

3D WORLD 3.0

User Guide Addendum



3D World® 3.0 User Guide Addendum

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Reference: HP-3DW3.0Add-14/5/98

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1. INTRODUCTION



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This addendum is divided into four main sections, Changes to the Application, Revised Plug-ins, New Plug-ins and Librarian. The section *Changes to the Application* documents the revisions that have been made to the core application software in 3D World 3.0. *Revised Plug-ins* discusses changes to existing plug-ins and *New Plug-ins* covers those additional plug-ins now shipping with the application. *Librarian* discusses changes to the Librarian utility, used to catalog, store and retrieve data files of many different types.

Please read this addendum in conjunction with the 3D World 2.5 User Guide for complete information regarding 3D World 3.0.

◆ Installation

Before installing 3D World, we recommend that you turn off any virus protection software.

1. Insert the CD into the CD drive and double click on the CD icon on the desktop to display its contents.
2. Double-click on the 3D World Installer icon.
3. Follow the instructions in the dialogs that display to install the complete 3D World application, plug-ins, Librarian application and QuickDraw 3D software. After installation you will need to restart your Mac.

The QuickDraw 3D software will be installed in the appropriate places on your hard drive. The remaining items will be placed in a folder, called 3D World 3.0, on your hard drive.

◆ Loading Plug-Ins

3D World offers a plug-in architecture that makes it easy to add tools to ‘custom build’ the application and extend the program’s functionality. Plug-ins can be palettes, tools, or menu items.

Plug-ins can be loaded when the application starts up by placing them in the Plug-ins folder inside the 3D World 3.0 Folder. Plug-ins can also be ‘hot’ loaded as needed, individually or in groups, while the application is running.

To make the best use of available memory it is recommended that the plug-ins always used with 3D World are placed in the Plug-ins folder and loaded when the application is launched. Additional plug-ins can then be loaded as required, while the application is running.

Loading Plug-ins when 3D World is Launched

Place any plug-ins to be loaded when 3D World is launched, inside the Plug-ins folder. Plug-ins can be grouped inside folders and the folders placed in the plug-ins folder if required.

Note: Hold down the Shift key when launching 3D World to stop all plug-ins from loading.

Note: Plug-in renderers from third party companies can be accessed by 3D World if they are installed in the Extensions folder.

‘Hot’ Loading Plug-ins

See Loading Plug-ins while 3D World is Running on page 2-2 for more details.

◆ Types of Plug-In

3D World’s plug-in architecture allows plug-ins to be used to add functionality to the application in many different ways. Plug-ins may be available in more than one category:

Import Plug-ins: Plug-in functions accessed via the Import submenu in the File menu.

DXF	MacInteriors	VRML 1.0 Format
Extrude Bitmap	Relief	

Export Plug-ins: Plug-in functions accessed via the Export submenu in the File menu.

3D Movie	DXF File	VRML 1.0 Format
3DMF Text	Picture	

Idler Plug-ins: Run constantly once loaded.

Draw Direct Idler	PhotoLink	Status
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Menu Plug-ins: Plug-in functions accessed via the Plug-in menu in the application menu bar.

3D Controller	Delete Attributes	Save Textures
Add UV	Draw Direct	Scale Object
Animate Camera	Earthquake	Size Window
Animate Color	Floors And Ceilings	Surface Area
Animate Textures	Gravity	Spin
Array Duplicate	Interactive	Timer
Bomb	Make Wireframe	To Interactive
Color	Material	Turbocharge
Convert To Mesh	Rain	Use Conics
Counter	Random Color	

Plug-in Palettes: Palettes provide a range of options for a specific feature. Display a palette by selecting its name from the Palettes menu.

3D Controller	Construct	Nudge
Alignment	CSG	Picker
Animation Player	Find	RAM
Animation Tweener	Gradient	Renderer Options
Axis	Group Special	Section
Bevel	Layers	Subdivision
Camera	Lights	Textures
Color Palette	NaviCam	Tripod

Plug-in Geometries: Plug-in tools to create shapes. Accessed from the Tool Palette.

3D Text	Lathe	Pyramid
4 Walls	Math Graph	Regular Polygon
Cone	Mountain	Relief
Cube	Mountains	Sound Marker
Cylinder	Multi Walls	Sphere
Dimension	Pie Chart	Spot Lights
Gears	Pipes	Text Marker
Irregular Polygon	Point Lights	Torus

Plug-in Modifiers: Plug-in tools to modify objects. Accessed from the Tool Palette.

3D Paint	Edit NURB	Random Color
Add UV	Edit Path	Scale Object
Animate Color	Edit Vertex	Shear
Animate Object	Gravity	Spin
Animate Textures	Internet	Sun Direction
Bomb	Light Director	Teleport
Color	Make Wireframe	Triangulate
Construct	Material	VR
Delete Attributes	Orbit	Walkthrough
Distance	Pencil	

◆ ATI QuickDraw 3D Accelerator Hardware

Many of the most recent Macintosh computers, such as the 6500 and G3 series, include ATI QuickDraw 3D accelerator hardware chips on the computer's motherboard. The ATI QuickDraw 3D Acceleration hardware can also be purchased in the form of a PCI card to use in a PCI Macintosh computer. These ATI hardware products include XClaim 3D, XClaim VR, and Rage Pro.

Troubleshooting

QuickDraw 3D hardware acceleration stops due to insufficient VRAM

The ATI QuickDraw 3D accelerator hardware also runs the video, and the hardware's capabilities are determined by the amount of VRAM available. If the hardware runs out of VRAM, QuickDraw 3D hardware acceleration will stop working and QuickDraw 3D will revert automatically to software rendering.

To increase the amount of VRAM available for QuickDraw 3D acceleration try the following:

- Reduce the size of the largest 3D World QuickDraw 3D window. If you are working with multiple windows open, the amount of VRAM used is determined by the largest window, but smaller windows may still be accelerated.
- Reduce the monitor color depth to thousands of colors.

- Reduce the monitor resolution towards 640 x 480.
- Install more VRAM

Textures do not display

If many textures are used in a document, there may not enough VRAM to store them. In this case the textures will not be displayed when using hardware acceleration.

Try the following solutions:

- Increase the texture compression setting in the ATI control panel.
- Increase the amount of VRAM available using one of the methods listed on page 1-5.
- Turn off hardware acceleration in the Renderer Options palette. Software rendering uses real RAM to hold the textures.

Transparencies do not display

Transparency is a function of hardware acceleration and will not be seen if hardware acceleration is not running.

Try the following solutions:

- Check that hardware acceleration is turned on in the Renderer Options palette.
- Increase the amount of VRAM available using one of the methods listed on page 1-5.

◆ Technical Support

You must have completed and returned the product registration card in order to receive technical support, as well as upgrade and new product information. In North America, South America and the Far East, please contact:

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2. APPLICATION



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PLUG-INS

Almost all 3D World tools and palettes are now plug-ins. Previously plug-ins were loaded by placing them in the Plug-ins folder and restarting 3D World. Plug-ins can now be loaded as needed, individually or in groups, while the application is running.

◆ Loading Plug-ins when 3D World is Launched

As previously, hold down the Shift key when launching 3D World to stop plug-ins from loading. If the Shift key is not held down, 3D World still loads any plug-ins in the Plug-ins folder, but now also loads any plug-ins in folders within the Plug-ins folder. This allows you to group plug-ins together in folders as per your requirements, and load or unload them as a group by dragging the folder in or out of the Plug-ins folder.

◆ Loading Plug-ins while 3D World is Running

Plug-ins not loaded when 3D World is launched can be loaded, while the application is running, in the following ways:

- Double click on a plug-in icon in the Finder.
- Drag a plug-in icon into the 3D World Tool palette.
- Drag a plug-in icon into the main 3DWorld document window.
- Drag a folder containing plug-ins into the Tool palette. All the plug-ins in the folder will be loaded.
- Drag a folder containing plug-ins into the main 3D World window. All the plug-ins in the folder will be loaded.

Note: When a plug-in, for example the Cube tool, is dragged and dropped into the Tool palette or document window, a cube is not added to the document, the cube tool is just added to the Tool palette. It may be that simply double-clicking on plug-ins to load them is less confusing to the user.

When Import, Export, Idler, Menu Command and Palette plug-ins are loaded they appear in the appropriate locations in the application menus. Palettes loaded when 3D World is launched will be opened if they were open last time the application was closed. Palettes loaded when the application is running will open automatically. Plug-in Geometries and Modifiers will be added to the Tool palette, which grows dynamically to accommodate them. *See The Tool Palette on page 2-3 for more details.*

Note: To make the best use of available memory it is recommended that the plug-ins always used with 3D World are placed in the Plug-ins folder and loaded when the application is launched. Additional plug-ins can then be loaded as required, while the application is running.

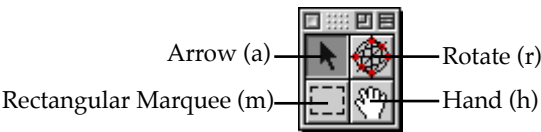
PALETTES

The Tool, Info and Help palettes are still part of the core application. All other palettes are now plug-ins. *See Plug-ins on page 2-2 for more details.*

If any palette is moved to within 5 pixels of the edge of the screen, the palette will snap to the edge of the screen.

◆ The Tool Palette

The only tools now built-in to the 3D World Tool palette are the Arrow, Rotate, Rectangular Marquee and Hand tools. Keystrokes previously used to select other tools are no longer valid.



The rest of the tools are now plug-ins that can be loaded when 3D World is launched or while the application is running. *See Plug-ins on page 2-2 for more details.*

The first time 3D World is launched with all the plug-ins loaded, it will look very similar to the Tool palette in 3D World version 2.5. Most of the tools appear in the same place as previously, those that have changed location are as follows:

- Pipes is now stacked with Cylinder.

- The remaining plug-ins which were previously all stacked together as Plug-in Modifiers and Plug-in Geometries will now be sorted into logical groups, the contents of each group being stacked together and appearing under a single button in the Tool palette. Any unclassified plug-in will be placed under a general Plug-in Geometries or Plug-in Modifiers button, at the bottom of the tool palette, as previously.



Configuring The Tool Palette

Configure the Tool palette in the following way:

- 2-4

- To move a tool, hold down the Command key, click on the tool and drag it to a new location.
- Drop a tool on another tool to stack them together.
- Drop a tool on the four selection tools at the top of the palette to separate it from a group of stacked tools and add it to the top of the tool palette as an individual tool.

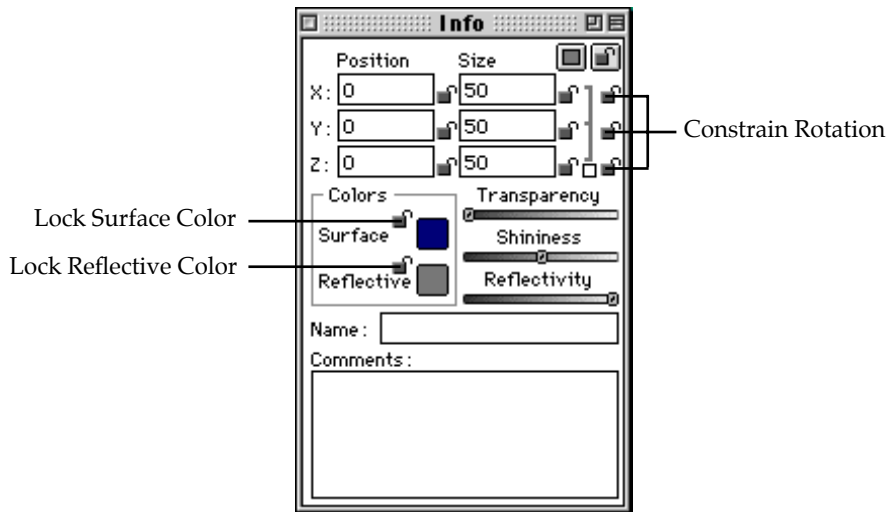
Tool Options

To open a dialog showing any options available for a tool, use either of the following methods:

- Hold down the Option key and select the tool in the Tools Palette.
- Click on the tool in the Tools palette and hold down the mouse button. Select the same tool again from the popup menu that displays.

◆ The Info Palette

The Info palette now includes additional options for locking an object to restrict the ways in which it can be manipulated.



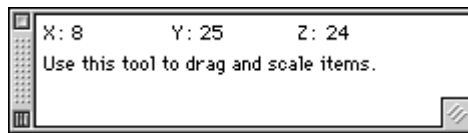
- On the right of the palette additional padlocks for the X, Y, and Z axes are used to constrain the rotation of an object.

Click on the padlock relating to the X axis. It will close, indicating that the object cannot be rotated around the X axis, although it can still be rotated in the Y and Z axes. The rotation of the object can be constrained in any or all of the axes. The X Y and Z axes are determined by the orientation of the object.

- The padlock next to the Surface Color box is used to protect the surface color of the object from being changed.
- The padlock next to the Reflective Color box is used to protect the reflective color of the object from being changed.

◆ The Help Palette

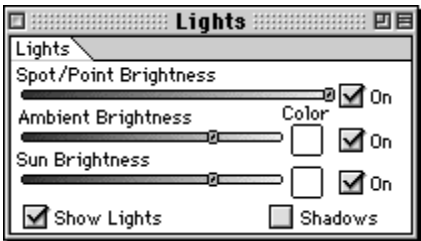
In addition to help messages, the Help palette now displays the coordinate values that show the position of the cursor. These were previously displayed in the window toolbar at the bottom of the document window.



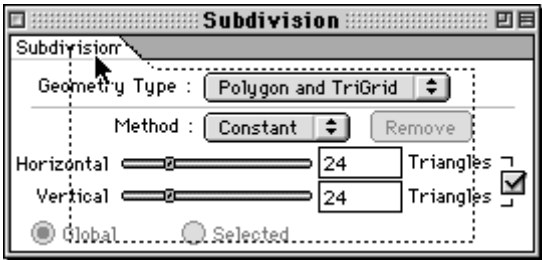
◆ Tabbed palettes

All plug-in palettes, except the Axis, Find, Layers and Section palettes, are now tabbed palettes.

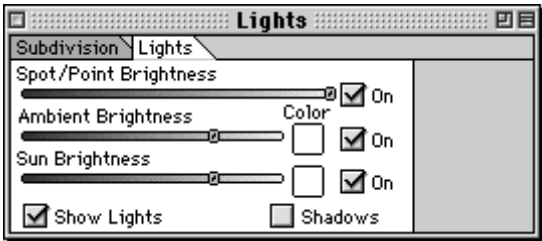
When a palette is opened it displays in a window with the palette name on a tab at the top of the palette.



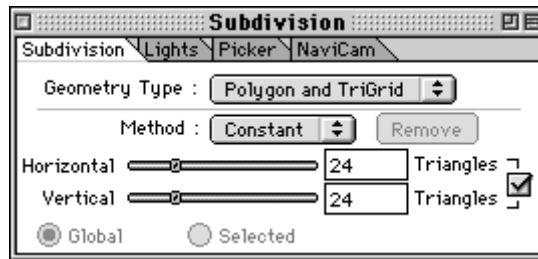
Tabbed palettes can be stacked together by simply clicking on the palette tab and dragging the palette onto the tab area of another tab palette:



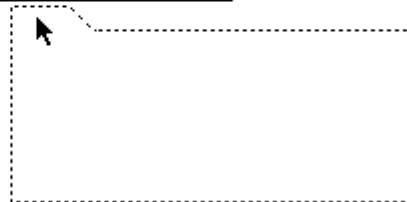
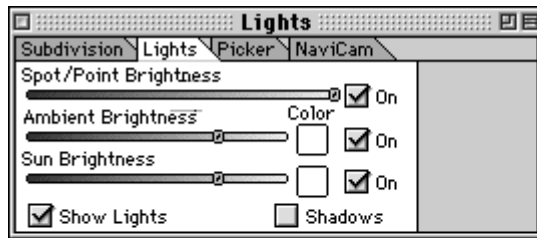
Both palettes then appear in the same palette. To access a palette click on its tab.



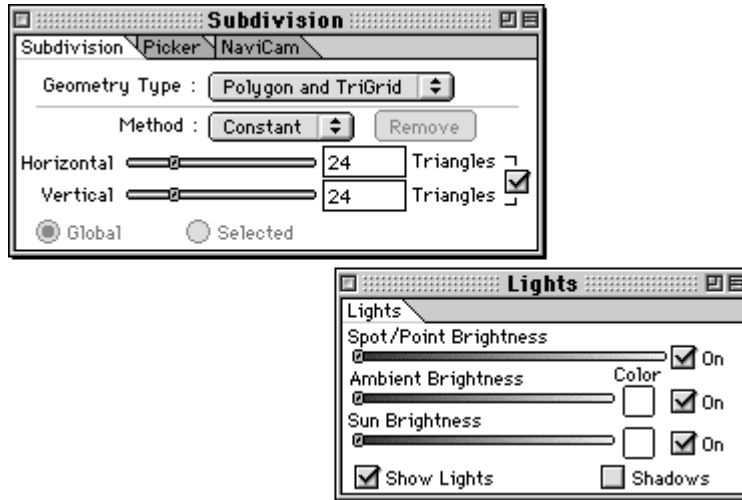
Any number of tabbed palettes can be stacked together, although in practice this will be limited by the number of tabs that are visible in a palette.



To remove a tabbed palette from a stack, click on the palette tab and drag the palette onto the desktop.



The palette will appear on its own, while the other palettes remain stacked together.



Double click on a tab to reduce the palette, and any others stacked with it, to just the palette tab(s).



DIALOGS

◆ Movable Modal Dialogs

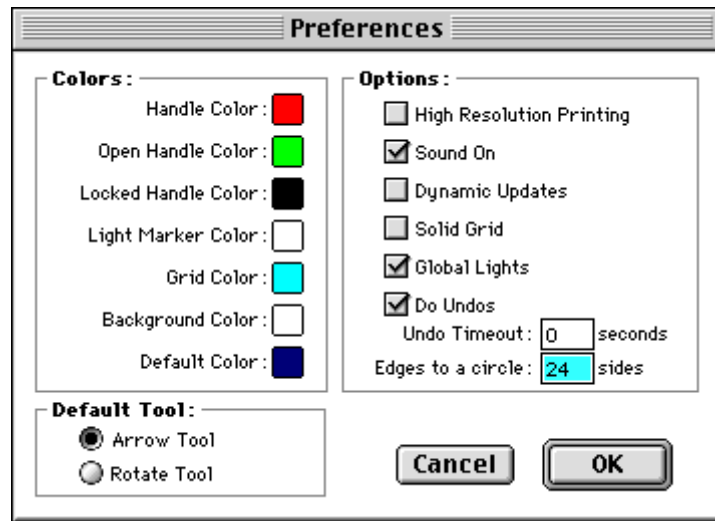
Many 3D World dialogs are now movable modal dialogs.

- **Modal Dialog:** If a dialog is a modal dialog, you cannot continue working in any way until the dialog has been closed.
- **Movable Dialog:** A dialog that can be repositioned on screen by clicking and dragging on the menu titlebar.
- **Movable Modal Dialog:** If a dialog is a movable modal dialog, you cannot continue working in the current application until the dialog has been closed. However you can switch to

another application without closing the dialog. A movable modal dialog can be repositioned on screen.

◆ Preferences Dialog

The Preferences dialog contains two new options, Default Color and Do Undos:



Default Color

The Default Color is the color that displays in the color block in the window toolbar and is used to draw new objects. Set the Default Color by clicking on the color square to display the Color Picker. Select a new color and close the Color picker.

Do Undos

The Do Undos checkbox is used to specify whether or not you wish to be able to use the Undo command. It is checked on by default.

To be able to perform an Undo command, when anything in the 3D World document window is changed, 3D World must store a copy of the document (or parts of it) before carrying out the required action. This means that you potentially need twice as much memory as the document itself requires to be available for 3D World. It also means that for large documents, the time it takes 3D World to store the copy of the file may result in unacceptably slow updates as you edit

your document. Unchecking the Do Undos checkbox will therefor allow 3D World to use less memory and also speed up the updating of large documents.

Undo Timeout

As an alternative to completely disabling the Undo command, you can leave the Do Undos checkbox checked on, and enter a value in seconds in the Undo Timeout field. This specifies the amount of time that you are prepared to give 3D World to store a copy of the document. If a copy of the document cannot be stored in the time specified, no copy will be saved and the Undo command will not be available. The default setting of 0 seconds gives unlimited time.

THE DOCUMENT WINDOW

The coordinate values that show the position of the cursor were previously displayed in the window toolbar at the bottom of the document window. These are now displayed in the Help palette.

The Radius, Diameter, 2D, 3D and Color mode controls have been added to the window toolbar, these were previously located in the Tool palette. The function of these mode controls remains the same.



The Zoom Out, Zoom In, Wire Frame, Solid Fill, Orthographic, Perspective, Camera Coordinates, World Coordinates, Object Coordinates and View popup menu remain in the window toolbar as previously.

PATH/SECTION GEOMETRIES

Many of the object drawing tools now create geometries based on a path and section. This means that their edges can be bevelled and the paths and sections edited. The path/section geometries are: 3D Text, Cone, Cylinder, Extruded Bitmaps, Irregular Polygon, Pipes, Pyramid, and Regular Polygon. The path and section of lathed objects can also be edited. *See See Bevel on page 4-8 for more details., See Section on page 4-32 for more details. and See Edit Path on page 4-78 for more details. for more details.*

MISCELLANEOUS

Other minor changes to the 3D World application are as follows:

- **Scale/Rotate:** When scaling or rotating an object it is now possible to click and drag on either the bounding frame of an object, or one of the handles of the bounding frame, to perform the action. Previously it was necessary to click and drag specifically on one of the handles of the bounding frame.
- **Moving the Camera:** The arrow keys can be used to move and rotate the camera when nothing is selected in the document window. The camera will either move or rotate depending on which tool is currently selected. Hold down the Control key to move or rotate in the Z dimension.
- **Foreground/Background Pictures:** A TIFF, JPEG or GIFF image can be applied as a foreground or background picture by using the Insert command in the File menu, or as a background picture by dragging and dropping the image into the 3D World document window.
- **The Grid:** The 3D World grid is now a trimesh. This means that rendering should be faster than it was previously when using a very large grid.
- **Opening Librarian Files:** Librarian files can now be opened from within 3D World. When Open is selected from the 3D World File menu, a standard open dialog displays. Librarian files will now be shown in this dialog. If a Librarian file is chosen to be opened, 3D World will launch the Librarian application to open the file.

3. REVISED PLUG-INS



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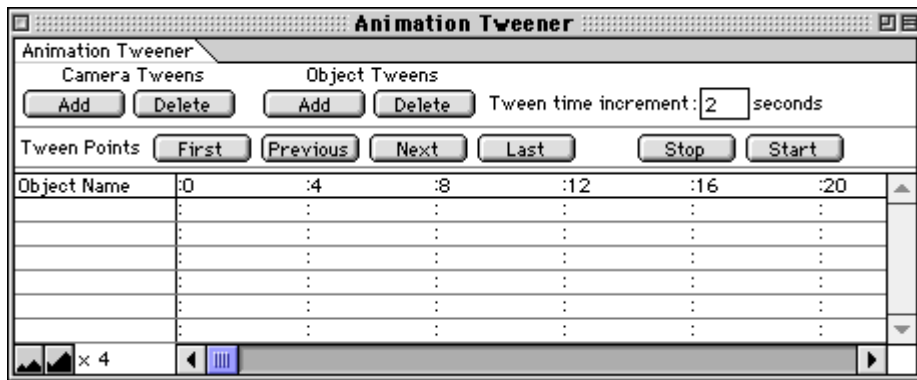
Pencil 3-12

PLUG-IN PALETTES

◆ Animation Tweener

The Animation Tweener palette is used in the same way as previously, but new Start and Stop buttons have been added.

- Click on Start to start the animation playing from the current time line position.
- Click on Stop to stop the animation playing at any point.



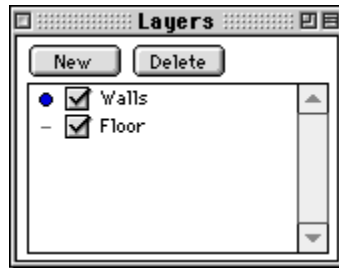
◆ Camera

The camera control buttons Tilt/Turn, Step/Crab, Height, Zoom and Clipping Plane remain in the Camera palette and are used in the same way as previously. The Camera View button has been removed completely, and the remaining controls can now be found in the Renderer Options palette.



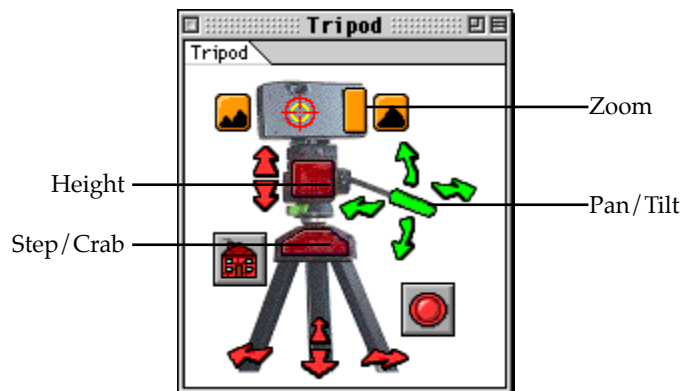
◆ Layers

The function of the Layers palette is the same as previously documented, but the layout of the palette has changed slightly. The new palette is shown below.



◆ Tripod

The controls in the Tripod palette remain essentially the same, with the addition of four new buttons as shown:



Click and drag on any of the new buttons to manipulate the camera view.

The new buttons do not provide new ways of manipulating the camera view, but are used in a slightly different way to the other controls, which may be more intuitive or familiar for some users.

PLUG-IN GEOMETRIES

◆ **Cone, Cube, Cylinder, Mountain, Mountains, Sphere, Torus**

All of the above geometries can now be drawn using NURBs. NURBs use very little memory compared to Polygon and Trigrid geometries and can produce smooth surfaces. NURBs are also more editable, but will take longer to render.

The Subdivision palette is used to specify what sort of internal geometries (polygons and trigrids, conic primitives or NURBs) 3D World will use to draw these geometries.

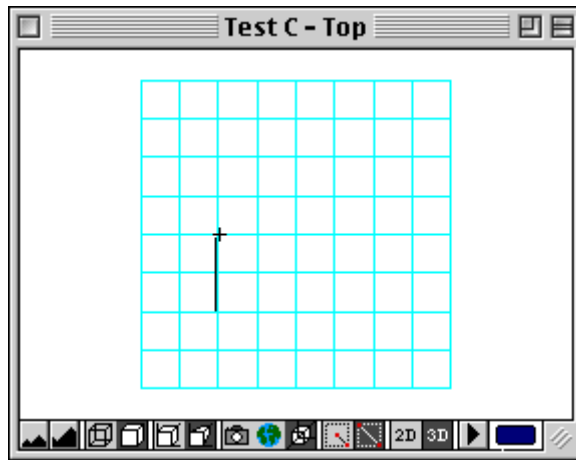
Note: NURBs — Non-Uniform Rational B-spline. This is the 3D equivalent of a Bezier curve.

◆ **Irregular Polygon, Lathe, Pipes**

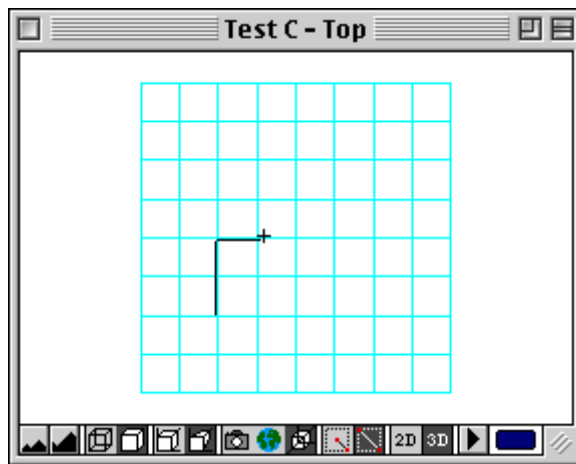
The Irregular Polygon, Lathe and Pipes tools can now be used to draw Bezier curves and splines as well as arcs.

