. The result is always a color darker than either original foreground or background, much like the result of two overhead transparencies stacked and projected from a single projector.

- **Screen:** The inverses of the two color values are multiplied. The result is a foreground brighter than either the original foreground or background.

- **Overlay:** Overlays either multiplies or screens, depending on the value of the background underneath. Overall, the effect is that the background is not replaced by the foreground, but is mixed with it, while weighted by the value of the original background.

- **Lighten:** Compares the values of the foreground and background and chooses the lighter of the two. The overall result is that the foreground can never do anything but make the background lighter.

- **Darken:** Compares the values of the foreground and background and chooses the darker of the two. The overall result is that the foreground can never do anything but make the background darker.

- **Difference:** The foreground is subtracted from the background, producing an inverted color effect.

- **Hue, Saturation, Value:** Uses the selected attribute of the foreground and the other attributes of the background.

- **Soft Light:** If the value of foreground is greater/less than 50% gray, the underlying background is lightened/darkened by the foreground. This is similar to shining a diffuse light on the image.

- **Hard Light:** If the value of foreground is greater/less than 50% gray, the background is screened/multiplied by the foreground. This is similar to shining a harsh light on the image.

- **Exclusion:** Similar (though not identical) to Difference mode.

| Spread | Controls the thickness of ink contours. |

Option	Description
Anisotropy	Increase ink spread at a preferred angle. This is useful for simulating a calligraphy pen, for example.
Amount	The strength of the effect (a setting of 0 disables).
Angle	The preferred angle, specified in degrees (such that 0 corresponds to 12:00 on the clock face, 90 to 3:00, etc.).
Direction	Varies contour spread as a function of surface-direction. By default, direction taper alters ink spread according to the degree of a surface's incidence to the camera (such that spread is greatest when a surface faces towards the camera, and least when facing away).
Amount	The strength of the effect (a setting of 0 disables).
Spread	Perturbation of ink spread.
Amount	The strength of the effect (a setting of 0 disables).
Frequency	Spatial frequency (x, y, z) of the random variation. Higher values result in "noisier" ink contours, while lower values result in more smoothly varying contours.
Facets	Detect contours at facet boundaries—this results in contours being drawn between intersecting, adjoining, or overlapping triangles in the tessellated surface.
Enable	Activates the effect.
Merge Coplanar	Ignores facet boundaries between adjacent co-planar triangles.

Background Property Page

This is a quick way to preview or render a contour image against a specified color (or image) background.

Option	Description
Enable	Activates the effect.

Option	Description
Color	Specifies a background color.
	📑 *Because of the effects of alpha pre-multiplication (mental ray's default color format), the alpha-channel value in the final rendered image may differ from that specified here.*

Lens Effects Property Page

The Lens Effects options allow for a fisheye lens-distortion effect useful for simulating distorted perspectives often found in hand-drawn artwork and non-photorealistic rendering.

Option	Description
Fisheye	The fisheye parameters simulate a hemispherical (fisheye) lens capable of rendering a 180-degree field of view with characteristic hemispherical distortion typical of real-world fisheye lenses.
Enable	Activates fisheye distortion.
Amount	Adjusts the degree of fisheye distortion. A value of 0 effectively "flattens" the lens, while a value of 1 results in completely hemispherical distortion.
	Distortion is relative to the camera's field of view (FOV). Hence, only if FOV is set to 180 degrees and Amount to 1 will the lens be truly hemispherical.
	You can adjust the camera's field of view from the Camera property editor.
Target Offset	
X/Y/Z	Offsets the orientation of the constraining object in global space in relation to the constrained object.
Roll	
Active	Toggles on/off any roll applied to the object.
Roll	Sets the roll value of the object around the aligned axis.

Animation

Direction Constraint Property Editor

Constrains the axis of a selected object to another object without changing the location of the constrained object; instead, it changes the orientation of the constrained object. The aligned axis (the X axis by default) of the constrained object always remains facing the center of the constraining object.

To display: Select the constrained object, then click the Direction Cns node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Active	Toggles the activeness of this constraint.
Align Axis	
X/Y/Z	Sets the axis of the constrained object that will always face the center of the constraining object.
Target Offset	
X/Y/Z	Offsets the orientation of the constraining object in global space in relation to the constrained object.
Roll	
Active	Toggles on/off any roll applied to the object.
Roll	Sets the roll value of the object around the aligned axis.

Fcurve Editor Property Editor

Controls various settings of the function curve editor, including how the grid is displayed and how the clipboard is managed.

To display: Select the animated object, then click the Function Curve Editor tab of the multi-purpose editor.

Editor Property Page

Controls the display of grids, rulers, and slopes in the function curve editor.

Option	Description
Display Grids	Sets the spacing between grid lines on the X (Time) and Y (Value) axes. **Show** displays or hides the X and Y axis grid lines.
Snap Grid	Sets the interval on the grid's X (Time) and Y (Value) axes to which a key will snap when it is moved or created. **Snap** toggles the snap-to-grid feature on and off.
Snap Slope	Sets the Length in distance units or the Angle in degrees to which slope handles on key points will snap when manipulated. **Snap** toggles this option on and off.
Rulers	Controls the properties of the rulers displayed along the axes of the function curve editor. You can set the properties for the horizontal and vertical rulers separately.
	Sets the spacing between ruler increments on the X (Time) and Y (Value) axes. The units displayed on the ruler are the same as the units you choose for the current Time Display. Use the Time preferences to choose units of frames, seconds, or milliseconds. **Show** displays or hides the rulers on the X and Y axes.

View Property Page

Controls how various elements appear in the function curve editor.

