PiXELS:3D™

version **3.2**

pixels

user manual

PiXELS:3D version 3.x

USER MANUAL

Introduction User Manual

About *PiXELS:3D*

PiXELS:3D is an integrated suite of professional tools for creating and animating 3D characters and visual effects. *PiXELS:3D* gives you full control of every step in the production process:

- Easily build and edit organic models in real-time
- Realtime Shaded Preview
- Create and apply textures and materials
- Position objects and lights within a scene
- Create realistic movements for all objects
- Produce broadcast quality renderings of your animations

We thank you for choosing *PiXELS:3D* and look forward to providing you with powerful and efficient solutions for all of your creative needs. Should you require help, please contact our technical support desk at the number below.

Customer Support: 9 am–6 pm Monday–Friday (pst)

(619) 220-4902

Fax us at:

(619) 299-4821

E-Mail: support@pixels.net

URL: www.pixels.net or www.pixels3d.com

System Requirements

- PowerPC based computer running MacOS 8.0 or later
- 16 MByte available RAM (Complex scenes may require more memory)
- 30 MByte of hard disk space
- Color monitor capable of displaying at least 800 x 600 pixels:3d (A large monitor is a definite advantage, since it helps distinguish details of the wireframe models for precision work.)

Recommended System

- PowerMac G3 @ 266+mHz
- 128 MByte available RAM
- 1GB of hard disk space for rendered images and texture maps
- 21” color monitor

Legal Notice

Installing *PiXELS:3D*

1. Insert the *PiXELS:3D* CD in your CD ROM drive.

2. Double click on the *PiXELS:3D_3.0_Install* icon and follow the instructions.

3. There are optional files included on the PiXELS:3D CD. If you have room on your hard drive, you should copy these files into your *PiXELS:3D* folder.

- *PiXELS:3D* utility files
- Shaders and texture maps
- Sample *PiXELS:3D* models
- Optionally, a Read Me file for late-breaking information about *PiXELS:3D*

To begin using *PiXELS:3D*:

1. If you see a Read Me file, double click on the icon to open it. It describes last minute changes which may not be included in this guide.

2. Double click on the *PiXELS:3D* application icon inside the *PiXELS:3D* folder.

3. The first time you use *PiXELS:3D*, you will see a dialog box asking for your name, your company name, and a *Software Key*. The *Software Key* can be obtained by following the instructions shown in the dialog. After obtaining your *Software Key*, type in the requested information, and click **Register** to imbed it in your *PiXELS:3D* file. The *User Name* and *Company Name* will appear on the splash screen each time you launch *PiXELS:3D.*

4. If *PiXELS:3D* is installed on a computer that does not have the proper system requirements (for example, insufficient memory or an unsupported processor), the application cannot be opened. If this happens, a dialog box will present an error message explaining the problem.

About this Manual

This manual explains everything you need to know to use *PiXELS:3D*. If you are new to 3D, it is highly recommended that you read the *"3D Basics"* chapter in the Self Training Workbook before beginning to learn the software.

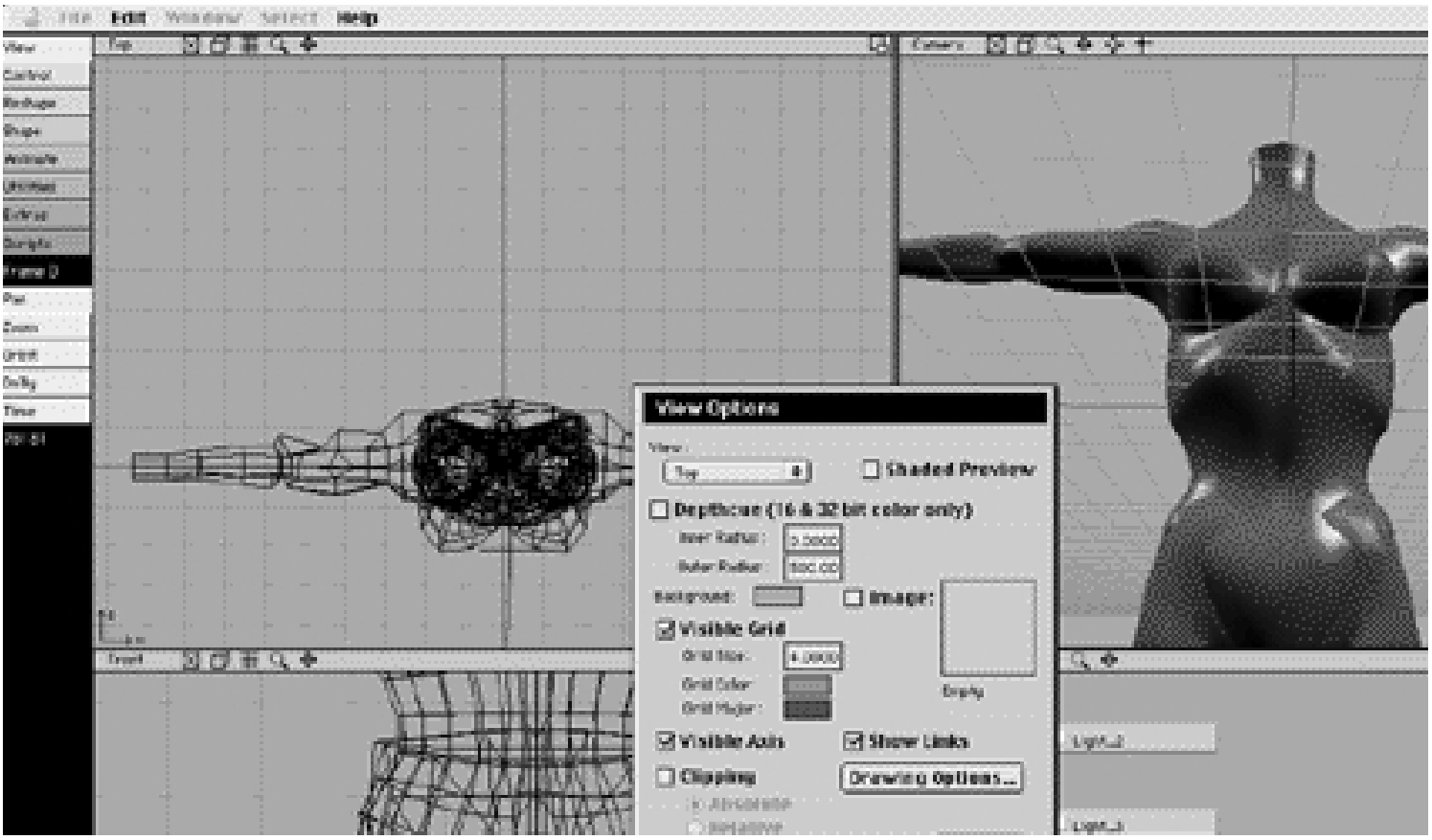
In addition, we assume that you are familiar with the use of the mouse, as well as the Macintosh interface, icons and pull down menus. Basic skills common to all Macintosh applications like clicking, dragging, scrolling and opening files are not explained within these pages, but are covered in detail in the manuals that came with your computer.

This manual is broken into five sections: *Views*, *Menus*, *ShaderMaker*, *Tools* and *Constraints*. Each section contains a list of all tools and features with step-by-step instructions for performing their related functions.

A *Glossary* at the back of the manual provides definitions to terminology used in this guide.

introduction

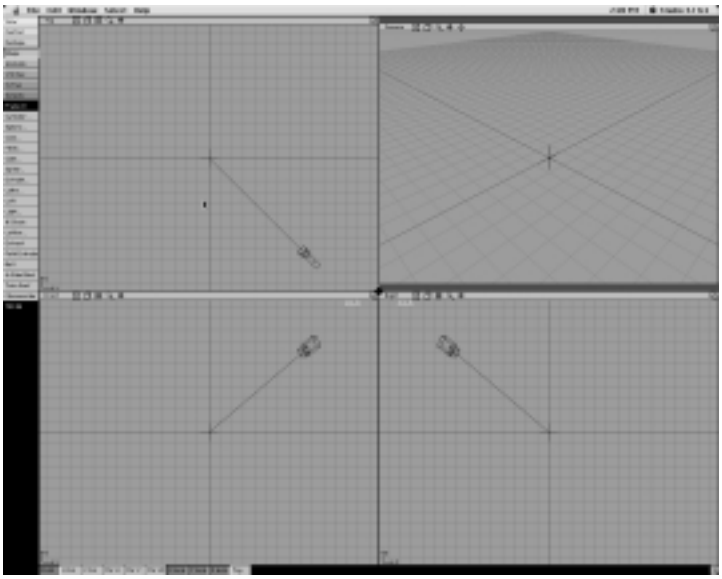
views


Edit
Help
View Options
Shaded Preview
Depthcue (16 & 32 bit color only)
Visible Grid
Visible Axis
Show Links
Clipping
Drawing Options...

views

Views

The viewing area of the *PiXELS:3D* display by default contains four viewing panes: *Top, Front, Right,* and *Camera*. The *Top, Front* and *Right* views present a 2D representation of the object(s) from the corresponding viewpoint. The *Camera* view is unique in that it represents the point of view of an object as it exists in the applications space. As you manipulate and edit an object, you can see the changes occur in each window.



Each viewing pane has a number of controls that you can access. Let's look at each of these.

Sizing

Any of the four viewing panes can be resized in one of two ways. The first is to click on the "**+**" sign that is located where all four viewing panes meet in the center of the interface. While holding the mouse button down, you can drag this around to resize all four views simultaneously. Holding the *Option* key down while clicking on the "**+**" sign, will reset all four views back to their default sizes. The second way to resize the views is to click on any view's *Zoom Box*.

Zoom Box

The *Zoom Box* can be found in the upper right hand corner of each view's title bar. It looks like two intersecting squares. Clicking in this *Zoom Box* fills the viewing area with that view. Any view can be set to fill the viewing area by clicking in its *Zoom Box*, including the *Camera* view. If you hold the *Option* key down while clicking in a *Zoom Box*, the view will zoom horizontally, but not vertically. This can be useful when working on wide objects or when using the *Twist & Taper* view.

Deactivate

Any view can be deactivated by clicking on the first icon from the left in that view's title bar. The title bar will dim and that view will no longer refresh, speeding the refresh of all other views.

Perspective

Perspective can be turned on or off by clicking on the second icon from the left in that view's title bar. When perspective is on, *PiXELS:3D* will show objects "realistically" from that view's particular point of view. The edges of objects will converge on a central vanishing point and objects closer to the viewer will appear larger than objects farther away. Any view can have perspective either on or off. When modeling, it is usually better to work without perspective in the top, front and right views.

Grid

Click on this icon to show or hide a visible grid in the top, front or right views. The dimensions of the grid can be set in the **View Options** dialog, or by using the *grid size* command in the **Command Line** window (which can be opened by selecting *Control* > *Command*).

Zoom In/Out

Use this icon to zoom into or out of a view. To use, click on the icon and drag the mouse up to zoom out or down to zoom in. The distance from the original mouse click controls the speed of the zoom. In the *Camera* view, zoom moves the Camera forward and back along the line of sight.

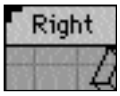
Pan

Use this icon to pan around a view. To use, click on the icon and drag the mouse up, down, left or right. The view will move in relation to the mouse. The distance from the original mouse click controls the speed of the pan.

Orbit (*Camera* view only)

Use this icon to orbit the Camera around the interest. To use, click on the icon and drag the mouse up, down, left or right. The Camera will orbit in relation to the mouse. The distance from the original mouse click controls the speed of the orbit.

View Options



Each of the four viewing panes have a number of different options that can be set. To access the **View Options** dialog box, click on the name of the viewing pane that you want to effect. The name can be found in the left corner of the bar at the top of each viewing pane. Any changes that you make to the **View Options** dialogue box are saved with the current scene and will be reinstated when that scene is loaded from disk.

Let's look at each of the options that can be set for the **View Options** dialogue box.

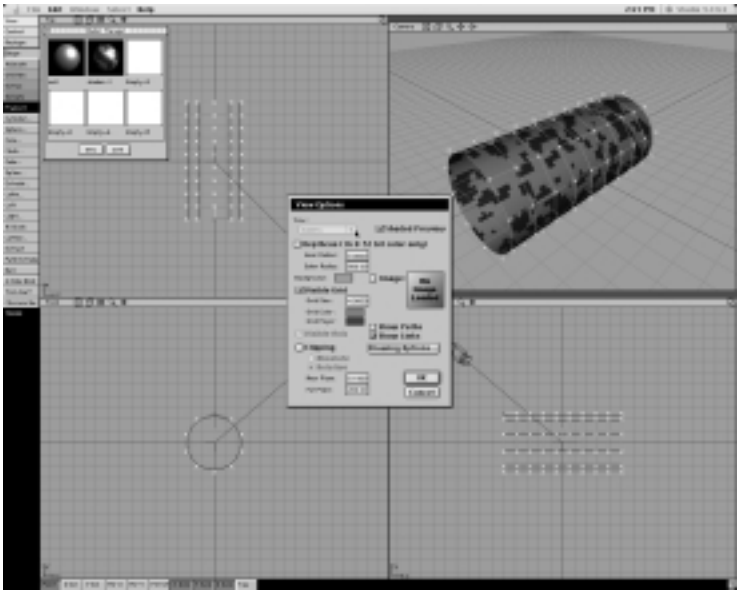
View

When clicked on, this pop-up menu lists optional views that the selected viewing pane can display. Any view except the Camera view can be changed. You can select from the following view options:

Top View
Front View
Right View
Schematic View—discussed at the end of this chapter
ShaderMaker View—discussed at the end of this chapter
Twist & Taper View—discussed at the end of this chapter

Shaded Preview

Shaded preview displays an object preview, complete with textures, and transparency.



Depth Cue

The Depth Cue option draws wireframes which fade to the *Background* as the distance from the Camera approaches the *Outer Radius.*

Inner Radius

Distance from the Camera where wireframes begin to fade.

Outer Radius

Distance from the Camera where wireframes are 100% *Background.*

Background

Every view has a background color. Clicking in the box to the right of the *Background* title will open the Apple color picker, allowing you to set the background color.

Image

Any view can also have a PICT image as a background. This is helpful when modeling something from a scanned image (i.e. take photos of an object from the top, front and right) or for placing a computer model into a real scene. PICT sequences can also be used for rotoscoping. Click on the box to the right of the Image check box to open the Texture Manager dialog. See the ShaderMaker section for more details.

Visible Grid

When checked, this option shows this viewing panes grid. When unchecked, the grid will be hidden.

Grid Size

Sets the size of the visible grid in *PiXELS:3D* units. The **Visible Grid** option must be checked before the grid can be seen.

Grid Color

Clicking on this box opens the Apple color picker, allowing you to set the color of the grid lines.

Grid Major

Clicking on this box opens the Apple color picker, allowing you to set the color of the center or origin grid lines (the ones which intersect at 0,0).

Visible Axis

When checked, this option shows the axis reference icon in the lower left corner of this viewing pane. When unchecked, the axis reference icon will be hidden.

Clipping

When checked, portions of objects which are closer than *Near Plane* or farther than *Far Plane* are invisible or *clipped*. This makes working with complex scenes much easier, allowing you to focus on a single object or even a portion of that object.

Absolute/Relative

When the **Absolute** option is selected, the clipping planes are considered to be absolute (world space) coordinates.
When the **Relative** option is selected, the clipping planes are considered relative to the Camera, so as you dolly in and out, different portions of the scene appear and disappear.
These options are a *Radio Group*, which means selecting one will automatically deselect the other. Both cannot be selected at one time.

Near Plane

When **Relative** is selected, this value defines how close an object can be to the Camera before being clipped.
When **Absolute** is selected, this value defines the minimum position where, along the orthogonal (perpendicular) axis to this viewing plane, objects are visible.

Far Plane

When **Relative** is selected, this value defines how far an object can be from the Camera before being clipped.
When **Absolute** is selected, this value defines the maximum position where, along the orthogonal (perpendicular) axis to this viewing plane, objects are visible.

Show Links

Shows the Links between the 'parent' and 'child' objects.

Show Path

Shows the Links between the object andits path.

Drawing Options

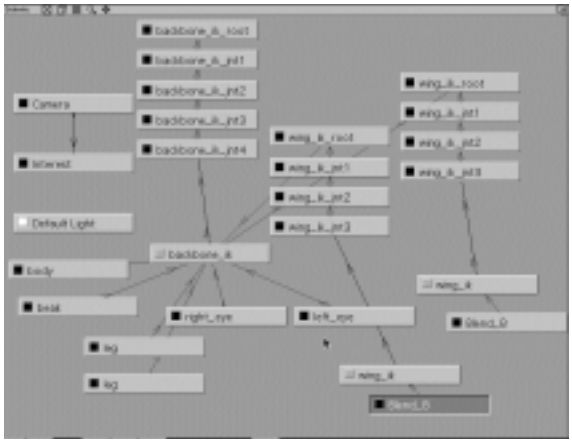
The Drawing Options palette has two collums. The 'Selected Objects' and 'Unselected Objects'. Both have the same options available.

These are:
Hull: Shows a wire mesh outline of objects.
Surface: Draws the actual spline curves that make up a shape. This is the most accurate representation of a shape, but will take more time to draw.
CVs: Display's the Control Vertices.
Center: Shows the objects center, and X , Y , and Z orientation.
Normals: Shows the surface normals of the objects.
Bounds: Shows the Bounding boxes of the object.
Spline: Shows the central Bezeir curve of the objects.

Special Views

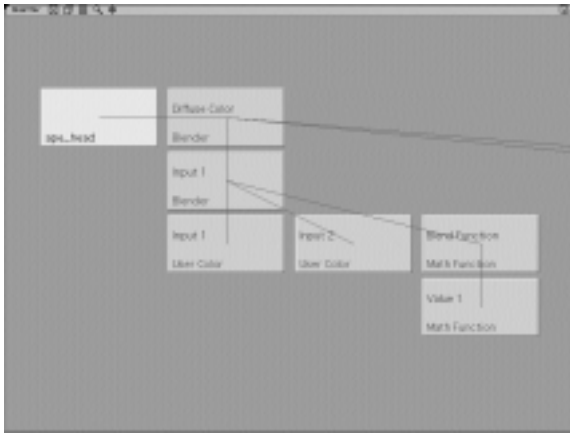
Each of the viewing panes for the top, front and right views can display one of the following special views: The Schematic View, The ShaderMaker View or The Twist & Taper View. Let's examine each of these.