The following example shows a cross section drawn using the Irregular Polygon tool, but Bezier curves and splines and arcs are drawn in exactly the same when drawing a lathe template with the Lathe tool or a path with the Pipes tool.

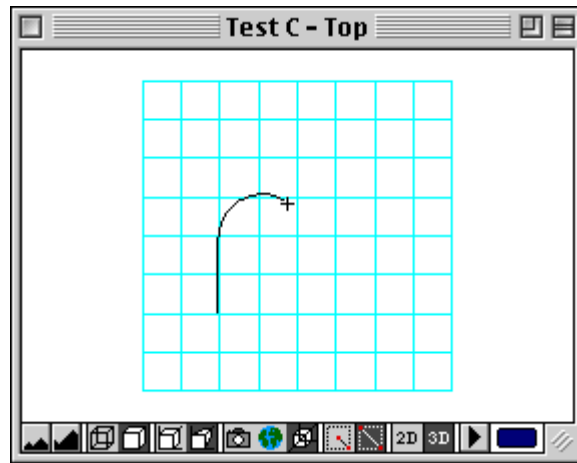
1. Position the cursor where you want to begin drawing, click the mouse button to place a vertex point, move the cursor and click again:



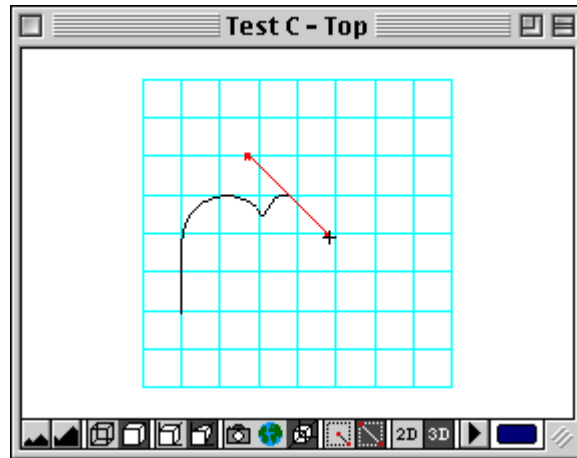
2. To draw an arc, hold down the Option key and click at the point that will represent the center of a circle.



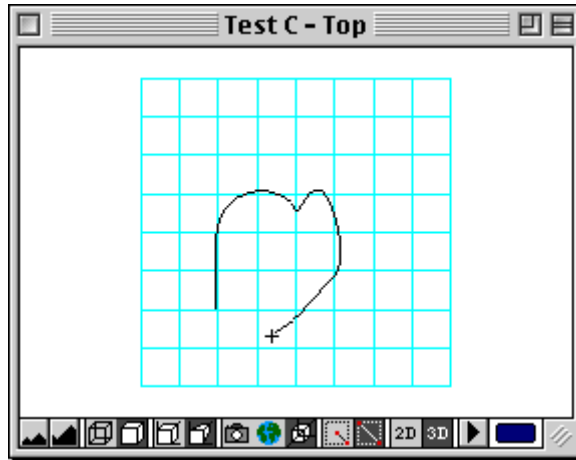
3. Release the Option key and mouse button and move the cursor ready to place the next point. The arc will display:



4. Click to place the next point at the end of the arc.
5. To draw a Bezier curve, click and drag the cursor.



6. To draw a spline curve, hold down the Option key and click and drag the cursor.



7. Use the Delete key at any time to delete the last point placed.
8. Double-click at any time to complete the shape.

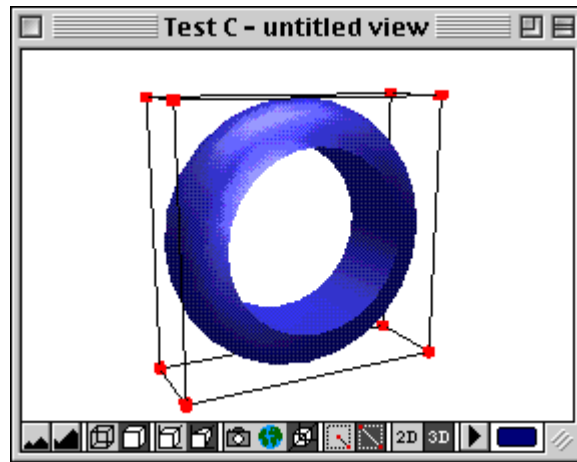
◆ Lathe

When defining a lathe template, the Lathe tool can now draw Bezier curves and splines as well as arcs. *See Irregular Polygon, Lathe, Pipes on page 3-4 for more details.*

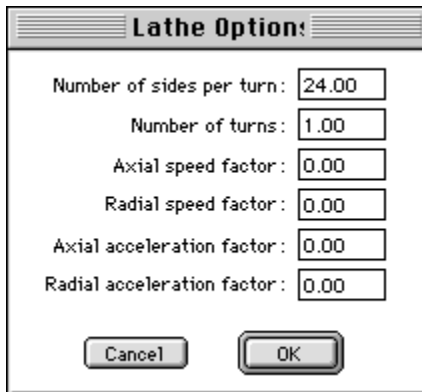
The path of a lathed object can now be adjusted using the Edit Path tool to alter the axial and radial speed and acceleration and the number of turns of the lathe template. For some users this may provide a more intuitive method of adjusting a lathed object than using the Lathe Options.

It is now also possible to change the lathe options after a lathed object has been drawn.

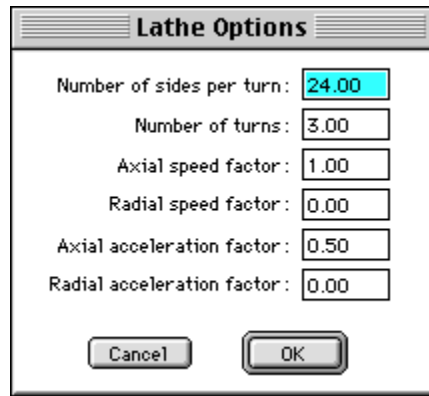
1. Select a lathed object in your 3D World document.



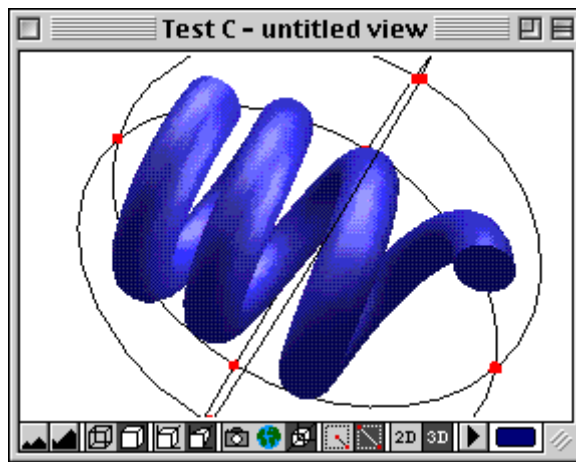
2. Hold down the Option key and click on the Lathe tool in the Tool Palette to display the Lathe Options dialog.



3. Change the settings in the Lathe Options dialog.



4. Click OK and the selected object will be re-lathed as per the new settings.



◆ Lights

Two new modifier key options are now available when placing spot or point lights in a document:

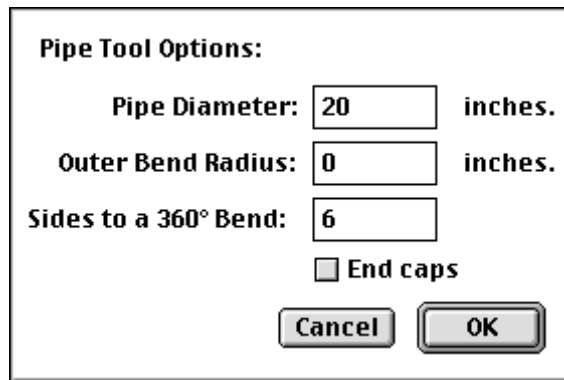
- Hold down the Command key when placing a light and, if the scene is rendered using a LightWorks renderer, that particular light will not cast any shadows.

- Hold down the Option key when placing a light and a light with a negative brightness value will be placed in the document. The negative brightness value can be adjusted using the Brightness slider in the Info palette as usual. To adjust a light with a negative brightness value so that it has a positive brightness value, set the brightness to 0 in the Info palette, then adjust brightness as for an ordinary point light.

◆ Pipes

The Pipes tool can now be used to draw Bezier curves and splines as well as arcs. *See Irregular Polygon, Lathe, Pipes on page 3-4 for more details.*

The Pipes Tool Options dialog has also changed, with the Sides field now replaced with the Sides to a 360° Bend field, and a checkbox for End caps added:



The image shows a dialog box titled "Pipe Tool Options:". It contains three input fields: "Pipe Diameter:" with the value "20" and the unit "inches.", "Outer Bend Radius:" with the value "0" and the unit "inches.", and "Sides to a 360° Bend:" with the value "6". Below these fields is a checkbox labeled "End caps" which is currently unchecked. At the bottom of the dialog are two buttons: "Cancel" and "OK".

Enter a value in the Sides to a 360° Bend field to determine the accuracy with which bends in the pipe are formed. The 3D World Edges to a circle preference controls the number of vertices used to form each cross section of pipe.

Check the End caps checkbox if you wish the pipe to be sealed at both ends.

◆ **Pyramid, Regular Polygon**

Previously the Options dialog for the Pyramid or Regular Polygon tool was displayed by clicking on the tool icon and holding down the mouse button. This dialog is now displayed by holding down the Option key and clicking on the tool icon. The Options dialog is used to specify the number of sides the geometry is to have.

PLUG-IN MODIFIERS

◆ Orbit

Previously, the Orbit tool allowed you to orbit the camera around a selected object. In addition to this, if no object is selected, the Orbit tool can now be used to orbit around the center of the grid.

◆ Pencil

Previously, when the Pencil tool was used to draw onto a 3D object, it drew a series of pixels wherever the cursor was moved. This tool has now been updated so that these pixels are joined together and appear as lines.

4. NEW PLUG-INS



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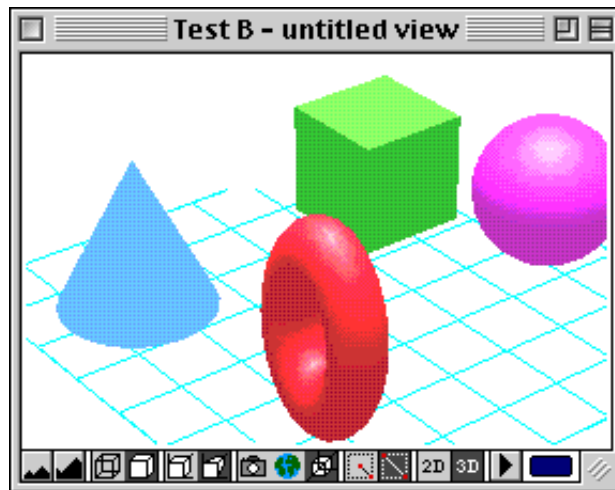
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EXPORT PLUG-INS

◆ 3D Movie

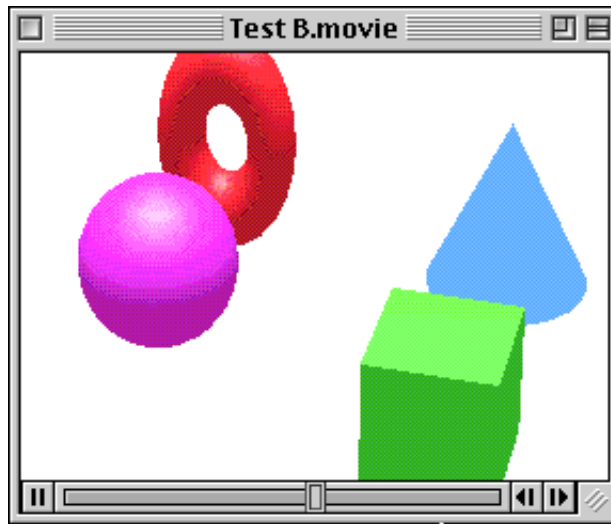
The 3D Movie plug-in saves the current scene as a 3DMF QuickTime movie with a 5 second, 360° rotation. It makes use of the fact that QuickTime 2.5 has a QuickDraw 3D track and a QuickDraw 3D animation track, and will only work if QuickTime 2.5 or later is installed.

1. Open a3D World scene.



2. Select 3D Movie from the Export submenu in the File menu.
3. A standard Save dialog displays. Enter a name and select a location to save the 3D Movie file and click Save.

4. Open the movie file in Movie Player and play the movie. The scene will rotate by 360° over 5 seconds.

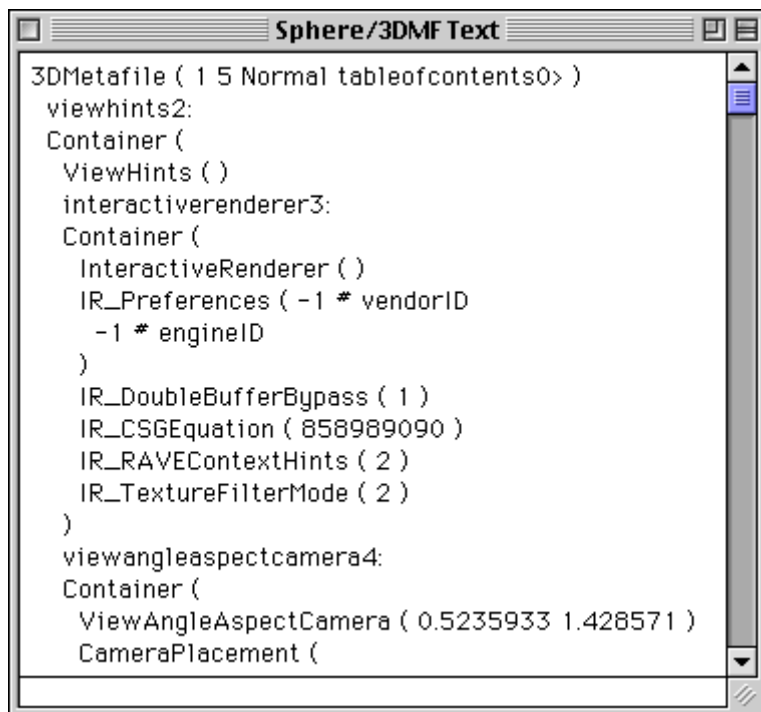


◆ 3DMF Text

The 3DMF Text plug-in produces a 3DMF text file format of the 3D scene. This could be used to help solve data problems.

1. Select 3DMF Text from the Export submenu.
2. A standard Save dialog displays. Enter a name and select a location to save the text file and click Save.

3. A description of the 3DMF scene in your document is saved in text format:



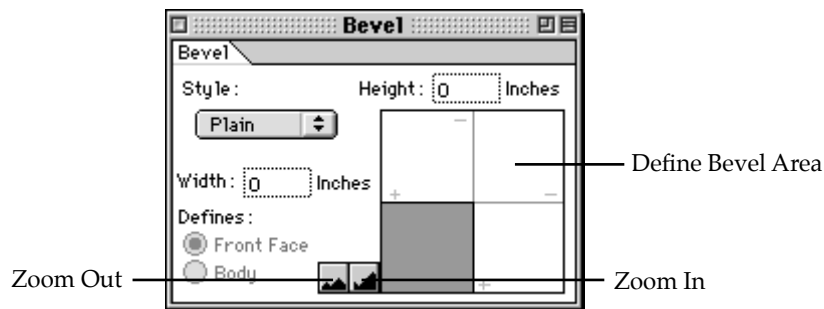
PLUG-IN PALETTES

◆ Bevel

Use the Bevel Palette to apply a bevel to any shape that is made up of a path and cross section i.e. 3D Text, cone, cylinder, extruded bitmap, irregular polygon, pipes, pyramid, and regular polygon. The bevel is applied at both ends of the path or body of the shape.

Note: Bevels can only be applied to polygon and trigrid geometries, not conics or NURBs.

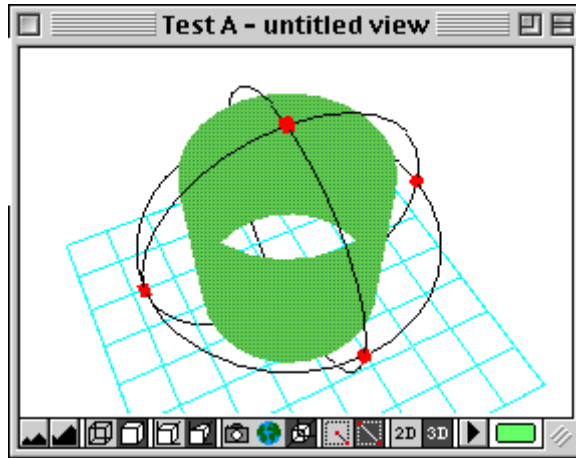
1. Select an appropriate geometry (for example, a cylinder) in your 3D World document.
2. Select Bevel from the Palette menu to display the Bevel palette.



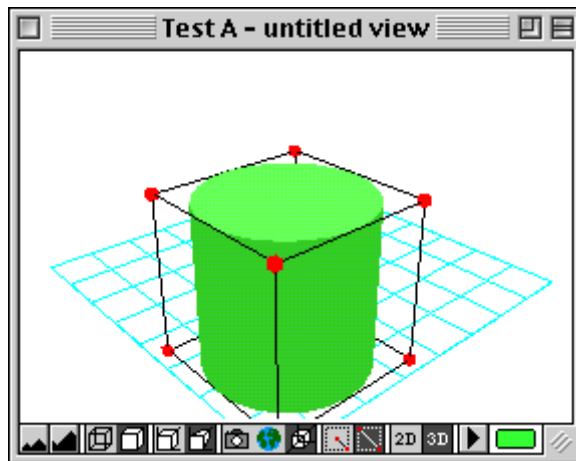
3. Adjust the settings in the Bevel palette (see below), and the selected shape will be updated to reflect the changes you have made.

Style

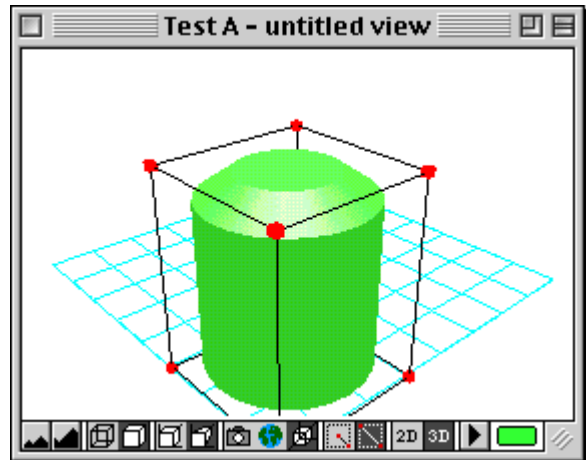
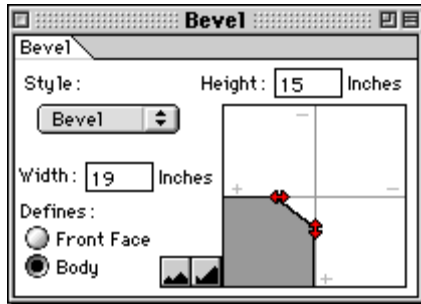
- **Hollow:** Removes the end caps from the geometry. There are no other options available for this style.



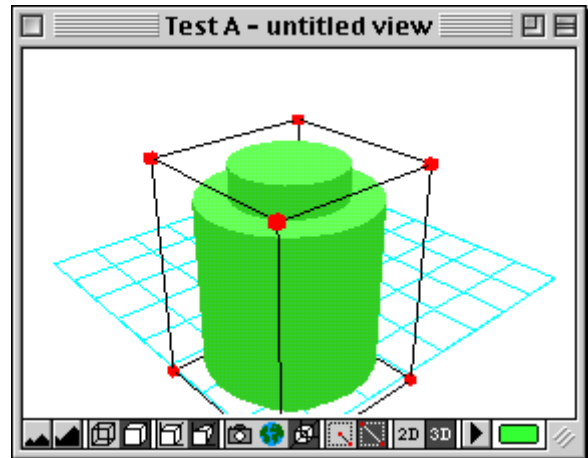
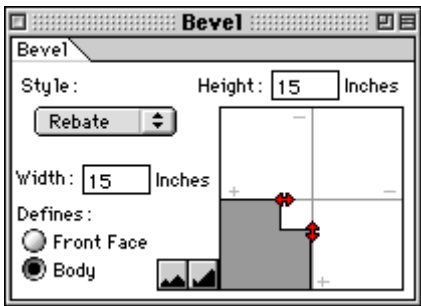
- **Plain:** Replaces the flat end caps on a geometry when they have been removed by using the Hollow style option, or turns off the bevel set by one of the other style options. There are no other options available for this style.



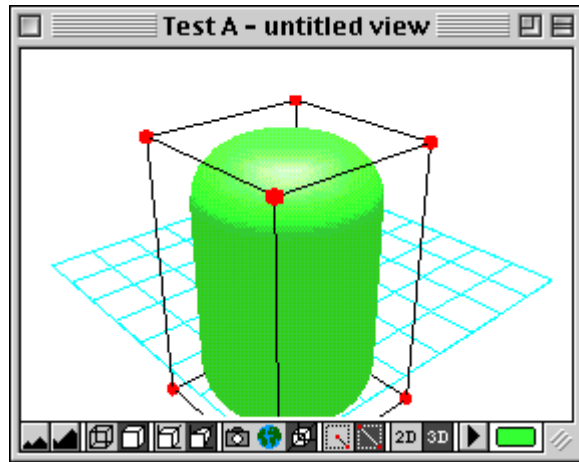
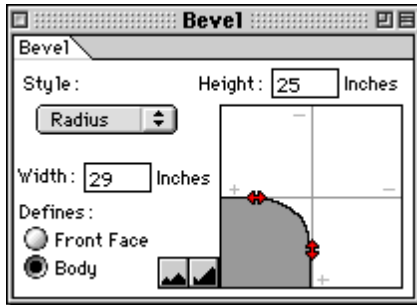
- **Bevel:** Applies a straight bevel to the geometry.



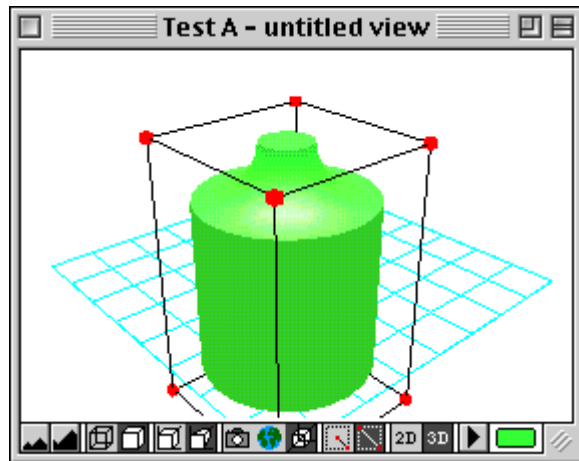
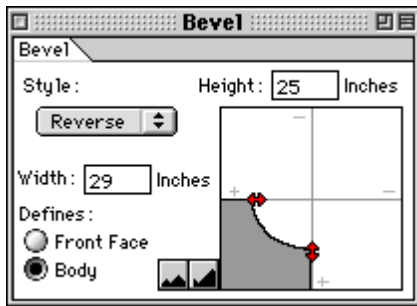
- **Rebate:** Cuts a square section from the edges of the geometry.



- **Radius:** Applies a convex curve to the edges of the geometry.



- **Reverse:** Applies a concave curve to the edges of the geometry.



Defining The Bevel

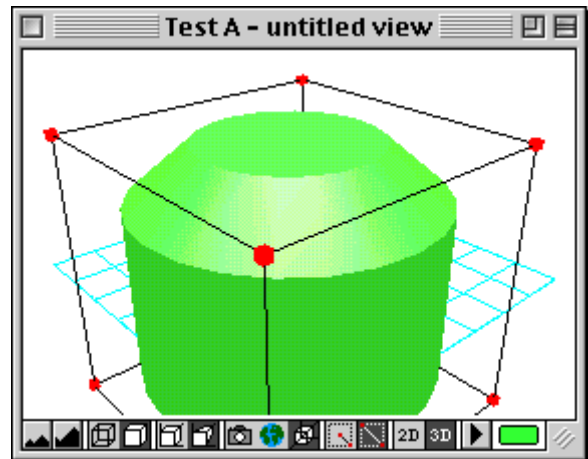
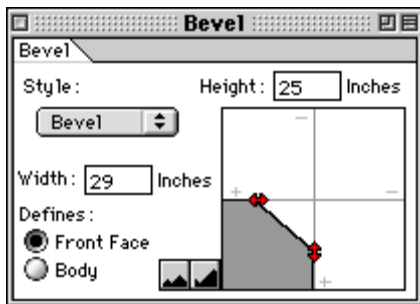
For the Bevel, Rebate, Radius and Reverse style options, define the bevel by sliding the red arrows in the Define Bevel Area, or entering values in the Height and Width fields.

- If the horizontal arrow is in the positive area of the Define Bevel Area, the object will become narrower at its ends.
- If the horizontal arrow is in the negative area of the Define Bevel Area, the object will become wider at its ends.
- If the vertical arrow is in the positive area of the Define Bevel Area, the object will have raised ends.
- If the vertical arrow is in the negative area of the Define Bevel Area, the object will have indented ends.

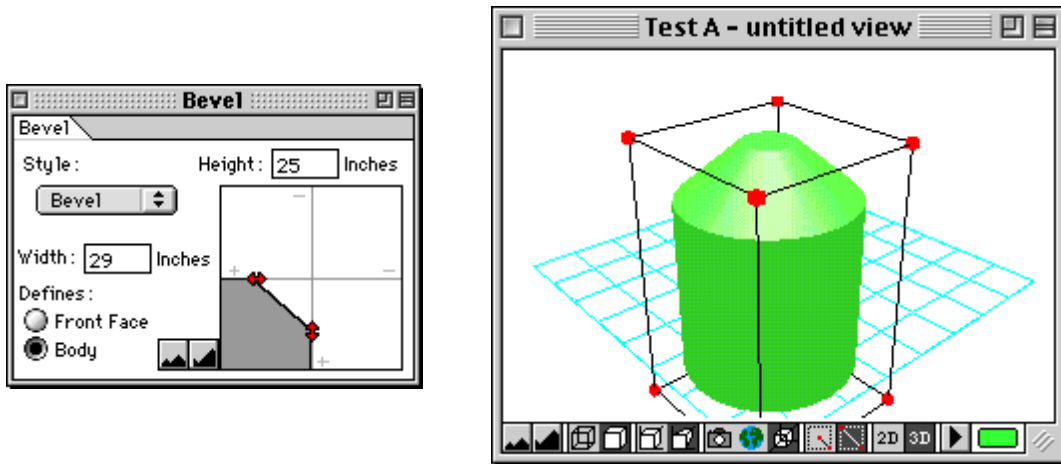
Use the Zoom buttons to zoom in or out of the Define Bevel Area.

The Bevel Defines

- **Front Face:** Select to specify that the front face or end cap of the geometry should remain a fixed size, and the bevel palette setting should affect the body of the geometry.



- **Body:** Select to specify that the body of the geometry should remain a fixed size, and the bevel palette setting should affect the front face or end cap of the geometry.



Note: The Front Face/Body setting can be very important when applying a bevel to 3D Text, when either the font outline or letter spacing needs to be maintained.