Option	Description
Key Coordinates	Displays the X and Y coordinate values for each selected key.
Slopes on Unselected Keys	Displays the slope handles of all points on a selected function curve. When off, only the slope handles of selected keys are displayed.
Keys on Unselected Curves	Displays the keys of all displayed function curves. When off, only the keys of selected function curves are displayed.
Pan & Zoom Tool Mode	Choose either the Pan & Zoom or Zoom (rectangular selection) tool to be the default zoom mode.
Use OpenGL	Uses OpenGL for increased speed, especially with large amounts of fcurves and keys.

Local Transform Property Editor

Sets the position, rotation, and scaling coordinates of the selected object's X, Y, and Z axes in local space.

To display: Select the object, then click the Local Transform node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Scaling	
X, Y, Z	Sets the size of the object along the specified axis.
Rotation	
X, Y, Z	Sets the rotation of the object around the specified axis.
Position	
X, Y, Z	Sets the position of the object along the specified axis.

Path Constraint Property Editor

Constrains an object so that it follows the path of a curve during playback of an animation.

To display: Select the path-animated object, then click the PathCns node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Active	Toggles the activeness of this constraint.
Path %age	Controls the percentage of the curve to be used as a constraining force on the selected object.
Attach Point	
X/Y/Z	Sets the offset distance in global space on the X/Y/Z axes of the constrained object in relation to the constraining object.
Tangency	
Active	Toggles the activeness of the tangency values on the constraint.
Axis to Align	
X/Y/Z	Sets the axis of the constrained object that will always face the slope of the constraining curve. You can either click the axis buttons (positive and negative X, Y, Z) or enter 1 or -1 in the axis text boxes.
Roll	
Active	Toggles on/off any roll applied to the object.
Roll	Sets the roll value of the object around the aligned axis.
Affected Axis X/Y/Z	Sets which axis of the constrained object will remain perpendicular to the path (Y is the default). You can either click the axis buttons (positive and negative X, Y, Z) or enter 1 or -1 in the axis text boxes.

Position Constraint Property Editor

Constrains the center of an object to another object. It also lets you toggle on and off scaling, orientation, and position constraints for the selected object.

To display: Select the constrained object, then click the Position Cns node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Active	Toggles the activeness of this constraint.
Attach Point — Constrained Object	
Affected by Orientation	Constrained object is affected by the orientation of the constraining object.
Affected by Scaling	Constrained object is affected by the scale of the constraining object.
X/Y/Z	Sets the offset distance in global space on the X/Y/Z axes of the constrained object in relation to the constraining object.
Attach Point — Constraining Object	
Affected by Orientation	Constraining object is affected by the orientation of the constrained object.
Affected by Scaling	Constraining object is affected by the scale of the constrained object.
X/Y/Z	Sets the offset distance in global space on the X/Y/Z axes of the constraining object in relation to the constrained object.

Time Property Editor

Specifies the frame format and rate of the scene's animation, as well as how time is displayed on the timeline.

To display: Click the Show All Options tab in the tools and options panel, then click the Time Format Options tab.

Option	Description
Default Frame Rate	Toggles the activeness of this constraint.
Frame Format	Specifies the frame rate used in the scene. Choose from NTSC, PAL, Film, 30 fps, or Custom. If you select **Custom frame rate**, you must enter a value in the **Frame Rate** text box below.
Frame Rate	The frame rate of your scene in frames per second (fps). This option is only available if you select **Custom frame rate** from the Frame Format list.
Time Display Format	These options are not available if you have selected **Custom frame rate** as the Frame Format.
Display As Frames	Toggles between displaying time in the timeline as frame numbers or in time code (hours:minutes:seconds:frames). This option is not available if the Display Format has been set to milliseconds.
Use Custom Display Format	Allows you to select a custom format from the **Display Format** list.
Display Format	Displays time in the timeline as milliseconds, SMPTE Film (24fps), SMPTE NTSC drop-frame or non-drop frame format, EBU PAL (25fps), or audio samples.

Particles

Fan Property Editor

A Fan force simulates the effect of a "local" wind blowing via a cylinder on the selected particle simulation. The wind's direction follows with the cylinder's axis, while the wind's intensity falls off from the center to the cylinder's border, moving from bottom to top.

To apply: Select the particle cloud and click the Apply Fan to Selected Cloud button in the particle tools panel.

To display: Select the particle cloud, then click the Fan node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles on/off the force effect.
Strength	
Amplitude	Intensity of the fan force.
Radius	Radius of the fan's cylinder.
Drop Length	Length of the fan's cylinder
Decay	
Radial	Falloff (decay) along the fan's radius from its center to its outer edges.
	• A value of 0 is no decay. This means that a particle would have the same amount of intensity on it throughout the radius.
	• A value of 1 is a linear decay so the fan would have full intensity at its origin and less intensity as the particle gets closer to the radius edge where its intensity is 0.
	• A value of 2 produces a quadratic, smooth falloff.

Option	Description
Axial	Falloff along the fan's cylinder axis from the point of its origin to its end (Drop Length).
	• A value of 0 is no decay. This means that a particle would have the same amount of intensity on it throughout the length of the cylinder.
	• A value of 1 is a linear decay so the fan would have full intensity at its origin and less intensity as the particle gets closer to the end of the cylinder where its influence is 0.
	• A value of 2 produces a quadratic, smooth falloff.

Gravity Property Editor

The Gravity force simulates a gravitational pull on the selected particle simulation.

To apply: Select the particle cloud and click the Apply Gravity to Selected Cloud button in the particle tools panel.

To display: Select the particle cloud, then click the Gravity node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles on/off the force effect.
Strength	
Amplitude	Sets the intensity of the gravitational force in either a positive or negative direction. The default value of 98.1 simulates earth's gravity.
	This default value is set as such to simulate particles properly when 1 distance unit equals 10 cm. Depending on the scale of your scene, you may need to adjust this value to get particles falling as they should. For example, if you define 1 distance unit to be equal to 1 meters, you would need to set the gravity to 9.81.