Schematic View



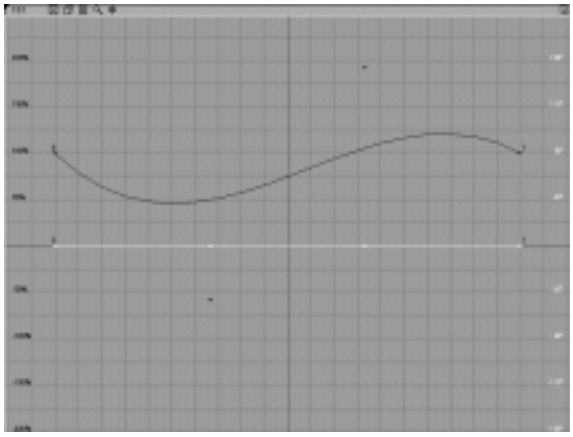
The Schematic View allows you to view the hierarchical structure of your scene. Each object is displayed as a small box, with its name printed inside the box. To the left of the name is the object's wireframe color. Objects can be selected from this view, making object selection much easier in complex scenes. The arrows that connect each object are color coded. Green arrows show objects that are linked together with a parent / child relationship, blue arrows show an object's point of interest, red arrows show a motion path that an object will follow, while magenta arrows point to a lattice that will deform an object.

ShaderMaker View



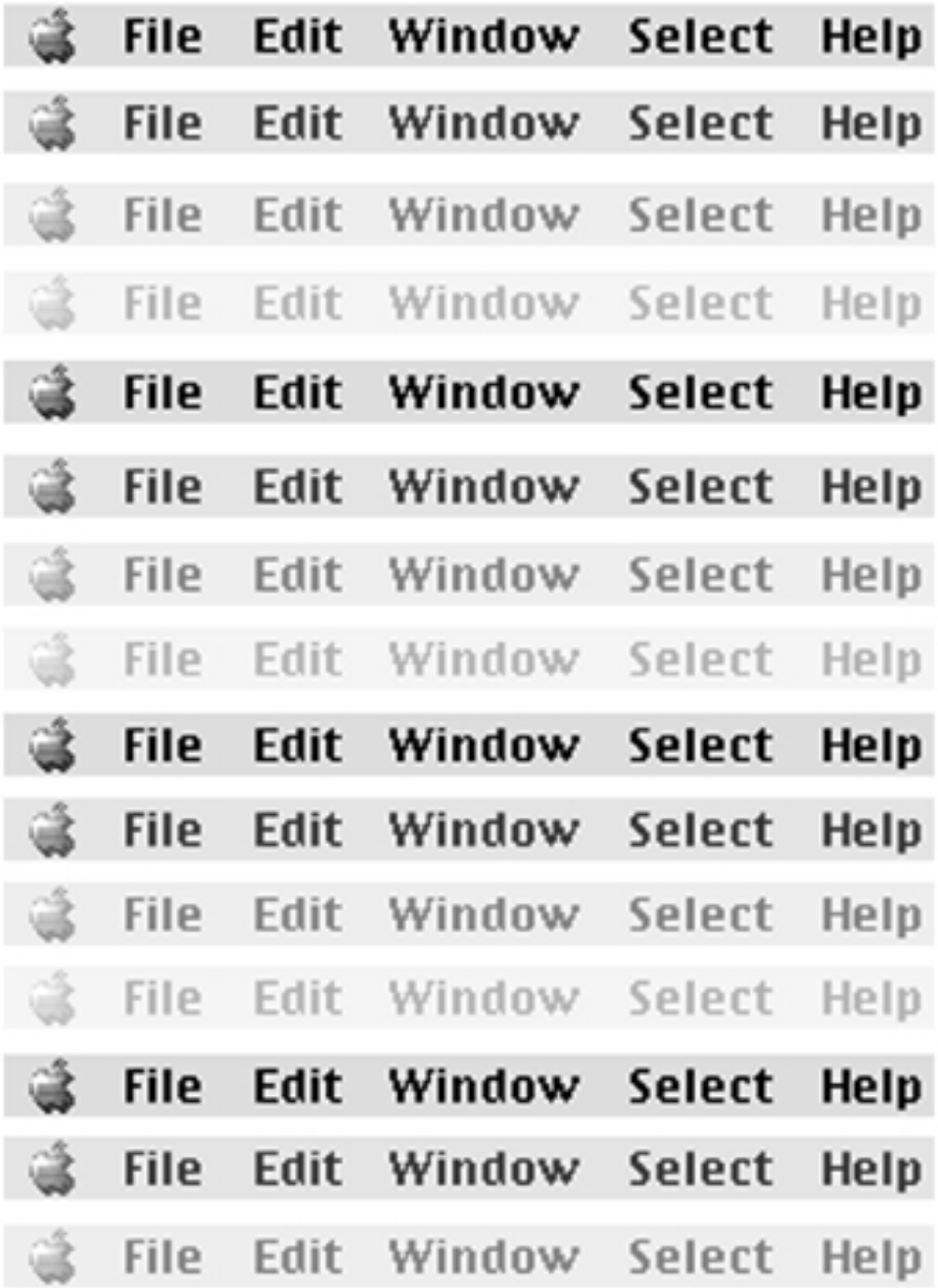
The ShaderMaker View allows you to view the hierarchical structure of the currently selected object's shader nodes. Clicking on a node will open the options dialog for that node. Clicking on the first node will open ShaderMaker. Having the ability to see the different nodes that make up a shader, and being able to access the dialogue box for any of them, allows you to quickly make changes to a shader.

Twist & Taper View



The Twist & Taper view is a powerful feature for freeform reshaping of objects. It allows you to scale and rotate part of an object by moving four control points along the objects central spline.

The Twist & Taper View displays a blue (upper) curve that defines the object's scale at any given point from front (0) to back (1) and a red (lower) curve that defines the twist. Dragging any point on the upper curve will taper, flare and bulge the selected object, while dragging on the lower curve twists it.


File Edit Window Select Help
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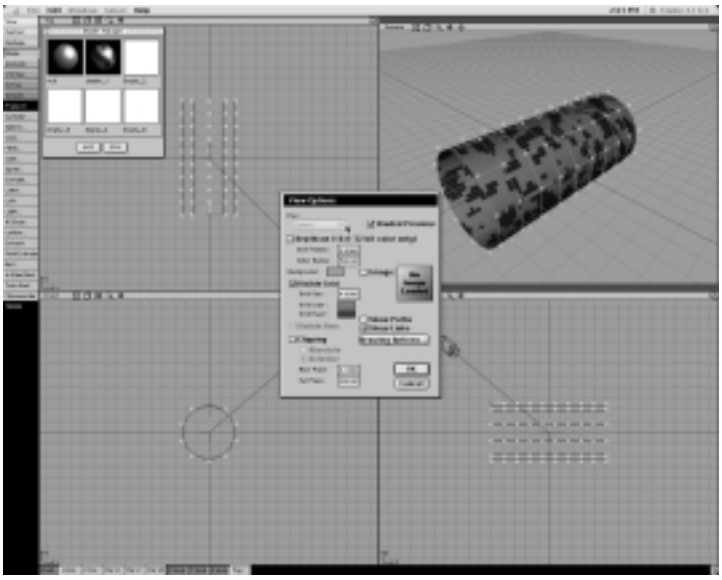
menus

File: New [N]

Creates a new, unnamed *PiXELS:3D* file using default settings to begin model creation.

1. Choose **New** from the **File** menu or type **N**.
2. An untitled window appears on the screen with the tool palette on the left, ready to begin. A typical session begins by choosing or importing a shape. (see *Tools* > *Shape* or **File > Import**.)

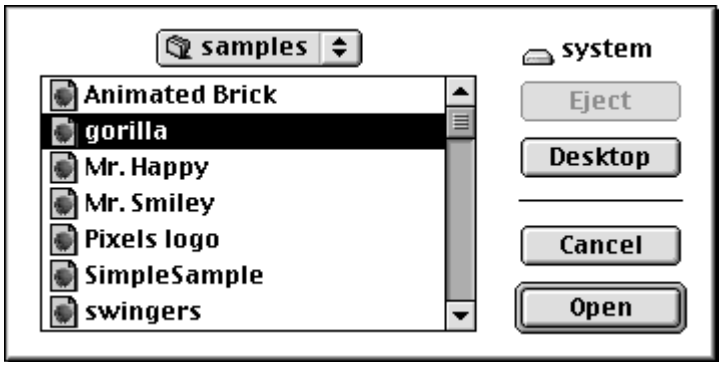


A new, untitled scene.

File: Open [O]

Opens an existing *PiXELS:3D* file and displays it on the screen. Closes the file on the screen before opening another.

1. Choose **Open** from the **File** menu or type **O.**
2. A dialog box appears listing files in the selected folder that can be opened from *PiXELS:3D.* Select a file name from the list and click **Open** or click **Cancel** to abort.
3. A *PiXELS:3D* file can also be opened directly from the desktop by double clicking its icon.



The standard Apple open dialog.

File: Import

Merges external model or motion data with the current *PiXELS:3D* scene.

1. Choose **Import** from the **File** menu and drag the mouse to select and highlight the desired format.
2. Find the folder in which the file to be imported is located.
3. Highlight the desired file, and click **Open**. *PiXELS:3D* opens the file and displays it on the screen.

Illustrator Import Options

Linearize Spline

When checked, converts Bézier splines to linear splines.

Flatness

Sets the number of subdivisions used when converting Bézier splines to linear splines. The lower this value, the smoother your curves will appear. The value is a tolerance in degrees.

Extrude Imported Art

When checked, all of the imported outlines will be extruded. Trim surface end caps are automatically created and placed. Compound objects are also detected, so holes in letters are created automatically. This is very useful for logos and text.
See the *Shape > Extrude* tool in the *Tools* section for more details about the various extrude options.

Importing Dynamation Files

Dynamation is Wavefront's high-end particle animation system for Silicon Graphics workstations. Although some users won't have access to this system, the format which it exports provides a very straightforward way of describing generic particle data. The following information is provided for those of you who wish to create your own Dynamation files.

A Dynamation file is simply an ASCII file containing the position and, optionally, directional vector information for any number of particles. Each file contains only one frame of information, so more often than not, multiple files will be needed. Each file has a numeric suffix to define its position in time. A typical file name might be something like "*SwarmOfBees.00001"* where 00001 would be the frame number.

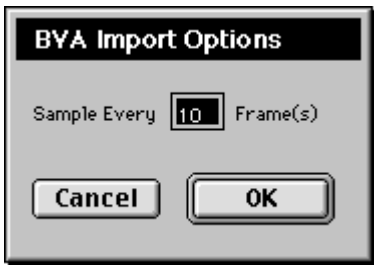
The Dynamation File Format

A simple Dynamation file may look something like this:
4 6 5 0 0 1
This is a particle definition. The first three numbers define a particle's position in space (x, y and z respectively.) The next three numbers represent a *directional vector*. This is simply a line which points in the direction the particle is heading. Because lines need at least two points to properly define them, in a direction vector it is assumed that the first point in the line is {0, 0, 0}. Currently the directional vector is assumed to be normalized. In other words the total length of the line is 1 unit.

For each particle in a scene there should be one particle definition like the one above. Each particle definition, except the last one, should be followed by a return character.

When *PiXELS:3D* imports a Dynamation file, it duplicates the currently selected object or hierarchy and places it according to the x, y, z information contained in the Dynamation file. For each particle definition a new copy of the selected object is created. Once all the particle definitions are read, *PiXELS:3D* goes to the next file in order. No more copies of the object are created. Instead the positional information is added to the object's fCurves. This process is repeated until the last file is read in or the maximum number of keyframes is reached.

BVA Import Options



Sample Every *n* Frame(s)

Imported motion data will be sampled every *n* frames. The function curve generated is smoothed using all the imported data, but control points are spaced out giving the animator some room to manipulate the imported data.

DXF Import Options

Exchange Y and Z

Some modeling systems use a coordinate system that differs from the one used by *PiXELS:3D*. This option is used to correct for that.

Smooth Normals

If checked, *PiXELS:3D* will automatically smooth all normals for shared vertices.

Scale

Sets the scaling factor for the imported model. (i.e. 0.5 = 50%)

Smooth Limit

Defines the breaking point (in degrees) for smoothed polygons. If the angle between adjacent polygons is greater than this value, their normals will not be shared. If the angle is less than or equal to this value, the normals will be averaged and shared.

OBJ Import Options

Exchange Y and Z

Some modeling systems use a coordinate system that differs from the one used by *PiXELS:3D.* This option is used to correct for that.

Use Existing Normals

If present, use the normals defined within the file, otherwise recompute them.

Scale

Sets the scaling factor for the imported model. (i.e. 0.5 = 50%)

Smooth Limit

Defines the breaking point (in degrees) for smoothed polygons. If the angle between adjacent polygons is greater than this value, their normals will not be shared. If the angle is less than or equal to this value, the normals will be averaged and shared.

3DMF Import

PiXELS:3D now has the ability to import 3DMF files. 3DMF is Apple's file format for QuickDraw 3D. The importer can read in Tri-Mesh, Tri-Grid, NURB, and three or four sided polygons. If the file contains polygons with more than four sides, you will be given a warning indicating that some of the polygons are not being imported.

File: Export

Saves a *PiXELS:3D* document in DXF, RIB, Multi-Frame RIB, 3DGF or 3DMF formats for use with other software applications. Optionally exports a PICT map of the surface to aid in the creation of texture maps.

1. Open or create a *PiXELS:3D* file.
2. Choose **Export** from the **File** menu and drag the mouse to select and highlight the desired format.
3. In the dialog box, type in a name for the file to be exported.
4. Click **Save**, or click **Cancel** to return to the model without creating an export file.
5. Choose export options for DXF and 3DGF formats.

DXF Export Options

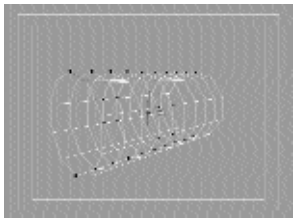
Subdivide

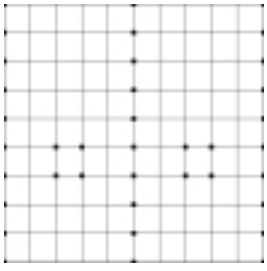
Breaks the object down into finer polygons before exporting. The resolution is set in the **Object Info** palette, using the **U Step** and **V Step** edit fields. (See **Window Menu > Object Info > UStep** or **Window Menu > Object Info > VStep** for more info on this.)

Scale

Sets the scaling factor for the exported model. (i.e. 0.5 = 50%)

Tag Map Export





1. Using the tag tool, select key points on a model's surface. (i.e. eye sockets)
2. Select **File > Export > Tag Map**. This creates a PICT file representing the surface of the model, with tagged points marked as red squares.
3. Import the PICT into your favorite paint package. Use the tagged points as a reference for painting. (i.e. Paint eyes where the eye sockets are.)

3DGF Export Options

Splines

Retains spline information when exporting. Splines not supported by 3DGF are converted to the closest supported spline.

Polygons

Converts splines to a linear basis when exporting. Some applications do not directly support splines, so this option can be used along with the **Subdivide** option to smooth models.

Subdivide

Breaks the object down into finer polygons before exporting. The resolution is set in the **Object Info** palette, using the **U Step** and **V Step** edit fields. (See **Window Menu > Object Info > UStep** or **Window Menu > Object Info > VStep** for more info on this)

Scale

Sets the scaling factor for the exported model. (i.e. 0.5 = 50%)

3DMF Export Options

NURBS

Objects with a spline basis will be converted to NURBS (Non Uniform Rational B-Splines) on export.

Polygons

All objects will be converted to polygons on export.

Subdivide

Spline based objects are smoothed before being converted to polygons for export.

Scale

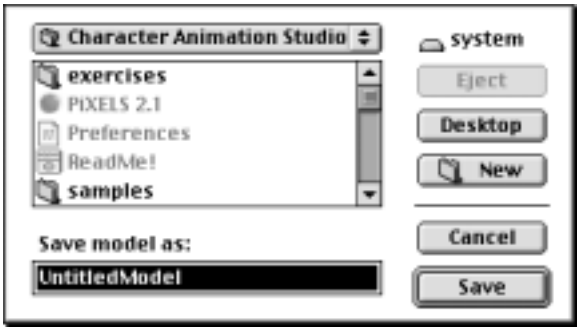
Controls the relative size of the exported scene.

File: Save [S]

Saves changes made to the open model to a disk file. If no file has been created for the model, **Save** behaves just like **Save As**.

1. Choose **Save** from the **File** menu or type **S**.

File: Save As



Saves a new *PiXELS:3D* file or saves an existing one under a new name without overwriting the original version.

1. Choose **Save As** from the **File** menu.
2. A dialog box appears showing the default file name: *Untitled Model*. Type in a new file name.
3. Choose the folder and disk on which you want the document saved.
4. Click **Save**, or click **Cancel** to abort.

File: Revert To Saved

Discard any changes you have made to your model since the last time it was saved.

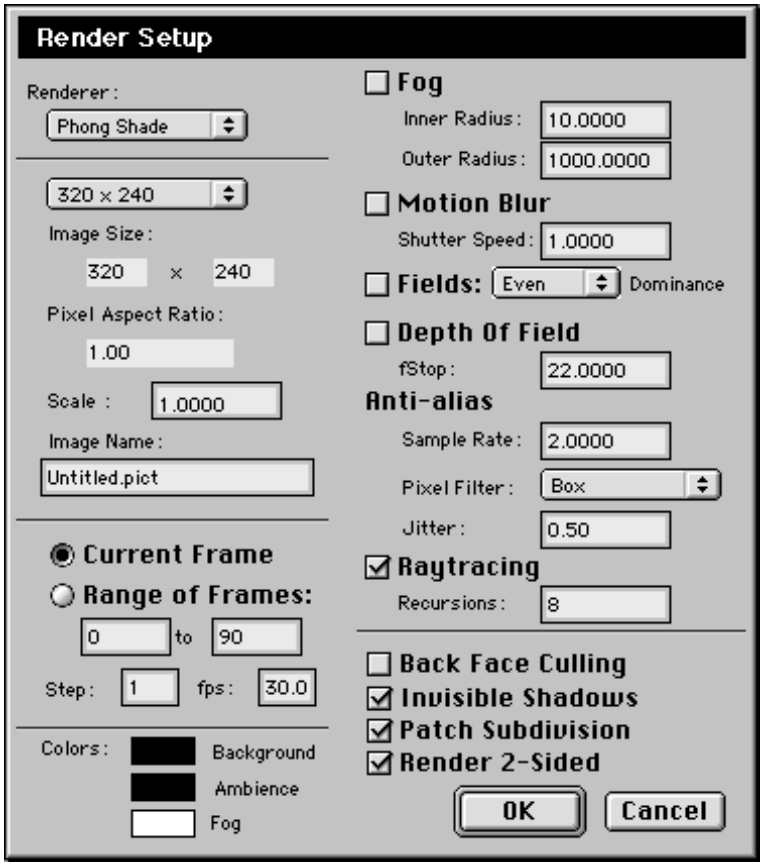
1. Choose **Revert To Saved** from the **File** menu.