◆ Color Palette

The Color Palette plug-in provides a repository for 12 colors.

1. Select Color Palette to display the Color Palette.



2. To use a color in the Color Palette, drag and drop it onto an object, the background, grid or color box in the Info Palette.
3. To change a color in the Color Palette, drag and drop a new color over an existing one, or click on a color to open the color picker and choose a new color.

◆ Group Special

The Group Special palette is used to produce further copies of a selection and apply transformations to the copies based on the original selection's size and position.

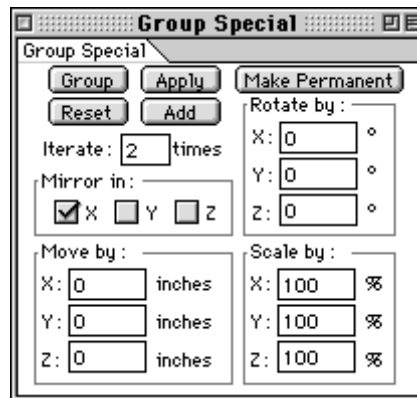
The original selection and its copies are placed in a group. As long as the group remains intact, the additional copies will remain identical to the original selection. This means that if the original selection is edited in any way, each copy will also be updated to reflect the changes made. *See Editing Group Special Objects on page 4-23 for more details.*

As Group Special objects use relatively little disk space compared to identical objects made up of several normal 3D World geometries, it makes sense to use the Group Special palette to create objects made up of multiple identical components. Also, if the object needs to be changed, it should be much simpler to edit a Group Special object.

Positioning objects is very important as different results will be produced for the same options in the Group Special palette depending on the position of the original selection. *See Positioning Objects on page 4-26 for more details.*

The Group Special Palette

Select Group Special from the Palette menu to display the Group Special palette.



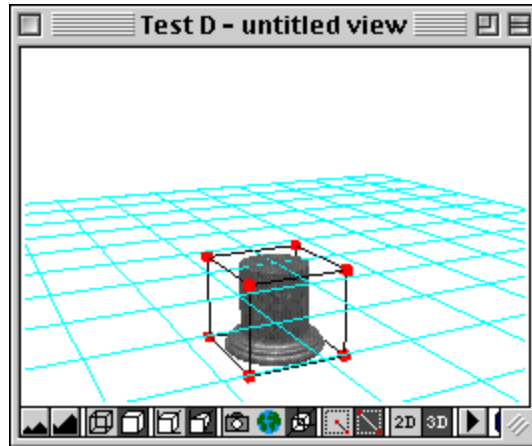
Group Special options are performed on a selected object or several selected objects, in your 3D World document.

Iterate

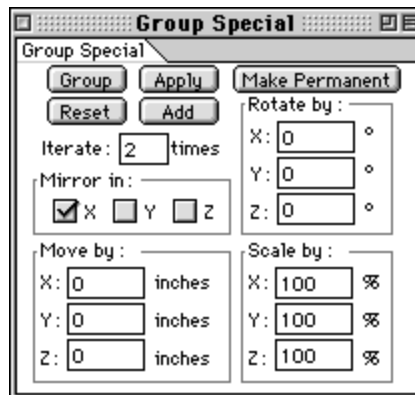
Enter a value in the Iterate field to specify how many copies of the selection should be transformed and displayed (including the original selection).

Mirror

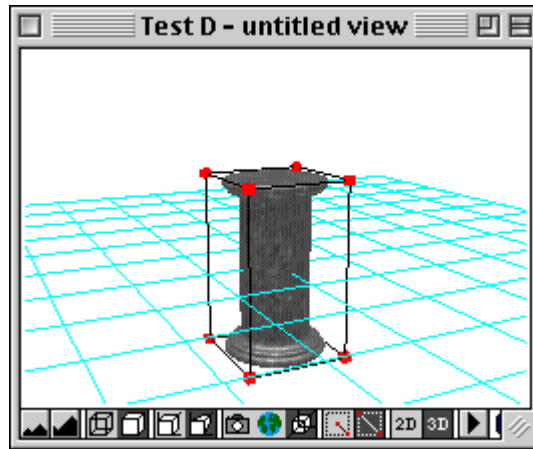
1. Select an object or objects in your 3D World document window. In the picture on the right, the object has been carefully positioned just under the center of the grid.



2. Click the Reset button in the Group Special palette to clear any existing settings.
3. Check the Y checkbox in the Mirror section of the palette. (Any or all of these checkboxes can be checked at the same time.)
4. Enter a value in the Iterate field. Note that a value more than 2 will result in copies being placed in the exact locations of the original and second copy, and so will not be visible.



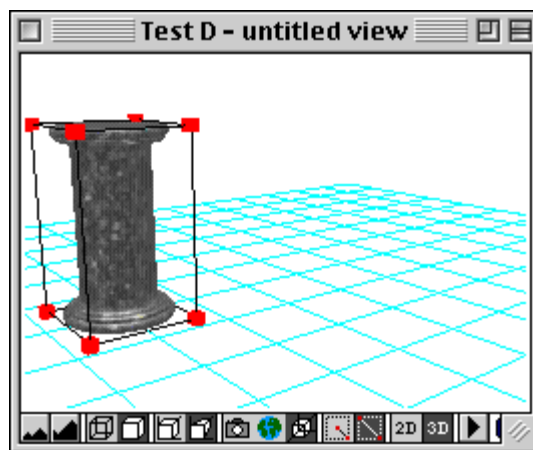
5. Click on the Group button.
6. A group is created containing the original selection and one copy, so there are two copies in total. The copy is placed in the same location as the original selection as far as the x and z coordinates are concerned, but is mirrored in the y dimension.



Mirror transformations are performed in relation to the grid origin. If the object in the above example had been positioned 12" below the grid, its mirrored copy would have appeared 12" above the grid, and the 'pillar' would not have joined in the middle.

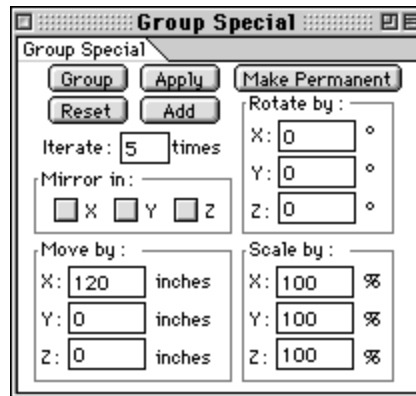
Move

1. Select an object or objects in your 3D World document window.

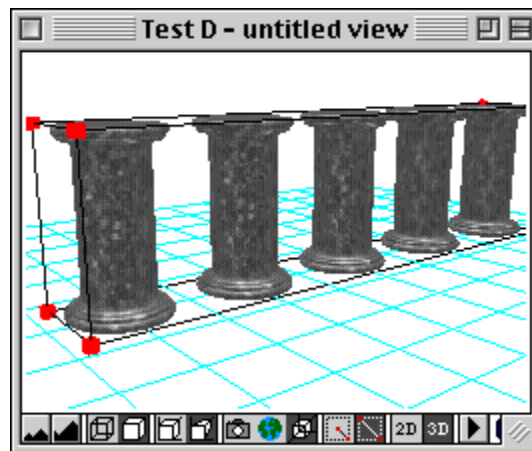


2. Click the Reset button in the Group Special palette to clear any existing settings.

3. Enter values to move the copied objects by in the x, y and z fields in the Move section of the palette. Suitable values will depend on the current grid settings.
4. Enter a value in the Iterate field.



5. Click on the Group button.
6. The original selection is copied so that the total number of copies (including the original) is the same as the Iterate value. Each copy is moved from the previous copy by the values specified. The objects are grouped together.

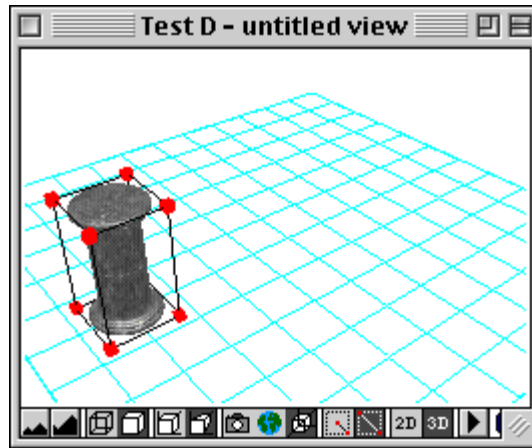


In the above example, the original object was the pillar produced in the Mirror example, so the Move/Group Special command was performed on an object that was already a Group Special object. The basic component is still the half pillar, which can be edited.

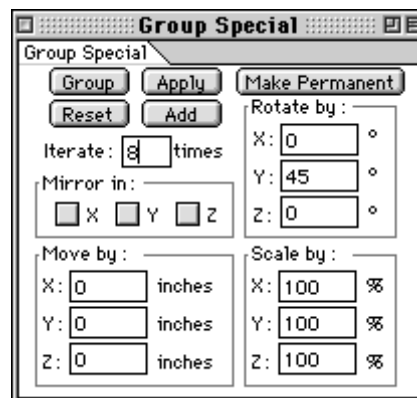
In this case the tops and bottoms of all five pillars would be updated to reflect the changes made.

Rotate

1. Select an object or objects in your 3D World document window:

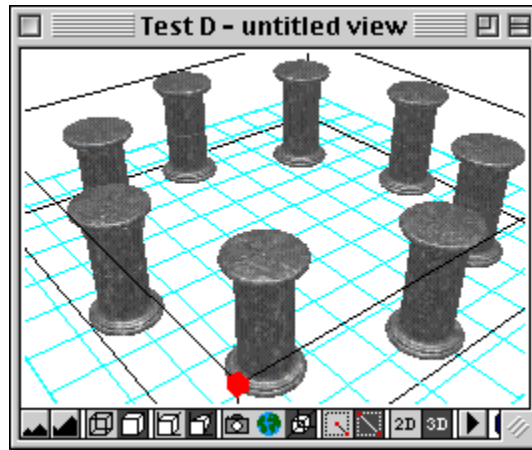


2. Click the Reset button in the Group Special palette to clear any existing settings.
3. Enter values, in degrees, to rotate the copied objects by in the x, y and z fields in the Rotate section of the palette.
4. Enter a value in the Iterate field.



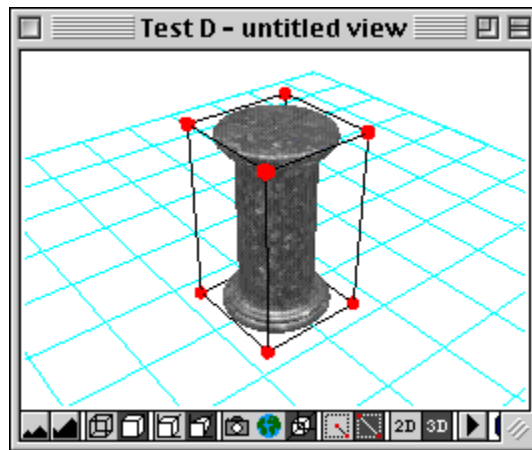
5. Click on the Group button.

6. The original selection is copied so that the total number of copies (including the original) is the same as the Iterate value. Each copy is rotated around the relevant axis, by the specified number of degrees from the previous copy. The objects are grouped together.



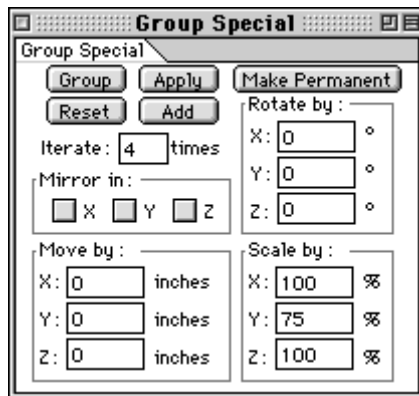
Scale

1. Select an object or objects in your 3D World document window. This object has been carefully positioned standing on the center of the grid.

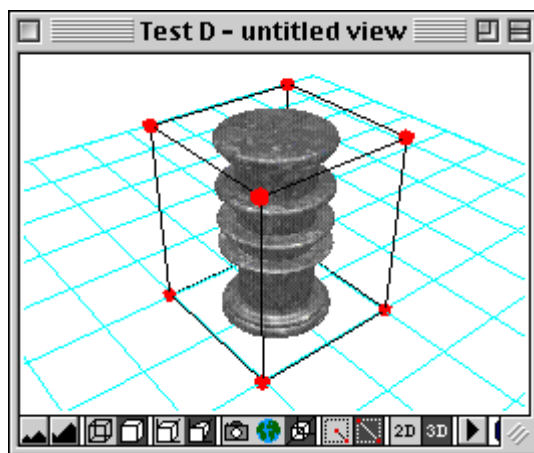


2. Click the Reset button in the Group Special palette to clear any existing settings.
3. Enter percentage values to scale the copied objects by in the x, y and z fields in the Scale section of the palette. A setting of 100% does not result in a transformation.

4. Enter a value in the Iterate field.

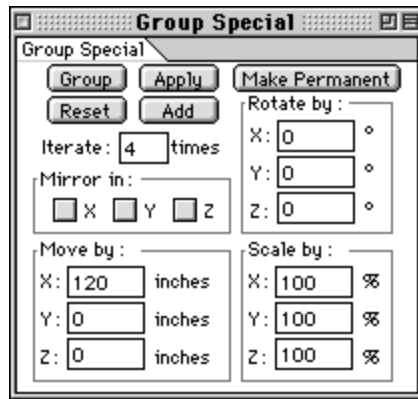


5. Click on the Group button.
6. The original selection is copied so that the total number of copies (including the original) is the same as the Iterate value. Each copy is scaled in relation to the previous copy by the values specified. The objects are grouped together. As the original object was placed on the center of the grid, the copies are placed in the same location, if the original object had been placed away from the center of the grid, the position of each copy would be determined by the scale values for each axis.

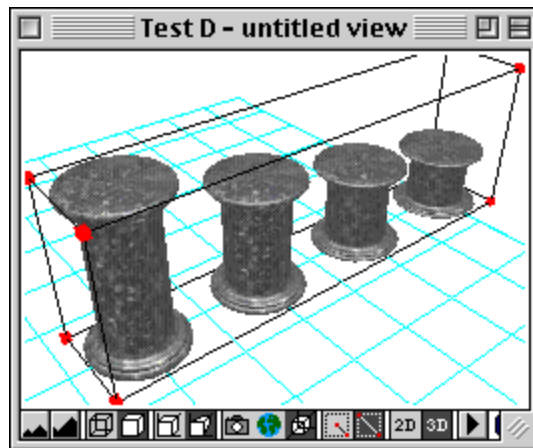


7. Click on the Reset button in the Group Special palette to clear the settings in the palette.

8. Enter values to move the copied objects by in the x, y and z fields in the Move section of the palette. Suitable values will depend on the current grid settings.



9. Click on the Add button to add the new transformation to the existing Group Special object.
10. The copied objects are positioned according to the values specified.



Group

The Group button creates a new group determined by the original selection and the settings in the Group Special palette.

Apply

The Apply button applies transformations to an existing group, based on the settings in the Group Special palette and overwriting the existing transformation.

Add

The Add button applies transformations to an existing group, based on the settings in the Group Special palette in addition to the existing transformation.

Reset

The Reset button clears the settings in the Group Special palette.

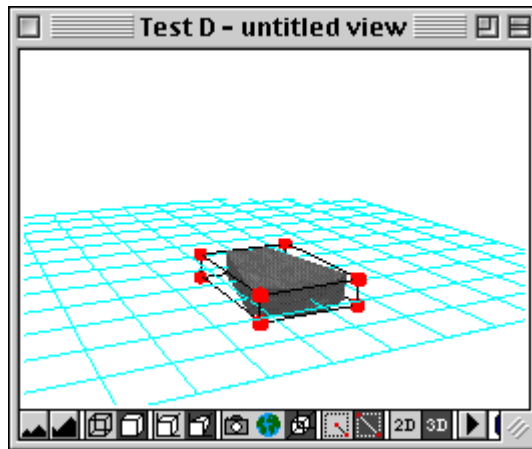
Make Permanent

The Make Permanent button is used to add the transformed copies to the document as individual objects. The copies will now be clones of the original object. Clones share the same basic geometry and surface attributes as the original, which means that if the geometry, color, transparency, shininess etc. of the original is changed, any clones will also be changed, and if a clone is changed, other clones and the original will be changed. The clone link relates to the basic geometry and surface attributes only. Changes in size, position and rotation will not be reflected by clones. The objects will still appear as a group. Using the Ungroup command produces the same result, but the objects are ungrouped.

Multiple Transformations

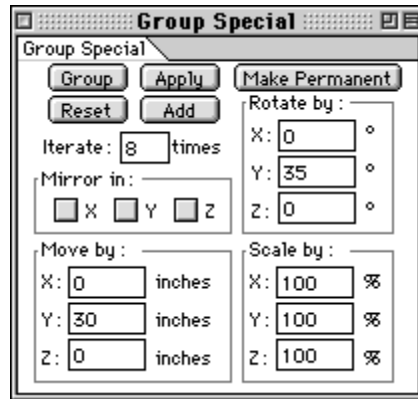
Multiple transformations can be applied to a selection at the same time.

1. Draw a step shaped object in your 3D World document.
2. Position it at coordinates $x = 0$, $y = 0$, and position your step in the z dimension so that one end is set slightly away from the origin.

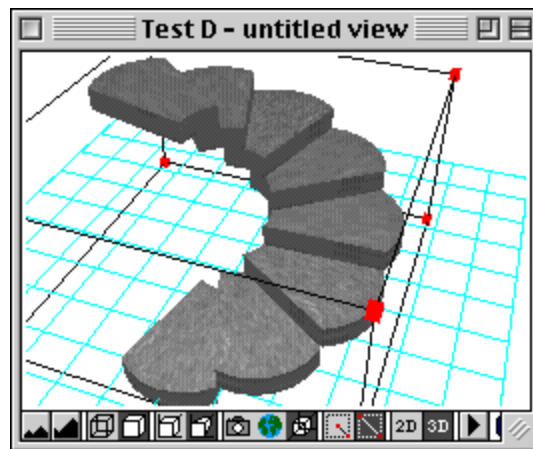


3. Click on the Reset button in the Group Special palette to clear the settings in the palette.

4. Enter a value in the Iterate field to specify the number of steps to be created.
5. Enter a value in the y field in the Move section to specify the distance above the previous step that each step should be placed.
6. Enter a value in the y field in the Rotate section to specify the number of degrees that each step should be rotated around the y axis.



7. Click the Group button to produce a spiral staircase.

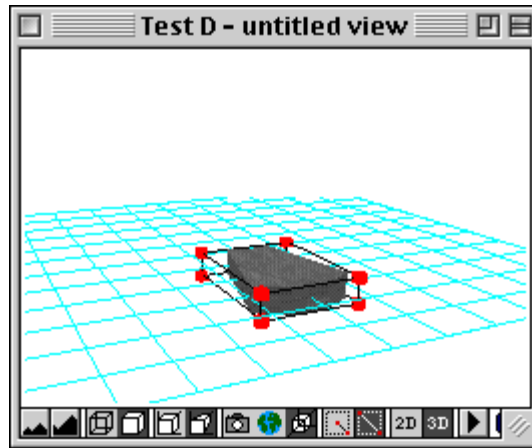


Editing Group Special Objects

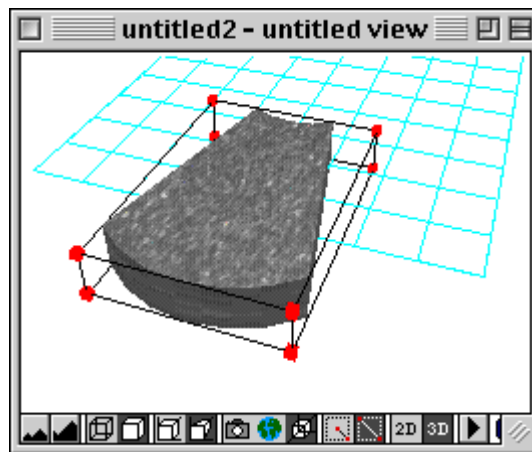
Double-click on a Group Special group or select it and choose Edit Item from the Options menu. An editing window opens containing only the original object(s) from the Group Special

group. The original selection can now be edited, in any way, and each of its copies will be updated to reflect the changes made.

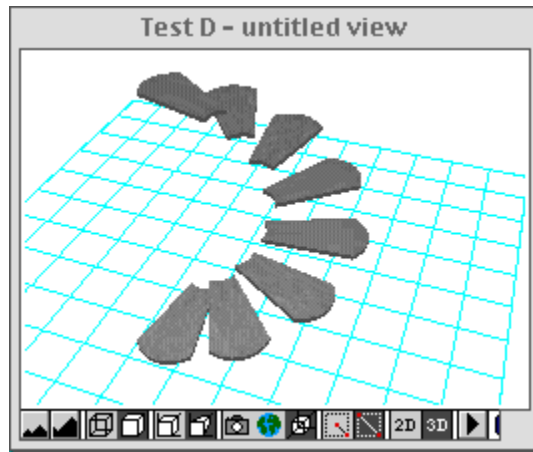
1. Double-click on the spiral staircase created in the previous example.
2. An editing window opens containing only the original step:



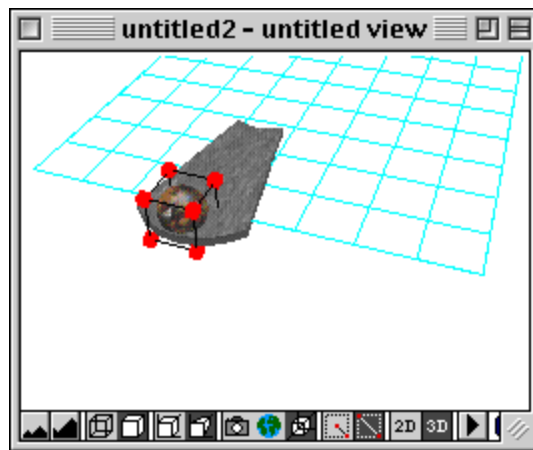
3. Click and drag on the handles of the object's bounding frame to adjust its size:



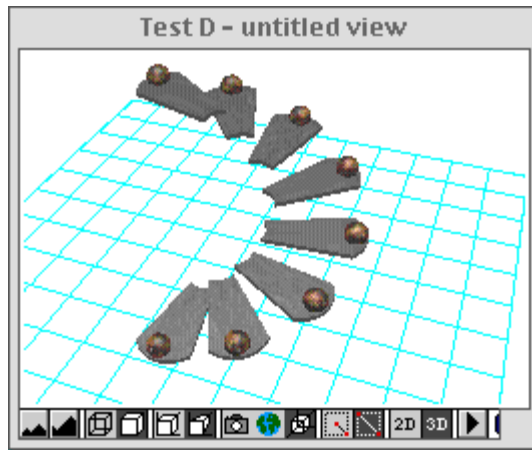
4. Notice that in the main document window, all the steps in the staircase have changed:



5. In the editing window, draw a sphere and place it at the edge of the step:



6. Again, notice that in the main document window, the sphere has been added to each step:

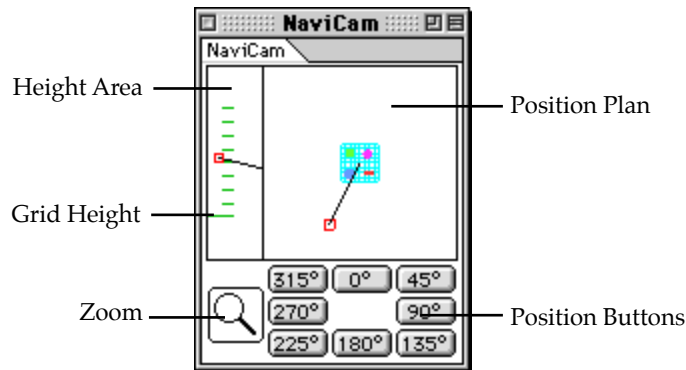


Positioning Objects

It is very important to position the original object(s) carefully, before using the Group Special palette options, as the results produced will vary depending on the position of the original selection. For this reason it is recommended that you create each Group Special object in a new 3D World document, setting the Grid Options as per the requirements of this particular object. The original object(s) should be carefully positioned in relation to the center of the grid before producing a special group as the Mirror, Rotate and Scale transformations are all calculated with respect to the grid origin. Once the group is created, the object can be moved or placed in the master 3D World document and its position relative to the grid origin is no longer relevant.

◆ NaviCam

The NaviCam palette provides an alternative way of controlling the camera position and view. Select NaviCam from the Palette menu to display the NaviCam palette.



The red square displayed in the palette, both in the height area and in the position plan, represents the camera. The line from this square shows the camera view direction, and at the end of this line is the look at point, or point of interest.

Height

Use the controls in the Height Area to adjust the position of the camera, or point of interest, in the y dimension.

The long green line in the Height Area represents the grid height. The lines above represent height as determined by the size of the grid and each grid square.

- Click on the camera square and move it up or down to change the camera height while maintaining the point of interest.
- Click on the view direction line (or anywhere in the Height Area except the camera square) and drag up or down to change the height of the point of interest without changing the camera height. This is the same as tilting the camera.
- Hold down the Option key, click anywhere in the Height Area and drag up or down to adjust the height of the camera and move the point of interest relative to the camera height.

If the camera is moved out of the height range shown, the display will be rescaled so that the camera square can still be seen. When the camera is moved back into range, the display will be rescaled again.

Position

Use the controls in the Position Plan to adjust the position of the camera or the point of interest in the x and z dimensions.

The Position Plan displays an image of the 3D scene in plan view.

- Click on the camera square and drag to change the position of the camera while maintaining the point of interest.
- Click on the view direction line (or anywhere in the Position Plan except the camera square) and drag to change the position of the point of interest without moving the camera position. This is the same as turning the camera.
- Hold down the Option key, click anywhere in the Position Plan and drag to adjust move the camera and move the point of interest relative to the camera position. This is the same as the step and crab movements of the camera.

If the camera is moved out of the plan shown, the display will be rescaled so that the camera square can still be seen. When the camera is moved back into range, the display will be rescaled again.

Zoom

Click on the Zoom button and drag up or down to zoom in or out on the scene.

Position Buttons

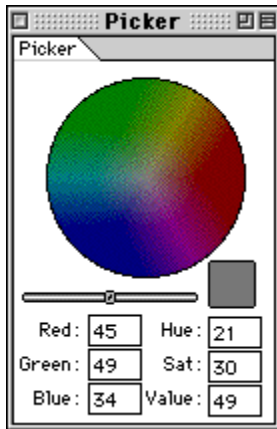
Use the position buttons to move either the camera or the point of interest to predefined positions.

- Click on the position buttons to move the camera while maintaining the point of interest. 0° moves the camera to directly above the point of interest, 90° to the right, 180° directly below, 270° to the left, and so on.
- Hold down the Option key and click on the position buttons to move the point of interest while maintaining the camera position. 0° moves the point of interest to directly above the camera, 90° to the right, 180° directly below, 270° to the left, and so on.

◆ Picker

The Picker plug-in displays a color picker, so that an object's color or the default color can be changed easily.

1. Select Picker from the Palette menu to display the Picker palette:



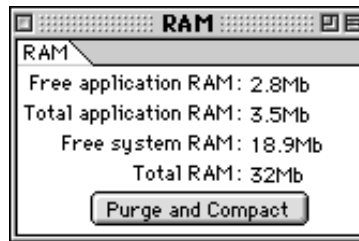
2. To change the color of an object, several objects or a group, make a selection in the document window. If nothing is selected, the default color will be changed.
3. Choose a color from the Picker palette by clicking on the color wheel and/or adjusting the brightness slider bar and values for Red, Green, Blue, Hue, Saturation and Value.
4. Click on the current color button to display the system color picker(s).