Obstacle Property Editor

Defines obstacle characteristics for objects as well as the behavior of particles as they strike the obstacle.

To apply: Select the particle cloud and click the Apply Obstacle to Selected Cloud button in the particle tools panel. Pick the objects you want to define as obstacles.

To display: Select the particle cloud, then click the obstacle's node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Temporarily prevents the collision with this obstacle from being used in the calculations of the particle simulation.
General	Sets obstacle attributes, as well as the dynamics of the impact.
Obstacle Type	Sets the type of obstacle surface.
	• B-Plane: Particles strike the obstacle on the surface of its bounding plane.
	• B-Box: Particles strike the obstacle on the surface of its bounding box.
	• B-Sphere: Particles strike the obstacle on the surface of its bounding sphere.
	• Actual Shape: Particles strike the obstacle on the surface of its geometric shape.
Animatable Deformation	Sets collision detection for deformed objects. Because this option requires more processing time, it should not be on if no animated deformation is used.
Double Face Collision	Sets collision detection for each face of a two-sided object.
Physical	
Friction	Controls the drag, or resistance, on particles as they strike the obstacle.
Elasticity	Controls the resilience of particles as they bounce off the obstacle.

Option	Description
Push Length	Controls the offset between the obstacle's surface and the actual particles' collision point.
Tolerance	Controls the degree of accuracy in all the Physical parameter settings. A lower tolerance level improves the accuracy of the set parameters but reduces overall performance.

Particle Billboard Property Editor

Renders particles as a 2D surface (a billboard) upon which you can create many different effects.

To display: Select the particle cloud, then click the Particle Billboard node in the Material and Fx Properties tab of the multi-purpose editor.

Rendering Properties Property Page

Option	Description
Geometry	
Shape	The outline shape of the billboards:
	• Square is a square shape that is circumscribed by the particle's radius.
	• Rectangular is the same as Square except that its aspect ratio is the same as the sprite that's applied to the particle.
	• Circular is a circle shape with the same radius as the particle.
Surface Normal	The calculated normal for lighting calculations: Billboard or Spherical.

Option	Description
Face Direction	Direction that the billboard faces:
	• Camera: the billboard faces the camera.
	• Incoming ray: billboard faces the camera unless there are reflections. If so, the billboard tries to orient itself so that it faces the reflected/refracted ray as well.
	• Camera and Lights: the billboard faces the camera unless shadows are being cast. If so, the billboard faces each shadow casting light. This ensures that the billboard's Shape doesn't appear flat, giving the illusion that it is three-dimensional.
	• Use Rotation: billboard uses the particle's Orientation values set in the Particle Emission property editor.
Rotation Follow Velocity	Particle billboard rotates in the direction of the velocity. This is disabled if the billboard Face Direction is set to Use Rotation.
Texture Coordinates	Controls which texture coordinates are generated for the particle.
	• Planar is a straight planar UV mapping with origin in the lower-left corner.
	• Particle's Local Space is the hit point in the particle's own local space.
	• Cloud's Local Space is a hit point in the local space of the particle cloud.
	• World Space is the hit point in the world coordinate space.
Effects	
Burn	Adds the particle's RGB values together when particles overlap in space (sometimes called color burn or additivity). This lets you create bright spots of colors and glows where many particles are on top of each other.
Self-Shadowing	Shadows cast by the particles onto themselves are attenuated by this factor.

Shading Properties Property Page

Option	Description
Apply Shading	Applies a simple shading model to the particles. If not selected, only shadows are calculated, and the particles are still visible even if no lights are applied to the cloud.
Ambient	
Type	The way in which the ambient color is calculated: % of Base Color (particle type color), Use Ambient Color (the values of the Color sliders below), or None.
Color	When you select Use Ambient Color as the Type, this is the surface's underlying ambient color, which gets modified by the scene's ambience. To get luminescent particles, use a high value for this parameter.
% of Base	When you select % of Base Color as the Type, this is the percentage of the particle type's color (the base color) to use as the ambient color. To "blast" the base color, enter values higher than 100%.
Specular	
Type	The way in which the specular color is calculated: % of Base Color (particle type color), Use Specular Color (the values of the Color sliders below), or None.
Color	When you select Use Specular Color as the Type, this is the color of the surface specular highlight.
% of Base	When you select % of Base Color as the Type, this is the percentage of particle type (base) color to use as the specular color.
Shininess	Shininess of the specular highlight. Lower values result in a larger highlight.

Particle Emission Property Editor

Applies general particle emission characteristics to objects, such as particle speed, density, and spread angle.

To display: Select the particle cloud, then click the particle emission's node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Emission Properties	
Generation	Specifies where the particles originate from, according to the geometry of the emitter object.
	• Point: Particles originate from the points of the emitter object.
	• Line: Particles originate from the edges of the emitter object.
	• Surface: Particles originate from the entire surface of the emitter object.
	• Volume: Particles originate from within the volumetric boundaries of the emitter object.
Direction	Specifies the direction in which the particle stream is emitted. Emission direction can be relative to the emitter object's local or global reference or relative to the direction of the emitter object's normals.
	Normals are invisible vectors that are perpendicular to the object's the surface. Their purpose is to indicate the visible side of the object and its orientation to the camera. Basically, the particles are emitted outward from the object with the Normal option selected.
Rate	Controls the number of particles emitted per second. This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.
Spread	Controls the diameter of the aperture through which particles are emitted from the emitter object. Range is 0 to 180 degrees. This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.