File: Render Setup [U]

Sets the various rendering options.

1. Choose **Render Setup** from the **File** menu or type **U**.
2. Set the **Render Setup** parameters as desired.
3. Click the **OK** button to accept or the **Cancel** button to abort.

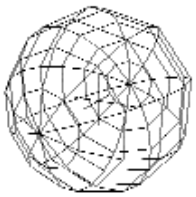
Render Setup Options



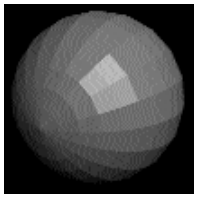
Let's look at each of the options that can be set for the **Render Setup Options** dialogue box.

Renderer

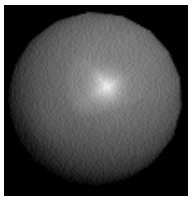
Use this pop-up menu to select the rendering method you wish to use. *PiXELS:3D* has four rendering methods to choose from:



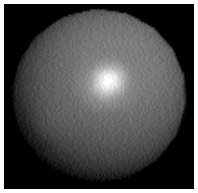
Wireframe: The simplest and fastest rendering technique, it shows only the transparent outline of forms.



Flat Shade: Gives the surface a faceted appearance to approximate the shape. Fast, but low quality renderings—good for previews.



Gouraud Shade: Renders a smooth, diffuse object by interpolating shading values between vertices. Not as fast, but higher quality to help see the details.



Phong Shade: Renders a smooth, specular object by interpolating normals between vertices. The highest quality renderings, takes longer but worth it! Use for final rendering to achieve broadcast quality images.

Image Size

A pop-up menu which lists common image formats. You can select one of the predetermined image sizes or select the **Custom** menu item to manually enter any size.

Pixel Aspect Ratio

Some devices use non-square pixels (such as NTSC television). This option ensures compatibility of images with these devices. The ratio is automatically determined for you based on the image size that you selected.

Scale

A scaling factor to apply to the image when rendering. (i.e. 400x400 with a scale of 0.5 will render at 200x200)

Image Name

The name to be applied to the final rendering when saved.

Current Frame

Renders the current frame only (still image).

Range of Frames

Renders a range of frames (animation). The frame range is set using the two edit fields immediately below this button. The first edit field is the start frame # and the second edit field is the end frame #.

Step

Forces the renderer to render every *n*th frame.

fps

Sets the number of frames needed to create one second of finished animation. (frames per second)

Background, Ambience & Fog Colors

Uses the Apple color picker to define a background, ambience or fog color. The background color is merely placed behind rendered images. The ambient color is a 'global' illumination present in all rendered scenes. The fog color is used when calculating fog in a scene.

Fog

Enables the fog option for the Flat, Gouraud and Phong renderers.

Inner Radius

Sets a radius around the Camera inside which fog has no effect.

Outer Radius

Sets a radius around the Camera outside which fog has a maximum effect. All points between the inner radius and outer radius will be effected by fog based on their distance from the viewer.

Motion Blur

Enables the motion blur option for the internal renderer. Motion blur is caused by the exposure of a moving object over time.

Shutter Speed

Defines a percentage of time between frames during which the aperture is open. A higher value causes greater motion blur. A value greater than one (1) can have unpredictable results and should not be used.

Samples

Defines the number of samples used over time to render one pixel. Higher sampling rates will result in smoother motion blur, but will require longer rendering times.

Fields

Used to reduce temporal aliasing when rendering for video. Note: if this option is enabled, the Pixel Filter option should be set to none.

Depth of Field

Enables the depth of field option for the internal renderer. Depth of field causes objects over a certain range of depth to appear in focus, while objects outside that range appear blurred.

fStop

Defines the size of the aperture opening on the Camera. A higher value results in a less pronounced depth of field, while values closer to zero produce a more exaggerated depth of field. Common values range from 1.2 to 22.

Anti-alias Sample Rate

Sets the number of sub-pixel samples to average together when anti-aliasing. Higher values result in better anti-aliasing but require more RAM and time to render.

Pixel Filter

Sets the shape of the subpixel filter applied to supersamples when summing the final pixel's color.

Jitter

Controls the size of jittered offset used on subpixel samples.

Ray Tracing

Ray tracing is a technique for creating realistic looking images by tracing rays of light as they bounce around a scene.

Backface Culling

When selected, this feature accounts for all surfaces that can not be seen from the Camera's perspective and removes any related rendering calculations for them. This speeds up rendering time.

Invisible Shadows

Enabling this feature allows shadows to be rendered from an object that is invisible, providing that the shadow casting feature for that object was turned on in the **Object Info** palette.

Patch Subdivision

Divides the patches of all models in a scene into smaller pieces to create more detailed, smoother models. Each model's sub-division is based on settings placed in the **Object Info** palette.

Render 2 Sided

When selected, this feature allows the insides of models that are exposed to the Camera to be rendered. However, use with caution as this may cause aliasing.

File: Quick Render [R]

Uses the options defined in **Render Setup** to render an image into the *Camera* view.

1. Choose **Quick Render** from the **File** menu or type **R**.
2. To cancel a rendering in progress type a **period**.
3. When you are finished looking at the rendering, click your mouse anywhere to return to *PiXELS:3D.*

File: Final Render [F]

Uses the options defined in Render Setup to render a final image, or series of images to disk.

1. Choose **Final Render** from the **File** menu or type **F**.
2. To cancel a rendering in progress type a **period**.

File: Quit [Q]

Exits *PiXELS:3D,* returning you to the Macintosh desktop.

1. Choose **Quit** from the **File** menu or type **Q**.
2. If any unsaved changes have been made to the open file, *PiXELS:3D* asks whether to save the changes before closing the file.
3. Click **Yes** to save changes, **No** to ignore changes, or **Cancel** to return to the current model without exiting *PiXELS:3D*.

Edit: Undo [Z]

Reverses the most recent movement or repositioning applied to a model.

1. Choose **Undo** from the **Edit** menu or type **Z**.

Edit: Cut [X]

Deletes the selected model and stores it on the Clipboard.

1. Select the object to cut.
2. Choose **Cut** from the **Edit** menu, or hit **X**.

Edit: Copy [C]

Copies currently selected model into the Clipboard without changing the original model.

1. Select the object to be copied.
2. Choose **Copy** from the **Edit** menu or type **C**. The item will be stored in the Clipboard for later use.

Edit: Paste [V]

Places the model copied to the Clipboard into the scene.

1. Choose **Paste** from the **Edit** menu or type **V**.
2. The model will be pasted where it was when it was originally copied.

Edit: Clear [delete]

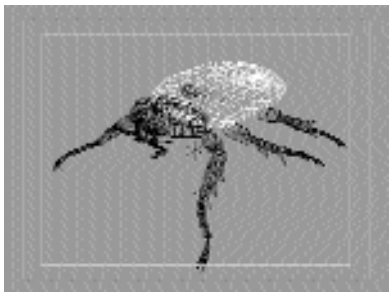
Deletes a selected model from the scene, leaving remaining models unchanged. The clear command cannot be undone.

1. Select the object you wish to clear.
2. Choose **Clear** from the **Edit** menu or hit the **Delete** key.
3. A dialog box alerts you that this operation is irreversible. Click **OK** to confirm and delete, or click **Cancel** to abort.

Edit: Hide Selected [3]

Hides the currently selected model.

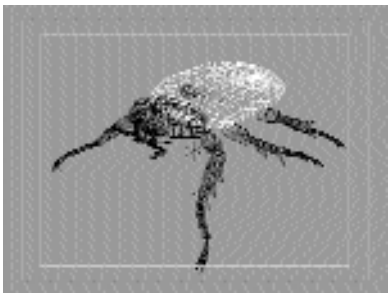
1. Select the object you wish to hide.
2. Choose **Hide Selected** from the **Edit** menu or type **3**.

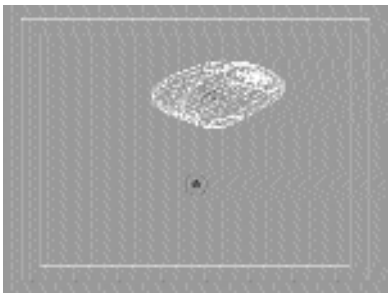


Edit: Hide Unselected [7]

Hides all models except the currently selected model.

1. Select the object you wish to retain.
2. Choose **Hide Unselected** from the **Edit** menu or type **7**.

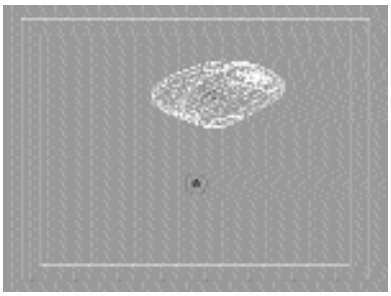


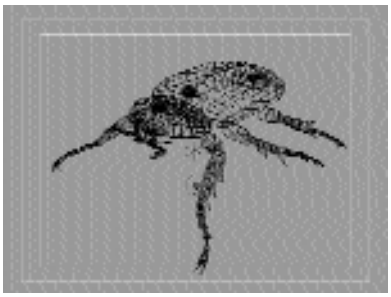


Edit: Show All [4]

Restore hidden parts of the model to the screen.

1. Choose **Show All** from the **Edit** menu, or type **4**.
2. Any hidden objects will be made visible.





Edit: Show Selected [5]

Restore hidden parts of the model to the screen.

1. Choose **Show All** from the **Edit** menu, or type **5**.
2. Any hidden objects will be made visible

Edit: Duplicate [D]

Makes a clone of the currently selected model. The duplicate is placed directly on top of its twin.

1. Select the object you wish to duplicate.
2. Choose **Duplicate** from the **Edit** menu or type **D**. A copy of the object will be pasted directly on top of the original.
3. The duplicate is the currently selected model, so you can now move, resize, reshape, etc... this object.

Edit: Duplicate Hierarchy

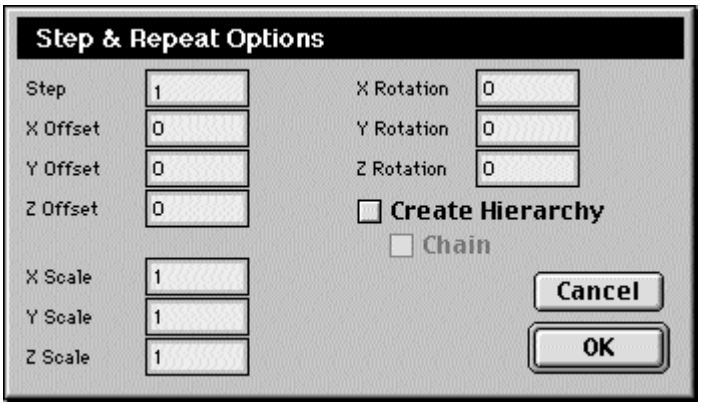
Makes a clone of the currently selected model and all its children. The duplicate is placed directly on top of its twin.

1. Select the parent of the hierarchy you wish to duplicate.
2. Choose **Duplicate Hierarchy** from the **Edit** menu. A copy of the hierarchy will be pasted directly on top of the original.
3. The duplicate is the currently selected model, so you can now move, resize, reshape, etc... this object.

Edit: Step and Repeat

Copies an object and pastes it according to the offset instructions. The object may be pasted as many times as desired.

1. Select the object you want to affect.
2. Choose **Step and Repeat** from the **Edit** menu.



Step and Repeat Options:

Step

The number of duplicates desired.

X, Y, Z Offset

Offset factor for x, y or z-axis.

X, Y, Z Scale

Scale factor for x, y or z-axis.

X, Y, Z Rotation

Rotation factor for x, y or z-axis.

Create Hierarchy

Links each duplicate to the first item in the chain.

Chain

Links each duplicate to the previous item in the chain.

OK

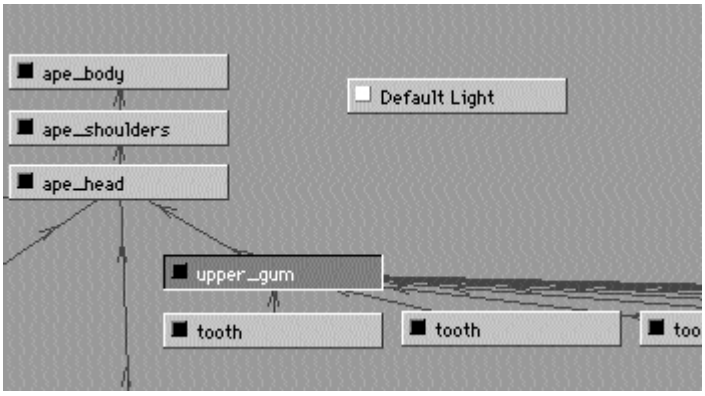
Accept and apply settings.

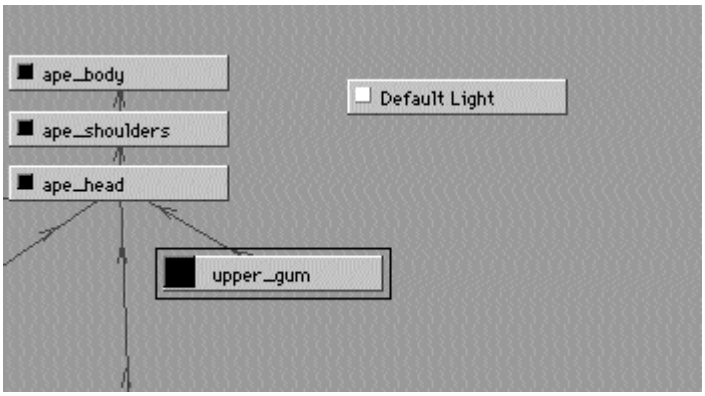
Cancel

Exit dialog without applying settings.

Edit: Expand Hierarchy [E]

This command affects the appearance of objects in the Schematic view which can be selected in any of the view panes. When a parent object (an object that has children in the hierarchy) is collapsed, its children are not displayed in the Schematic view, but rather only the parent object is shown with a double outline to indicate that it has hidden children. When a parent object is selected, this command will expand a collapsed parent or collapse an expanded parent.





Edit: Register Options [E]

When upgrading your software, this is the dialog

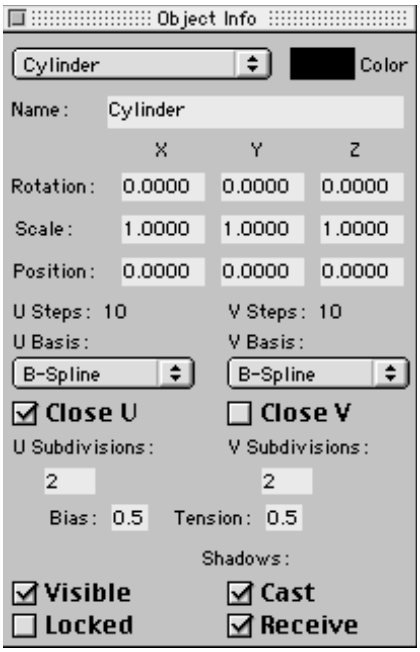
Window: Object Info [I]

All objects, including lights and the Camera, have a number of different settings that can be assigned to them. The **Object Info** Palette displays all of these settings along with other relevant information about the currently selected model, light, or Camera. To view and edit these settings:

1. Select **Object Info** from the **Window** menu or press **I**.
2. The **Object Info** Palette will appear. Click on the Object pop-up menu at the top to select either a model, light or Camera.
3. Depending on your selection, different settings will appear. Settings are typed, toggled, or selected from pull down menus.

Let's examine the different settings that are available for models, lights and the Camera.

Object Info Options for a selected *model*

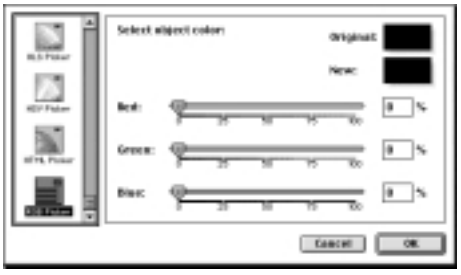


Object

A pop-up menu which allows you to directly select a different object for editing.

Color

Click this box to open the Apple color picker to select a color for this object's wireframe. It is useful on complex scenes, when you have multiple objects overlapping each other. By color coding them, they become easier to spot. Bright colors are usually preferred over muted tones. This color does not affect the color of the object when rendered.



Name

The name of the model. Can be up to 32 characters.

Rotation X

The rotation factor for the x-axis (pitch).

Rotation Y

The rotation factor for the y-axis (yaw).

Rotation Z

The rotation factor for the z-axis (roll).

Scale X

The scaling factor for the x-axis (width).

Scale Y

The scaling factor for the y-axis (height).

Scale Z

The scaling factor for the z-axis (depth).

Position X

The translation (offset) factor for the x-axis (left and right).

Position Y

The translation (offset) factor for the y-axis (up and down).

Position Z

The translation (offset) factor for the z-axis (in and out).

U/V Steps

The number of subdivisions or steps this patch contains in each direction. These values cannot be changed directly.

U/V Basis

The basis of the spline used to interpolate this surface when either rendering or subdividing.

Close U

Closes the model along its u-steps.

Close V

Closes the model along its v-steps.

U/V Subdivisions

The number of intermediate points added to this object when rendering. For example, start with an object with a resolution of 10u x 10v. If U and V Subdivisions were both set to 2, the object would be subdivided to a resolution of 20u x 20v for rendering. If U and V Subdivisions were both set to 4, the object would be subdivided to a resolution of 40u x 40v for rendering.

Bias

Controls the "lean" of the Tau and Beta splines.

Tension

Controls the "rigidity" of the Cardinal, Tau, Tensed-B, and Beta splines.

Skew

Forces patches with spline deformations to retain parallelism between v steps.

Proxy

Sets the proxy feature for the selected object. (See **Edit Menu > Proxy.**)

Visible

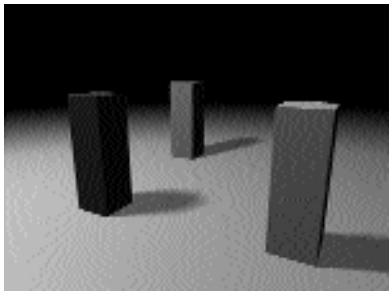
Sets the visibility for the selected object. (See **Edit Menu > Hide Selected.**)

Locked

Objects with this set cannot be selected or altered and will appear dimmed in the modeling views. Locked objects will render normally.