Note: Colors can be dragged to and from the current color button.

◆ RAM

The RAM plug-in is used to display the memory usage of 3D World and the amount of free system RAM available.

Select RAM from the Palettes menu to display the RAM palette:



- **Free application RAM:** The amount of RAM allocated to, but not currently used by, 3D World. It is recommended that this amount stay above 500k to maintain the application's performance.
- **Total application RAM:** The amount of RAM allocated to 3D World. This may be the same as the amount allocated to 3D World via the Get Info dialog, but is affected by whether Virtual Memory is turned on or off.
- **Free system RAM:** The amount of RAM not currently in use by the system or any other application. QuickDraw 3D uses free system RAM, so this amount will decrease as your 3D model grows in size, or if additional applications are launched. It is recommended that this amount stay above 1Mb and an alert will display warning you when this point is reached.
- **Total RAM:** The amount of total physical RAM installed in the computer. This value is not affected by Virtual Memory.
- **Purge and Compact:** Click on the Purge and Compact button to purge unused memory and compact the rest of the memory so that one contiguous block of free RAM remains. It affects only the application's memory partition, so use this button if you are running short of free application RAM. The amount showing in the RAM palette for Free application RAM may not change when this button is used, but the difference will be seen if you look at the RAM usage with a RAM usage application.

◆ **Renderer Options**

The new Renderer Options plug-in palette contains the display the options that were previously in the Camera palette.



All the menus/options perform as previously. The only change is that the renderer options popup menu has been replaced by a button. This is only active if a non-interactive renderer is installed. Click on the Options button to display any available options for the currently selected non-interactive renderer. The dialog below shows the options available for the LightWorks SuperLite renderer.



◆ Section

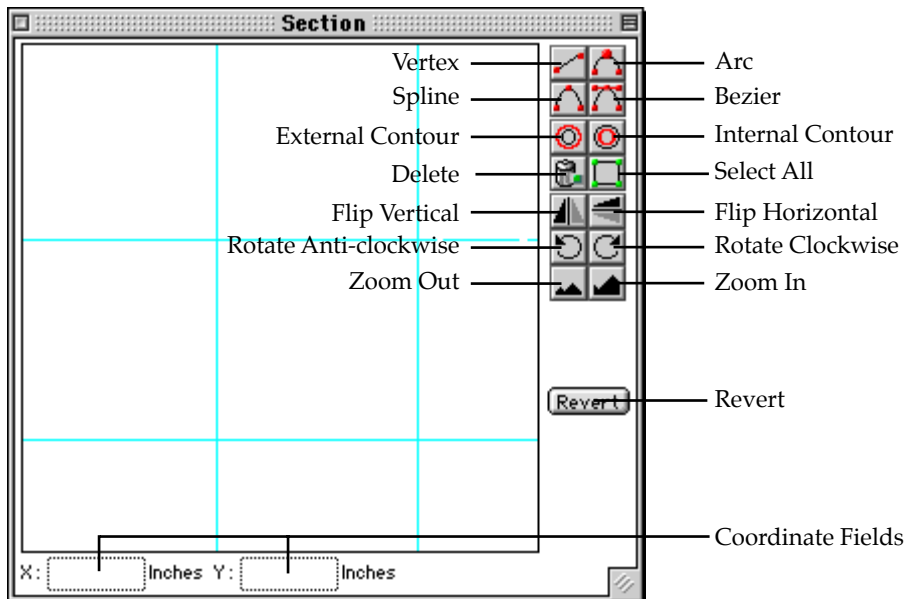
The Section palette is used to edit the section of geometries that are made up of paths and sections. These are: 3D Text; cones; cylinders; extruded bitmaps; irregular polygons; lathed objects; pipes; pyramids; and regular polygons.

If the Dynamic Updates application preference is checked on, as the section is edited, the geometry in the 3D World document window is updated to reflect the changes made, so the results of any actions can be seen instantly.

If the Dynamic Updates preference is checked off, the geometry in the 3D World document window is updated only when the mouse button is released as an editing action is completed.

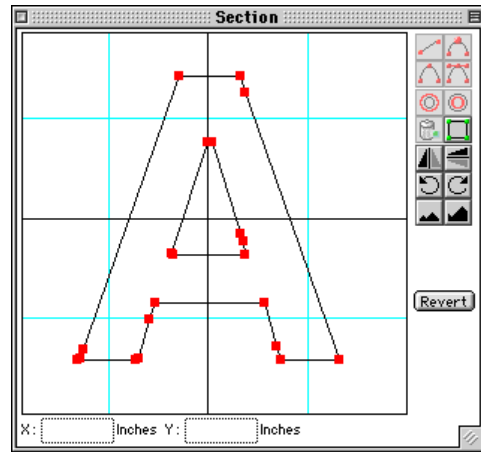
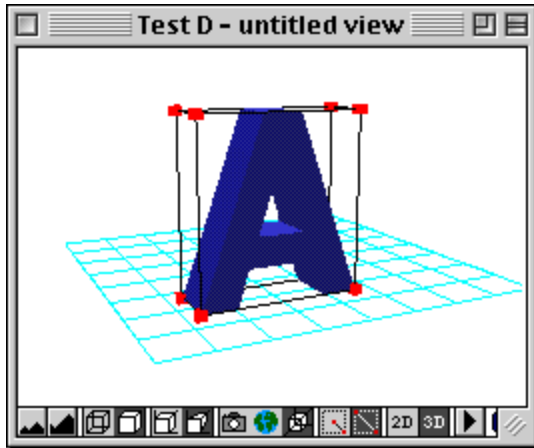
See documentation regarding the Preferences dialog in the Edit menu for further information about the Dynamic Updates preference.

To display the Section palette, select Section from the Palette menu:







Displaying An Object Section

Select a geometry in the document window and its section will display in the Section palette. The section is drawn in black with handles showing the various points on the section. Black lines show the x and y axes, and the object origin is at the point these two axes intersect.



Types Of Point

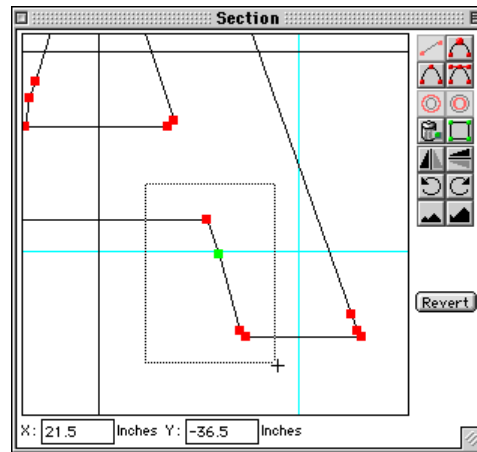
-  **Vertex:** A standard point used to define the beginning or end of a straight section of a path or line.
-  **Arc:** A point on a section of a circle defined as the center point on the arc between two vertex points, one at either end of the arc.
-  **Spline:** A point on a curve. The curve is defined automatically and cannot be edited except by adjusting the points at either side of the spline point.
-  **Bezier:** A point on a curve. Two Bezier handles allow the curve to be adjusted.

Vertex point handles display as squares, Bezier and spline point handles as diamonds, and arc point handles as circles.

Selecting Points

Click on a handle to select it. Note: When selected, a Bezier point has two additional handles that allow you to adjust the Bezier curve.

- **To select additional points:** Hold down the Shift key and click on another point.
- **To deselect points:** Hold down the Shift key and click on a selected point.
- **To select several points at the same time:** Hold down the Shift key and click and drag in the Section palette to drag out a marquee selection:

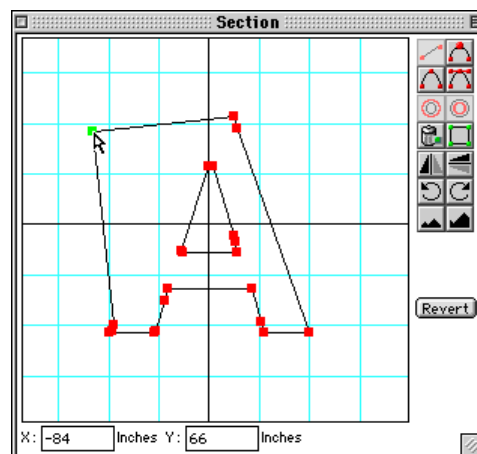


- **To select all the points in the section:** Click on the Select All button in the Section palette.

Moving Points

There are three methods of moving points of any type:

- Click on a handle and drag to reposition it.



- Enter coordinate values in the x and y fields at the bottom of the Section palette to move a point by precise values. The coordinates entered here relate to the object origin rather than the grid origin.
- Use the arrow keys to move a point by two screen pixels at a time, or by the grid snapping distance if one is set.

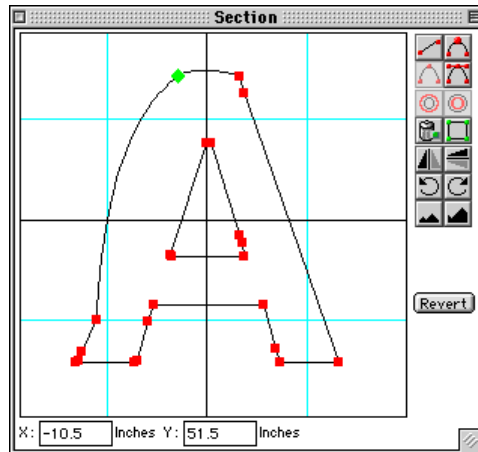
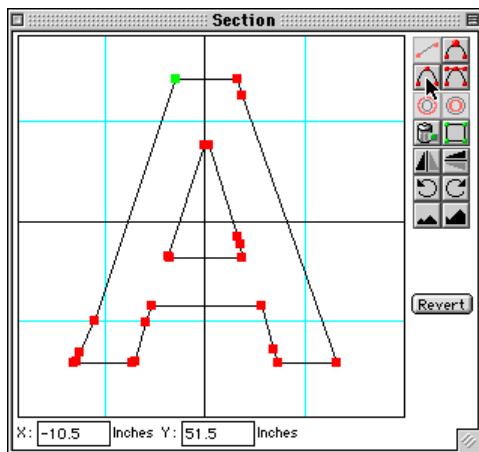
When moving points by clicking and dragging or using the arrow keys, the section window will autoscroll so that you can see the new position of the point(s).

Manipulating Points

- **Arc:** Other adjustments can be performed by manipulating the vertex points at either end of the arc.
- **Bezier:** Click and drag on the Bezier handles to adjust the curve. Hold down the Option key and click and drag on the Bezier point or Bezier handles to break the Bezier curve.

Changing Points

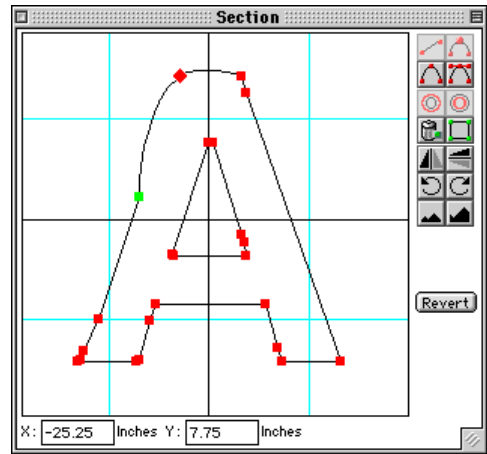
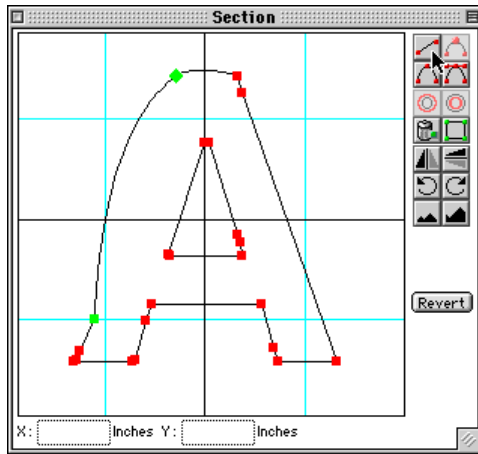
To change a point to a point of a different type, select the point then click on the Vertex, Arc, Spline or Bezier button in the Section palette. The point will change to the type selected.



Note: An arc point can only be added between two vertex points.

Adding Points To A Section

To add a point to a section, select two contiguous points on the section, then click on the Vertex, Arc, Spline or Bezier button in the Section palette. A point of the appropriate type will be added between the two points originally selected.



Note: An arc point can only be added between two vertex points.

An alternative way to add vertex or spline points is to hold down the Option key, click on an existing vertex or spline point and drag to place a copy of the vertex or spline point.

Note: Arc and Bezier points cannot be added in this way. Holding down the Option key and clicking and dragging on a Bezier point causes the Bezier curve to be broken.



External/

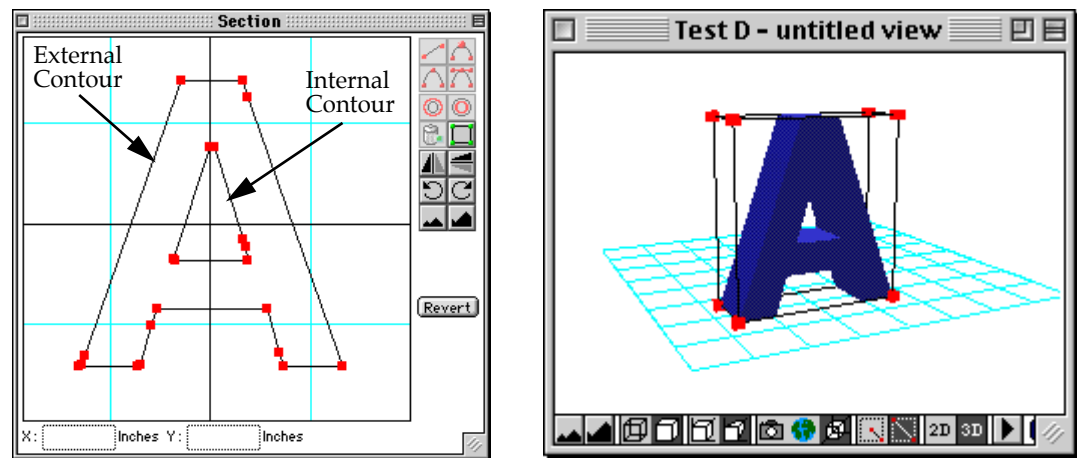


Internal Contour

The way light shines on a surface will be affected by whether a contour is defined as being an internal or an external contour. A contour is part of a section made up of a closed line.

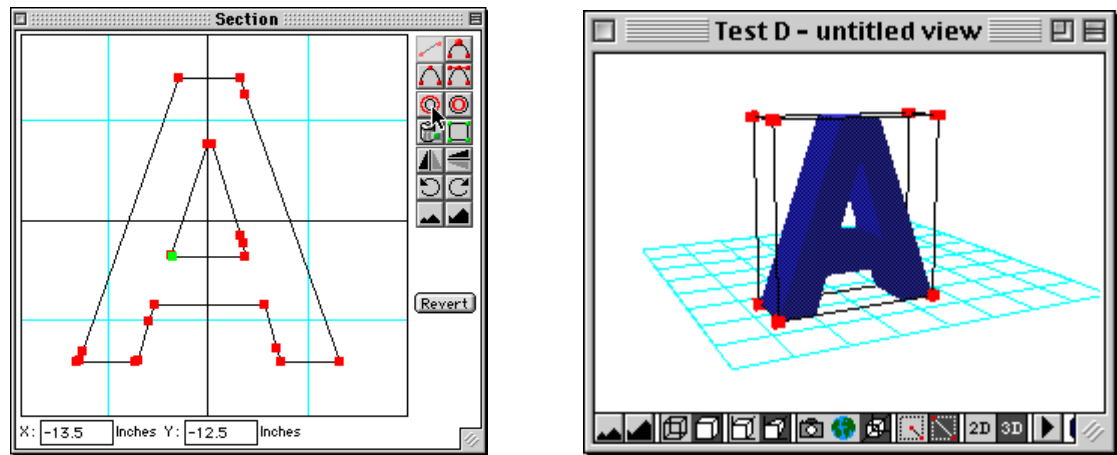
For example, the cross section of the letter A contains two contours. By default they are an external contour and an internal contour. As the window cut out of the letter A is defined as an

internal contour, the light is shown shining down on the bridge of the letter A and the other inside surfaces are in shadow.



To change the definition of a contour, select a point on the contour line and click on the External Contour or Internal Contour button in the Section palette.

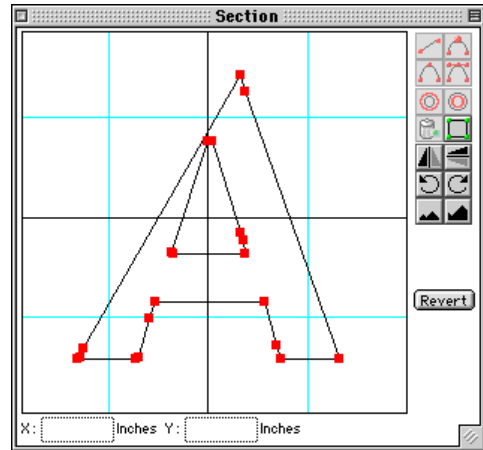
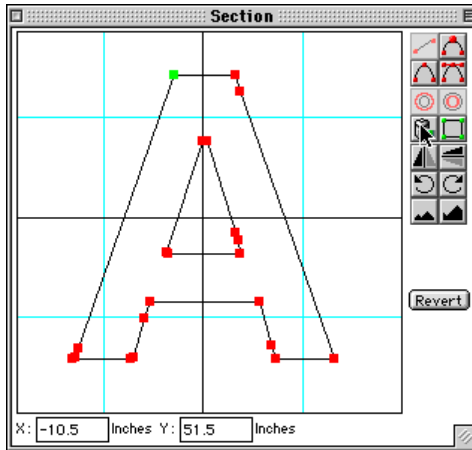
In the figure below, the internal contour of the letter A is selected and changed to an external contour. It is now treated as an external contour as far as the lighting effects are concerned, so the bridge of the letter A is now in shadow and the other inside surfaces have light shining on them.





Delete

Select a point or points in the Section palette and click on the Delete button to remove them from the section.



Select All

To select all the points in the section, click on the Select All button in the Section palette.



Flip Vertical



Flip Horizontal

The orientation of the object's section when it initially appears in the Section palette is determined by the way the original object was drawn and how the object's internal data structure is held by 3D World. To view the section in the same orientation as the object as it now is displayed in the 3D World document, it may be necessary to use the Flip Vertical or Flip Horizontal button to flip the section around the x or y axis. This affects only the view of the section in the Section palette, it does not affect the 3D geometry in the 3D World document window.



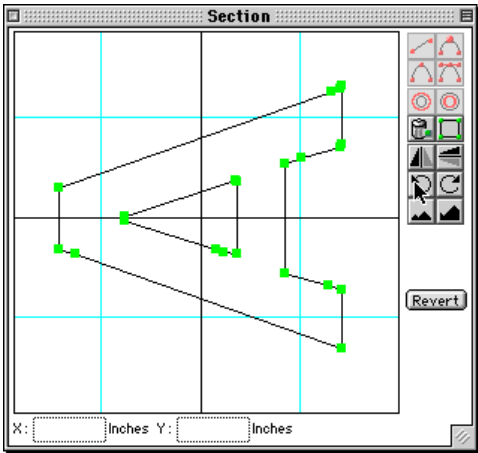
Rotate Anti-clockwise



Rotate Clockwise

The orientation of the object's section when it initially appears in the Section palette is determined by the way the original object was drawn and how the object's internal data structure is held by 3D World. To view the section in the same orientation as the object as it now is displayed in the 3D World document, it may be necessary to rotate the section in the Section pal-

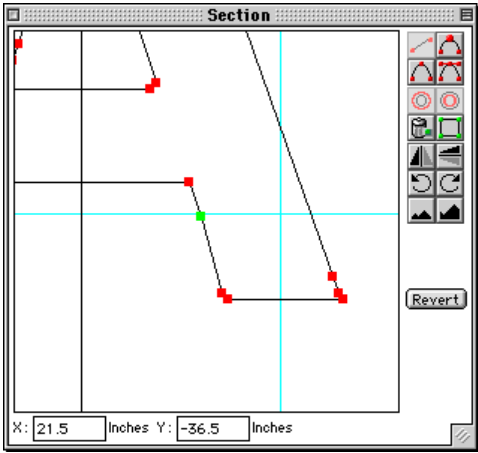
ette by clicking on the Rotate Anti-clockwise or the Rotate Clockwise button. The section will be rotated by 90° in the relevant direction.



This affects only the view of the section in the Section palette, it does not affect the 3D geometry in the 3D World document window.



Click on the Zoom In or Zoom Out button to zoom in or out of your view of the section in the Section palette. The view is centered on any selected points, or on the center of the section if no points are selected.

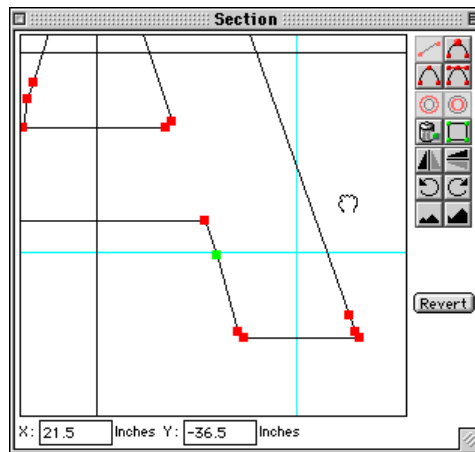


Revert

Click on the Revert button to return to the section as it was when the object was first selected. This relates to the points on the section only, not to any view options you have used in the Section palette.

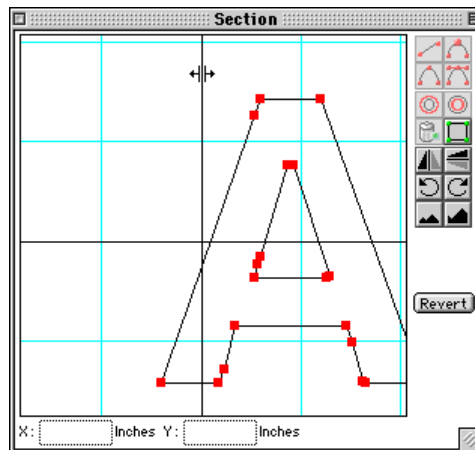
Moving the Section Window Contents

Click on the section window and drag to reposition window contents. The section window will autoscroll.



Changing the Object's Origin

Click on X or Y axis and drag to reposition the location of the axis relative to the section.



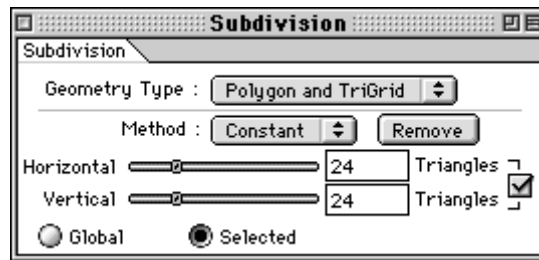
When the X or Y axis is moved the origin will change, so the origin of the object's path is changed relative to the object's section. This will alter the effects of using the Edit Path tool to scale and rotate the section of a geometry at specific points on its path. *See Edit Path on page 4-78 for more details.*

◆ Subdivision

The Subdivision palette is used to specify what sort of internal geometries 3D World will use to draw conics and to determine how 3D World triangulates geometries drawn using conics or NURBs geometries.

Note: The conic geometries are: cone, cube, cylinder, sphere and torus. If the NURBs geometry type is chosen, the way that geometries are drawn using the Mountain or Mountains plug-ins will also be affected.

Select Subdivision from the palette menu to display the Subdivision palette:



Geometry Type

The Geometry Type setting is a modal setting to determine the sort of internal geometries 3D World will use to draw conics. Existing geometries are not changed when this setting is altered.

- **Polygon and Trigrid:** This is the method of drawing conics used prior to QuickDraw 3D version 1.5.
- **Conic Primitives:** The relevant geometries will be drawn using QuickDraw 3D 1.5 conics. Conic Primitives use very little memory compared to Polygon and Trigrid geometries, but will take longer to render.

- **NURBs:** The relevant geometries will be drawn using NURBs. NURBs use very little memory compared to Polygon and Trigrid geometries and can produce smooth surfaces. NURBs are also more editable, but will take longer to render.

Method

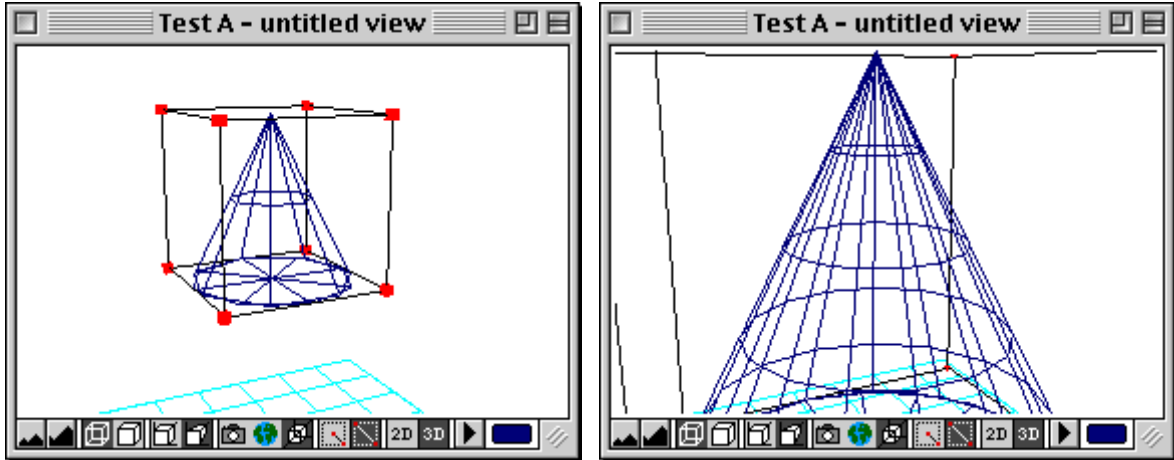
The Method settings have no effect on geometries drawn using Polygons and Trigrids, but specify how QuickDraw 3D should triangulate geometries drawn using Conic Primitives and NURBs.

- **Global:** If nothing is selected in the document, the Global radio button will be on, and the global settings will be changed.
- **Selected:** If an object is selected in the document, the Selected radio button will be on, and the settings just for the selected object(s) will be changed. Alternatively, switch on Global to change the global settings.

Select the Method setting, then adjust the Horizontal and Vertical slider bars or enter values in the Horizontal and Vertical fields. Check or uncheck the constrainer box on the right of the dialog as required.

- **Constant:** Specify the number of triangles an object is to be subdivided into.
- **Screen:** Specify the maximum number of pixels that one side of a triangle can be.
- **World:** Specify the maximum size, in inches or millimeters, that one side of a triangle can be.

If either the Screen or World method is chosen, the number of triangles making up an object will vary depending on the view of the object. An object seen close up, will be made up of more triangles. This is known as dynamic tessellation.



These options enable the user to work with objects made up of relatively few triangles, which will be fast to render, then change the settings so that objects are made up of more triangles (depending on the view) to produce a final render or high quality print.