Option	Description
Velocity	
Speed	Controls the initial speed of emitted particle in distance units per second. This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.
Inherit	Controls the velocity of the particle emissions from an animated 3D object or moving vertices that you are using as a source. This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.

Particle Gradient Property Editor

Renders the particle's color using a color ramp (gradient). The gradient is determined by the particle's age % by default.

To display: Select the particle cloud, then click the Particle Gradient node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Name	Enter any name you like for the gradient or leave the default.
Evaluation Range	
Minimum/ Maximum	Minimum/maximum points on the gradient to evaluate for color.
Gradient	
Show Alpha	Displays the alpha channel in the gradient control if you have RGB selected. Deselect this option if you want to display only RGB values.
RGB	Displays only the RGB values in the gradient control if Show Alpha is off.
Alpha	Displays only the Alpha values in the gradient control.

Option	Description
Gradient Control	The gradient slider is where you create and adjust the gradient. The bar displays the gradient left-to-right from beginning (0.00) to end (1.00).
	Square markers on the bottom of the gradient bar are color markers. You can use up to 8 color markers, each with its own color. Clicking on the gradient bar inserts a color marker at the click-point. By default, the new marker assumes the color of that point in the gradient. To delete a color marker, right-click it and choose Delete marker from the menu.
	A round marker on the top of the gradient bar appears between each pair of color markers, indicating the mid-point in the blend between those two colors. Moving the round marker closer to either color marker causes less of that color, and more of the other, to appear in that "sub-gradient". The net effect is a sharper blend and a larger portion of the dominant color.
Color	Controls the R, G, B, and alpha values for the selected color marker.
Pos	Controls the position of markers on the gradient:
	Color Markers: If a color marker is selected, the Pos value indicates its position, on a scale of 0.00-1.00, within the entire gradient.
	Interpolation Markers: If an interpolation marker is selected, the Pos value indicates its position, on a scale of 0.00-1.00, between its associated pair of color markers.
Cubic/Linear	Switches between linear and cubic interpolation of the gradient. Cubic interpolation results in a smoother transition between alpha values, while linear interpolation results in sharper transitions.
Presets	
B/W	Loads a preset using black and white values in the gradient control.
Flame	Loads a preset using a color spectrum going from blue to yellow, orange, and then black in the gradient control.
Smoke	Loads a preset using only white and the alpha channel in the gradient control.

Option	Description
Animation	
Key All RGB/Alpha Markers	Keys all current RGB or Alpha marker values on the gradient control at this frame.
Remove All RGB/Alpha Keys	Removes all keys on RGB or Alpha markers.
Reset Gradient	Removes all keys on to the RGB and Alpha markers, puts the markers back in their original positions, and disconnects all shaders that are attached to gradient shader parameters.

Particle Shape Property Editor

Renders the shape of the particles, including the way the falloff (transparency) is calculated around the shape.

To display: Select the particle cloud, then click the Particle Shape node in the Material and Fx Properties tab of the multi-purpose editor.

Falloff Property Page

Option	Description
Name	Enter a name for the shape.
Type	Radial falloff type: Linear, Square, Smooth, Cubic, Gaussian, User-defined, or None. If you select User-defined, you can set its Exponent value below; if you select Gaussian, you can set its falloff Rate below.
Pattern Center	X, Y - Center point for falloff pattern in X and/or Y.
Modulation	
RGB, Alpha	Multiplies the RGB and/or Alpha component of the base color by the falloff value at the intersection point.
RGB/Alpha Inverted	Inverts the shape value when multiplying the RGB/Alpha components.

Option	Description
Range	
Start, End	The distance from the given center at which the falloff value goes to 1 (Start) and 0 (End). The falloff value is interpolated between the Start and End values using the Falloff Type selected.
User-defined Falloff	
Exponent	If you select User-defined as the Type, you can control the transparency falloff rate with this value. Values less than 1 give a steep falloff from the center. Higher values give a more gradual falloff.
Gaussian Falloff	
Rate	If you select Gaussian as the Type, you can control the rate of falloff for this interpolation. Higher values give a more rapid falloff.

Shape Property Page

Option	Description
Type	Lets you choose a geometric shape pattern for emitted particles. None uses no predefined shape for emitted particles.
	• Step is the ratio of the size of the particle set in a single step.
	• Sine creates a particle with an editable number of rings that are equally spaced from one another.
	• Star creates a particle with a star-like configuration.
	• Beam gives the particle a long beam shape with a bright center surrounded by a glow effect.
	• Symmetry creates symmetrical particles.
	• Noise creates an infinite variety of patterned effects.
	• Turbulence creates chaotic movement.
	• Fractal creates a fractal pattern.
Pattern Center - X, Y	Center point for shape pattern in X and/or Y.

Option	Description
Modulation	
RGB, Alpha	Multiplies the RGB and/or Alpha component of the base color by the shape value at the intersection point.
Step - Width	Width of step, which is a ratio of the particle size. Range is 0 to 1.
Sine - Scale	Scale of sine. Range is 0 to 30.
Star - Branches	Number of branches in star. Range is 0 to 20.
Beam - Width	Width of beam. Range is 0 to 1.
Symmetry - Width	Width of symmetry. Range is 0 to 2.
Noise	
Time	Evaluation time of noise pattern over time. Range is 0 to 10.
Scale	Scale of the noise pattern. Range is 0 to 5.
Turbulence	
Time	Evaluation time for turbulence pattern over time. Range is 0 to 10.
Scale	Scale of turbulence pattern. Range is 0 to 5.
Low Frequency	Low frequency of turbulence pattern. Range is 0 to 10.
High Frequency	High frequency of turbulence pattern. Range is 0 to 10.
Fractal	
Time	Evaluation time for fractal pattern over time. Range is 0 to 10.
Scale	Scale of fractal pattern. Range is 0 to 5.
Weight	Iteration weight for fractal pattern. Range is 0 to 1.
Granularity	Granularity of fractal pattern. Range is 0 to 5.
Octaves	Number of octaves (iterations) of noise in fractal pattern. Range is 0 to 8.