Shadows: Cast

Enables shadow casting for this object. At render time, only objects with this option enabled can cast shadows.



Shadows: Receive

Enables shadow receiving for this object. At render time, only objects with this option enabled can receive shadows.

Object Info Options for a selected *light*

If the selected object is a light, the **Light Info** dialog is displayed when the **Object Info** menu-item is chosen.

Light Info Options

Color

Click this box to open the Apple color picker to select a color and intensity for this light.

Icon

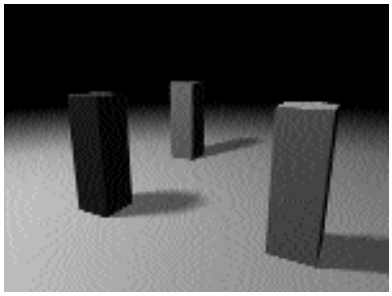
Enables the visibility of the light icon in the modeling views. When disabled, the light will not be incorporated into the rendered image.

Light Type

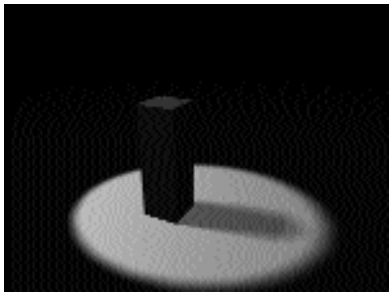
A pop-up menu from which you select the type of light you want. The types are:

Null: A light source which has no illumination, but can still glow.

Point: An omnidirectional light. Light rays travel in all directions from the light.



Spot: A unidirectional light. Light rays travel in a cone from the position of the light toward the spotlight interest.



Sun: A light source that is infinitely far from the objects in the scene. The position of the light and interest are only used to define the direction the light is coming from.

Position

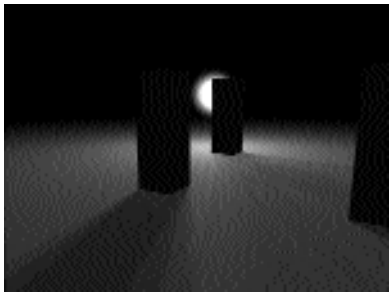
Defines the position of the light in 3D space.

Interest

Defines the position of the interest in 3D space. (i.e. the spot at which the light is pointing.)

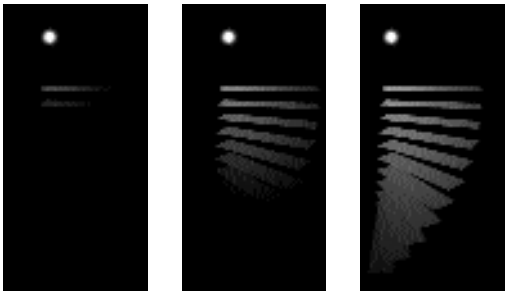
Glow

When enabled, this light source will be visible at render time.



Falloff

When enabled, the area of affect of the selected light source will be limited by the inner and outer core values. When disabled, this light source will have an infinite area of affect.

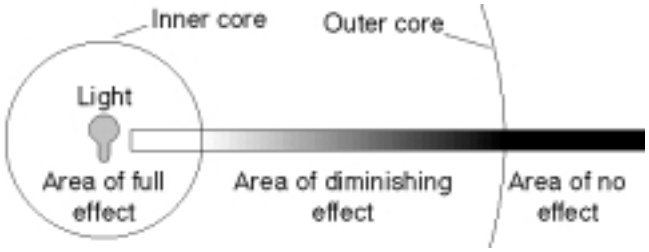


Inner Core

Defines the area upon which the light will have full effect.

Outer Core

Defines the area upon which the light will have diminishing effect.



Rate

Sets the softness or fuzziness of the outer core.

Shadows

Enables shadow buffering for this light. Only objects with shadow casting enabled will be incorporated into the shadow buffer and only objects with shadow receiving enabled will render with shadows.

Buf Size

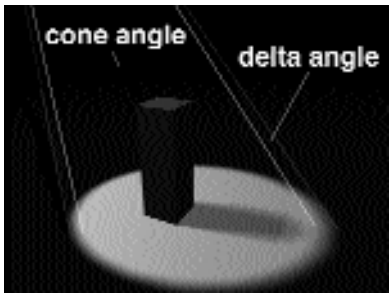
Controls the horizontal and vertical dimensions of the rendered shadow buffer. The higher this number, the finer the detail in the rendered shadows for this light. Higher values also require more RAM, and longer render times.

Density

Defines the density of the shadow. Higher values create darker shadows.

Samples

The number of physical samples taken from the shadow buffer for each rendered pixel in the final image. Higher numbers will yield more accurate shadows, but may take longer to render.



Cone Angle

Sets and defines the angle at which light rays emanate from a spot light.

Delta Angle

Sets the angle of decreasing light around the light cone.

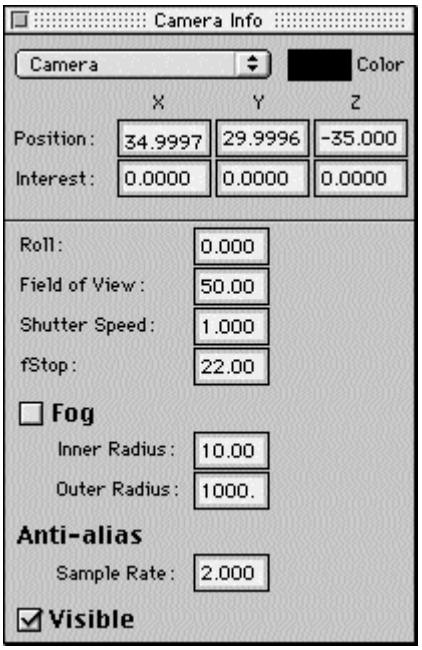
Softness

Blurs the edges of cast shadows. Higher values produce smoother shadows.

Object Info Options for the *Camera*

If the selected object is the Camera, the **Camera Info dialog** is displayed when the **Object Info** menu-item is chosen.

Camera Info Options



Color

Click this box to open the Apple color picker to select a color for the Camera's wireframe.

Position

Defines the position of the Camera in 3D space.

Interest

Defines the position of the Interest in 3D space.

Roll

Sets the angle of lateral inclination for the Camera.

Field of View

Sets the angle of view.

Shutter Speed

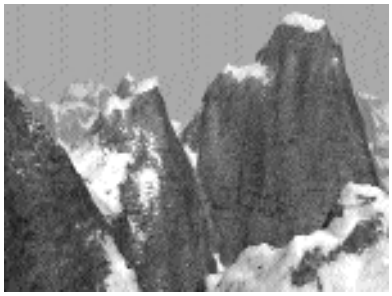
Defines a percentage of time between frames during which the aperture is open. A higher value causes greater motion blur. A value greater than one can have unpredictable results.

fStop

Defines the size of the aperture opening on the Camera. A higher value results in a less pronounced depth of field, while values closer to zero produce a more exaggerated depth of field. Common values range from 1.2 to 22.

Fog

Enables the fog option for the Flat, Gouraud and Phong renderers.



Anti-alias Sample Rate

Sets the number of sub-pixel samples to average together when anti-aliasing. Higher values result in better anti-aliasing but require more RAM and time to render.

Visible

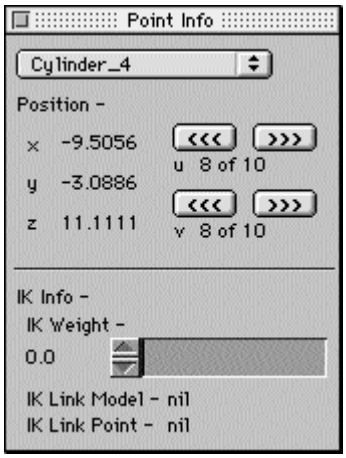
Enables the visibility of the Camera icon in the modeling views. Does not effect the rendered image.

Window: Point info [P]

Used to precisely position points and set their weights for use with inverse kinematics.

1. Select a point (or a row of points.)
2. Select **Point Info** from the **Window** menu.
3. Enter coordinate information and IK information for the point(s)
4. Use the arrow buttons to edit neighboring points.
5. Click **OK** to accept settings or **Cancel** to abort.

Point Info Options



Object

A pop-up menu which allows you to directly select a different object for editing.

Position

Displays the x, y, and z positions in global coordinates.

<<< >>>

Use these to select different points for editing.

IK Link Model

The IK Chain this point is linked to.

IK Link Point

The joint on the IK Chain this point is linked to.

IK Weight

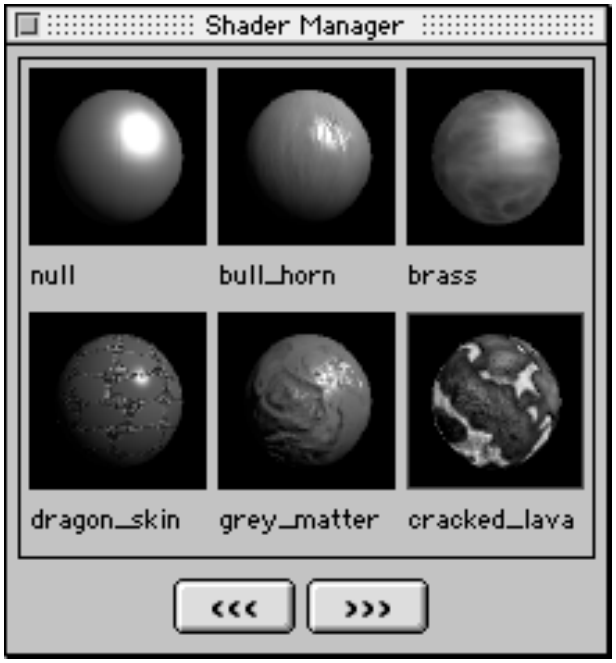
Sets how much rotational information this point will inherit from the segment of the IK Chain it is linked to, versus the previous segment in the chain. (i.e. A value of 1 tells the point to inherit all rotational information from the IK Segment it is linked to. A value less than 1, and the point will inherit that percentage from the segment it is linked to and the remaining rotational information will be inherited from the previous segment in the chain.)

Window: Shader Manager [W]

Shader Manager

Every object in a scene has a shader associated with it. The shader defines the look of the object when rendered. The Shader Manager palette is where shaders are created and assigned to objects in a scene. Multiple objects can share a single shader.

1. Select an object(s) whose shader you wish to create or modify.
2. Select **Shader Manager** from the **Window** menu.
3. To modify the object's shader, click on the highlighted shader (the one outlined in red).
4. To create a new shader, click on an empty tile. If no empty tiles are visible, click on the >>> button until an empty tile is encountered.
5. To load an RMan shader, option + click on an empty tile.
6. To delete a shader, **+** click on the shader's tile.

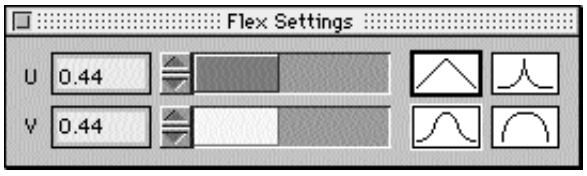


Window: Flex [B]

Sets the surface flexibility of the selected object.

1. Select a model
2. Choose **Flex** from the **Window** menu, or press **B**.
3. Use the sliders to set new values.
4. Select either linear or smooth interpolation.

Flex Options



U

Sets the area of effect for the u axis.

V

Sets the area of effect for the v axis.

A linear interpolation will be used to remap surrounding points.

A smooth interpolation

A smooth interpolation weighted at the source.

A smooth interpolation weighted at the edges.

Window: Link Options [L]

Sets which attributes to inherit from the parent object and provides access to true Boolean modeling.

1. Select a model.
2. Choose **Link Options** from the **Window** menu or press **L.**
3. Select which attributes to inherit.
4. Click **OK** to apply link settings or **Cancel** to abort.

Link Options Options

Scale

Inherit scaling factors from parent.

Rotation

Inherit rotational factors from parent.

Position

Inherit x, y, and z offset from parent.

Texture

Inherit all shader parameters from parent.

Lattice

Inherit lattice deformations from parent. (If the parent is linked to a lattice).

Boolean

Sets whether or not this object will affect its parent at rendering time.

Union

Renders the parent and child objects as though they were one.

Intersection

Renders only the overlapping portions of the parent and child.

Difference

Carves out or subtracts the child from the parent when rendering.

Smooth Seams

Enables Fusion™, Pixels proprietary seam smoothing technology, hiding the visible ridges created when non-continuous surfaces intersect.

Range

Sets the size of the Fusion™ blending.

Intersections

Intersecting objects are smoothed. When this is active, the Range parameter is assumed to be in world space.

Edges

The edges of the smoothed objects are blended into the parent object. When this is active, the Range parameter is assumed to be in st (parameter) space.

Window: MorphMaker [M]

MorphMaker is a tool that allows you to define a neutral reference pose for an object and any number of variations on that reference. These variations are called *gestures*. Any number of gestures can then be blended in any amount to form a *pose*. This feature can greatly simplify facial animation, among other things.

1. Select a model.
2. Choose **MorphMaker** from the **Window** menu or type **M.**

MorphMaker Options

Gesture Pop-up Menu

Allows you to select a gesture to edit with the **Gesture Slider**.

Gesture Slider

Controls how much of the Gesture shown in the **Gesture** pop-up is added to the current pose.

Set Reference

Saves the current shape of the selected object as the reference pose.

Keyframe Pose

Saves the current pose in a new keyframe at the current frame number.

Save Gesture...

Opens a dialog allowing you to name a gesture and then saves the current shape of the selected object under that name.

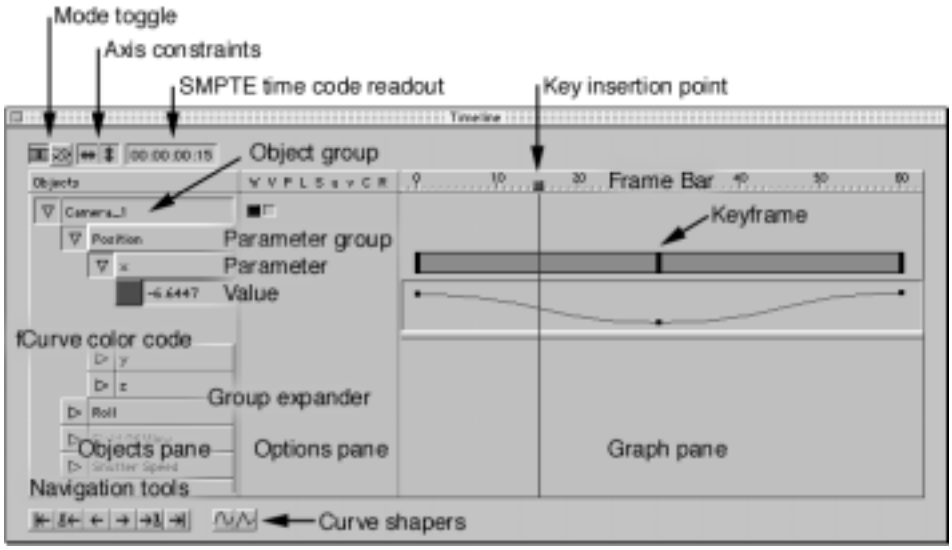
Zero Gestures

Sets the effect of each saved gesture to zero, effectively returning you to the reference pose.

Window: Timeline [T]

Opens a floating window containing a graphical representation of animation timings for all objects in a scene. All animatable parameters of an object can be directly edited from within this window.

1. Select an object.
2. Click **Animate** in the main tool palette.
3. Click **Timeline** in the lower tool palette.



The Timeline window is divided into three main parts. From left to right they are the: *object pane*, *options pane* and *graph pane*. There is also a group of push-buttons in the upper left corner. The first button sets the graph pane to *Bar mode*. The second button changes it to *Curve mode*. The second pair of buttons can be used to constrain movement of function curve *control points*. The left button, if depressed, allows horizontal movement, i.e. you can change the *time* of a control point. The right button, if depressed, allows vertical movement, i.e. you can change the *value* of the parameter at that time. You can *pan* by **shift–dragging** in any pane. You can *zoom* by **option–dragging** in any pane. The window can be resized by dragging its bottom-right corner.

Object Pane

You can select an object by clicking on its name in the object pane. The entry for the selected object will appear indented. The object pane is hierarchical, like an outline. You can click the *group expander* to the left of an object name to show or hide the parameter groups for that object. If the object has any objects linked to it (children) they will show up here as well. Clicking the group expander for a parameter group will reveal the animatable parameters for that group. Parameters can be expanded in this way as well. Expanded parameters reveal a color box and a value number. The color box shows the color that parameter's function curve will have in the graph pane. To change the color, click on the color box to open the Apple color picker dialog. The value number displays the value that that parameter has at the current frame. This value can be changed by clicking on the value number and typing in a new number. Type the **return** or **enter** key to apply the new value. To create a new keyframe, **option–click** any object group, parameter group or parameter. A black keyframe marker will appear in the graph pane.

Options Pane

There are nine options available in the options pane: Wireframe color, Visible, Proxy, Lock, Skew, Close u, Close v, Cast shadows, and Receive shadows. If you click and hold on an option selector for a few seconds, a description of what it does appears in the pane header. See **Window > Object Info** for a description these options. Not all objects have all nine options available. Lights and the Camera, for example, have wireframe color and visible options, but none of the others.

Graph Pane

The current frame can be changed by dragging the key insertion point. If you hold down the **option** key while you drag, the key insertion point will change, but the current frame will not. This can be used to copy keyframes from one point in time to another.

The appearance and behavior of the graph pane will differ depending on whether *Bar mode* or *Curve mode* is selected. Bar mode shows the function curve for each fully expanded parameter in its own function curve pane. The function curve pane can be resized by dragging the bar just below the pane. To select bar mode, click on the **Bar** button (the left button in the upper left corner of the window). Curve mode allows you to view and edit multiple curves simultaneously. Any curve which has been fully expanded in the hierarchy will show up in this mode, so you can even edit curves from multiple objects. To select curve mode, click on the **Curve** button (the second one from the left in the upper left corner of the window).