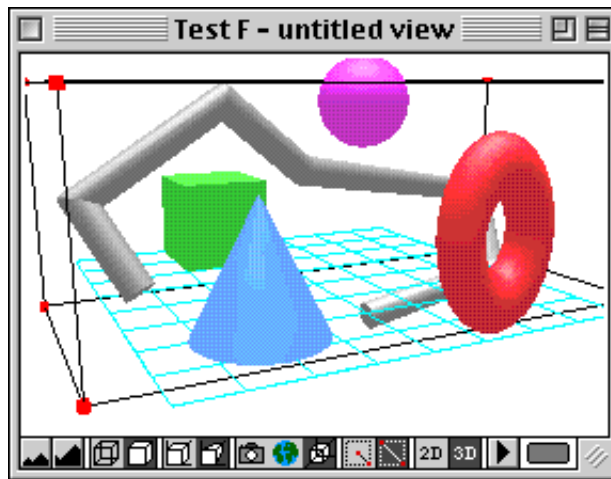
COMMAND PLUG-INS

◆ Animate Camera

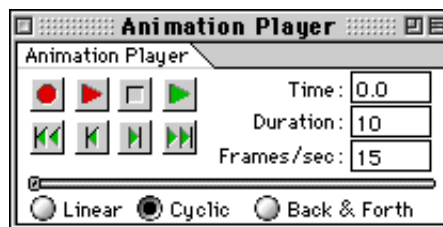
The Animate Camera plug-in is used to move the camera along a specified path, over a set time.

To use the Animate Camera plug-in you will require the Animation Tweener plug-in to be loaded. The Animation Player and Pipes plug-ins will also be useful.

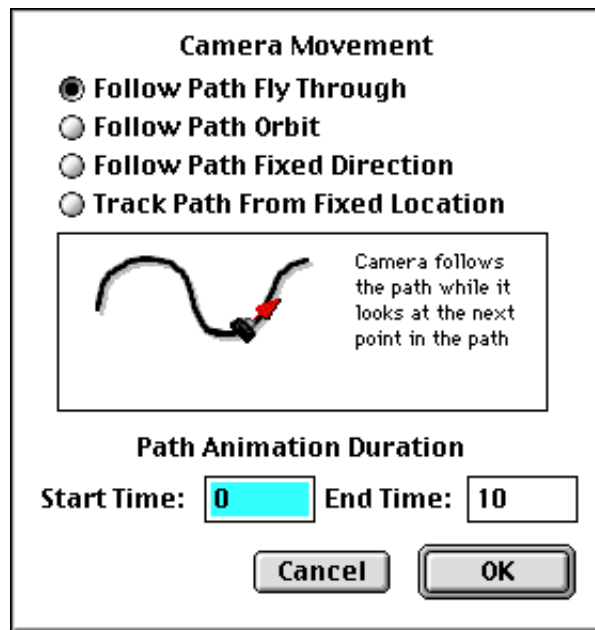
1. Define a path for the camera to be animated along. The screen shot below shows a path created by using the Pipes plug-in.



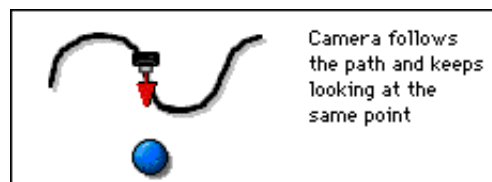
2. Set up the Animation Player palette according to your requirements for the movie you wish to record.



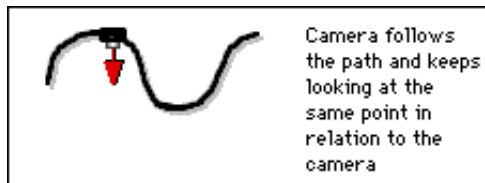
3. Select the path object in the 3D World document and choose **Animate Camera** from the Plug-in menu. The **Animate Camera Options** dialog displays:



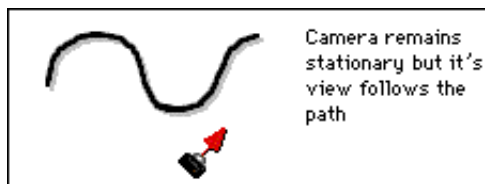
4. Select one of the Camera Movement radio buttons to specify the way in which the camera should move along the path. The preview below the radio buttons shows how the camera will move.
 - **Follow Path Fly Through:** Both the camera object and the camera view will move along the path.
 - **Follow Path Orbit:** The camera moves along the path, but the camera view remains centered at the point it was looking at initially. When using this option, set the camera view prior to selecting the **Animate Camera** plug-in.



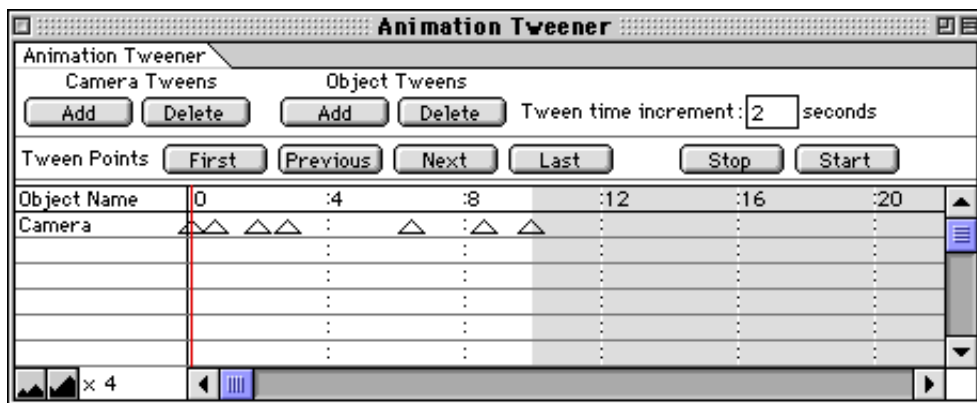
- **Follow Path Fixed Direction:** The camera moves along the path, the camera view settings remain constant in relation to the camera position.



- **Track Path From Fixed Location:** The camera remains in its initial position, the camera view follows the defined path.



5. Enter values in the Start Time and End Time fields to specify when this particular camera animation should start and finish. The maximum time for the camera animation is determined by the duration for the animation as set in the Animation Player palette. Multiple camera animations can be saved for different time periods in the same animation.
6. Once Animate Camera has been selected, Camera Tweens are saved and displayed in the Animation Tweener palette. The object drawn to define the path can then be deleted or moved to another layer and hidden.

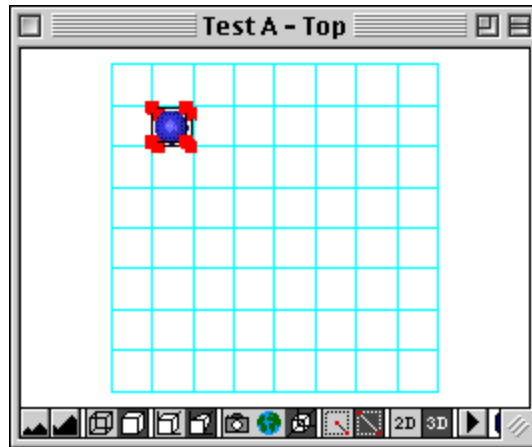


Note: The camera is not linked to the path in any way. If the path is edited, the animation for the camera will not be changed. The camera must be animated along the new path for the animation to be updated.

◆ Array Duplicate

The Array Duplicate plug-in allows an object to be duplicated in any or all of the x, y and z axes, by a specified offset, a specified number of times.

1. Select an object in the document.



2. Select Array Duplicate from the Command plug-in menu. The Array Duplicate dialog displays:

Array Duplicate:

X Offset: inches

Y Offset: inches

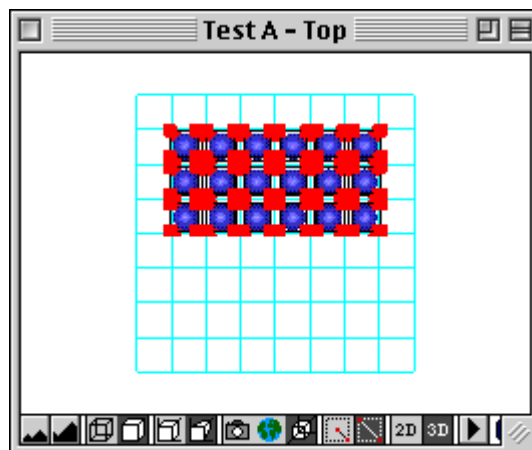
Z Offset: inches

Number of times in X: times

Number of times in Y: times

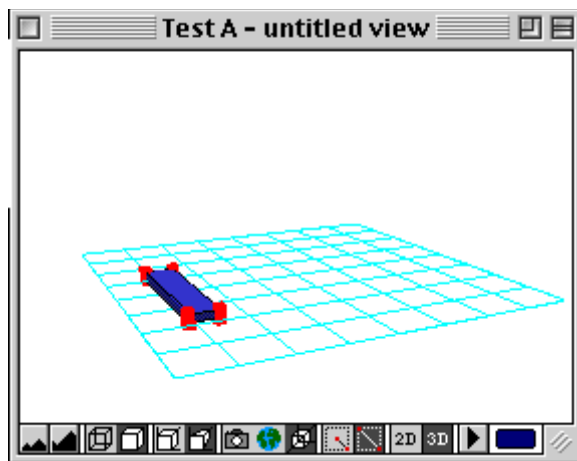
Number of times in Z: times

3. Enter an offset and number of times for the object to be duplicated in each of the x, y and z axes and click OK.
4. The object will be duplicated the specified number of times, with the duplication offset applied each time, in the x, y and z axes as per your settings.

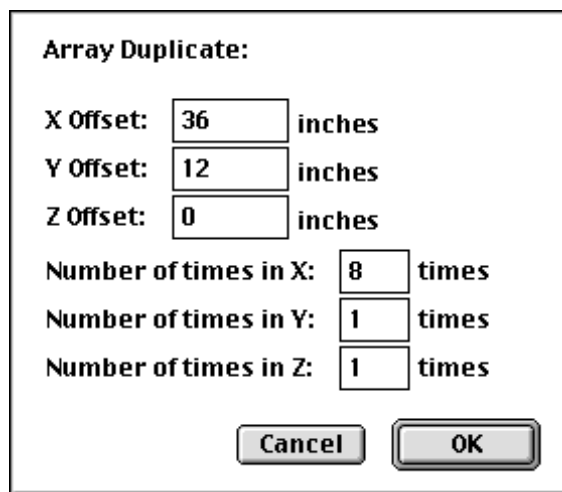


It is possible to apply an offset in more than one axes, but only duplicate the selected object a set number of times in one axes. In this case, both the offset values are applied each time the object is duplicated.

1. Select an object in the document.

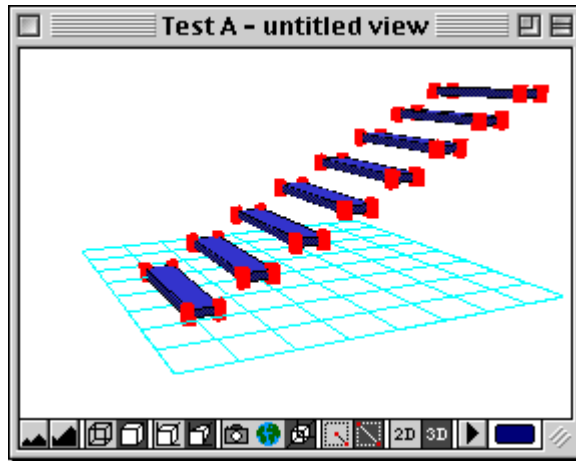


2. Select Array Duplicate from the Command plug-in menu.
3. In the Array Duplicate dialog, enter an offset in both the x and y fields, but only duplicate the object in the x dimension:



4. Click OK.

5. The object will be duplicated the specified number of times in the x dimension. Each time the object is duplicated, the specified offset in both the x and y axes is applied.



◆ Convert To Mesh

The Convert To Mesh plug-in converts any QuickDraw 3D 1.5 geometries, NURBs and general polygons into QuickDraw 3D 1.0 mesh geometries. This means other applications that support only QuickDraw 3D 1.0 geometries will be able to understand 3D objects produced in 3D World.

1. Make a selection to convert only the selected objects, or select nothing to convert the entire scene.
2. Choose Convert To Mesh from the Command plug-in menu.
3. Any QuickDraw 3D 1.5 geometries, NURBs and general polygons, in the selection/entire scene will be converted into QuickDraw 3D 1.0 mesh geometries.

Note: Any QuickDraw 3D 1.0 triangles (which will be present if the Triangulate plug-in has been used), will be grouped together and converted into a single mesh geometry. The triangles may originally be from several different objects, and may not necessarily be connected in any way before conversion to a mesh geometry.

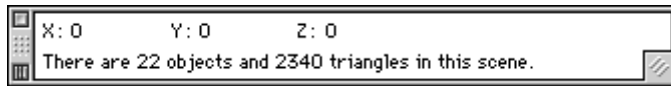
Note: There will be no visible difference between the QuickDraw 3D 1.5 geometries, NURBs and general polygons, and the QuickDraw 3D 1.0 mesh geometries, but the scene may render more slowly.

◆ Counter

The Counter plug-in counts the number of objects and triangles in the selection or scene.

1. Make a selection to count only the number of objects and triangles in the selected objects, or select nothing to count the number of objects and triangles in the entire scene.
2. Choose Counter from the Command plug-in menu.
3. The plug-in counts the number of objects and triangles, and displays the results in the Help Palette. (Select Help from the Palette menu to display this.

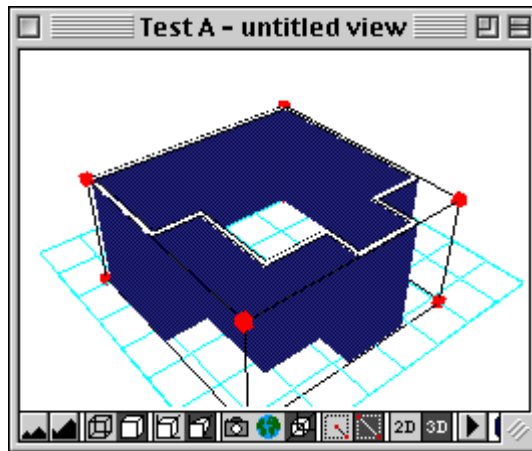
)



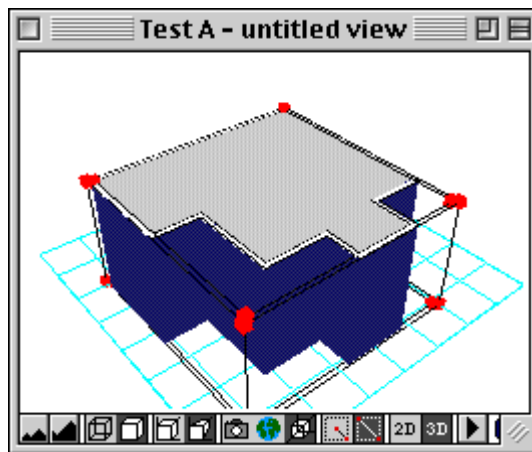
◆ Floors And Ceilings

The Floors And Ceilings plug-in is used to quickly add floors and ceilings to selected objects drawn with the 4 Walls or Multi Walls drawing tools.

1. Draw an object using the 4 Walls or Multi Walls drawing tool:



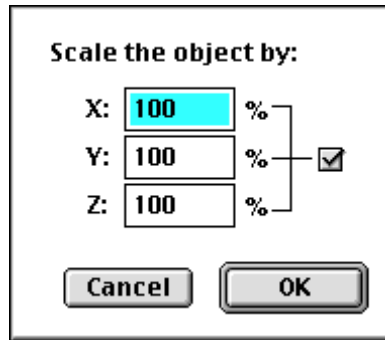
2. Select the object and choose Floors And Ceilings from the Command plug-in menu.
3. A floor and a ceiling will automatically be added to the object.



◆ Scale

The Scale plug-in command allows selected objects to be easily scaled by percentage values.

1. Select an object, or several objects, in the document window.
2. Select Scale from the Command plug-in menu and the Scale dialog displays:



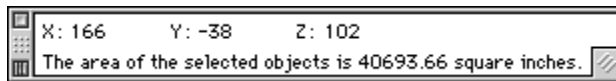
3. To maintain the proportions of the object(s), ensure that the constrain checkbox to the right of the dialog remains checked on. Enter a percentage value to scale the object by in the x dimension, the percentage values for the y and z dimensions will be automatically changed to the same value.
4. To scale the object(s) without maintaining the proportions, uncheck the constrain checkbox. Enter percentage values to scale the object(s) in each of the x, y and z dimensions.
5. Click OK and the selected object(s) will be scaled by the specified value(s).

Note: The Scale plug-in is also a plug-in modifier tool, which can be used to scale individual objects or groups. *See Scale on page 4-93 for more details.*

◆ Surface area

The Surface Area plug-in calculates the surface area of the objects in a selection or in the entire scene.

1. Make a selection to calculate only the surface area of the selected objects, or select nothing to calculate the surface area of all the objects in the scene.
2. Choose Surface Area from the Command plug-in menu.
3. The plug-in calculates the surface area and displays the result in the Help Palette. (Select Help from the Palette menu to display this.)



◆ To Interactive

The To Interactive plug-in is a mode command that switches 3D World automatically from non-interactive to interactive rendering, to avoid the user having to switch manually back to interactive rendering when the image is to be manipulated.

1. Select To Interactive from the Command plug-in menu to switch into To Interactive mode. A check mark by the plug-in name shows that it is active. The plug-in does not do anything when an interactive renderer is selected.
2. Select a non-interactive renderer (e.g. LightWorks SuperLite) in the Settings Palette.
3. The scene will be rendered using the non-interactive renderer.
4. Manipulating an object in the scene will cause 3D World to automatically switch back to using the interactive renderer.
5. To use a non-interactive renderer again, it must be manually selected.
6. Select To Interactive again from the Command plug-in menu to switch out of To Interactive mode.

Note: The To Interactive plug-in performs a similar function to the Interactive plug-in, and ideally only one of these plug-ins would be used at the same time. If both plug-ins are loaded and active, the Interactive plug-in will take priority.

PLUG-IN MODIFIERS

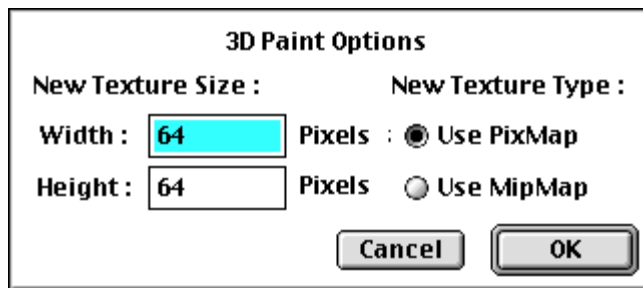
◆ 3D Paint

The 3D Paint plug-in is used to paint or modify textures directly on 3D objects.

3D Paint Options

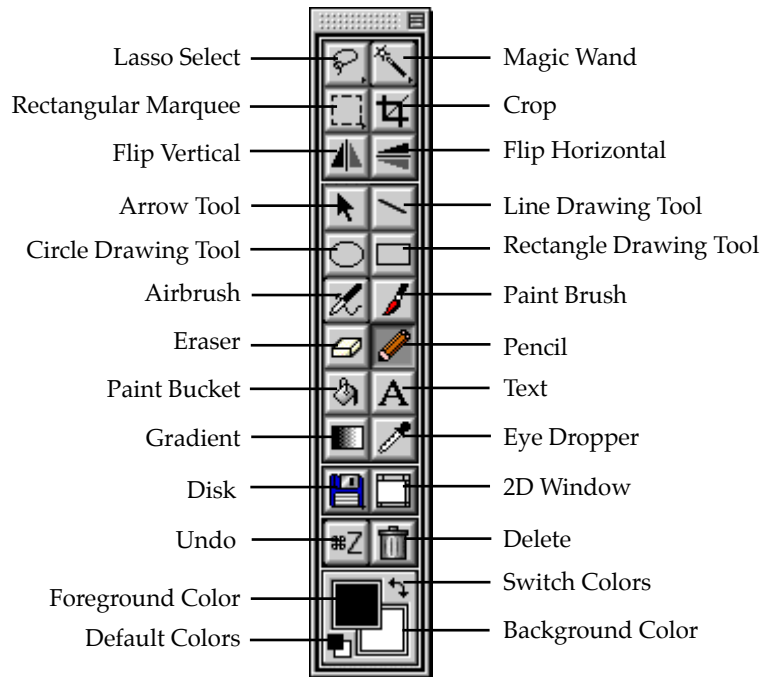
The 3D Paint Options are used to specify a size and type for new textures that will be created when the 3D Paint tool is used on objects that do not already have a texture applied to them.

1. Hold down the Option key and click on the 3D Paint tool in the Tool palette to display the 3D Paint Options dialog:



2. Enter values in the Width and Height fields to set the size of new textures in pixels.
 3. Click on the Use PixMap or Use MipMap radio buttons to specify the type of new QuickDraw 3D textures that should be applied to objects.
- **Use PixMap:** Pixel Map. This is the standard texture type, and although it can be slower to use PixMap textures rather than MipMap textures, they use less memory. The LightWorks SuperLite renderer is compatible with PixMap textures.
 - **Use MipMap:** Multiple In Place Map. This texture type stores lower resolution copies of the main texture to use in different views of an object. This makes it faster to use MipMap rather than PixMap textures, but the MipMap textures require more memory. The LightWorks SuperLite renderer is not currently compatible with MipMap textures.

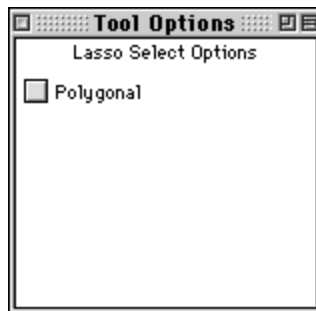
3D Paint Palette



Click on the tool currently selected, or double-click on a tool icon to display any options available for that tool.

Lasso Select Tool

The Lasso Select tool allows you to create selections of any shape by clicking on the surface to be edited and dragging the cursor around to draw the outline of the selection. Click on the Polygonal checkbox in the Lasso Select Options to make a polygonal selection.



To add pixels to a selection, hold down the Shift key and drag around the pixels you want to add. To subtract pixels from a selection, hold down the Option key and drag around the area you want to eliminate.

Magic Wand Tool

The Magic Wand tool is used to select adjacent pixels of similar color or brightness.

Use the Tolerance slide bar in the Magic Wand Options dialog to adjust the tool's tolerance:

- **Tolerance = 0%:** the Magic Wand will only select adjacent pixels with the exact same color or brightness.
- **Tolerance = 100%:** the Magic Wand will select all adjacent pixels regardless of their color or brightness.



By default, the Magic Wand tool will select adjacent pixels of similar color. To select adjacent pixels of similar brightness, click the Light radio button.

Click anywhere on the surface to be edited. The Magic Wand tool will automatically select adjacent pixels of similar color or brightness according to your settings.

To add pixels to a selection, hold down the Shift key and click on the desired area. To subtract pixels from a selection, hold down the Option key and click on the area you want to eliminate.

Rectangular Marquee Tool

The Rectangular Marquee tool is used to make rectangular selections.

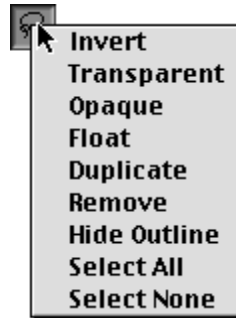
Select the tool, click on the surface and drag out a rectangular selection.

To add pixels to a selection, hold down the Shift key and make an further selection. To subtract pixels from a selection, hold down the Option key and drag around the area to be eliminated.

Selection Tool Popup Menu

All of the selection tools, (Lasso Select, Magic Wand and Rectangular Marquee) produce selections that also act as a mask.

The same Selection popup menu is available for each selection tool, and is accessed by clicking on the tool and holding down the mouse button:



- **Invert:** Selects the portion of the texture that is currently not selected, and deselects the original selection.
- **Transparent:** Makes the selected area of the texture transparent.
- **Opaque:** Makes any transparent portions of the selected area opaque.
- **Float:** Duplicates the selected pixels and places them in a floating selection. This allows you to duplicate a selected portion of the texture so that it can be retouched and moved without altering the original image.
- **Duplicate:** Pastes a copy of the selected pixels into the texture in the current position, and leaves a copy of the pixels in a floating selection.
- **Remove:** Removes a floating selection from the texture or, if there is not a floating selection, deselects all areas currently selected.
- **Hide Outline:** Hides the selection outline, making it easier to precisely retouch the selection's borders and to see modifications.
- **Select All:** Selects the entire texture (Command-A).
- **Select None:** Deselects all areas currently selected (Command-D).

Crop Tool

The Crop tool is used to remove unwanted parts of a texture.

Select the Crop tool, then click and drag an outline around the area to be saved. The texture will be reduced to contain only those pixels inside the crop outline.

Flip Vertical

Flips the texture around the vertical axis.

Flip Horizontal

Flips the texture around the horizontal axis.

Arrow Tool

The Arrow tool is used to select the surface of the 3D object that is to be edited, and also to rotate the object.

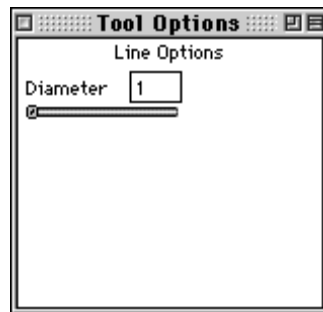
Select the Arrow tool and click on the surface of the 3D object you wish to edit. If the 2D Editing window is open, the selected surface will display in it. *See Window on page 4-67 for more details.*

When a surface of the object is selected using the Arrow tool, the object displays with a bounding sphere and rotation handles. Click on a handle and drag to rotate the object so that other surfaces can be seen.

Line Drawing Tool

The Line Drawing Tool is used to draw straight lines.

Set the line thickness in pixels by entering a value in the Diameter field, or adjusting the slider bar, in the Line Options dialog:



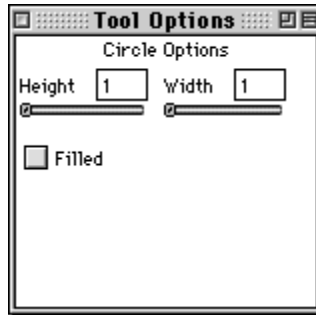
Click on the object's surface and drag to draw a straight line.

Hold down the Shift key to draw a vertical or horizontal line, or a line at a 45° angle.

Circle Drawing Tool

The Circle Drawing Tool is used to draw empty or filled circles and ovals.

Set the pen dimensions in pixels by entering values in the Height and Width fields, or adjusting the slider bars, in the Circle Options dialog:



Click on the object's surface and drag to draw an oval.

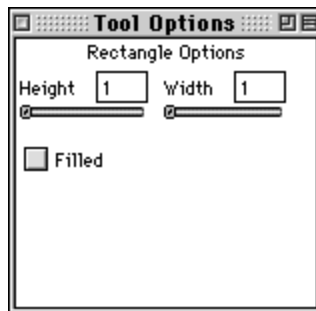
Hold down the Shift key to constrain the oval to a circle.

Click on the Filled checkbox to draw an oval or circle filled with the foreground color.

Rectangle Drawing Tool

The Rectangle Drawing Tool is used to draw empty or filled squares and rectangles.

Set the pen dimensions in pixels by entering values in the Height and Width fields, or adjusting the slider bars, in the Rectangle Options dialog:



Click on the object's surface and drag to draw a rectangle.

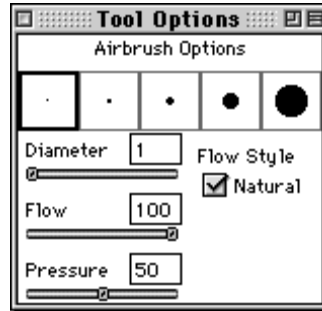
Hold down the Shift key to constrain the rectangle to a square.

Click on the Filled checkbox to draw an rectangle or square filled with the foreground color.

Airbrush

The Airbrush tool is used to spray a fine-grained paint on your image.

Use the settings in the Airbrush Options dialog to configure the Airbrush tool.