Particle Sprite Property Editor

Renders sprite image sequences that are used for the particle shape.

To display: Select the particle cloud, then click the Particle Sprite node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Start Sequence (%)	Where in the sprite sequence you want to evaluate the frame.
Looping	With looping off, values less than or equal to zero mark the first frame, and values equal to or greater than 1 mark the last frame.
	With looping on, a whole number (integer value) always marks the first frame and the last frame is the number just before the next whole number.
Output Color	Connects the shape shader to this one.
From Sprite	Uses the color from the sprite; otherwise, the color is taken from the input (if there is no connection to the input, then the particle's color is used).
Alpha Modulation	Controls how the particle alpha is modulated. Multiplies the particle's alpha channel by the sprite's alpha channel or RGB intensity, or None.
Inverted	Inverts the alpha calculated from the sprite before multiplying with the incoming alpha.

Particle Type Property Editor

Defines the characteristics of particles after they are emitted from their source object.

To display: Select the particle cloud, then click the PType node in the Material and Fx Properties tab of the multi-purpose editor.

Option	Description
Particle Type Characteristics	
Max. Life	Controls the amount of time, in seconds, a particle exists once it is emitted. This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.
Live Forever	Makes particles live for a very long time (many many seconds). The particles do not die off during the simulation.
Mass	Specifies the mass of particles. The mass of a particle is an indication of how swiftly it reacts to forces applied to it. The more massive a particle, the more difficult it is to change its motion. This means that for a given change in a particle motion, you need to apply stronger forces to a massive particle than to a less massive particle.
	Gravity is a force directly proportional to the particle mass. The more massive the particle, the stronger the gravity force applied to it. As a result, several particles of different masses will all have the same identical motion if the only force acting upon them is gravity.
	This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.
Size	Controls the size of the emitted particle in distance units. Particle size is only computed when the scene is rendered. The size of the rendered particles is affected by the perspective transformation; i.e., the farther away a particle appears in the viewport, the smaller it appears when rendered.
	This parameter has an associated Var (variance) parameter that allows you to add a value for random behavior.
Noise Intensity	Adds mathematical randomness to the particles. You can animate each of these parameters using these variables: Birth, Age, Abs (see Color - Animation Reference below).
Position	Amount of noise to be added to the particle's position (in distance units).

Option	Description
Velocity	Amount of noise to be added to the particle's velocity (in [distance units]/[time units]).
Acceleration	Amount of noise to be added to the particle's acceleration (in [distance units]/[time units]) ^2).
Color	
Color	Adds a color to the particle using RGBA or HLSA color values. This color is displayed for the particles in the viewport and is the color rendered unless you override it with a sprite's color or the color set in the Particle Billboard.
Animation Reference	RGB/Alpha • Birth: A particle's RGB/Alpha values remain constant throughout its lifetime (no color animation). • Age: RGB/Alpha values change over the particle's lifetime, depending on how the parameter's function curve is modified. • Abs: RGB/Alpha values are identical for all particles throughout the simulation. • Age%: RGB/Alpha values change over the particle's life percentage, depending on how the parameter's function curve is modified. In this case, parameter animation between the start and end frames is mapped to the whole particle life. Tip: When you're animating the Color and you want to use Age%, key the Color values first, then set the animation reference mode to Age%.

Option	Description
Variance	Controls the amount of variance added to the hue (H), luminance (L), saturation (S), or Alpha values in a particle's color. The value you enter here defines the range in which the random numbers are generated.
	The distribution method of the variance can be Uniform or Gaussian:
	• With Uniform, random numbers are distributed uniformly around the parameter's value using the Variance value. The parameter will always be in the range [Value - Variance; Value + Variance], never outside of it.
	• With Gaussian, random numbers are distributed as a bell curve around the parameter's value using the Variance value. Most numbers will be in the range [Value - Variance; Value + Variance], but they may be outside of that range with [Value - Variance], and they will be outside of that range with [Value + Variance]. Values using Gaussian distribution will have greater variations than the ones using a Uniform distribution.
	The seed parameter (the text box with no label to the right of the Uniform/Gaussian parameter) allows you to change the effect on the variance without changing either the parameter's value or its Var value. The seed defines which numbers will be generated in the range that the Var parameter specifies. It allows you to have very fine control over the parameters, changing them slightly without having to change the parameter's value or its Var value.

ParticlesOp Property Editor

Defines the general parameters of the particle simulation. The parameters defined in this editor are associated with the particle simulation's particle cloud.

To display: Select the particle cloud, then click the Particles Op node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Simulation Time	
Offset	The number of frames by which you want to offset the start of the particle simulation.
Duration	The duration, in frames, of the particle simulation.
Copy from Scene	Copies the scene's number of frames (based on its first and last frame values) to the particle simulation. This changes the Offset and Duration so that the particle simulation is played throughout the scene's timespan.
Particles Multiplicator	
Particles %	Specifies how much of the total number of particles (defined with the Rate parameter in the Particle Emission property editor) will be generated.

Turbulence Property Editor

The turbulence force builds a wind field to let you imitate real-life turbulence effects, such as the violent gusts of air that occur when an airplane lands. A wind field is created by superimposing a small scale random field over a large scale deterministic field. Intensity is applied to the whole wind field.

You can control the orientation of the large scale wind field and the frequency of the eddies in the small scale wind field. As well, you can control the wind field direction (phase angle) independently of the turbulence direction (force direction).