Keyframes appear in the bar graph display as black rectangles. If the horizontal movement button is depressed, you can move a keyframe to a different time by dragging it. Multiple keyframes can be selected at one time. To select multiple keyframes, -**click** and drag a box around the keyframes you want selected. -**shift click** toggles selected keyframes. Selected keyframes can be moved or they can be deleted by typing the **delete** key. NOTE: the cursor must be inside the **Timeline** palette when typing.

Function curves are bézier curves. There is one control point for each key frame. **–click** on a control point to select it. The selected point will show a *control handle* that can be adjusted to alter velocity from keyframe to keyframe. By default, control handles will maintain continuity from one side of the control point to the other. If you want to break continuity (to have a sudden change of direction or velocity) at a control point, **control–click** and drag the handle. The continuity will remain broken until you **control–click** on the handle a second time.

Navigational Controls

In Point

Returns the key insertion point to the In Point as defined in the Render Setup dialog.

Previous Key

The key insertion point is placed on the first keyframe occurring directly before the current key insertion point. Only keyframes belonging to the currently selected object are considered.

Previous Frame

Moves the key insertion point back one frame.

Next Frame

Move the key insertion point ahead one frame.

Next Key

The key insertion point is placed on the first keyframe occurring directly after the current key insertion point. Only keyframes belonging to the currently selected object are considered.

Out Point

Moves the key insertion point to the Out Point as defined in the Render Setup dialog.

Window: Script Editor [Y]

A simple text interface which facilitates the creation and editing of object scripts or expressions. The currently selected object's script is visible in this window. If more than one object is selected, the most recently selected object (the one highlighted in green) will be used.

1. Select an object.
2. Choose **Script Editor** from the **Window** menu, or type **Y**.
3. Type a script or expression into the edit field.
4. Click **Run** to execute the script. The script is also executed whenever the current frame changes or the source object is modified in any way.
5. Click **Load** to read a script from a file.
6. Click **Save** to save the current script to a file.

Script Editor Options

Save

Saves the current script to disk.

Load

Loads a pre-defined script from disk.

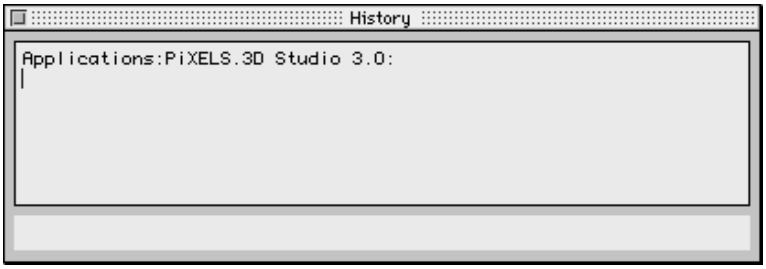
Run

Executes the current script.

Window: History [H]

Provides a visual reference of the command sequence used to create the current scene. Command sequences can be copied and pasted into stand-alone scripts to create macros (see the Scripts tool). Commands can also be entered manually.

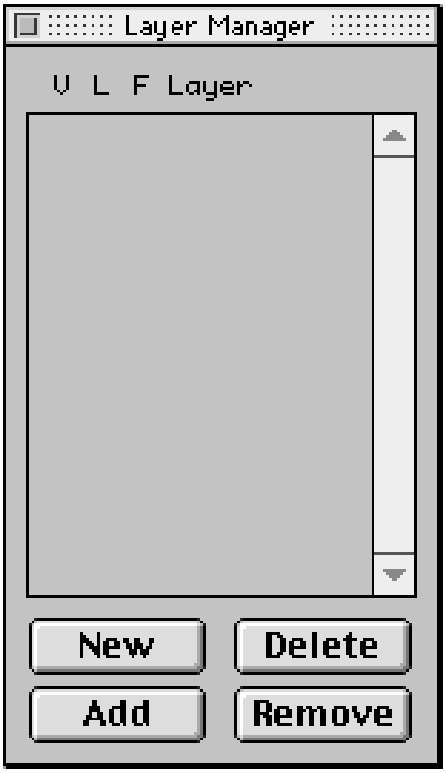
1. Choose **History** from the **Window** menu, or type **H**.
2. To enter a command manually, click inside the edit field at the bottom of the palette. To exit manual entry mode, type **return**.



Window: Layers [J]

Creates and administrates object groups.

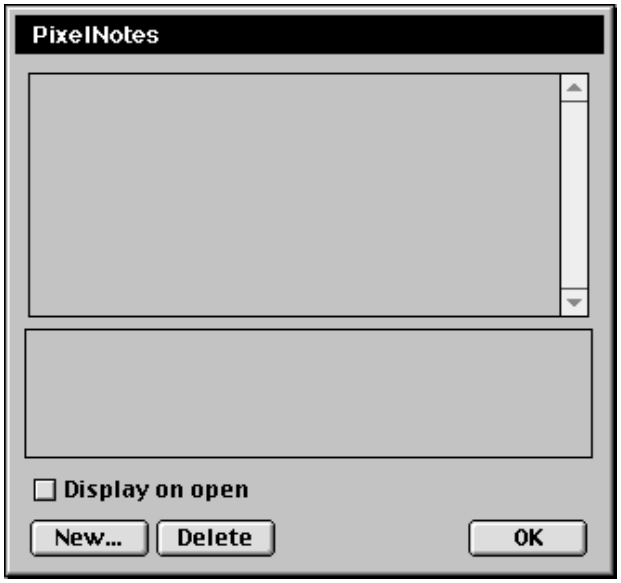
1. Choose **Layer Manager** from the **Window** menu, or type **J**.
2. To create a new layer, click on the **New** button.
3. To delete a layer, select the layer and click on the **Delete** button.
4. To add objects to a layer, select the object(s) you want to add, select the layer you want to add them to and click on the **Add** button.
5. To remove objects from a layer, select the object(s) you want to remove, select the layer you want to remove them from and click on the **Remove** button.
6. To toggle visibility of a layer, click in the **V** column to the left of that layer's name.
7. To toggle the locked status of a layer, click in the **L** column to the left of that layer's name.
8. To toggle the Fusion™ status of a layer, click in the **F** column to the left of that layer's name. (See Fusion™ under the *Link Options* dialog)
9. To select a layer, click on the layer's name.
10. To edit a layer's name, click on the name a second time. Type **return** to apply the new name.
11. To select all objects on a layer, + click on that layer. Note: anything selected prior will now be unselected, unless it is part of the selected layer.
12. To toggle the selection of all objects on a layer, + shift + click on that layer. Note: anything selected prior will remain selected.



Window: Pixel Notes [K]

Facilitates the communication among artists collaborating on a project. Can also be used to help track revisions and client changes.

1. Choose **PixelNotes™** from the **Window** menu, or type **K**.



PixelNotes™ Options

Display on open

The selected note will be displayed whenever the current project is opened.

New

Creates a new note.

Delete

Deletes the currently selected note.

OK

Accepts changes end exits the dialog.

Window: Full Screen [=]

Sets the viewing window to either fill the screen (default) or fit into a resizeable, relocatable window.

1. Choose **Full Screen** from the **Window** menu, or type **F**.

Window: Snap To Grid [G]

Provides for more precise positioning by aligning changes to an underlying grid. The grid size can be changed from the command line using the gridsize command.

1. Choose **Snap To Grid** from the **Window** menu or type **G**.

Window: View Options [/]

Dialog which controls many view specific parameters.

1. Select **View** from the **Window** menu or type /.

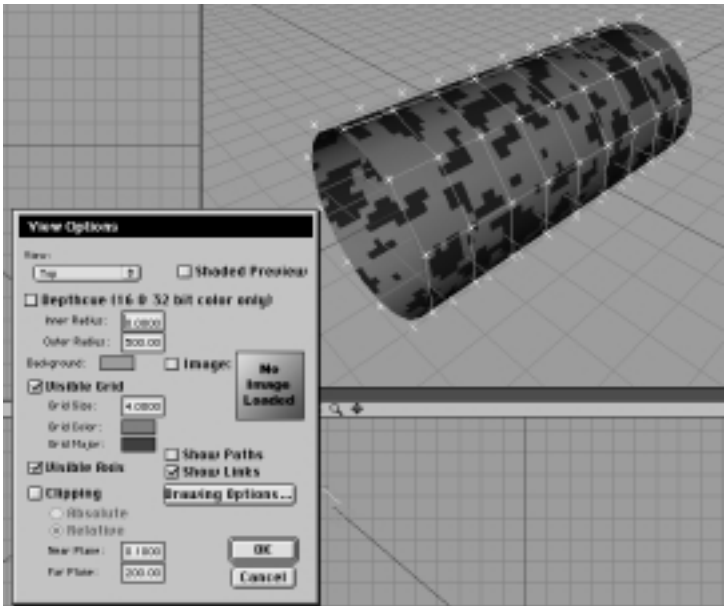
View

When clicked on, this pop-up menu lists optional views that the selected viewing pane can display. Any view except the Camera view can be changed. You can select from the following view options:

Top View
Front View
Right View
Schematic View—discussed at the end of this chapter
ShaderMaker View—discussed at the end of this chapter
Twist & Taper View—discussed at the end of this chapter

Shaded Preview

Shaded preview displays an object preview, complete with textures, and transparency.



Depth Cue

The Depth Cue option draws wireframes which fade to the *Background* as the distance from the Camera approaches the *Outer Radius.*

Inner Radius

Distance from the Camera where wireframes begin to fade.

Outer Radius

Distance from the Camera where wireframes are 100% *Background.*

Background

Every view has a background color. Clicking in the box to the right of the *Background* title will open the Apple color picker, allowing you to set the background color.

Image

Any view can also have a PICT image as a background. This is helpful when modeling something from a scanned image (i.e. take photos of an object from the top, front and right) or for placing a computer model into a real scene. PICT sequences can also be used for rotoscoping. Click on the box to the right of the Image check box to open the Texture Manager dialog. See the ShaderMaker section for more details.

Visible Grid

When checked, this option shows this viewing panes grid. When unchecked, the grid will be hidden.

Grid Size

Sets the size of the visible grid in *PiXELS:3D* units. The **Visible Grid** option must be checked before the grid can be seen.

Grid Color

Clicking on this box opens the Apple color picker, allowing you to set the color of the grid lines.

Grid Major

Clicking on this box opens the Apple color picker, allowing you to set the color of the center or origin grid lines (the ones which intersect at 0,0).

Visible Axis

When checked, this option shows the axis reference icon in the lower left corner of this viewing pane. When unchecked, the axis reference icon will be hidden.

Clipping

When checked, portions of objects which are closer than *Near Plane* or farther than *Far Plane* are invisible or *clipped*. This makes working with complex scenes much easier, allowing you to focus on a single object or even a portion of that object.

Absolute/Relative

When the **Absolute** option is selected, the clipping planes are considered to be absolute (world space) coordinates.
When the **Relative** option is selected, the clipping planes are considered relative to the Camera, so as you dolly in and out, different portions of the scene appear and disappear.
These options are a *Radio Group*, which means selecting one will automatically deselect the other. Both cannot be selected at one time.

Near Plane

When **Relative** is selected, this value defines how close an object can be to the Camera before being clipped.
When **Absolute** is selected, this value defines the minimum position where, along the orthogonal (perpendicular) axis to this viewing plane, objects are visible.

Far Plane

When **Relative** is selected, this value defines how far an object can be from the Camera before being clipped.
When **Absolute** is selected, this value defines the maximum position where, along the orthogonal (perpendicular) axis to this viewing plane, objects are visible.

Show Links

Shows the Links between the 'parent' and 'child' objects

Show Path

Shows the Links between the object andits path.

Drawing Options

The Drawing Options palette has two collums. The 'Selected Objects' and 'Unselected Objects'. Both have the same options available.

These are:
Hull: Shows a wire mesh outline of objects.
Surface: Draws the actual spline curves that make up a shape. This is the most accurate representation of a shape, but will take more time to draw.
CVs: Display's the Control Vertices.
Center: Shows the objects center, and X , Y , and Z orientation.
Normals: Shows the surface normals of the objects.
Bounds: Shows the Bounding boxes of the object.
Spline: Shows the central Bezeir curve of the objects.

Select: Parent

Selects the parent (if there is one) of the currently selected object.

Select: Interest

Selects the interest (if there is one) of the currently selected object.

Select: Path

Selects the path (if there is one) of the currently selected object.

Select: Lattice

Selects the lattice (if there is one) of the currently selected object.

Select: Bone

Selects the IK chain (if there is one) of the currently selected point.

Select: Skin

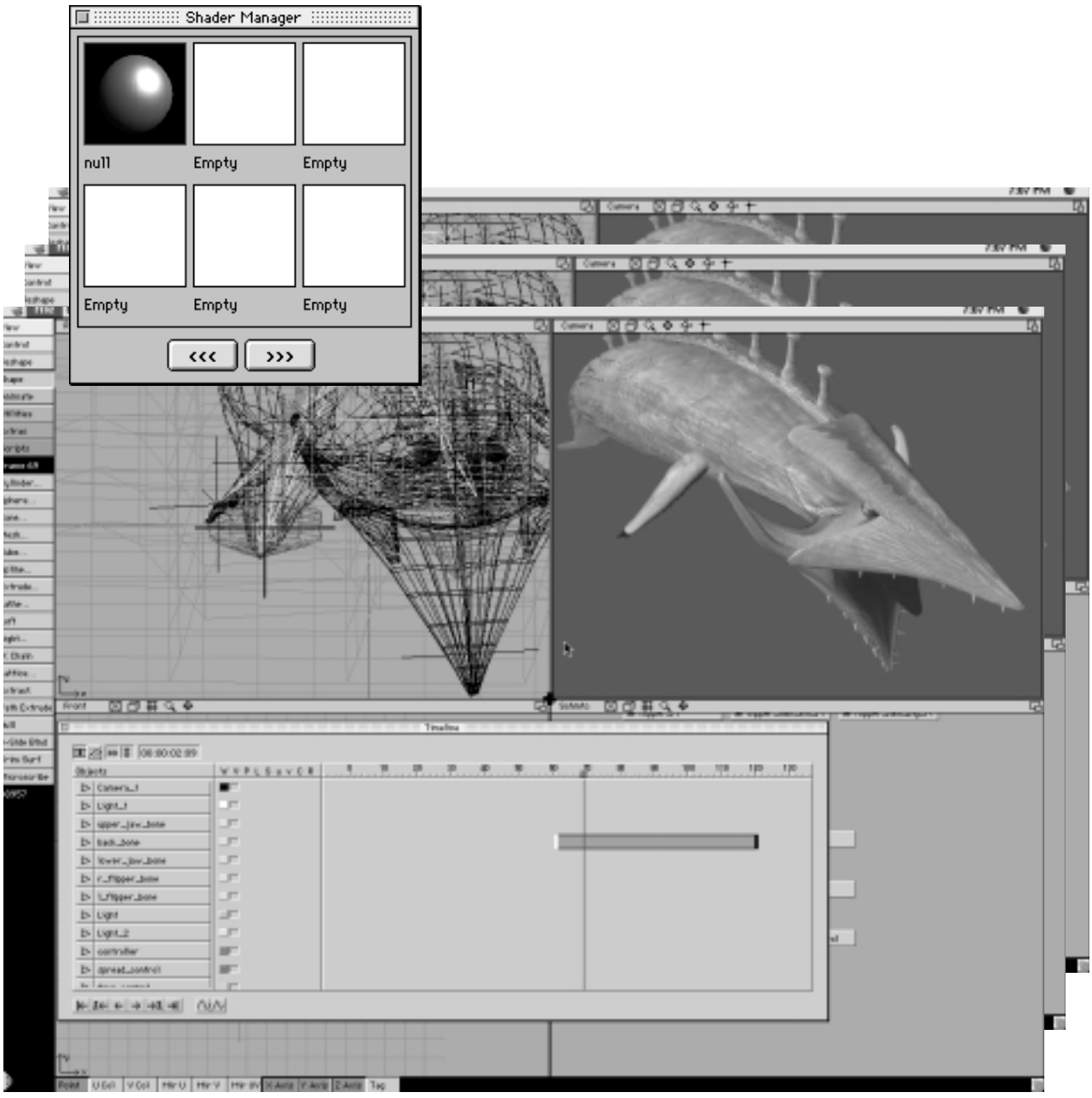
Selects the skin (if there is one) of the currently selected IK chain.

Select: Next Object [ ]]

Selects the next object in the scene list. The order of objects in this list is determined by the order in which objects are created.

Select: Previous Object [ ]

Selects the previous object in the scene list. (see above)


Shader Manager
null
Empty
Empty
Empty
Empty
Empty
<<<
>>>

shadermaker

ShaderMaker

ShaderMaker allows you to describe the material properties of your object's surface. ShaderMaker gives you full control over every aspect of shading a surface, from the color of the surface to complex light interactions such as reflection and refraction. All of this can be controlled using any one of ShaderMaker's *nodes*.

Nodes

Node is the name given to the basic building blocks used within ShaderMaker. To see all the nodes available, choose **Window > ShaderMaker** and open the ShaderMaker dialog box then click on the first Diffuse pop-up menu. Take a moment to read the names of all the nodes. Every one of these nodes will produce a color, so we call these *color nodes*. Now click on the second Diffuse pop-up menu. Every one of these nodes will produce a numerical value, so we call these *value nodes*. Each node has a set of variables associated with it, called *input variables*. These variables describe the characteristics of a given node. Input variables require either a color or a value as input. Some common variables are scale, softness, grain and turbulence.

Node Interaction

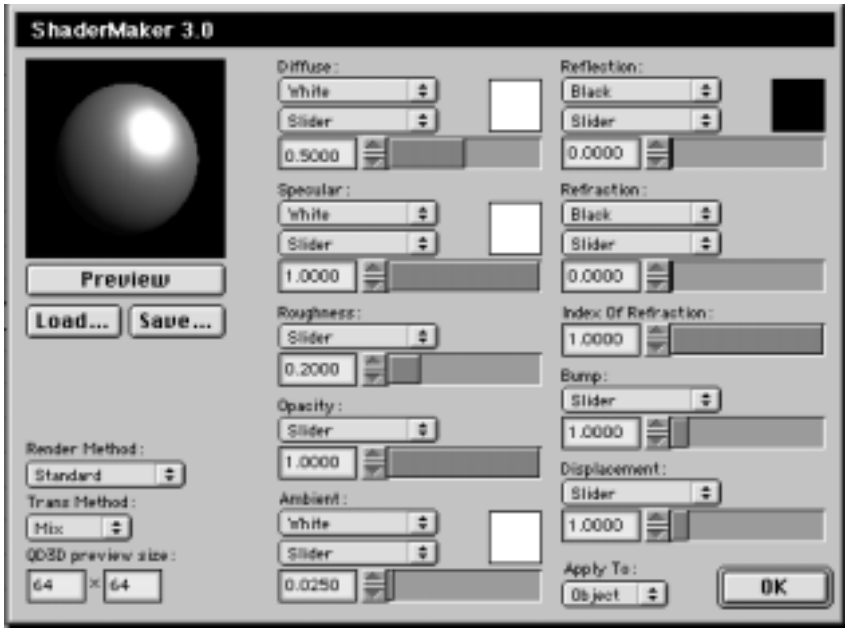
Within ShaderMaker, nodes can be linked to other nodes, making it possible to control a node's input variable with the output of another node. This interaction between nodes may at first seem complex, but it is, in fact, quite straight forward. It works somewhat like a patch bay, plugging values or colors from one node into another. There is no theoretical limit to how deep these interactions can go, however available memory and CPU speed will play a role in setting practical limits.