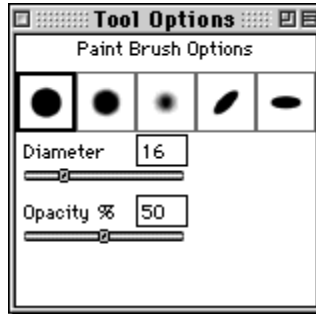
- **Diameter:** Set the Airbrush's width by choosing a brush size from the selection at the top of the dialog, or enter a value in the Diameter field or use the slider bar to define a new brush size.
- **Flow Style:** Choose a paint flow style by checking or unchecking the Natural checkbox. If Natural Flow Style is checked, paint is sprayed as you click the mouse and the faster the mouse is moved, the lighter the paint flows. If Natural Flow Style is unchecked, paint is sprayed in equal thickness on all areas, regardless of the speed of the mouse.
- **Flow:** Set the flow speed by entering a value in the Flow field or adjusting the slider bar. The Flow setting is only relevant if Natural Flow Style is checked, and only affects the Airbrush tool when the cursor is not moving.
- **Pressure:** Set the strength of the paint flow by entering a value in the Pressure field or adjusting the slider bar.

When the airbrush is configured, click on a surface to begin painting.

Paint Brush

The Paint Brush tool is used to paint with brushes of various shapes and widths.

Use the settings in the Paint Brush Options dialog to configure the Paint Brush tool.



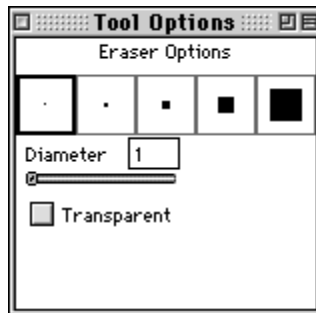
- **Shape:** Choose a brush shape and style to use from the selection at the top of the dialog.
- **Diameter:** Set the Paint Brush's width by entering a value in the Diameter field, or adjusting the slider bar.
- **Opacity:** Set the opacity of the paint by entering a value in the Opacity % field or adjusting the slider bar.

When the paint brush is configured, click on a surface to begin painting.

Eraser

The Eraser tool is used to remove parts of a texture and replace them with the background color or a transparent area.

Use the settings in the Eraser Options dialog to configure the Eraser tool.



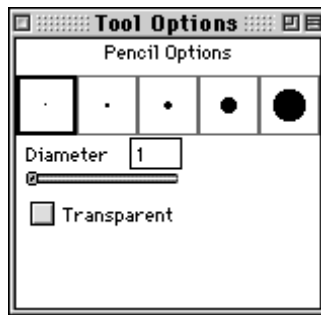
- **Diameter:** Set the Eraser's width by choosing a size from the selection at the top of the dialog, or enter a value in the Diameter field or use the slider bar to define a new size.
- **Transparent:** Check the Transparent checkbox to erase and replace with a transparent area, or leave Transparent unchecked to erase and replace with the background color.

When the eraser is configured, click on a surface to begin removing pixels.

Pencil

The Pencil tool is used to draw dots, curves and lines.

Use the settings in the Pencil Options dialog to configure the Pencil tool.



- **Diameter:** Set the Pencil's width by choosing a size from the selection at the top of the dialog, or enter a value in the Diameter field or use the slider bar to define a new size.
- **Transparent:** Check the Transparent checkbox to draw in transparent mode, or leave Transparent unchecked to draw using the foreground color.

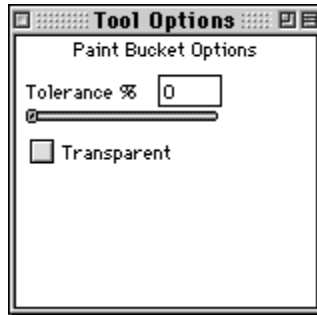
To draw straight horizontal or vertical lines, hold down the Shift key while drawing.

When the pencil is configured, click on a surface to begin drawing.

Paint Bucket

The Paint Bucket tool is used to fill adjacent pixels of similar color with the foreground color or a transparent area.

Use the settings in the Paint Bucket Options dialog to configure the Paint Bucket tool.



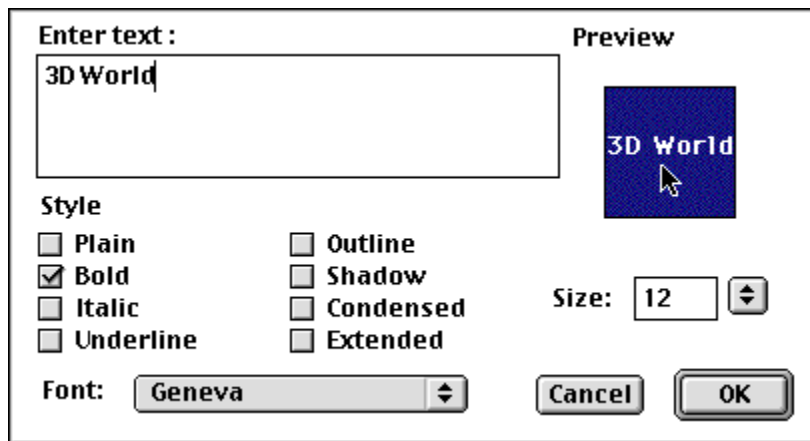
- **Tolerance:** Enter a value in the Tolerance % field or adjust the slider bar to adjust the Paint Bucket's tolerance. If Tolerance = 0%, the Paint Bucket tool will fill only adjacent pixels with exactly the same color. If Tolerance = 100%: the Paint Bucket tool will fill all adjacent pixels regardless of their color.
- **Transparent:** Check the Transparent checkbox to fill with a transparent area, or leave Transparent unchecked to fill using the foreground color.

When the Paint Bucket tool is configured, click on the surface to fill all adjacent pixels of similar color.

Text

The Text tool is used to add text to a texture.

Select the Text tool and click on the surface to be edited. The Text dialog will display:



- **Enter text:** Type in the text to be added to the texture.
- **Font:** Choose a font from the font popup menu.
- **Style:** Click on the Style checkboxes to apply styles to your text.
- **Size:** Choose a font size from the Size popup menu or enter a value in the Size field.
- **Preview:** The text will be drawn using the current foreground color and will display in the Preview area. Click on the text in the Preview and drag to place it in the correct position.

When finished, click OK to place your text.

Gradient

The Gradient tool is used to apply graduated colors to the area or a selection.

1. Set the foreground and background colors.
2. Click on the surface and drag to draw a line. Release the mouse button at the point the line is to end. Hold down the Shift key to constrain the line to horizontal or vertical.
3. A gradient is applied to the surface or selection. The foreground color is used at the point where the start of the line was drawn, blending to the background color at the point the end of the line was drawn.

Eye Dropper

The Eye Dropper tool is used to pick up colors from a texture.

1. Click on the Eye Dropper tool, then on the texture.
2. The color of the pixel clicked on will be picked up and displayed as the foreground color at the bottom of the 3D Paint palette.
3. This color can now be applied to the texture using any of the drawing or painting tools.

Note: Hold down the Option key with any drawing or painting tool selected, and the tool will be changed to the Eye Dropper tool.

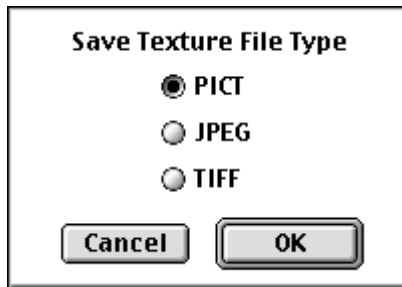
Disk

The Disk option is used to load textures from, or save textures to, disk.

Click on the Disk icon and hold down the mouse button to display the following menu:



- **Load Texture:** Select Load Texture and a standard dialog displays for you to locate and select a texture. Once chosen, the texture is applied to the object surface currently selected.
- **Save Texture:** Select Save Texture and a dialog displays for you to select the file format to save the texture in:

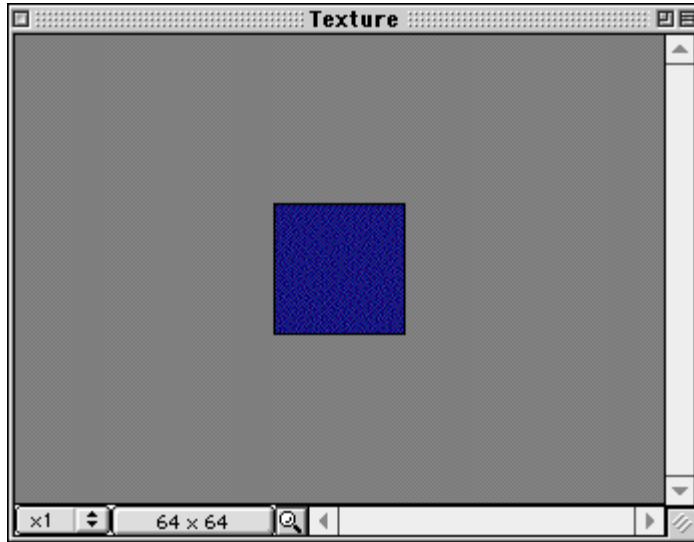


Choose the file type and click OK. A standard dialog displays for you to choose the file name and location to save the texture.

The texture on the currently selected surface will be saved as you have specified.

Window

Use the Window command to display the Texture window that displays the current surface texture in 2D.

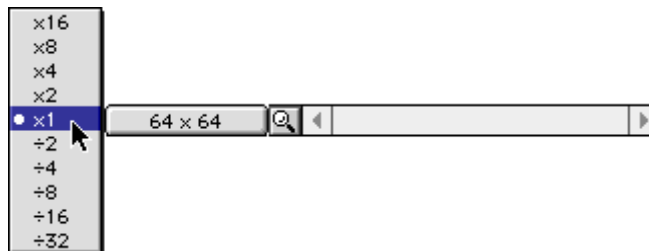


Editing the texture in 2D in the Texture window will be faster than editing textures in 3D in the 3D World document window.

The toolbar at the bottom of the Texture window provides the following controls:

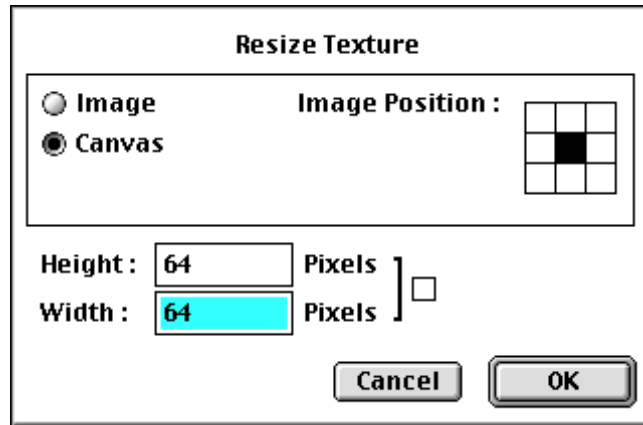
View Scale

Click in the bottom left corner of the window to display the View Scale popup menu. Select the scale at which to view the texture:



Resize Texture

The button next to the View Scale menu displays the size of the texture in pixels. Click on this button to display the Resize Texture dialog, which allows you to change the size of the image or canvas:



- **Image:** Click on the Image radio button to resize the existing texture.
- **Canvas:** Click on the Canvas radio button to increase the size of the texture area without changing the size of the existing texture. This allows you to add more space around the existing texture.
- **Image Position:** When Canvas is selected, position the existing texture on the new texture area by clicking on one of the squares in the area representing the canvas.
- **Dimensions:** Enter values in pixels in the Height and Width fields to set the new size of the image or canvas.
- **Constrain:** Check the constrain checkbox to maintain the proportions of the image or canvas.

Click OK to resize the image or canvas.

Zoom Tool

The Zoom tool on the window toolbar is used to zoom in or out of the image.

Select the Zoom tool and click in the window to zoom in. Hold down the Option key and click in the window to zoom out.

Undo

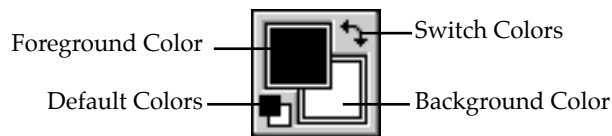
Use the Undo command to undo your last action only.

Trash

Use the Trash command to delete the texture or a selection of it.

Foreground/Background Colors

The current foreground and background colors are displayed at the bottom of the 3D Paint palette:



Click on the foreground or background color box to bring up the color picker and select a different color, or drag and drop a color onto a color box. Colors can also be dragged out of the foreground and background color boxes.

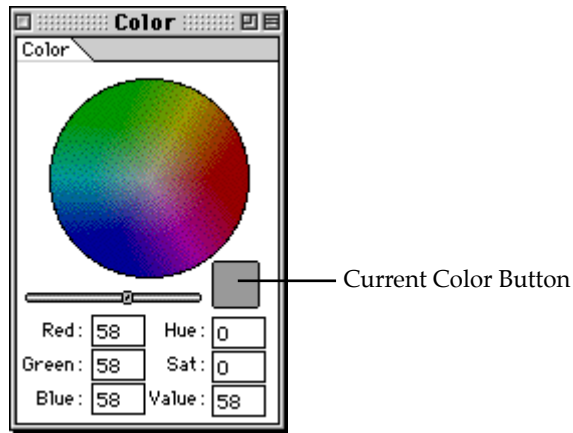
To switch the foreground and background colors over, click on the switch colors arrows.

To set the foreground color to black and the background color to white, click on the default color icon.

3D Paint Color Palette

The 3D Paint Color palette is used to easily select a new foreground color. It is included with the 3D Paint plug-in and will be loaded with it.

Select Color from the Palette menu to display the 3D Paint Color palette:



Choose a color from the Color palette by clicking on the color wheel and/or adjusting the brightness slider bar and values for Red, Green, Blue, Hue, Saturation and Value.

Click on the current color button to display the system color picker(s).

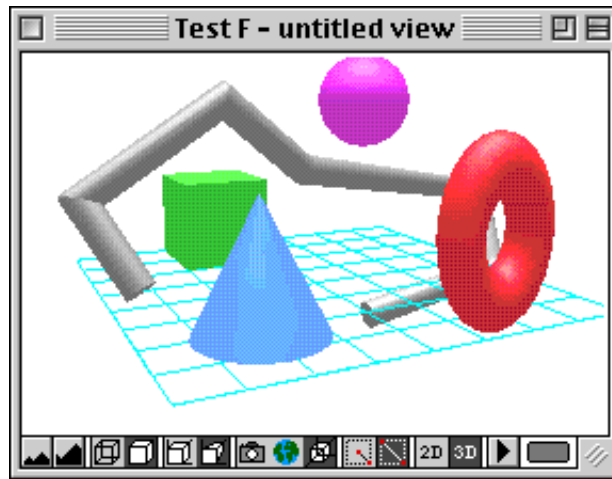
Note: Colors can be dragged to and from the current color button.

◆ Animate Object

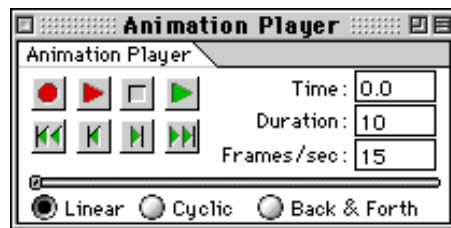
The Animate Object plug-in is used to move a selected object along a specified path over a set time.

To use the Animate Object plug-in you will require the Animation Tweener plug-in to be loaded. The Animation Player and Pipes plug-ins will also be useful.

1. Define a path for the object to be animated along. The screen shot below shows a path created by using the Pipes plug-in.

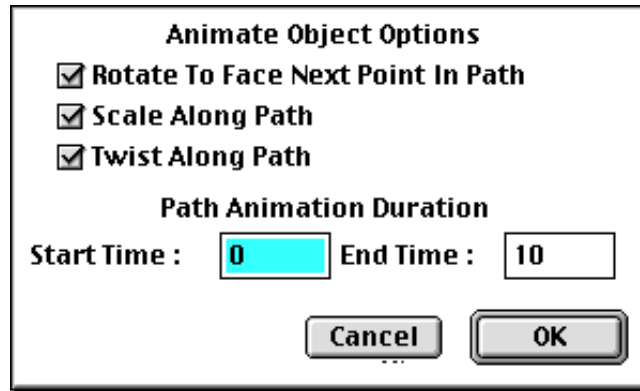


2. Set up the Animation Player palette according to your requirements for the movie you wish to record.



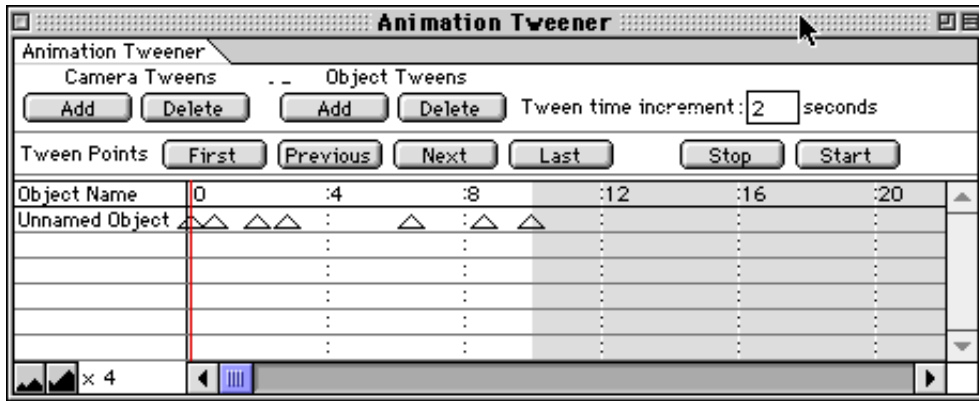
3. Position the object to be animated in the correct orientation in relation to the path it will be animated along.

4. To change the default settings for the Animate Object plug-in, hold down the Option key and select the Animate Object plug-in from the Tools palette. The Animate Object Options dialog displays:



5. Click on any or all of the check boxes to specify how the object should move along the path:
 - **Rotate To Face Next Point In Path:** The object is rotated as it moves along the path so that it maintains its original orientation in relation to the path.
 - **Scale Along Path:** If the path section has been scaled at any point using the Edit Path plug-in, the object will also be scaled in proportion to the path. *See Edit Path on page 4-78 for more details.*
 - **Twist Along Path:** If the path section has been rotated at any point using the Edit Path plug-in, the object will also be rotated as it moves along the path. *See Edit Path on page 4-78 for more details.*
6. Enter values in the Start Time and End Time fields to specify when this particular path animation should start and finish. The maximum time for the path animation is determined by the duration for the animation as set in the Animation Player palette. Multiple object animations can be saved for different time periods and/or different objects in the same animation.
7. Select the path object in the 3D World document and choose Animate Object from the Tools Palette.

- Click on the object to be animated. Object Tweens will be saved and displayed in the Animation Tweener palette. The object drawn to define the path can then be deleted or moved to another layer and hidden.



Note: The animated object is not linked to the path in any way. If the path is edited, the animation for the object will not be changed. The object must be animated along the new path for the animation to be updated.

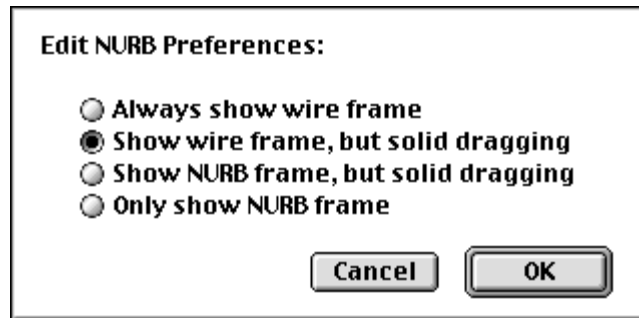
◆ Edit NURB

The Edit NURB plug-in allows you to edit objects by manipulating their NURB control points.

Only objects drawn using NURBs can be edited using the Edit NURB plug-in. The Subdivision palette is used to specify what sort of internal geometries (polygons and trigrids, conic primitives or NURBs), 3D World will use to draw geometries. *See Subdivision on page 4-41 for more details.*

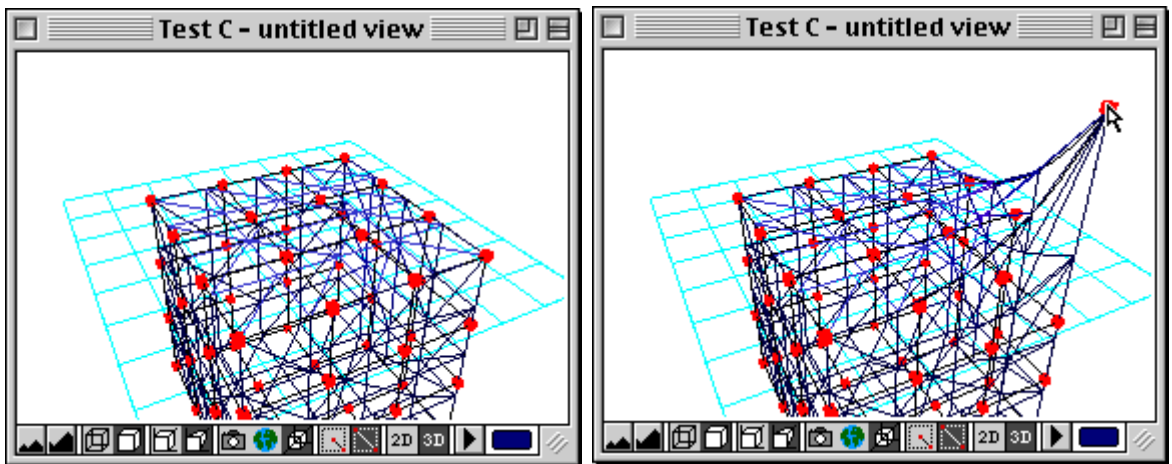
- Select the Edit NURB tool from the Tool palette.

2. To specify how the objects being edited should display, hold down the Option key and click on the Edit NURB tool again to display the Edit NURB Preferences dialog:

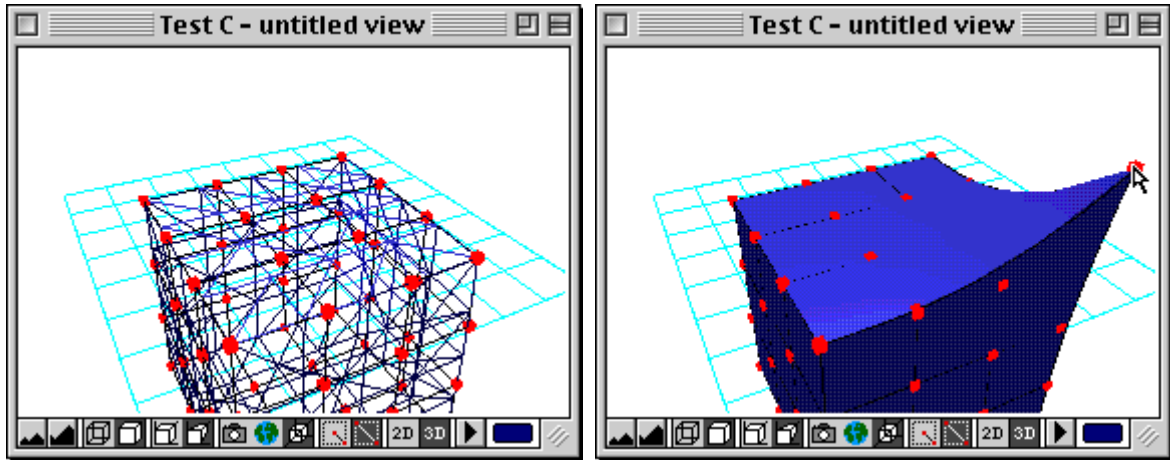


Check one of the radio buttons to set your display preference.

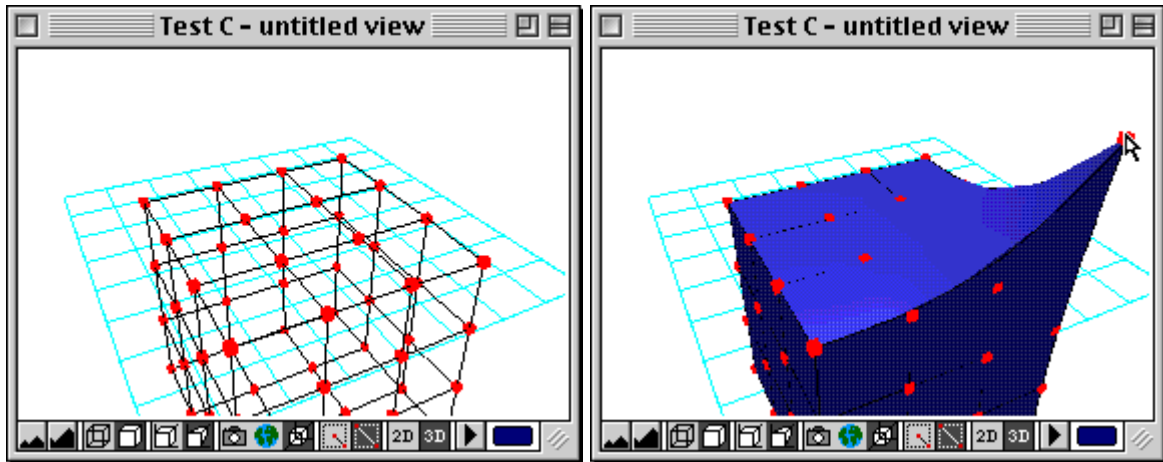
- **Always show wire frame:** The object displays in wire frame with the NURB frame and NURB handles, when the object is selected and when it is in the process of being edited.



- **Show wire frame, but solid dragging:** The object displays in wire frame with the NURB frame and NURB handles when the object is selected, but as a solid object when it is in the process of being edited.

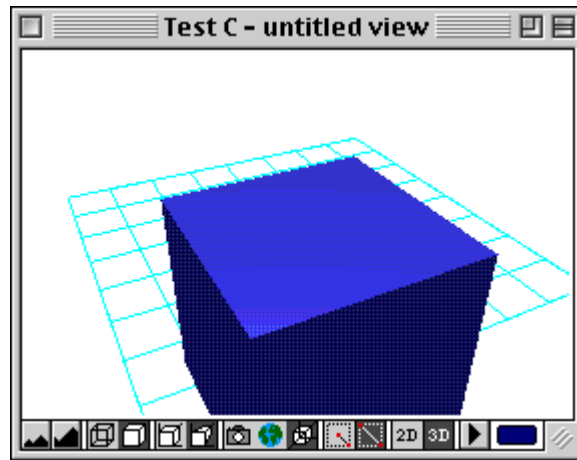


- **Show NURB frame, but solid dragging:** The NURB frame and NURB handles of the object display when it is selected, but the object displays as a solid object when it is in the process of being edited.

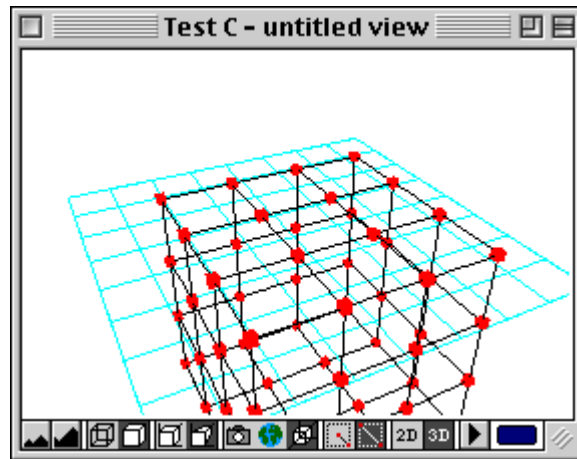


- **Only show NURB frame:** The object's NURB frame and NURB handles display when it is selected and when it is in the process of being edited.