To display: Select the particle cloud, then click the Turbulence node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles on/off the force effect.
Amplitude	Intensity of the turbulence effect. This acts as a constant multiplicative factor applied to the elementary force computed from the wind field. Values can be either positive or negative.

Option	Description
Decay	The rate of falloff of the turbulence effect. Slider values are from -10 to 10, but you can enter any positive value in the text box.
Frequency	These parameters control the small-scale wind field part of the turbulence force, allowing you to control the eddies. When you change any of these parameters, the force is recomputed. The same values of parameters always give the same results.
All Frequencies	Select this option to set the same frequency value along all axes. Drag the **All/X** slider to set the value.
All/X, Y, Z	Maximum value of the frequency of eddies present in the wind field. This value is linked to the eddies rotating along the force's X, Y, or Z axes. The higher the value, the smaller the eddies.
Min. Size	All the eddies with a frequency value lower than this value are removed, allowing you to filter out eddies of a certain size. The higher the value, the fewer large eddies. If this value is too high, no eddies are created
Diffusion Rate	The speed of the eddies.
Phase Angle	These parameters control the large-scale wind field part of the turbulence force.
All Phases	Select this option to set the same orientation value along all axes. Drag the **All/X** slider to set the value.
All/X, Y, Z	Control the X, Y, or Z orientations of the global wind.
Size	These parameters control the size of the lattice part of the turbulence force.
All Sizes	Select this option to set the same lattice size along all axes. Drag the **All/X** slider to set the value.
All/X, Y, Z	Control the X, Y, or Z size of the lattice in distance units.

Wind Property Editor

The Wind force simulates the effect of wind blowing on particle simulations.

To display: Select the particle cloud, then click the Wind node in the Geometry and Deform Properties tab of the multi-purpose editor.

Option	Description
Mute	Toggles on/off the force effect.
Amplitude	Sets the intensity of the wind force.

Preview and Rendering

Render Options Dialog Box

Defines how your scene will render. You can control the format, sampling, rendering method, effects, and optimization.

To display: Click the either the Render Low-Quality, Render High-Quality, or Inspect Render Options buttons in the rendering and preview controls.

Frames Output Property Page

Sets the frame range, file format, and image resolution to render.

Option	Description
Frame Sequence	
Image Filename	Specifies the file name of the rendered sequence.
	If **Rel** is on, the path is relative to the active project directory. If **Abs** is on, the path is absolute. You can type a different path or use the browse (**...**) button to change locations. Valid names are displayed in white, invalid names are red, and read-only files are gray.
	The rendered images have the file name format *filename.framenumber.extension*, where the extension is determined by the image format.

Option	Description
File Format	Sets the file format of the rendered sequence. This also determines the file name extension.

Available file formats include:

- **.pic:** SOFTIMAGE 8-bit RGBA picture
- **.bmp:** uncompressed 8-bit RGBA MS Windows BMP pictures
- **.tiff:** uncompressed 8-bit RGBA TIFF picture
- **targa:** compressed 8-bit RGBA Targa pictures
- **.sgi:** Silicon Graphics 8-bit RGB picture
- **.als:** Alias Research 8-bit RGB picture
- **.rla:** is Wavefront 8-bit RGBA picture
- .**jpg:** is JPEG format with maximum quality
- **.yuv:** is Quantel/Abekas YUV-encoded RGB picture, 720 x 576
- **.ct:** is mental images' color texture image.
- **.map:** is Memory mapped texture image.

Frame Padding	Specifies the format and placement of frame numbering in the file names of rendered frames. The following options are available:

This option	Yields this result
(filename).#.(extension)	foo.1.pic
(filename).##.(extension)	foo.01.pic
(filename).###.(extension)	foo.001.pic
(filename ####.(extension)	foo.0001.pic
(filename)#.(extension)	foo1.tga
(filename)##.(extension)	foo01.tga
(filename)###.(extension)	foo001.tga
(filename)####.(extension)	foo0001.tga

Playback sequence after render	Select this option to view the rendered sequence in the flipbook as soon as rendering is complete.

Option	Description
Frame Range	
Start	Sets the first frame of the sequence to be rendered.
End	Sets the last frame of the sequence to be rendered.
Step	Sets the increment between rendered frames. This allows you to skip frames. For example, if you select 4, every fourth frame is rendered
Skip Rendered Frames	When checked, rendered frames are not re-rendered.

Render Type Property Page

Specifies which rendering engine to use when rendering your scene.

Option	Description
Match Region Quality	Sets the render quality to match the render region's settings.
Change region to match render quality	Sets the render region's quality settings to match the current render options settings.

Option	Description
Render Type	Specifies which rendering type to use when rendering your scene. For all hardware rendering modes. All scene elements displayed in the 3D views are rendered, except for reference objects like the grid and axes.

Choose one of the following:

- **mental ray** renders the scene using the mental ray renderer, according to the settings defined in the other pages of this property editor.

- **Current camera display settings** outputs to file the OpenGL rendered scene. Scene elements are rendered according to the current camera display settings.

  This is useful for rendering particular camera display effects like depth-cue fog.

- **Bounding box** outputs to file the OpenGL rendered scene as seen in Bounding Box display mode.

- **Wireframe** outputs to file the OpenGL rendered scene as seen in Wireframe display mode.

- **Depth Cue** outputs to file the OpenGL rendered scene as seen in Depth Cue display mode.

- **Hidden-line removal** outputs to file the OpenGL rendered scene as seen in Hidden-Line Removal display mode.

- **Constant** outputs to file the OpenGL rendered scene as seen in Constant display mode.

- **Shaded** outputs to file the OpenGL rendered scene as seen in Shaded display mode.

- **Textured** outputs to file the OpenGL rendered scene as seen in Textured display mode.

- **Textured Decal** outputs to file the OpenGL rendered scene as seen in Textured Decal display mode.