Shaders

A shader is a combination of nodes which work together to create the final desired color, pattern, texture or look for your 3D object. Every shader is made up of 14 inputs controlling such variables as *Diffuse Color and Reflectivity*. Each of these inputs has a node associated with it which defines its value or color. Shaders can be created from scratch or you can use the **Load** button to read a Shader from disk. Once a Shader has been read into ShaderMaker, it can be edited to create a new look.

ShaderMaker Options

After selecting the object you want to effect, open ShaderMaker by choosing the **Window > ShaderMaker** menu item.



From this dialog box you have access to a suite of tools designed to help you interactively create realistic looking textures without programming.

Preview

Applies the current settings to a sphere and renders it into the **Preview Image** box.

Load

Load a shader from disk.

Save

Save the current shader to disk.

Render Method

Defines the rendering type used by this shader. The types available are:

Normal: Standard Phong illumination.

Toon: A high contrast renderer which resembles traditional cel animation.

Custom: Unimplemented.

Trans Method

The method used to sum overlapping, semi-opaque pixels.

QD3D preview size

Defines the size, in pixels, of the preview texture map.

Diffuse

Sets the surface illumination caused by scattering light.

Specular

Sets the intensity of the highlight reflection.

Roughness

Defines the spread of the specular decay over the object surface.

Opacity

Density or transparency of the material.

Ambient

Overall or internal illumination for a given object.

Environment

Defines what is to be reflected or refracted.

Reflectivity

How much of the environment is to be reflected.

Index of Refraction

Defines the distortion of light rays as they pass through transparent or partially transparent objects.

Bump

Simulates bumps in a surface by perturbing the normals.

Displacement

Similar to bump, but rather than simulating, displacement actually alters the surface.

Apply To:

Sets the model group you want this shader applied to. The options are:

Object - Applies the current settings to the currently selected model.

Children - Applies the current settings to all the children of the currently selected model.

Group - Applies the current settings to all objects associated with the current object.

All - Applies the current settings to all the models in a scene.

OK

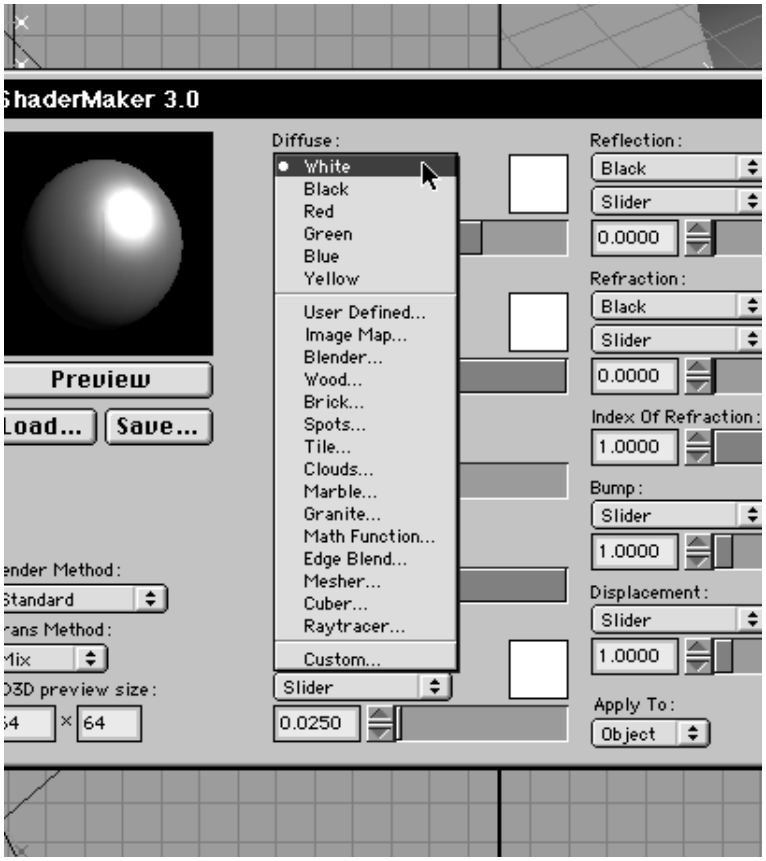
Apply settings to selected model group and return to PiXELS:3D.

More About Nodes

As discussed earlier, shaders are built of small components called *nodes*. There are two types of nodes; those that return *colors* and those that return *values*. Because of the flexibility inherent in ShaderMaker, the line between color nodes and value nodes is very grey. In fact color nodes can be used as value nodes. ShaderMaker simply converts the intensity of the color into a value and passes that to the parent node. Value nodes cannot directly return color values, but they are used to define the components of a user color—so you could quite easily create a shader that used a value node to create a color. A simple example would be a shader that used a *User Color* node to define *Diffuse Color*. The rgb components could be defined using the absolute value of the xyz components of the surface normal. Another example would be to use a *Function Curve* node to define the hue component of a *User Color* node. This allows you to change the hue of your color over time!

Color Nodes

Color nodes are used to define a color attribute such as what gets reflected or what color the surface of the object is. The base nodes which require color node inputs are: Diffuse, Specular, Ambient and Environment.



White, Black, Red, Green, Blue & Yellow

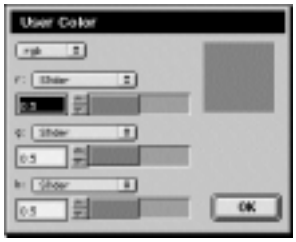
Predefined colors. These nodes contain no user definable parameters.

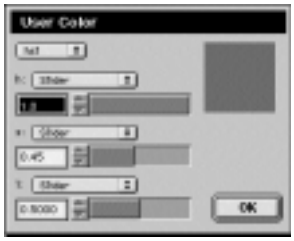
User Defined

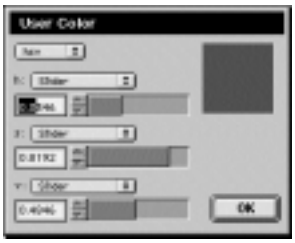
Allows the user to define a color in either the rgb, hsv or hsl color space. Optionally allows the user access to the Apple color picker.

Color Model

A pop up menu used to define the preferred color space. Options include rgb, hsv and hsl.







r/h Slider

Defines the function/scalar value used to determine the red component of the user color. When in *hsv* or *hsl* mode, this changes to the *h* slider, which controls the *hue* component.

g/s Slider

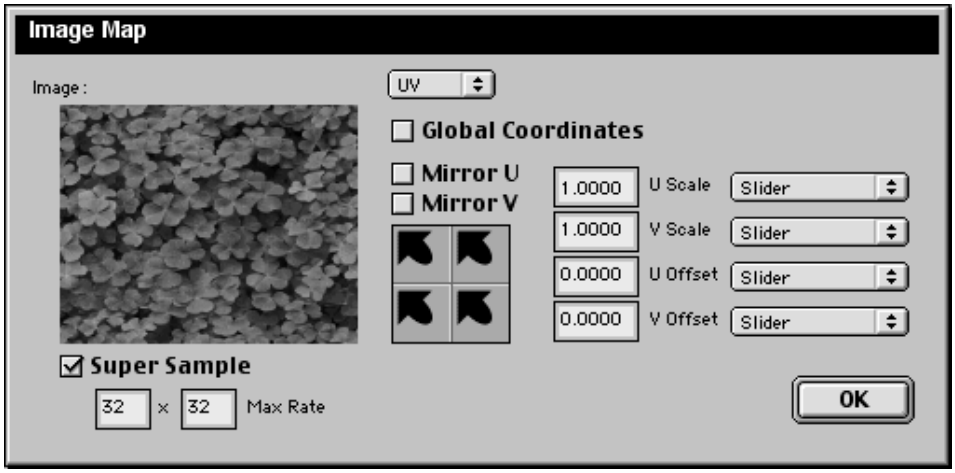
Defines the function/scalar value used to determine the green component of the user color. When in *hsv* or *hsl* mode, this changes to the s slider, which controls the *saturation* component.

b/l/v Slider

Defines the function/scalar value used to determine the blue component of the user color. When in *hsv* mode, this changes to the *v* slider, which controls the *value* component. When in *hsl* mode, this changes to the *l* slider, which controls the *lightness* component.

Image Map

Uses a PICT image or series of images to define surface color.



Image

The currently loaded PICT image. Click on the preview image to load a different image. PICT images can be stored in one of three places; inside the global Textures folder, inside the current project folder or inside the current project's Textures folder.

Super Sample

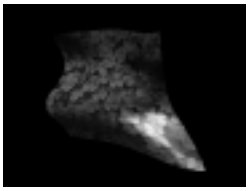
Enables the super sampling option. Super sampling smooths out the pixelization and aliasing that can occur when viewing textures from a distance or up close.

Max Rate

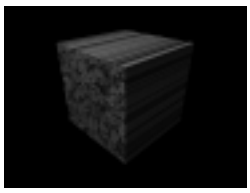
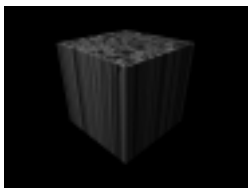
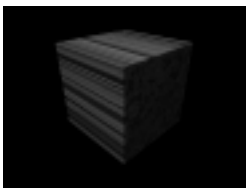
Defines the maximum number of samples to use when super sampling. Higher values give smoother results but can take longer to render.

Mapping Mode

A pop up menu used to define the mapping method to use.



uv, vu – These two options behave like magic rubber wallpaper that can be stretched over the object surface – the *pixels:3d* of the PICT file are made to correspond with set positions on the object's surface. As a result, any distortion from stretching appears more natural. This is by far the most versatile mapping method. The two options are the same except that the image map is rotated 90 degrees.

xy, xz, yz – Works like a slide projector. The "screen" being projected onto is equal to one of the three viewing planes; xy, xz or yz. The size and position of the 'screen' is defined using the U Scale, V Scale, U Offset and V Offset parameters. Any surface not oriented with the selected viewing plane will distort the texture when rendering.

Global Coordinates

Forces projected mappings to use global coordinates rather than local coordinates.

Mirror U/V

When tiling texture maps, these options can help hide the seams between texture cells.

U/V Scale

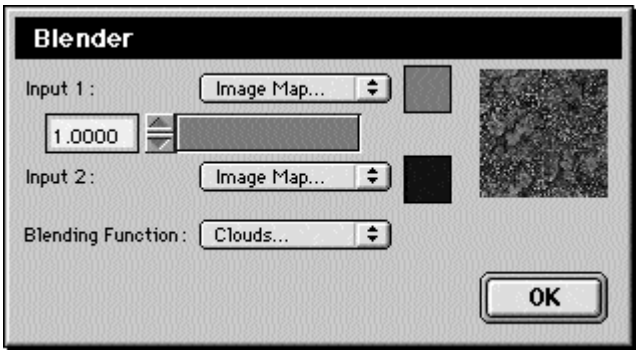
Sets the scale factor to apply to the texture map when using UV or VU mapping. When using one of the projection map methods, use these to define the size (in world space) of the texture map you are projecting on to the surface.

U/V Offset

Defines the position of the first texture tile un UV space. When using one of the projection map methods, defines the position of the upper left corner of the projection 'screen' in *PiXELS:3D* units.

Blender

Merges two color nodes using a value node as an alpha mask.



Input 1

Color node defining source channel 1.

Slider

Sets the weight assignments between channel 1 and channel 2. A value of 0.0 will reveal 100% channel 1, 0.5 will show a 50/50 blend of channels 1 and 2, 1.0 will show 100% channel 2.

Input 2

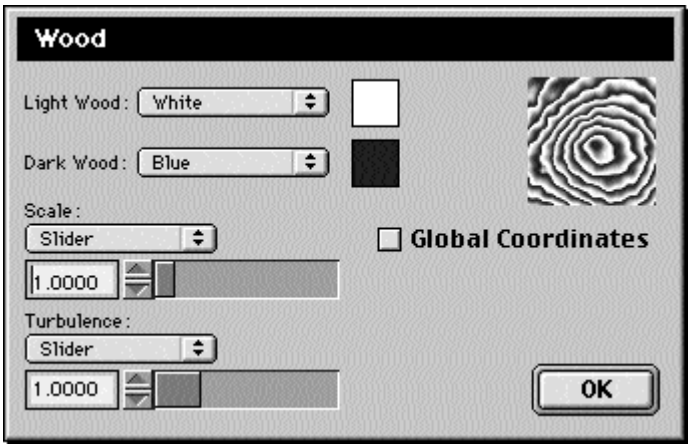
Color node defining source channel 2.

Blending Function

Value node used to define the blending mask. NOTE: the blending mask DOES NOT override the slider. If you want the blending function to fully control the output image, set the slider to 1.0.

Wood

A 3D texture which simulates wood patterns.



Light Wood

Color node used to define the base wood color.

Dark Wood

Color node used to define the color of the concentric rings running through the texture.

Scale

Slider/Value node used to define the size of the wood grain.

Turbulence

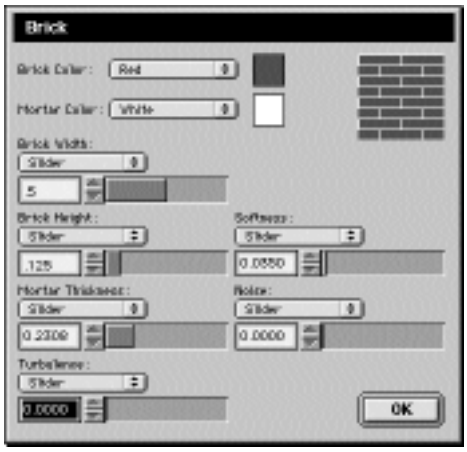
Slider/Value node used to define the randomness of the wood grain.

Global Coordinates

When this item is checked, the texture is computed in world space rather than object space. If the object is moving in any way and this option is on, the texture will appear to 'slide' through the object when rendered.

Brick

A 2D texture which simulates brick or stone wall patterns.



Brick Color

Color node used to define the stone segments.

Mortar Color

Color node used to define the area between stone segments.

Brick Width

Slider/Value node used to define the horizontal scale of the bricks.

Brick Height

Slider/Value node used to define the vertical scale of the bricks.

Mortar Thickness

Slider/Value node used to define the spacing between bricks.

Turbulence

Slider/Value node used to define the low frequency randomness of the brick pattern.

Softness

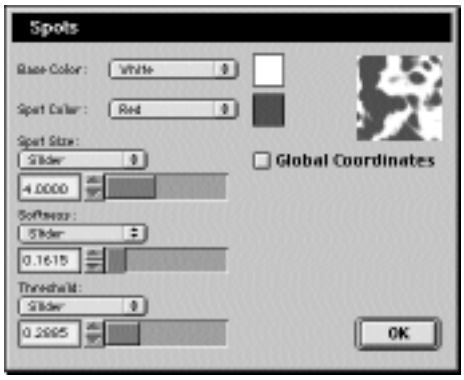
Slider/Value node used to define the how softly brick blends into mortar.

Noise

Slider/Value node used to define the high frequency randomness of the brick pattern.

Spots

A 3D texture constructed of random spots.



Base Color

Color node defining the area behind the spots.

Spot Color

Color node defining spots.

Spot Size

Slider/value node defining the size of the spots.

Softness

Slider/value node defining the transition from spot to base colors.

Threshold

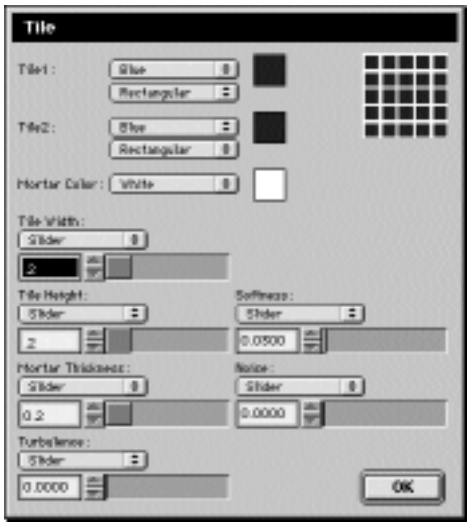
Slider/value node defining the lean towards base or spot color. Values close to zero will favor the base color, while values closer to 1 will favor the spot color.

Global Coordinates

When this item is checked, the texture is computed in world space rather than object space. If the object is moving in any way and this option is on, the texture will appear to 'slide' through the object when rendered.

Tile

A 2D texture which simulates tile patterns.



Tile 1

Color node used to define the even tiles. The bottom menu is used to define the tile shape; either rectangular or elliptical.

Tile 2

Color node used to define the odd tiles. The bottom menu is used to define the tile shape; either rectangular or elliptical.

Mortar Color

Color node used to define the area between tiles.

Tile Width

Slider/Value node used to define the horizontal scale of the tiles.

Tile Height

Slider/Value node used to define the vertical scale of the tiles.

Mortar Thickness

Slider/Value node used to define the spacing between tiles.

Turbulence

Slider/Value node used to define the low frequency randomness of the tile pattern.

Softness

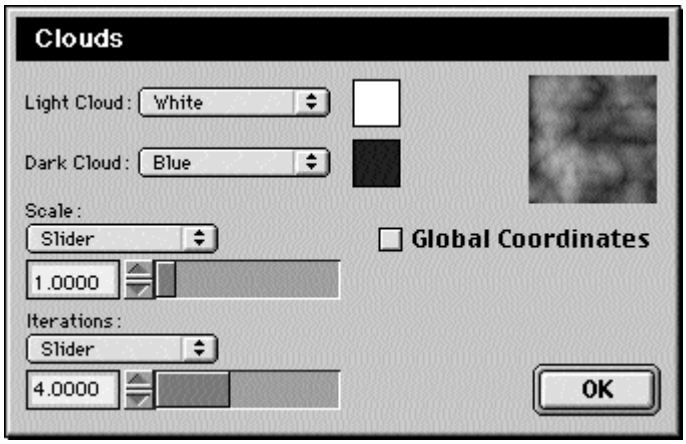
Slider/Value node used to define how softly the tile blends into mortar.