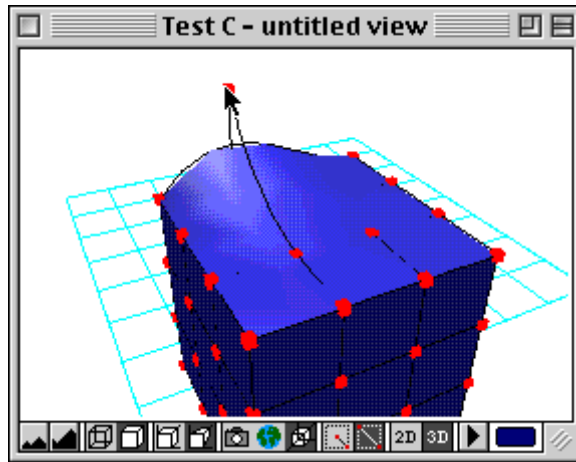
3. Click on an object in the document window that has been drawn using NURBs (*see above*).



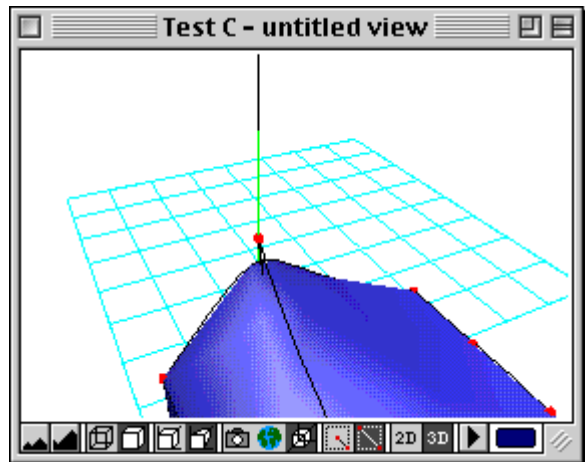
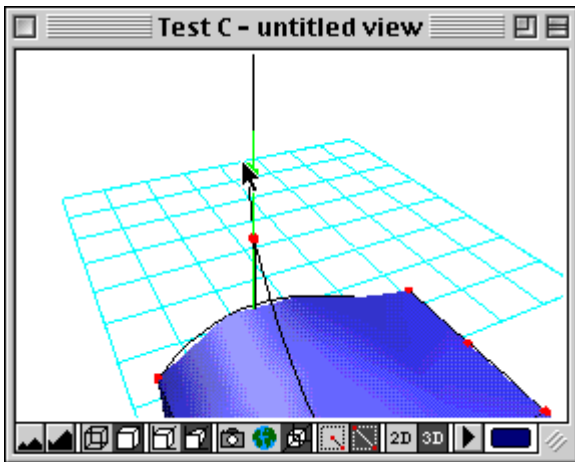
4. The object will display as specified in the Edit NURB Preferences dialog. The number of NURB control points on an object is determined by the object geometry and is constant for that specific geometry.



5. Click on a NURB control point and, holding down the mouse button, drag to move the point and modify the object's shape. Only one point at a time can be selected and edited.



6. Hold down the Option key and click on a NURB control point to pull out weighting handles for that point. Click and drag on the weighting handles to adjust the pull the NURB control point exerts on the object to further manipulate its shape.



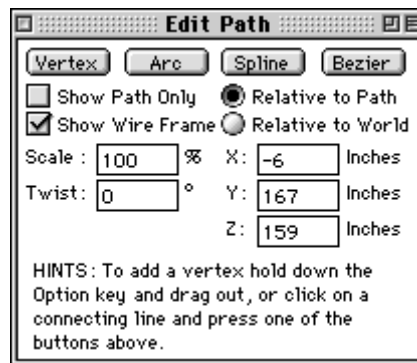
◆ Edit Path

The Edit Path plug-in is used to edit the path of a geometry, and can also be used to scale and rotate the section of a geometry at specific points on its path. The path of any geometry that is defined as a section and path can be edited, that is, 3D Text, cone, cylinder, extruded bitmap, irregular polygon, pipe, pyramid, and regular polygon. The path of lathed objects can also be edited, but this is done in a slightly different way from other geometries. *See Editing the Path of a Lathed Object on page 4-87 for more details.*

The position of the object's path can be changed relative to the object's section by repositioning the object's origin via controls in the Section palette. This will alter the effects of using the Edit Path tool to scale and rotate the section of a geometry. *See Changing the Object's Origin on page 4-40 for more details.*

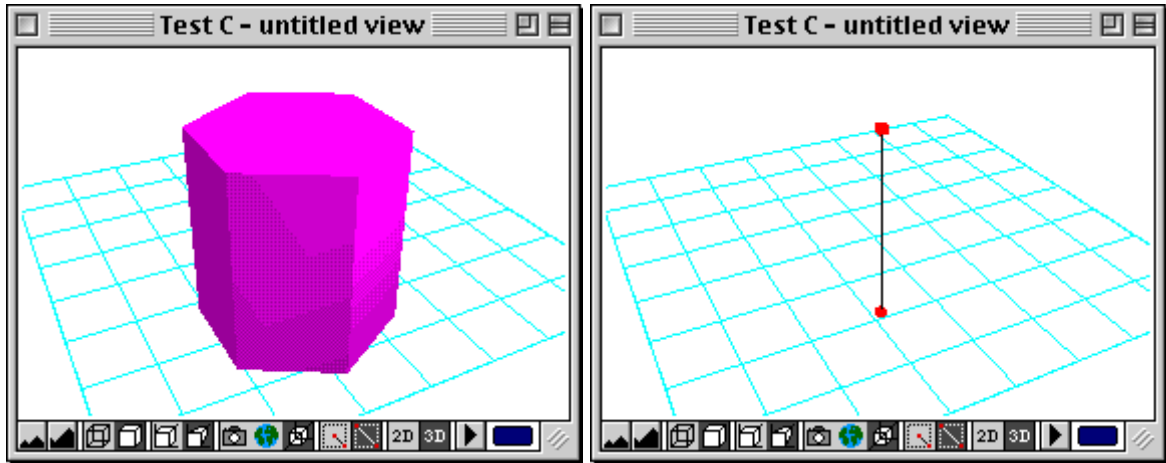
The Edit Path Dialog

To display the Edit Path dialog, click on the Edit Path tool in the Tool palette.



Displaying The Object Path

With the Edit Path tool selected, click on an object in the document window. The selected object will be hidden, but its path will display as a black line with handles at the ends and on the curves.



Types Of Point

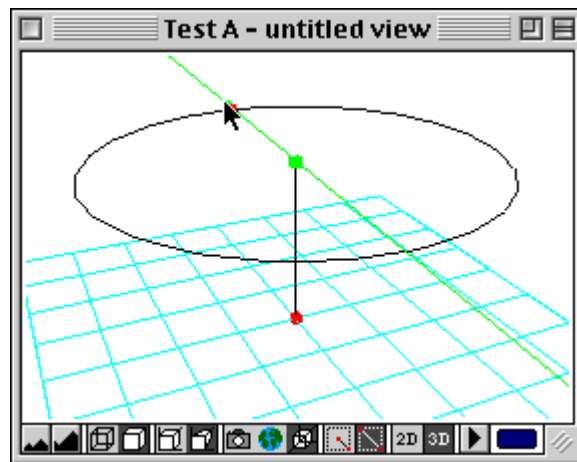
- **Vertex:** A standard point used to define the beginning or end of a straight section of a path or line.
- **Arc:** A point on a section of a circle defined as the center point on the arc between two vertex points, one at either end of the arc.
- **Spline:** A point on a curve. The curve is defined automatically and cannot be edited except by adjusting the points at either side of the spline point.
- **Bezier:** A point on a curve. Two Bezier handles allow the curve to be adjusted.

Vertex point handles display as squares, Bezier and spline point handles as diamonds, and arc point handles as spheres.

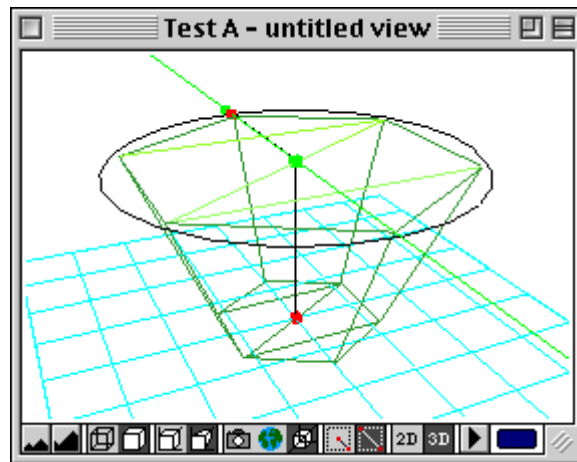
Viewing Manipulations

The Show Path Only and Show Wire Frame radio buttons allow you to determine how you will see your object when selected with the Edit Path tool, and as it is manipulated.

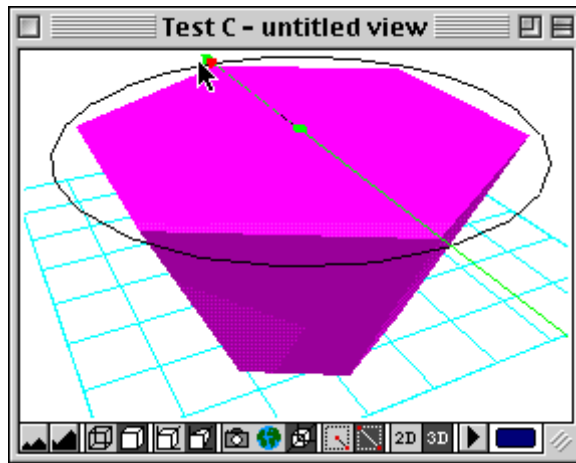
- **Show Path Only:** If this option is chosen, only the object path will display, both when the object is selected and as it is manipulated.



- **Show Wire Frame:** If this option is chosen, the object will display in wire frame both when the object is selected and as it is manipulated.



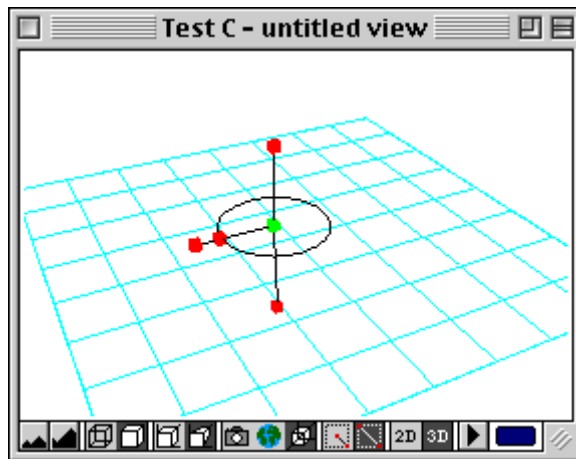
- **If neither option is chosen:** The object path will display when the object is selected and the solid object will display as the object is manipulated.



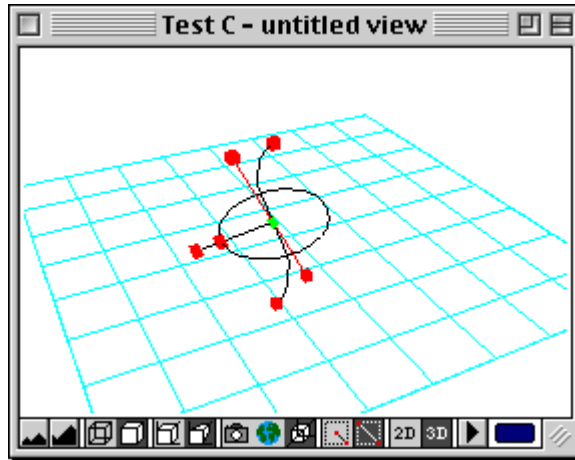
Selecting Points

Click on a handle to select it.

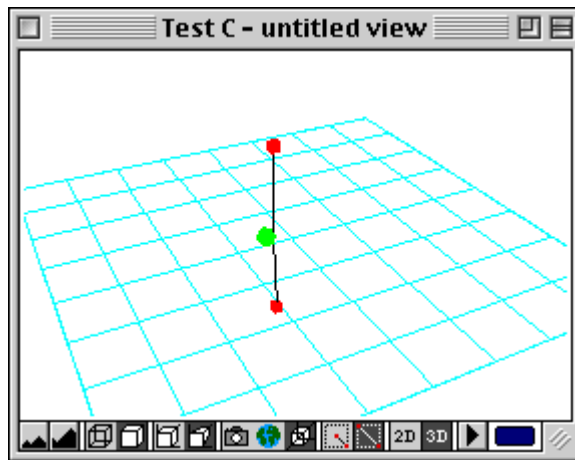
- A vertex or spline point will display with a ring around it, a line extending from the original handle through the ring, and two further handles on the line.



- A Bezier point has two additional handles to adjust the Bezier curve.



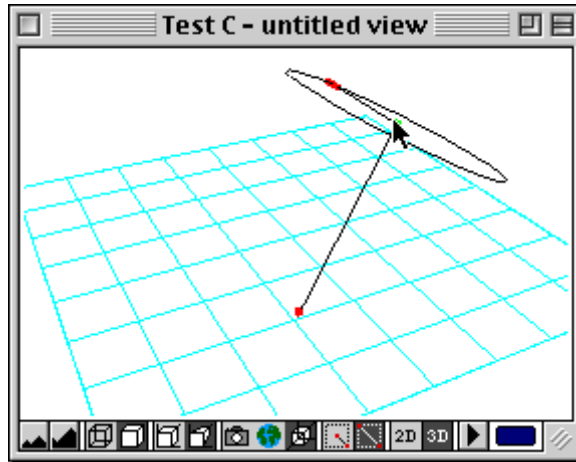
- An arc point has no ring around it and no additional handles.



To select additional points, hold down the Shift key and click on another point. To deselect points, hold down the Shift key and click on a selected point.

Moving Points On The Path

To move a path handle of any type, click on it and drag.



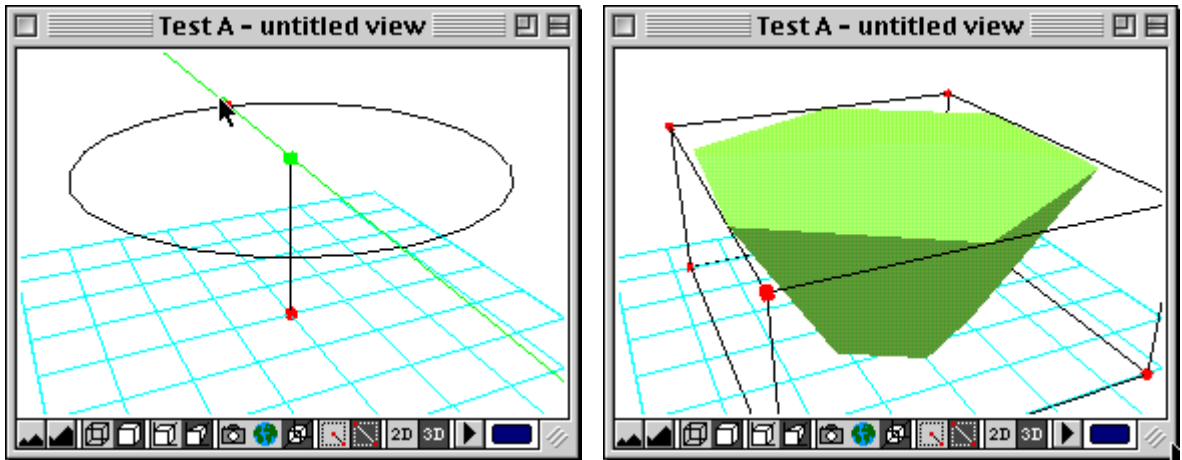
To move a point by precise values, click on the Relative to Path or Relative to World radio button in the Edit Path dialog and enter values in the x, y and z fields.

- **Relative to Path:** The selected point is moved to the values entered relative to the point of the start of the path.
- **Relative to World:** The selected point is moved to the values entered relative to the grid.

Scaling The Object's Section

The outer of the two handles displayed when a vertex, Bezier or spline point is selected, is used to adjust the scale of the object section at that point on the path.

Click on the handle and drag away from or towards the center of the object along the constraining line that appears. The section of the object will be scaled accordingly:



Hold down the Shift key when dragging the handle to snap the handle to 100% increments, based on the size of the original section.

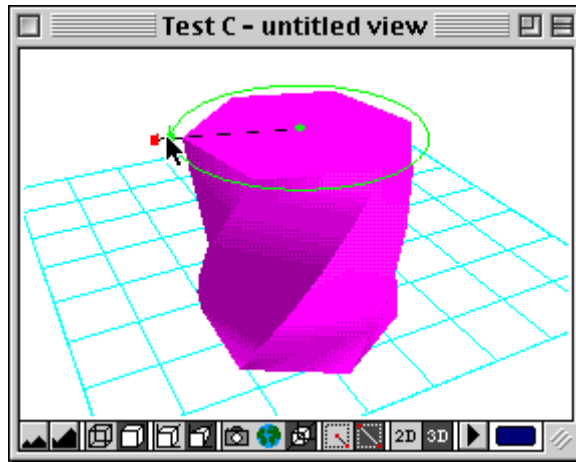
If more than one point is selected, only the specific point being manipulated will be scaled.

To scale the section by a precise percentage value, enter the value in the Scale field in the Edit Path dialog.

Rotating The Object's Section

The inner of the two handles displayed when a vertex, Bezier or spline point is selected, is used to rotate the object's section at that point on the path, so twisting the object.

Click on the handle and drag round the circle. The section of the object will be rotated accordingly:



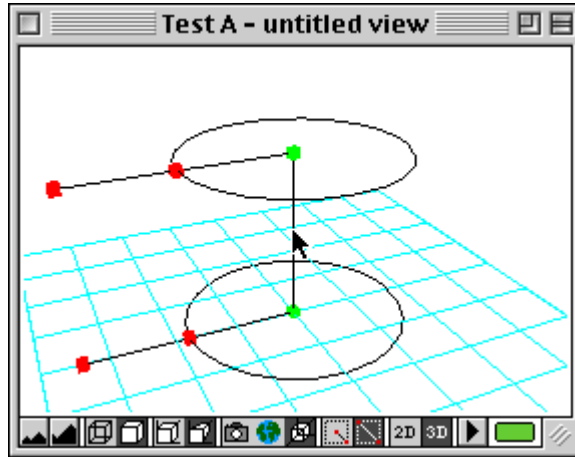
Hold down the Shift key when dragging the handle to constrain the rotation to 45° increments.

If more than one point is selected, the rotation is applied to the section at each selected point on the path.

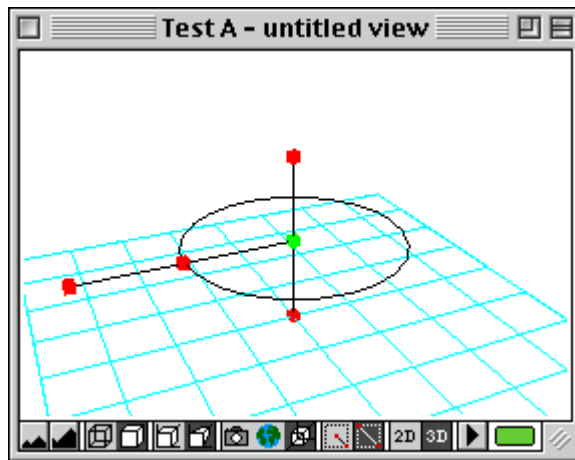
To rotate the section by a precise number of degrees, enter the value in the Twist field in the Edit Path dialog.

Adding Points To A Path

To add a point to a path, select two contiguous points on the path by clicking on the line between them, or by holding down the Shift key and clicking on a second point:



Click on the Vertex, Arc, Spline or Bezier button in the Edit Path dialog. A point of the appropriate type will be added between the two points originally selected.



Alternatively, hold down the Option key, click on the path or an existing handle and drag to place a new Vertex point.

Note: An arc point can only be added between two vertex points.

Changing Points

To change a point to a point of a different type, select the point then click on the Vertex, Arc, Spline or Bezier button in the Edit Path dialog. The point will change to the type selected.

Note: An arc point can only be added between two vertex points.

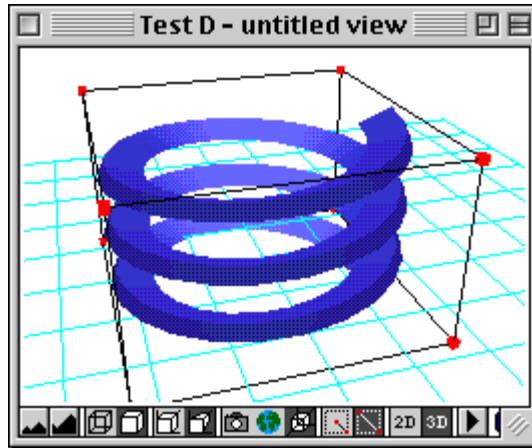
Manipulating Points

- **Vertex:** Click and drag on the point to move it. Adjust the scale or rotation of the section at that point as discussed earlier in this section.
- **Arc:** Click and drag on the point to move it. Any other adjustments can be performed only by manipulating the vertex points at either end of the arc.
- **Spline:** Click and drag on the point to move it. Adjust the scale or rotation of the section at that point as discussed earlier in this section.
- **Bezier:** Click and drag on the point to move it. Adjust the scale or rotation of the section at that point as discussed earlier in this section. Click and drag on the Bezier handles to adjust the curve. Hold down the Option key and click and drag on the Bezier point or Bezier handles to break the Bezier curve.

Editing the Path of a Lathed Object

The path of a lathed object can be adjusted to alter the axial and radial speed and acceleration and the number of turns of the lathe template. Editing the path of a lathed object may be more intuitive than adjusting the Lathe Options, for some users. *See the documentation relating to the Lathe tool for more information.*

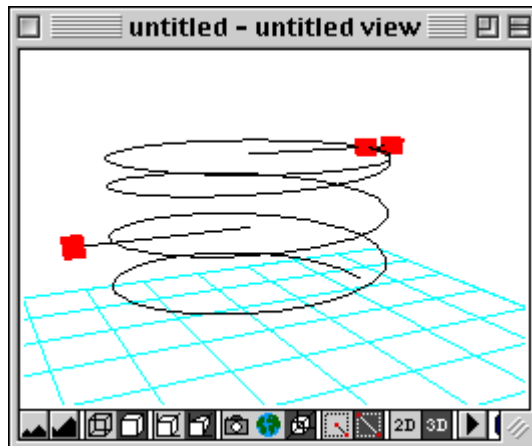
1. Draw a lathed object in your 3D World document. The lathed object below was produced with Lathe Options: Number of turns, 3; Axial Speed Factor, 4.



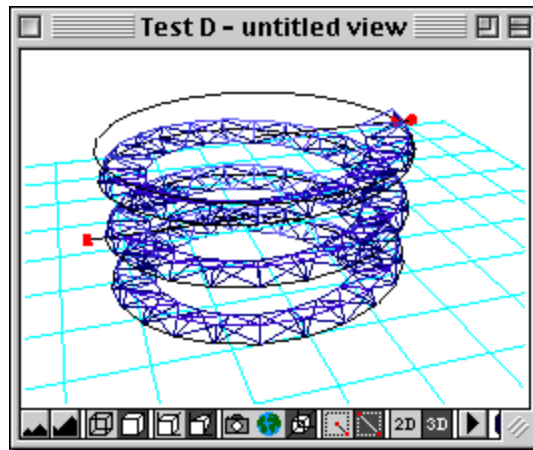
2. With the Edit Path tool selected, click on the object, it will be hidden, but its path will display as a black line.

At the end of the object's path is an editing circle. A radius line extends from the lathe axis through the editing circle at the point the object path ends. There is an editing handle at the end of the object path, and a further editing handle at the end of the radius line.

Half way round the lathed object is a second radius line, extending from the lathe axis through the lathe path. A third editing handle is at the end of this radius line.

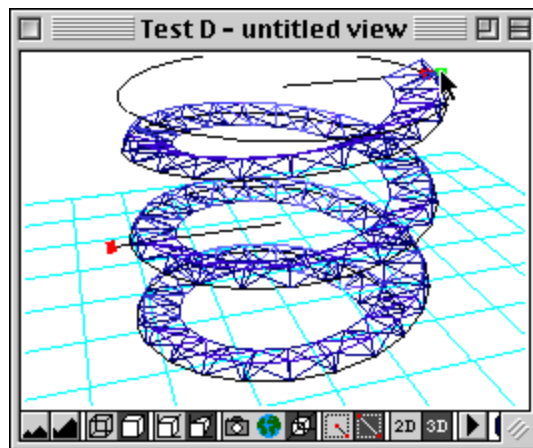


3. Check the Show Wire Frame checkbox in the Edit Path dialog to see the selected object in wire frame view.



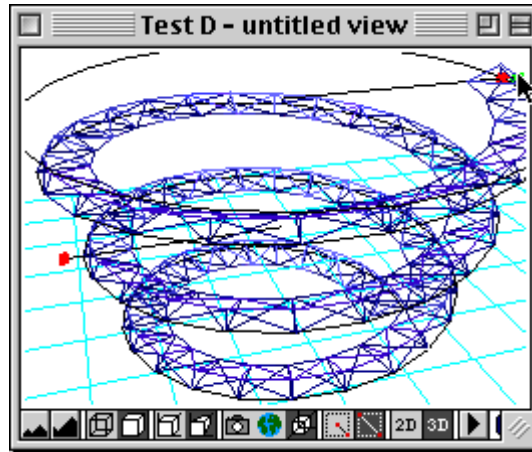
4. Select the outer of the two editing handles at the end of the lathe path. Holding down the mouse button, drag the cursor up or down to stretch or compress the lathed object vertically. This is the same as adjusting the Axial Speed option in the Lathe Options dialog.

Note: Hold down the Shift key to constrain movement to the x or y axis.



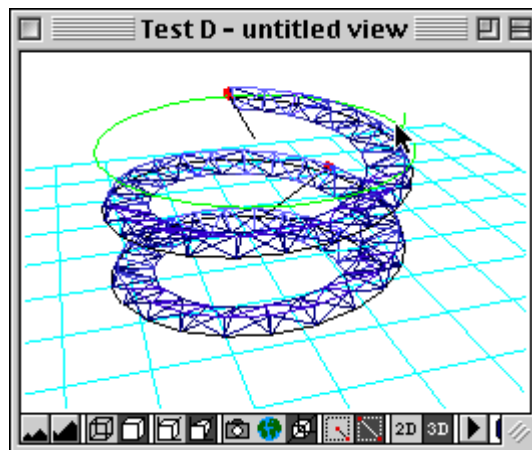
5. Still holding down the mouse button, drag the cursor left or right to increase or reduce the radius of the lathed object. This is the same as adjusting the Radial Speed option in the Lathe Options dialog.

Note: Hold down the Shift key to constrain movement to the x or y axis.

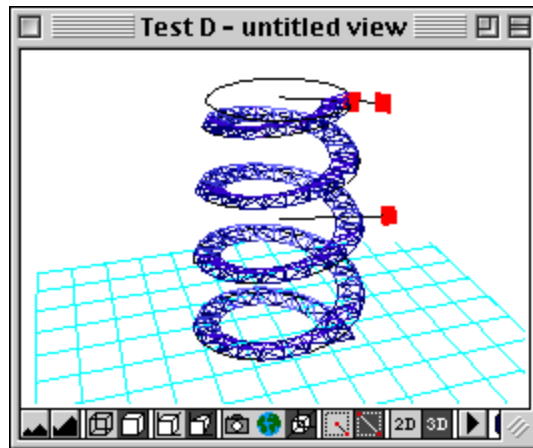


6. Select the inner of the two editing handles at the end of the lathe path or click on the editing circle. Holding down the mouse button, drag the cursor around the circle in either direction to increase or reduce the number of turns of the lathe. The lathed object remains the same height regardless of this adjustment, so the axial speed is adjusted to fit the lathed object, with more or fewer turns, into the same area.