- **Cg** outputs to file the Cg rendered scene.

- **OpenGL** outputs to file the OpenGL rendered scene as seen in the OpenGL display mode.

- **DirextX 9** outputs to file the Direct X 9 rendered scene.

Option	Description
Quality	Available only if you have **mental ray** selected as the **Render Type**. This lets you choose the quality of the rendered output. Lowest quality is the fastest and least accurate (good for quick previews), while highest quality is the slowest and most accurate (good for the final output).
Set Background Color	This lets you use the color controls to set the background color of the rendered output. This option is not available if you have **mental ray** selected as the **Render Type**.
mental ray Effects	Contains parameters for activating the effects to be applied during rendering. Use these settings to speed up rendering or to create a more accurate rendered image. These settings are also applied to the render region.
Displacement	Toggles the rendering of displacement maps.
Camera Effects	Toggles the rendering of camera effects.
Volumes and Volume Lights	Toggles the rendering of volumic light effects, such as clouds, smoke, and fire.
Glows and Lens Flares	Toggles the rendering of glows and lens flares.
Motion Blur	Toggles the rendering of motion blur.
Amount	The camera's shutter speed, which controls the amount of motion blur. • Longer shutter speeds (an Amount greater than 0.6) create a wider and/or longer motion blur effect, simulating a faster speed. • Shorter shutter speeds (an Amount of less than 0.3) create subtler motion blurs. • Shutter speeds higher than 1 produce intense motion blurs, but may cause artifacts in the rendered image. 📄 *If you're using motion blur with particles, the Amount must be less than 1.*
Image Based Lighting	Toggles the rendering of image-based lighting effects from environment maps.
Accuracy	Controls how often the surrounding environment map's light is sampled to create image-based lighting effects. Higher Accuracy values provide better results, but take longer to render.

Option	Description
Halve/Double all lights intensity	Halves or doubles the intensity of the scene's image-based lighting.

Format Property Page

Sets the frame resolution in pixels. A higher resolution produces a more detailed image. The higher the resolution, the longer it takes to render. There is no limit for image resolution, but if a resolution is greater than the monitor (x=1280), it cannot be displayed on screen while rendering.

Option	Description
Format	Defines the picture format you will render. The format is visible in the camera viewport. Available formats include: • Custom: Activates the Picture Ratio parameter; you can define your own camera output ratio. • NTSC (default) D1 4/3 720×486 • NTSC D1 16/9 720×486 • NTSC DV • PAL D1 4/3 720×576 • PAL D1 16/9 720×576
Picture Ratio	Displays the picture ratio of the output camera. Can only be edited if a Custom Picture Standard is selected.
Image Resolution	
X	Sets the X resolution independently of the Y resolution.
Y	Sets the Y resolution independently of the X resolution.
Pixel Ratio	Sets the pixel ratio. This ensures compatibility of images with devices that use rectangular or square pixels.
Set Frame Rate	Opens the Time property editor so you can set the scene's frame rate.

AAF and MXF Options Property Page

Allow you to create MXF files, and an AAF master clip that describes them, out of your rendered sequences. You can also create .AVI and QuickTime files.

• MXF (Material Exchange Format) is an industry-standard container format that encapsulates media and production metadata into a single file. MXF is supported as a common file format in a wide variety of applications such as Avid Xpress™ Pro, Media Composer®, Avid DS Nitris™, and SOFTIMAGE|XSI. MXF files replace OMFI media files.

MXF media files are video files, similar to AVI or QuickTime movies, and can be used on their own. However, they are not directly seen by users but instead are referenced by master clips and managed by an editing application, like Avid Xpress Pro or Media Composer.

• AAF (Advanced Authoring Format) is a cross-platform, multimedia file format that allows interchange of composition information between AAF-compliant applications. AAF replaces OMFI compositions.

The purpose of the AAF file is to present the media files as a higher-level named clip for the destination application.

Option	Description
Create Movie	Activates the options on this page, and tells Avid 3D to create the movie specified by the various settings.
	The movie file is created immediately after the last frame of the sequence is rendered. A separate progress bar is displayed so you can monitor the movie creation progress.
File Name	Specifies the name and path of the output movie file.
	If **Rel** is on, the path is relative to the active project directory. If **Abs** is on, the path is absolute. You can type a different path or use the browse (**...**) button to change locations. Valid names are displayed in white, invalid names are red, and read-only files are gray.
Format	Specifies the file format of the output movie. This can be either AAF, AVI, or QuickTime. Changing the format updates the file extension in the path.

Option	Description
Options	
Delete Source Image Sequence on Success	The rendered sequence is deleted if the movie file has been generated successfully.
Write Alpha Channel	Toggle this option to output the movie file with or without an alpha channel.
	When activated and the Format is set to AAF, two MXF files are generated; one for RGB and one for alpha. The AAF master clip contains the information necessary for recombining the tracks.
	If the sequence was rendered to an image format that doesn't support alpha channels (.jpg for instance), then the alpha file is not generated, regardless of the Write Alpha Channel setting.
	In the case of AVI and QuickTime movies, note that most compressors do not support an alpha channel.
AAF Master Clip Settings	These options are only active when the **Format** is set to AAF.
Project Name	The name that will appear with the clip in the Avid application's Media Tool. It does not have to match the actual project name in the Avid application.
Avid Media Drive	Specifies a valid system drive on which Avid media files are stored. When the AAF and MXF files are created, they are stored on this drive in the **Avid MediaFiles > VideoStorage > Avid3D** directory. For example, if the drive is set to **D:** this path will be **D:\Avid MediaFiles\VideoStorage\Avid3D**.
	Changing this setting updates the path.
Compression	Specifies whether the generated MXF files should be compressed and, if so, the type of compression to use. The following compression types are available:
	• Uncompressed
	• DV25 4:1:1
	• DV50 4:2:2

Option	Description
Fields	
Render Video Fields	Enables field rendering parameters for rendering.
	Lower Field First (NTSC and DV Formats) renders to fields using even dominance. With mental ray, this means that odd frame numbers contain the even fields. This is the dominance used by the PAL video standard.
	Upper Field/Odd (PAL and HD Formats) renders to fields using odd dominance. With mental ray, this means that odd frame numbers contain the odd fields. This is the dominance used by the NTSC video standard.
	If you are using video image clips in your scene, their field order must match the field order for rendering.