Noise

Slider/Value node used to define the high frequency randomness of the tile pattern.

Clouds

A 3D fractal texture which simulates cloud patterns.



Light Cloud

Color node defining the clouds.

Dark Cloud

Color node defining the area behind the clouds.

Scale

Slider/value node defining the size of the clouds.

Iterations

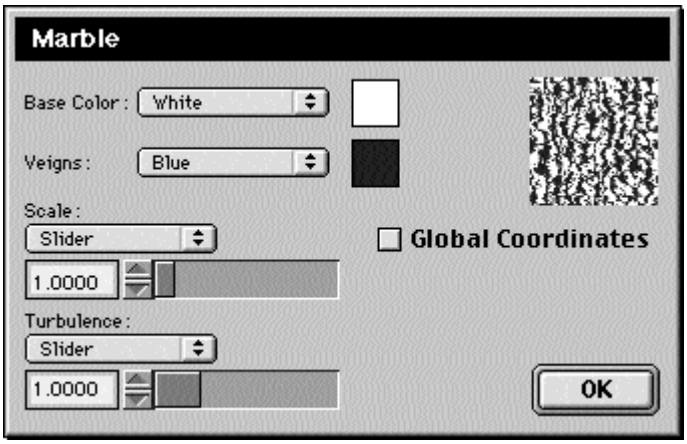
Slider/value node defining the complexity of the cloud patterns.

Global Coordinates

When this item is checked, the texture is computed in world space rather than object space. If the object is moving in any way and this option is on, the texture will appear to 'slide' through the object when rendered.

Marble

A 3D texture which simulates marble or stone patterns.



Base Color

Color node defining the main portion of the texture.

Veins

Color node defining the marble veins running through the texture.

Scale

Slider/value node defining the size of the veins.

Turbulence

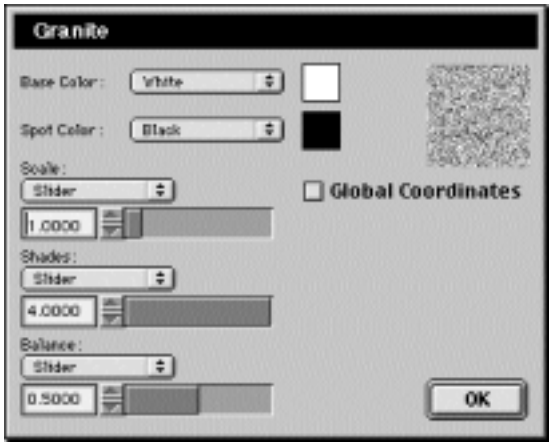
Slider/Value node used to define the low frequency randomness of the marble veins.

Global Coordinates

When this item is checked, the texture is computed in world space rather than object space. If the object is moving in any way and this option is on, the texture will appear to 'slide' through the object when rendered.

Granite

A 3D texture which simulates speckled granite patterns.



Base Color

Color node defining the main portion of the texture.

Spot Color

Color node defining the speckles.

Scale

Slider/value node defining the size of the speckles.

Shades

Slider/Value node used to define the number of varying shades visible inside the texture.

Balance

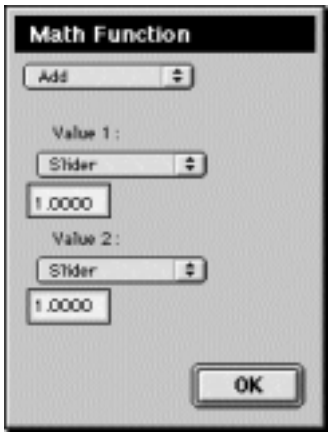
Slider/value node defining the lean towards base or spot color. Values close to zero will favor the base color, while values closer to 1 will favor the spot color.

Global Coordinates

When this item is checked, the texture is computed in world space rather than object space. If the object is moving in any way and this option is on, the texture will appear to 'slide' through the object when rendered.

Math Function

A utility node. Can be used to mathematically merge values, nodes and other parameters.



Function

Pop up menu listing available math functions.
The available functions are:

Add - returns *Value 1* plusValue *2*.
Subtract - returns *Value 1* minus*Value 2*.
Multiply - returns *Value 1* times *Value 2*.
Divide - returns *Value 1* divided by *Value 2*.
Sin - returns the sin of *Value 1*. *Value 2* is ignored.
Cos - returns the cosin of *Value 1*. *Value 2* is ignored.
Tan - returns the tangent of *Value 1*. *Value 2* is ignored.
Sqrt - returns the square root of *Value 1*. *Value 2* is ignored.
Pow - returns *Value 1* to the *Value 2* power.
Log - returns *Value 1* log *Value 2*.
Mod - returns the modulus (remainder) of *Value 1* divided by *Value 2*.
Abs - returns the absolute value of *Value 1*. *Value 2* is ignored.
Sign - returns -1 if *Value 1* is less than 0, returns 1 if *Value 1* is greater than 0 and returns 0 if *Value 1* is equal to 0. *Value 2* is ignored.
Min - returns *Value 1* if *Value 1* is less than *Value 2*, otherwise *Value 2* is returned.
Max - returns *Value 1* if *Value 1* is greater than *Value 2*, otherwise *Value 2* is returned.
Clamp - returns *Value 1* unless *Value 1* is less than 0 or greater than 1. If *Value 1* is less than 0, 0 is returned. If *Value 1* is greater than 1, 1 is returned. *Value 2* is ignored.
Ceil - returns *Value 1* rounded up to the next whole number. *Value 2* is ignored.
Floor - returns *Value 1* rounded down to the last whole number. *Value 2* is ignored.
Round - returns *Value 1* rounded to the closest whole number. *Value 2* is ignored.
Step - returns 0 if *Value 1* is less than *Value 2* . Returns 1 If *Value 1* is greater or equal to*Value 2.*
Smoothstep - returns *Value 1* bicubically smoothed. *Value 2* is ignored.

Value 1

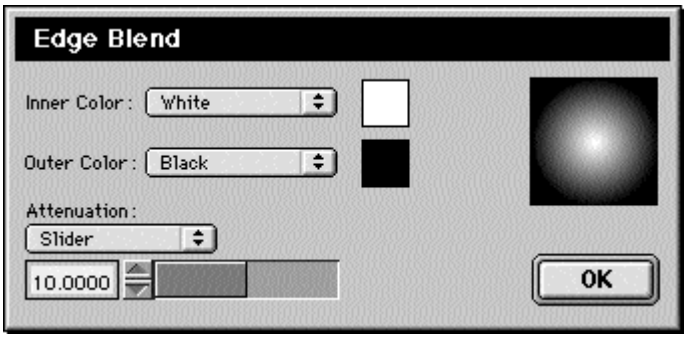
Slider/value node defining the first value in the math equation.

Value 2

Slider/value node defining the second value in the math equation.

Edge Blend

Blends color nodes based on surface and Camera angles.



Inner Color

Color node defining surfaces facing toward the Camera.

Outer Color

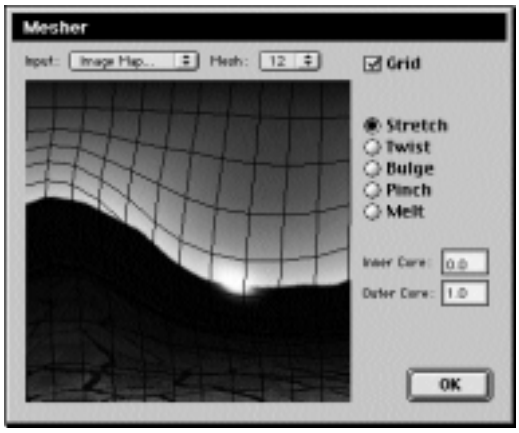
Color node defining surfaces facing away from the Camera.

Attenuation

Slider/value node defining the power curve used for transition from inner to outer colors.

Mesher

A color node used to apply mesh warps to other color nodes.



Input

Color node defining base image used. This is what will appear in the preview window.

Mesh

Pop up menu used to select the resolution of the underlying mesh.

Grid

When enabled, the underlying mesh is visible.

Stretch

Pushes and pulls the mesh around.

Twist

Rotates the mesh.

Bulge

Scales the mesh up.

Pinch

Scales the mesh down.

Melt

Randomly perturbs the mesh.

Inner Core

Defines the portion of the mesh effected 100% by the current tool.

Outer Core

Defines the total area of the mesh effected by the current tool. The area lying between the inner and outer core is the area of diminishing effect.

Cuber

A color node used to apply cubic environment maps.

Top, Right, Front Left, Back, Bottom: The color nodes used to define the environment as seen from these angles.

Blend

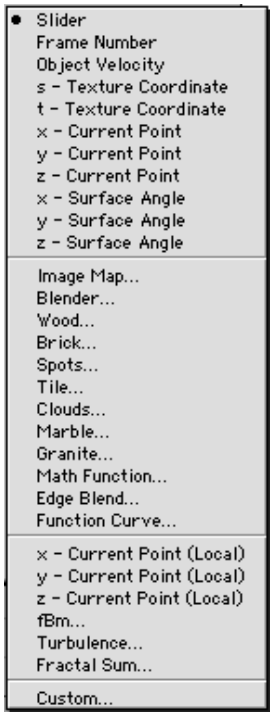
Unimplemented.

Custom

Unimplemented.

Value Nodes

Value nodes define a value attribute such as bump height or reflectivity. Value nodes are almost always used in conjunction with a slider. The value returned by the node is multiplied by the slider value.



Slider

Simply return the value of the slider.

Frame Number

Returns the current frame number.

Object Velocity

Returns the speed, in *PiXELS:3D* units, at which the current object is moving.

s/t - Texture Coordinate

Returns the location, in st space, of the current pixel being rendered.

X/Y/Z - Current Point

Returns the location, in world space, of the current pixel being rendered.

X/Y/Z - Surface Angle

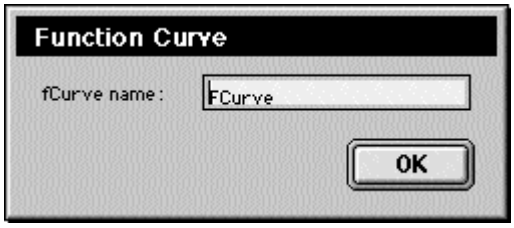
Returns the surface normal of the current pixel being rendered.

Image Map, Blender, Wood, Brick, Spots, Tile, Clouds, Marble, Granite, Math Function & Edge Blend

See the Color Nodes section for more information

Function Curve

Graphs values relative to time. Function curve points can be added, removed and edited from the **Timeline** palette, allowing for almost infinite control of values over time. To edit a function curve, exit **ShaderMaker** and open the **Timeline** palette. Expand the current object. Locate the **Shader** function curve group. Expand this item and you will find your newly created function curve.

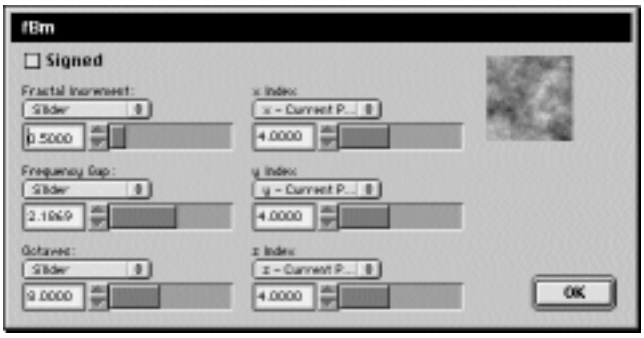


X/Y/Z - Current Point (Local)

Returns the location, in local space, of the current pixel being rendered.

fBm

A multi-fractal function. Very robust.



Signed

When checked, values returned will be in the range of -1 to 1. If unchecked, values less than 0 will be returned unsigned. i.e. a value of -.25 will be returned as .25.

Fractal Increment

Lower values will result in a smoother noise gradient.

Frequency Gap

Higher values will produce larger fractals.

Octaves

Defines the number of iterations for the fractal function. Higher values will produce more detailed fractals.

x Index, y Index and z Index

Defines the position point from which to derive a noise sample.

Turbulence

Another fractal function. Turbulence is always unsigned, returning values between 0 and 1.

x Index, y Index and z Index

Defines the position point from which to derive a noise sample.

Octaves

Defines the number of iterations for the fractal function. Higher values will produce more detailed fractals.

Fractal Sum

Another fractal function. Fractal Sum returns values between -1 and 1.

x Index, y Index and z Index

Defines the position point from which to derive a noise sample.

Octaves

Defines the number of iterations for the fractal function. Higher values will produce more detailed fractals.

Custom

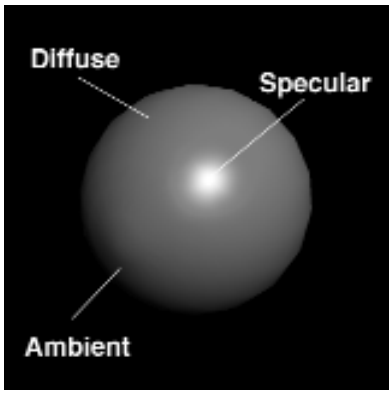
Unimplemented.

Shading

At render time, patches are smoothed out and subdivided into triangles. How smooth a patch becomes is controlled using the **Object Info** palette's **U & V Subdivision** settings. The higher these values, the smoother the patch will appear at render time and the more memory it will require. Each triangle is a planar surface with its front oriented in one direction. The renderer calculates the relation between this orientation and the light sources in order to determine the shading of each triangle.

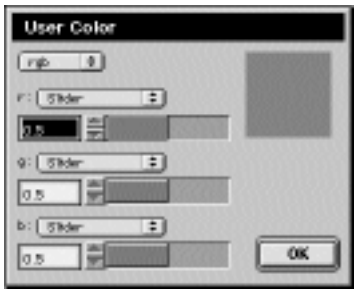
Ambient, Diffuse, Specular Areas of Illumination

A surface rendered in *PiXELS:3D* combines three different types of illumination to simulate the physical properties of light; ambient, diffuse and specular. Ambient shading represents the global 'scattered' light present in most scenes. A scene within a brightly lit white room would have high ambience. A scene in outer space would have no ambience. A shader with no diffuse or specular, but 100% ambient can be used on objects which require no shading, like backgrounds or glowing objects. Diffuse shading is the base illumination of any object, showing the subtle fluctuations in a surface through variations in highlight and shadow. Specular shading simulates the effect of light rays bouncing from the object to the observer's eyes, creating a highlight or hot spot. The size of this highlight can be controlled through the *Roughness* parameter to simulate a wide variety of materials, from plastic to metal.



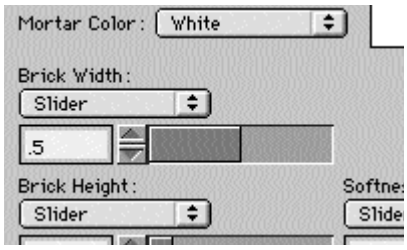
Defining Colors

There are many options for defining colors. The most common is to use the *User Color* node.



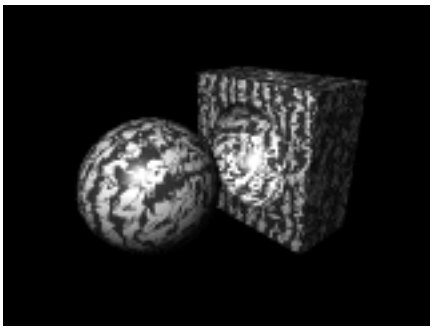
Defining Values

Most values are defined using a combination of input node and slider value. The value returned by the node is multiplied by the slider value before being used. The *Slider* node always returns a value of 1.0, so the value set using the slider control is the value that will get passed into the renderer. If a color node is selected, its rgb value will be converted to hsv and the v component will be used.



2D vs. 3D Textures

There are two types of textures in ShaderMaker; 2D and 3D. The difference between them is the coordinate system upon which they are based. A 2D texture exists in a 2D world - with only 2 coordinates available. For each pair of coordinates there is a corresponding color. The simplest example is a PICT image. Given an xy pair we could easily find the corresponding pixel and its rgb color. 3D textures are a bit more complicated. These textures are like blocks of a material with the object enclosed. Each point within the block can have a different color.

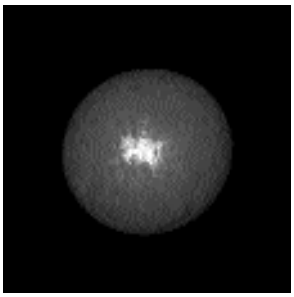


Animating Textures

Any value parameter can be animated. From the pop up menu, select *Function Curve*. Using a *Function Curve* you can graph values relative to time. Another way to animate textures is to use an animated PICT sequence. To do this, you will need a series of sequentially numbered PICT files, with a five digit numeric extension like this: 'texturename.00000'. At render time, the Texture Manager will automatically load the file whose numeric extension matches the current frame number. If the current frame is greater than the last image, the system will cycle the frames, starting with the first frame again. If a frame is missing from the animated PICT sequence, a blank image will be used in its place.

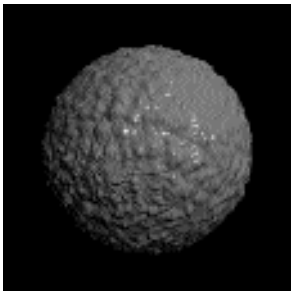
Bump Mapping

Bump mapping, also known as normal perturbation, creates the illusion of surface roughness by altering the surface normals without actually modifying the surface itself. This illusion works well when viewed from the front, but when viewed from the side, it becomes obvious that the surface is actually flat. Height or depth of the bumps can be controlled using the **Bump** slider.



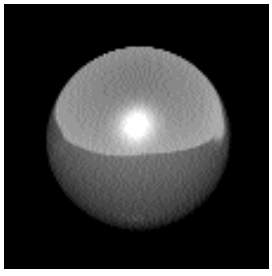
Displacement Mapping

Displacement mapping takes bump mapping to the next level, altering the actual surface itself. Because of this, higher levels of subdivision are required. To change the subdivision level for an object with displacement, select the object and use the **Object Info** palette to change the **U/V Subdivision** parameters to a higher value like 8 or 12. The actual levels required will depend on the resolution of the rendered image, the object's proximity to the Camera and the detail inherent in the displacement map.