Note: Hold down the Shift key to constrain movement to 45° increments.

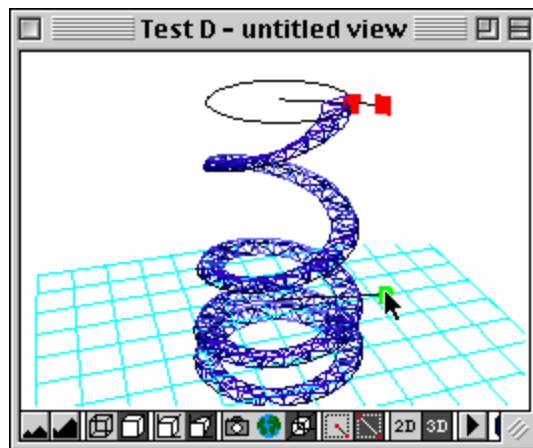


7. Adjust the lathed object so that the radius line and editing handle half way round the object is accessible.



8. Click on this editing handle, hold down the mouse button and drag the cursor up or down to adjust the vertical distribution of the object. The end points of the object are not moved. This is similar to adjusting the Axial Acceleration option in the Lathe Options Dialog.

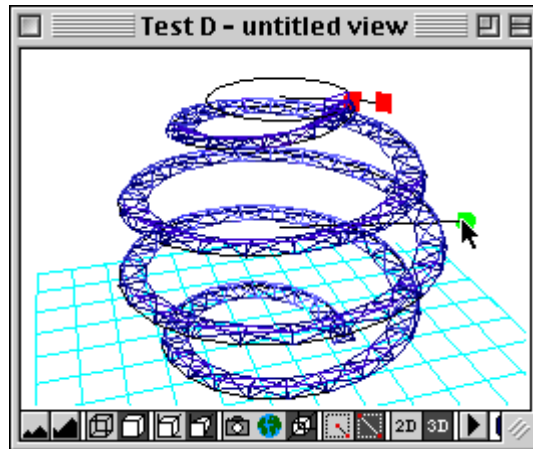
Note: Hold down the Shift key to constrain movement to the x or y axis.



9. Click on the editing handle, hold down the mouse button and drag the cursor left or right to adjust the radius of the object at that point. The end points of the object are not

moved. This is similar to adjusting the Radial Acceleration option in the Lathe Options Dialog.

Note: Hold down the Shift key to constrain movement to the x or y axis.

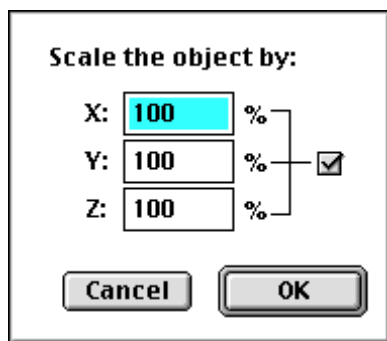


Note: Points cannot be added to the path of a lathed object.

◆ Scale

The Scale plug-in tool allows individual objects or groups to be easily scaled by percentage values.

1. Select the Scale icon from the Tool palette and the Scale dialog displays:



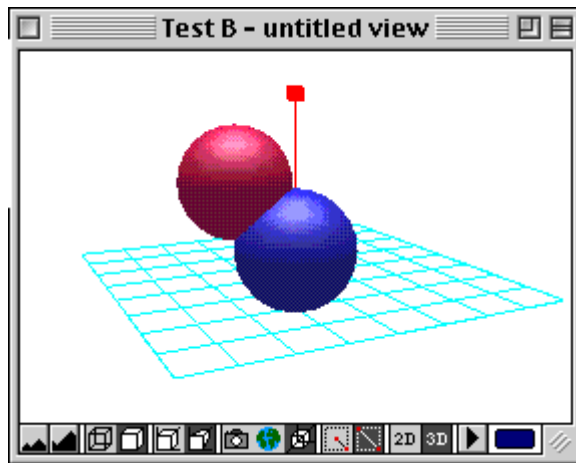
2. To maintain the object's proportions, ensure that the constrain checkbox to the right of the dialog remains checked on. Enter a percentage value to scale the object by in the x dimension, the percentage values for the y and z dimensions will be automatically changed to the same value.
3. To scale an object without maintaining its proportions, uncheck the constrain checkbox. Enter percentage values to scale the object in each of the x, y and z dimensions.
4. Click OK, then click on an object in the document window. It will be scaled by the specified value(s).

Note: The Scale plug-in is also a plug-in command, which can be used to scale several selected objects or groups. *See Scale on page 4-53 for more details.*

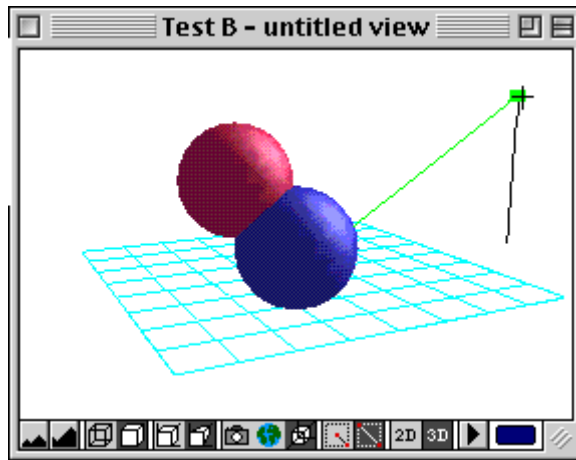
◆ Sun Direction

The Sun Direction plug-in allows you to adjust the direction the sun light shines in.

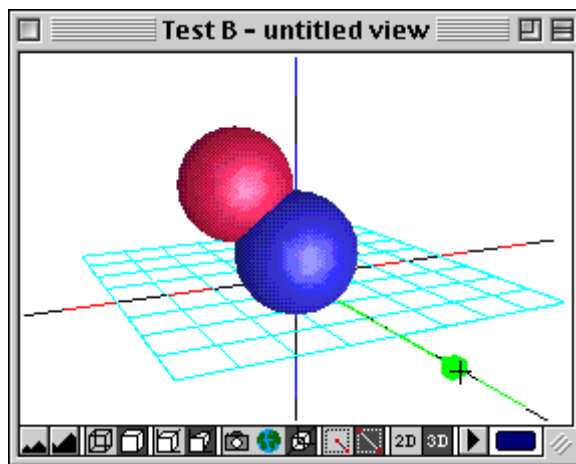
1. Select the Sun Direction icon from the Tool palette.
2. The current direction the sun light is shining in is depicted as a red line in your 3D scene.



3. Click on the handle at the end of the line and, holding down the mouse button, drag to change the position of the source of the sun light.



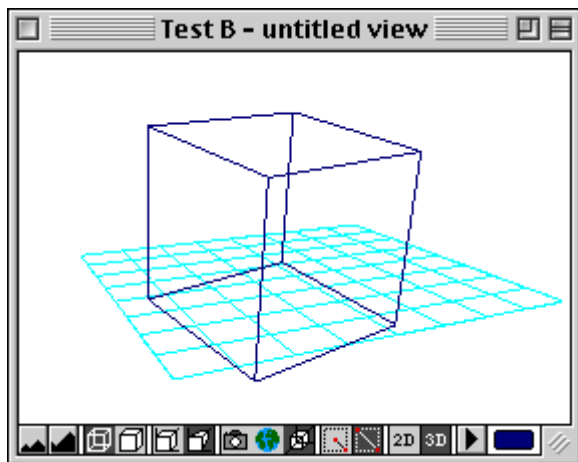
4. Hold down the Control key as you drag to change the position of the source of the sun light in the z dimension.
5. Release the mouse button to drop the handle at its new location.
6. Movement of the sun direction line can be constrained to the x, y and z axes by holding down the Shift key.



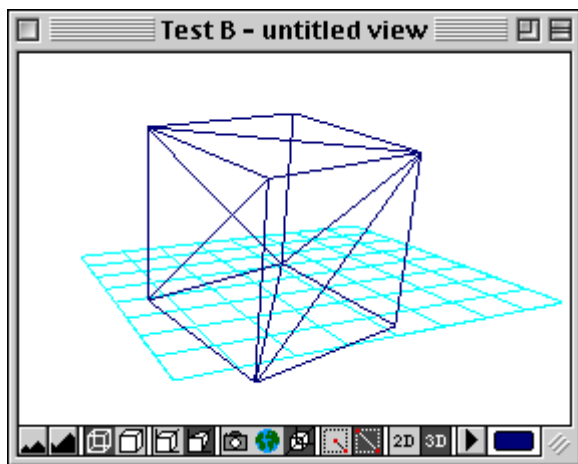
◆ Triangulate

The Triangulate plug-in is used to break an object or group up into its constituent triangles.

1. Select the Triangulate plug-in icon from the Tool palette.
2. Click on an object or group in the document window.



3. The object or group will be broken up into its constituent triangles.



4. Depending on the geometry clicked on, you may not be able to see any difference in the object, even in wire frame mode. However the object can now be ungrouped and individual triangles manipulated or deleted.

IDLER PLUG-INS

◆ Draw Direct Idler

The Draw Direct Idler plug-in automatically sets 3D World to draw direct to screen whenever a non-interactive renderer is selected, and switches 3D World back to draw into memory when an interactive renderer is used.

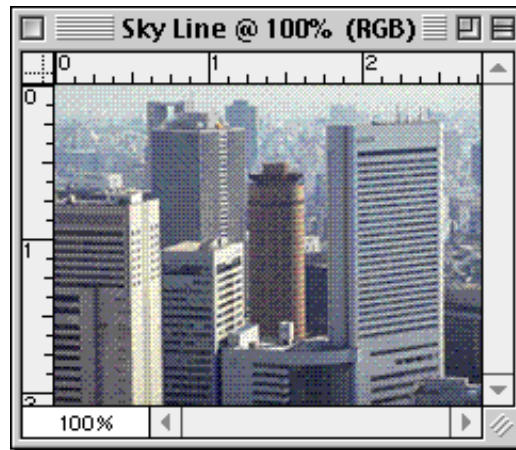
When a non-interactive renderer is selected and a large file is drawn to screen via memory, it may take a while for the scene to appear. It will appear as a complete scene only once it has been completely drawn in memory. Using the Drawing Direct Idler allows you to receive feedback as to what is happening during this time, as the scene is drawn directly to screen, so you will be able to see it in the process of being drawn rather than having to wait to see the finished result.

The Draw Direct Idler works independently of the Draw Direct Command plug-in, and ideally only one or the other of these plug-ins should be loaded and used. If both plug-ins are loaded, the second one to be loaded will have priority. If both are in the plug-ins folder and launched with the application, the Draw Direct Idler will be loaded second and so have priority.

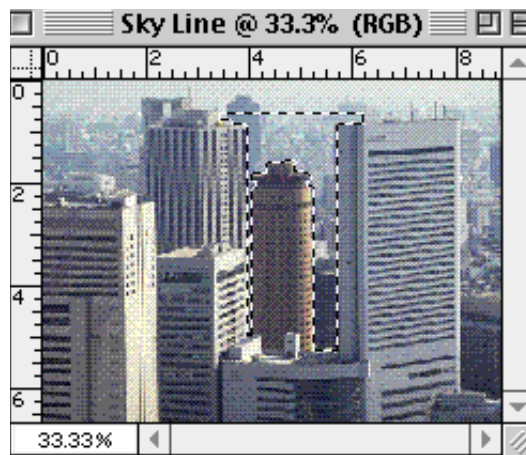
◆ PhotoLink

The PhotoLink plug-in is used to link 3D World to Adobe PhotoShop or any PhotoShop plug-in compliant application, such as Microspot's PhotoFix, and is useful for adding 3D models or 3D text into photographic images. The 3D World PhotoShop filter must be placed in the PhotoShop or PhotoFix plug-ins folder, and allows 3D World to be accessed directly from within the image editing application.

1. Launch the image editing application and open an image file:



2. If necessary, make a selection of the area you wish to work in within 3D World:



3. Select 3D World from the 3D Render submenu in the Filter menu. An alert will display asking if you wish to open a new or existing 3D World document. A standard dialog will display for you to select the file to open or name and save a new file.

4. If 3D World is not already open, it will be launched. The area selected in the image editing application document is placed in the 3D World document as a background picture. Any masked areas, i.e. areas not in the selection, are placed in the foreground.



5. The PhotoLink palette for the image editing application will also be displayed. Use the Mask Transparency slider to adjust the transparency of the masked areas in the foreground, if necessary, to make it easier to draw or select 3D objects.



6. Draw your 3D object(s) and add any lighting effects as required:

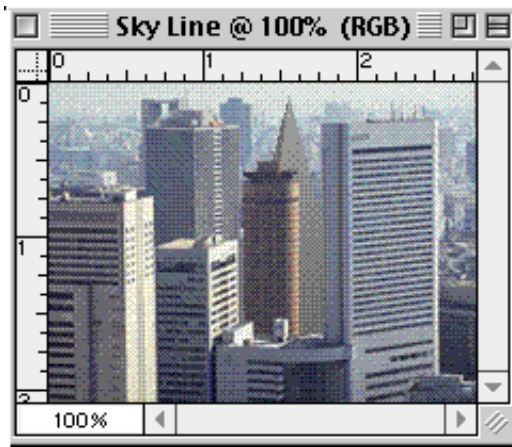


7. When you have finished drawing in 3D, click on the Render Scene button in the Photo-Link palette.

3D World will automatically save the document before rendering, and if you then select 3D World again by choosing the Last Filter option in the image editing application's Filter menu, the last document is opened without any alerts.

If 3D World was launched by the image editing application, it will quit, otherwise the document will be closed, but 3D World will be left running.

The rendered scene will be placed in the image editing application file.



Note: Once 3D World has been selected from the 3D Render submenu in the Filter menu, you will not be able to work in the image editing application until you have switched back into it from 3D World by either clicking on the Render Scene or Cancel Filter button in the PhotoLink palette. To remind you of this, a 3D World dialog displays when the image editing application is the foreground application. Click on Cancel to cancel the filter action or Switch to 3D World to return to 3D World and continue drawing in 3D.



◆ Status

The Status plug-in calculates the status of the rendering process when a non-interactive renderer is used.

1. Choose a non-interactive renderer from the Settings palette.
2. The Status plug-in calculates the percentage of the scene that the renderer has completed, the time the renderer has taken to draw so far, and the estimated time remaining.
3. The information is displayed in the Help palette (select Help from the Palette menu to display).



5. LIBRARIAN



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File Menu 5-2

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MENUS

◆ File Menu



Close (Command-W) / Close All (Command-Option-W)

Hold down the Option key and the Close menu item changes to Close All. Select this to close all open libraries.

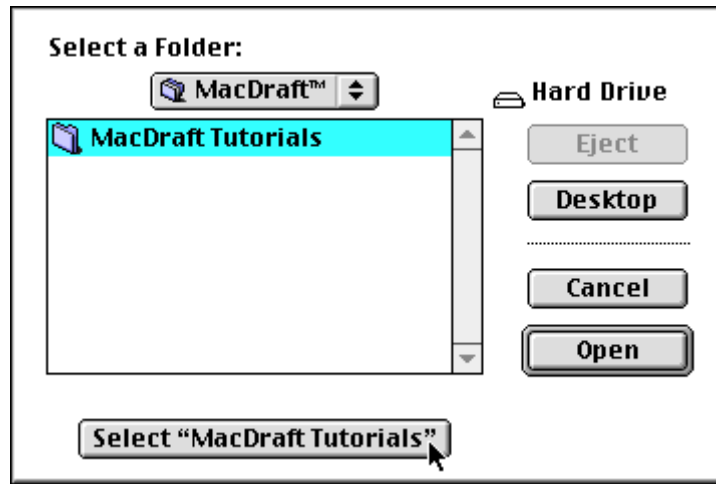
Add File

The Add File Alias option has been renamed Add File. The function of this option remains the same.

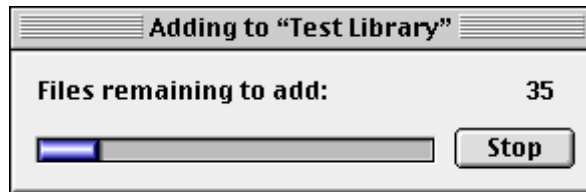
Add Folder

The new Add Folder option is used to add aliases of all files within a folder, and its sub-folders, to a library. (This feature can be used to quickly and easily catalog images on Photo CDs.)

1. When you choose Add Folder, a standard dialog will display so that you can select a folder.



2. Click the 'Select *folder name*' button once you have made a selection.
3. If there are several files in the folder, a dialog will display progress information as the contents of the folder are processed. Click Stop at any time to stop the processing of the folder contents.



4. The files in the folder will have their aliases added to the library.



The contents of folders can also be added to a library by dragging the folder into the library. The contents will be processed, and aliases to the files in the folder added to the library, as above.

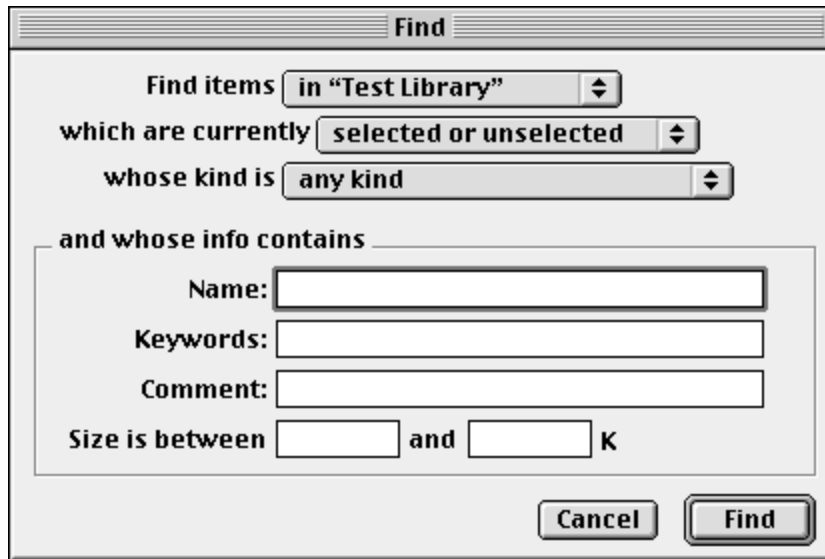
If the contents of a folder are added to a library using the Add Folder command, but the process is stopped part way through, only some of the items will have been added to the library. If the same folder is then added again, items will not be duplicated in the library, but the remaining items, not added to the library previously, will now be added.

Important: When the Add Folder option is used, Librarian will not import the data, but rather keep an alias for each file. Do not delete the original files as the data will be lost.

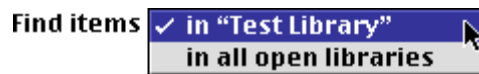
Find (Command-F)

Use the Find command to search for library items.

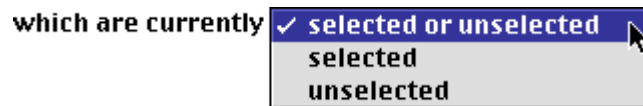
1. Choose Find. The Find dialog displays.



2. In the first popup menu, select the name of the current library, or choose to search all open libraries.



3. In the second popup menu, choose one of the following:



- selected or unselected - to search all library items.
- selected - to search only those items that are currently selected (to reduce the current selection).
- unselected - to search only those items that are currently not selected (to add to the current selection).

4. In the third popup menu, choose the type of file to search for.



5. Enter data in the Name, Key Words, Comments and Size fields to further qualify your search, if required.
6. Click Find. The specified libraries will be searched for files matching your search criteria. Any files found will be selected.

Open Selected Items

Select an item or items in the library and choose Open Selected Items. The item(s) will be opened in the appropriate application(s).

Library items can also be opened by double-clicking on the item in the library, or by dragging the library item onto a suitable application.

Show Original File (Command-R)

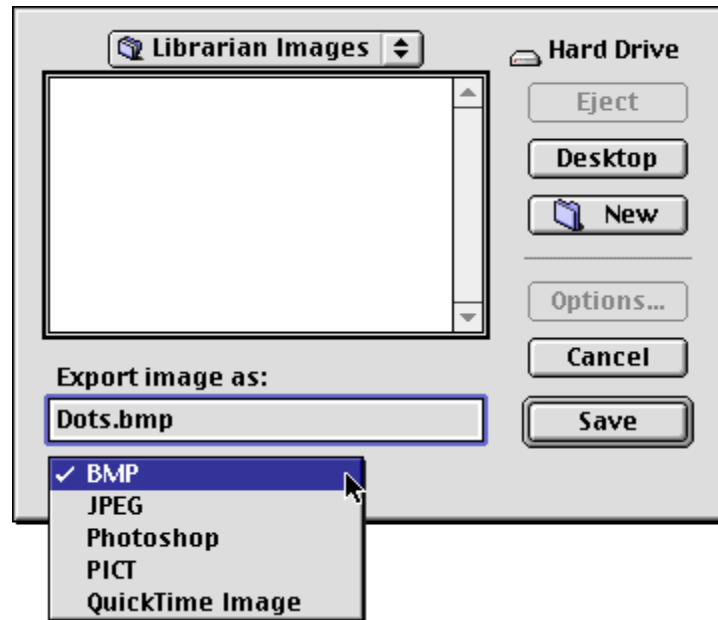
Use the Show Original File option to locate the original file relating to an alias in a library.

Select a library item and choose Show Original File. The Finder window containing the original file will open, with the original file selected within it.

Export File

The Export File option is used to export any file in a graphic format as another file type. Export File will only be available if you have QuickTime 3.0 running.

1. Select a library item that is in graphic file format and choose Export File from the File menu. The Export File dialog displays.



2. Choose a location to save the file and select the file format for the exported file from the Export image as popup menu. The options available in this menu will be determined by the translation options available to QuickTime 3.0. By default the file will be given the same name as the original file, with an extension relating to the file type chosen.

Update Library

Use the Update Library option to update any library items that have been revised.

Select the option from the menu. The library contents will be reviewed and any changes, such as the preview icon for a file alias, will be updated.

Select Missing Files

Use the Select Missing Files option to determine if any original files are missing.

Select the option from the menu. The library contents will be reviewed to check that original files can be found for each file alias in the library. If any original files cannot be found, the aliases in the library will be highlighted.

Page Setup

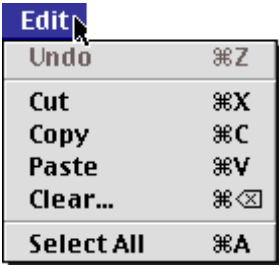
Select Page Setup to access the Page Setup dialog.

Print (Command-P)

Select Print to print the library contents.

The print produced will be of the entire library contents, fitted as best as possible to the page size, regardless of the current view of the library.

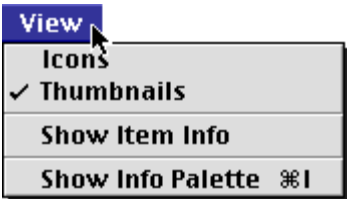
◆ **Edit Menu**



Select All (Command-A)/Select None (Command-Shift-A)

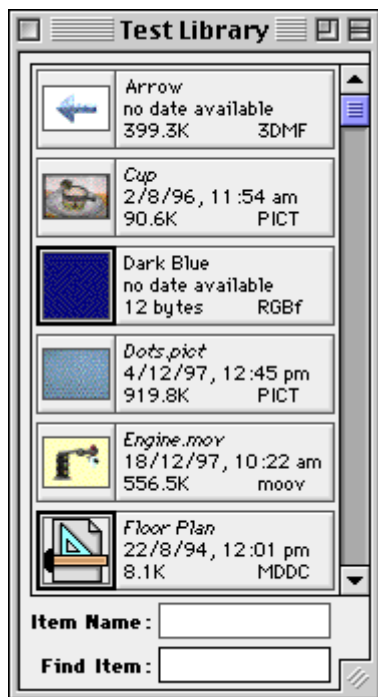
Hold down the Shift key and the Select All menu item changes to Select None. Use Select None to deselect all the items in the library.

◆ **View Menu**



Show Item Info/Hide Item Info

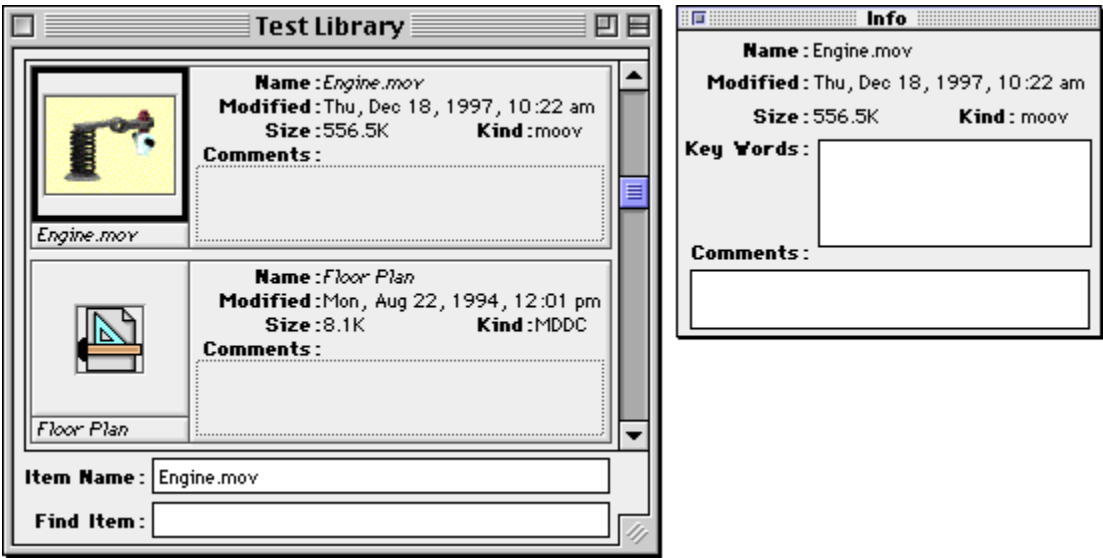
Select Show Item Info to display information about the library items next to the icon or thumbnail preview. In the Thumbnails view, an additional comments field can also be seen.



When the item information is displayed, the menu item changes to Hide Item Info. Select this option if you do not wish to display the item information in the library window.

Show Info Palette (Command-I)/Hide Info Palette (Command-I)

Choose Show Info Palette to display a palette containing information about the currently selected library item. In addition to the standard item information, the Info Palette also has a Key Words field. Use this to enter key words about an item, these can then be used in searches.



When the Info Palette is displayed, the menu item changes to Hide Info Palette. Choose this option to close the Info Palette.

◆ **Sort Menu**



Use the first five options in the Sort menu to sort the items in the current library.

By Item Name

Items are displayed in alphabetical order according to the item name.

Note: Item Name and File Name will not necessarily be the same. Item Name refers to the name of the item in the library, and this can be changed in the library. File Name relates to the name of the original file, if the library item is an alias. In this case the File Name cannot be changed in the library.

By File Name

Items are displayed in alphabetical order according to the file name. (See note above.)

By Size

Items are displayed according to the file size, with the largest file first.

By Kind

Items are sorted according to the file type.

By Date

Items are displayed according to the date the file was last modified, with the most recent modification date first.

◆ Help Menu

Librarian now includes Balloon Help, accessed via the Help menu.



To use Balloon Help, select Show Balloons from the Help menu. As you move the cursor over the document or menu items, help messages will display about those items.

When Balloon Help is turned on, the menu item changes to Hide Balloons. Select this option to turn Balloon Help off.

MISCELLANEOUS

The arrow keys can now be used to move quickly and easily through the library in any direction.

The Find field at the bottom of the library document window has been renamed the Find Item field. Its function remain the same.