Rendering Property Editor

Defines how your render region will render.

To display: Click the Show All Options tab in the tools and options panel, then click the Rendering Regions Options tab.

Option	Description
Render Region Settings	
Track Selection	Constrains the render region to the current selection so that it follows the selected object throughout its animation. If the selected object changes size, the render region is recomputed to fit around it. If you select another object, the render region tracks the new selection.

Option	Description
Display Mode	Displays the scene in various modes:

- **Show RGB** displays only the RGB channels of the scene in the render region.

- **Show Alpha** displays only the alpha channel of the scene in the render region. This is useful if you want to quickly check the accuracy of a particularly complex alpha channel.

- **Show RGB + Alpha** displays the RGB and alpha channels of the scene in the render region.

- **Show Depth** displays depth (Z) information instead of RGB channels.

- **Show Tags** assigns a constant color to each object in the render region. A scene rendered with tags is often used for compositing purposes.

Chapter 3
Keyboard Shortcuts

General

Shortcut	Description
Delete	Delete object
Esc	Escape (end) pick session
Ctrl + C	Copy
Ctrl + D	Duplicate object
Ctrl + N	New scene
Ctrl + O	Open scene
Ctrl + Q	Quit (exit Avid 3D)
Ctrl + S	Save scene
Ctrl + V	Paste
Ctrl + X	Cut
Ctrl + Y	Redo
Ctrl + Z	Undo

Selection Tools

Shortcut	Description
Ctrl + A	Select all
Ctrl + Shift + A	Deselect all
S	Select tool
Shift + S	Select tool with extended selection (add to selection)
T	Select Point tool (also works in profile and function curve editors)
U	Select Polygon tool

Transform Tools

Shortcut	Description
B	Spotlight Cone tool
C	Rotation tool
J	Edit Projection tool
M	Move Point tool (also works in profile and function curve editors)
X	Scaling tool
V	Translate tool (also works in function curve editor)

Camera Navigation and Framing Tools

Shortcut	Description
A	Frame all objects in viewport (also works in profile and function curve editors)
Shift + A	Frame all objects in all viewports
D	Dolly camera tool
F	Frame selected objects in viewport (also works in profile and function curve editors)
Shift + F	Frame selected objects in all viewports
L	Roll camera tool
O	Orbit camera tool
P	Pan and Zoom camera tool (also works in profile editor)
R	Reset camera
Alt + Y	Redo camera
Alt + Z	Undo camera
Z	Zoom and Pan camera tool (also works in profile and function curve editors)

Display Options

Shortcut	Description
G	Show/hide grid in viewport
H	Hide/unhide selection
Shift + H	Unhide all objects

Render Region

Shortcut	Description
F5	Refresh render region
Q	Render Region tool
Shift + Q	Show/hide render region

Playback Controls

Shortcut	Description
Home	First frame
End	Last frame
Right Arrow	Next frame
Alt + Space bar	Play backward
Space bar	Play forward/stop
Shift + Up Arrow	Play in real time
Left Arrow	Previous frame
Down Arrow	Stop

Animation Controls

Shortcut	Description
Ctrl + Up Arrow	Go to first key for selected object
Ctrl + Down Arrow	Go to last key for selected object
Ctrl + Left Arrow	Go to previous key for selected object
Ctrl + Right Arrow	Go to next key for selected object

Shortcut	Description
Ctrl + Shift + K	Remove animation
Shift + K	Remove key
K	Save key
N	Save key on path

Scene Explorer

Shortcut	Description
F2	Rename
Up Arrow	Next node
Down Arrow	Previous node

Function Curve Editor

Shortcut	Description
A	Frame all
Ctrl + A	Select all curves
Shift + A	Slope Type: Automatic
B	Stretch Keys tool
Shift + B	Slope Type: Zero Length (Break Point)
Backspace	Delete all keys from curve
C	Rectangle Zoom tool
D	Delete Key tool
Delete	Delete selected keys
Shift+E	Edit Key tool

Shortcut	Description
F	Frame selection
G	Shows/hides graph (grid)
I	Add Key tool
L	Unify/break slope length
Shift + L	Lock/unlock slope length
M	Select (tag) and Move Key tool
N	Select and Move Curve tool
O	Unify/break slope orientation
Shift + O	Lock/unlock slope orientation
P	Select tool with priority to tangents
Q	Region select tool
R	Frame to timeline
S	Pan & Zoom in Y tool
Space bar	Select Curve tool
T	Select (tag) Key tool
V	Translate tool
X	Pan & Zoom in X tool
Y	Select tool
Z	Pan & Zoom tool
. (period)	Select next key on fcurve
, (comma)	Select previous key on fcurve
Shift + - (minus)	Slope Type: Plateau
Shift + 0 (zero)	Slope Type: Zero Orientation (Flat Key)

Profile Editor

Shortcut	Description
Backspace	Delete Point tool (profile curves only)
I	Add Point tool
M	Move Point tool
R	Change proportional radius
S	Select tool
T	Select Point tool

Browser

Shortcut	Description
Backspace	Go up one level
F5	Refresh browser

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