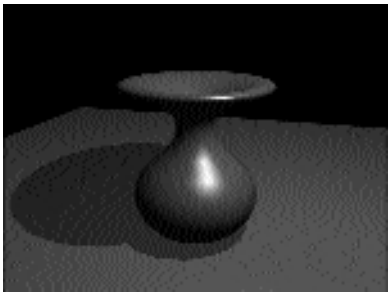
Environment Mapping

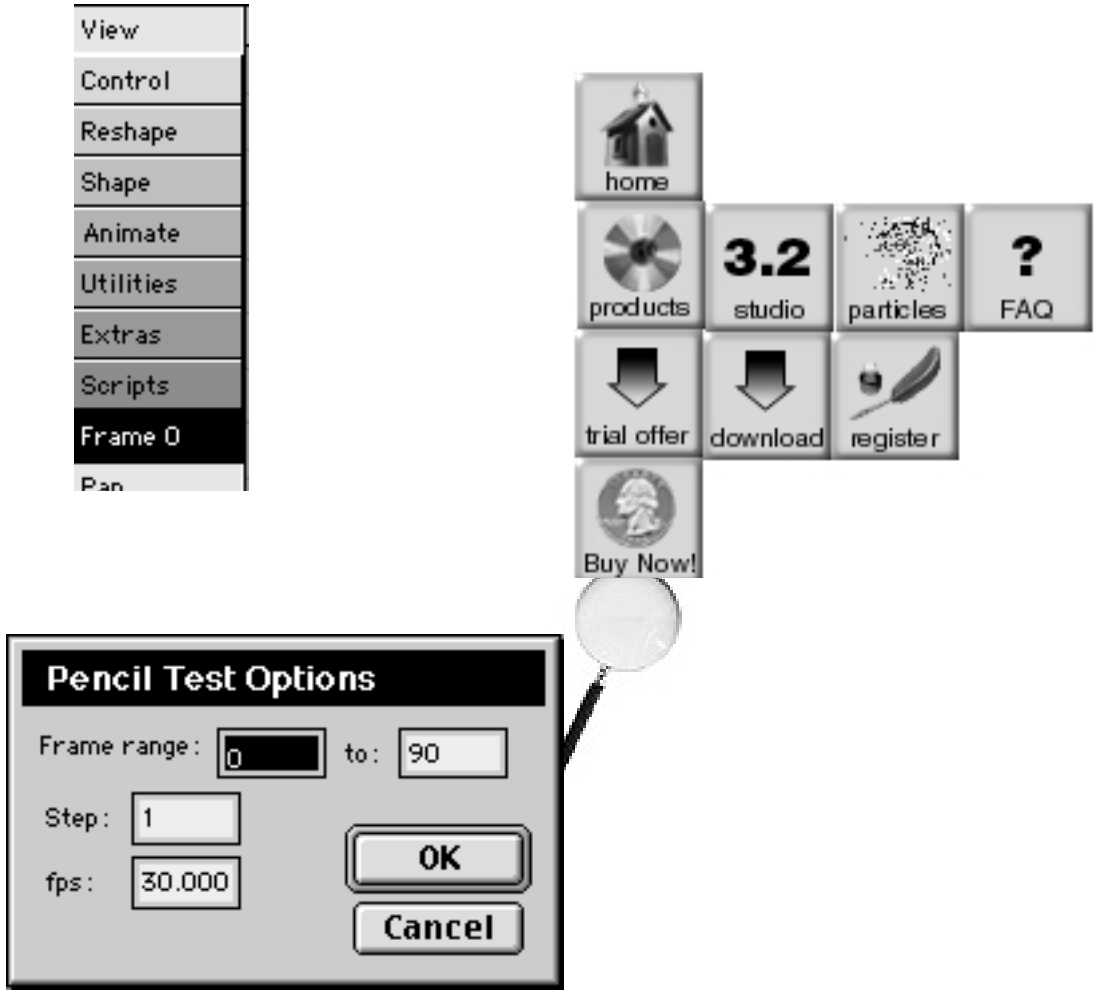
Environment mapping can be used to simulate the effect of an image reflected onto the object's material—without using raytracing. Any color node can be used as an environment map, but it should be noted that all nodes used in this manner will be given a spherical parameterization as if it were a colored sphere that surrounds the object and reflects from the object's surface. Unlike other types of maps, a reflection map is not linked to the object, and will remain stationery when the object moves or rotates. The amount of environment reflected in an abject is controlled using the **Reflectivity** control.



Shadows

Any renderable object can receive and/or cast shadows. You can set these options using the **Object Info** palette.



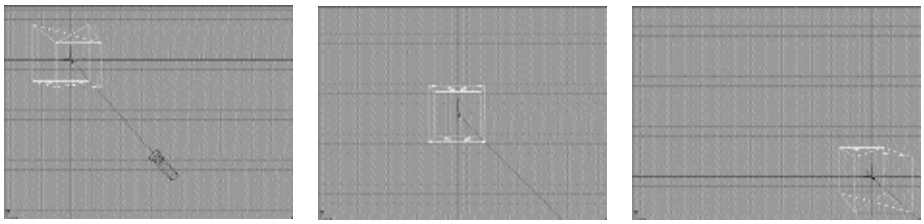

View
Control
Reshape
Shape
Animate
Utilities
Extras
Scripts
Frame 0
home
products
3.2
studio
particles
?
FAQ
trial offer
download
register
Buy Now!
Pencil Test Options
Frame range:
0
to:
90
Step:
1
fps:
30.000
OK
Cancel

tools

View > Pan [shift]

Moves the center of the current viewport. This tool does not effect the geometry of a model.

1. Click *View* from the main tool palette.
2. Click *Pan* in the lower tool palette.
3. Click in any window view and drag the mouse to move the center of that window.



View > Zoom

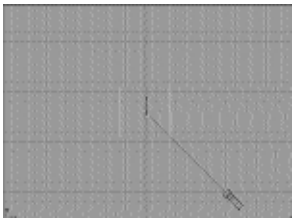
Scales the current view larger in 200% increments or smaller in 50% increments.

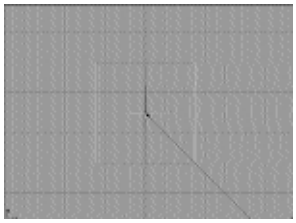
To zoom in:

1. Click *View* in the main tool palette.
2. Click *Zoom* in the lower tool palette.
3. Click in any window view. Each click doubles the size of the image.

To zoom out:

1. Click *View* in the main tool palette.
2. Click *Zoom* in the lower tool palette.
3. **–click** in any window view. Each click reduces the size of the image by half.

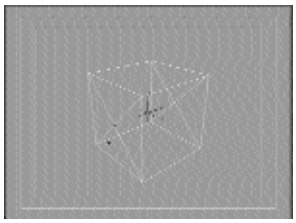


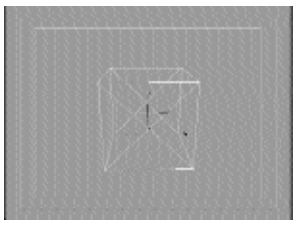


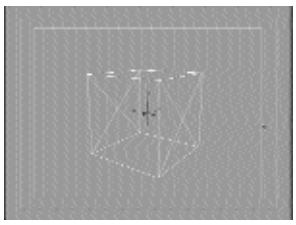
View > Orbit [control]

Rotates the Camera around the Interest.

1. Click *View* in the main tool palette.
2. Click Orbit in the lower tool palette.
3. Click in the Camera view and drag the mouse in any direction. The view turns as the mouse moves around.



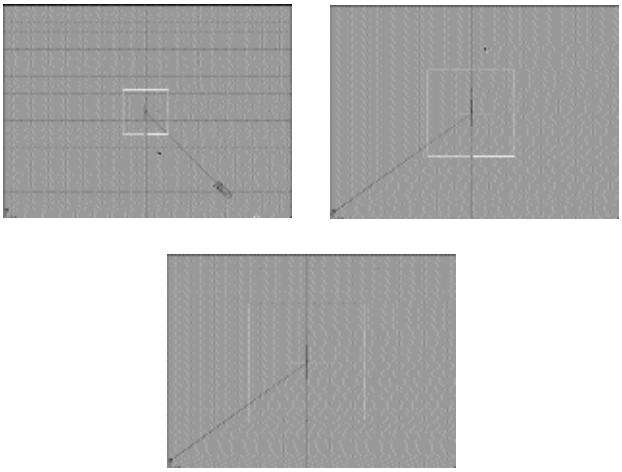




View > Dolly [option]

Interactively changes the user's view of the current view port in or out of a scene.

1. Click *View* in the main tool palette.
2. Click *Dolly* in the lower tool palette.
3. In any view window, click and drag the mouse. To bring the model closer (dolly in), move the mouse toward the bottom of the screen. To move the model further away (dolly out), move the mouse toward the top of the screen.



View > Time [control+shift]

Moves the scene forward or backward in time. Can be used to preview animations, or navigate through an animation.

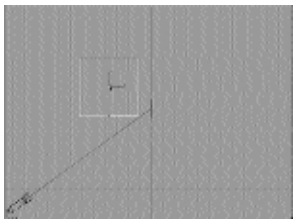
1. Click *View* in the main tool palette.
2. Click *Time* in the lower tool palette.
3. Click in any view and drag the mouse left to move backward or right to move forward in time. The view and frame counter change as the mouse moves.

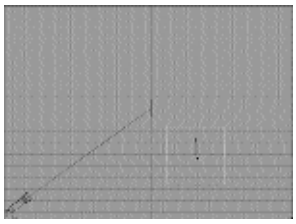
notes

Control > Move [q]

Sets how far the model is offset from the center of the grid.

1. Click *Control* in the main tool palette.
2. Click *Move* in the lower tool palette.
3. Click and drag in any window to move the currently selected model.

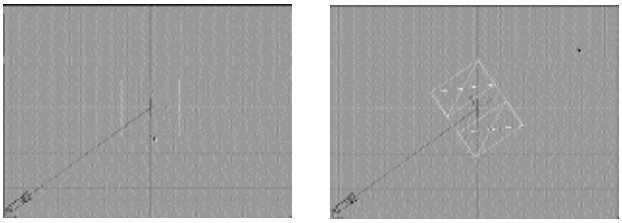




Control > Rotate [w]

Pivots the model, changing its orientation in 3 D space.

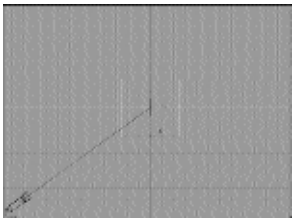
1. Click *Control* in the main tool palette.
2. Click *Rotate* in the lower tool palette.
3. Click in any view and drag the mouse in any direction to rotate the currently selected model.

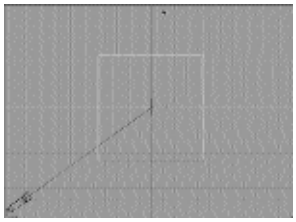


Control > Scale [e]

Resizes the currently selected object.

1. Click *Control* in the main tool palette.
2. Click *Scale* in the lower tool palette.
3. Drag the mouse up or down in any window to rescale the selected object. Moving the mouse up enlarges the object. Moving down reduces the selected object.

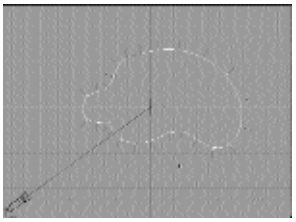




Control > Expand [r]

Expands the currently selected object by 'pushing' each vertex out (or in) along its normal vector.

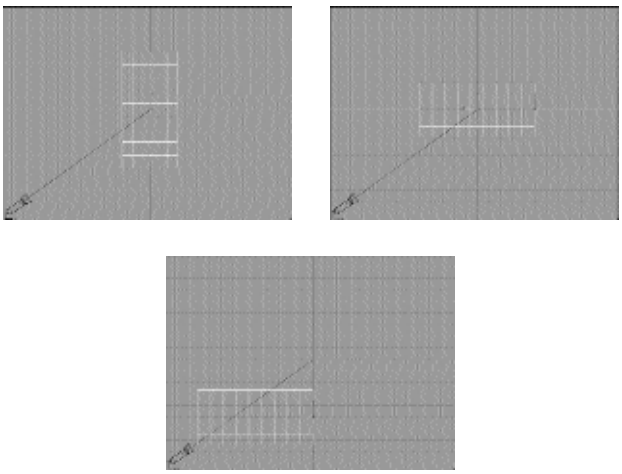
1. Click *Control* in the main tool palette.
2. Click *Expand* in the lower tool palette.
3. Drag the mouse up or down in any window to expand the selected object. Moving the mouse up expands the object. Moving down contracts the selected object.



Control > Center [t]

Moves the x, y, z center of the selected object. Used most often to set an object's pivot point.

1. Select the object.
2. Click *Control* in the main tool palette.
3. Click *Center* in the lower tool palette.
4. Click and drag to move the center of the currently selected object.



Control > Align [y]

Aligns the current object's center point with the center point of the next object selected.

1. Select the object(s) to be aligned.
2. Shift + select the target object. This object should be highlighted in green. If it isn't, deselect everything and go to step 1.
3. Click *Control* in the main tool palette.
4. Click *Align* in the lower tool palette.
5. Set any or all axis you want aligned.
6. Click **OK** to apply or click **Cancel** to abort.

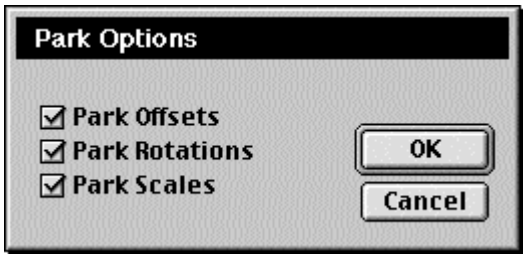
Align Options:

X Center - Sets the x-axis alignment factor.
Y Center - Sets the y-axis alignment factor.
Z Center - Sets the z-axis alignment factor.

Control > Park [u]

Applies all transformations and deformations and locks them into the object. The object center is reset to 0, its scaling is reset to 1 and its rotation is reset to 0. The model will still look the same, but may react differently.

1. Select the object which you want to park.
2. Click *Control* in the main tool palette.
3. Click *Park* in the lower tool palette.
4. Th object is now parked, and all rotations, transformations and deformations have been applied.

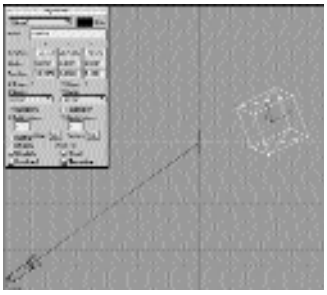


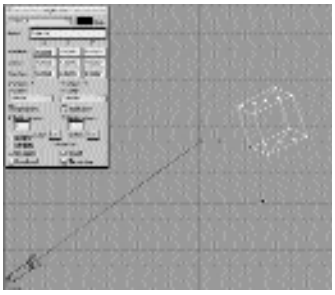
Park Options:

Park Offsets - Applies all position offsets to the objects' mesh and resets the object's positions to 0.0.

Park Rotations - Applies all rotations to the objects' mesh and resets the object's rotations to 0.0.

Park Scales - Applies all scaling factors to the objects' mesh and resets the object's scales to 1.0.

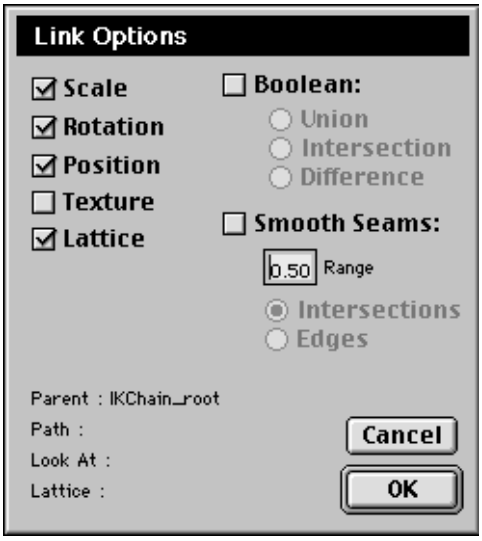




Control > Link/Unlink [o]

Applies a hierarchical (parent/child) grouping to objects so that they operate together but can retain their individual rotation and scale values. If a link has already been established, this tool breaks the hierarchical grouping of objects so that they operate independently once again.

1. Select the object(s) to be linked.
2. Shift + select the target object. This object should be highlighted in green. If it isn't, deselect everything and go to step 1.
3. Click *Control* in the main tool palette.
4. Click *Link/Unlink* in the lower tool palette.
5. To Unlink, hold option down click *Link/Unlink* in the lower tool palette.



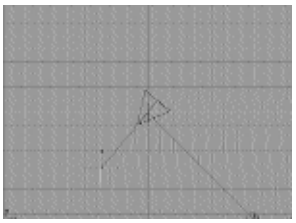
Link Options Options:

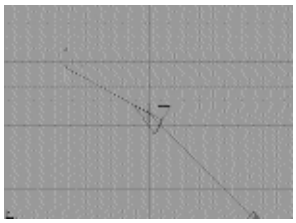
Scale - Inherit scaling factors from parent.
Rotation - Inherit rotational factors from parent.
Position - Inherit x, y, and z offset from parent.
Texture - Inherit all shader parameters from parent.
Lattice - Inherit lattice deformations from parent. (If the parent is linked to a lattice).
Boolean - Sets whether or not this object will effect its parent at rendering time.
Union - Renders the parent and child objects as though they were one.
Intersection - Renders only the overlapping portions of the parent and child.
Difference - Carves out or subtracts the child from the parent when rendering.
Smooth Seams – Enables Fusion™, Pixels proprietary seam smoothing technology, hiding the visible ridges created when non-continuous surfaces intersect.
Range – Sets the size of the Fusion™ blending.
Intersections – Intersecting objects are smoothed. When this is active, the Range parameter is assumed to be in world space.
Edges – The edges of the smoothed objects are blended into the parent object. When this is active, the Range parameter is assumed to be in st (parameter) space.

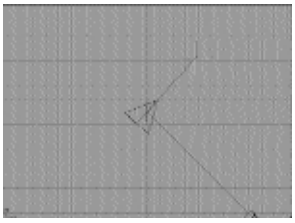
Control > Look/Unlook [p]

Creates a hierarchy which forces one object to always face toward another object. If such a hierarchy has already been established, this tool breaks the hierarchical grouping of objects so that they operate independently once again.

1. Select the object(s) to be looked at.
2. Shift + select the target object. This object should be highlighted in green. If it isn't, deselect everything and go to step 1.
3. Click *Control* in the main tool palette.
4. Click *Look/Unlook* in the lower tool palette.
5. To Unlook, hold option down click *Look/Unlook* in the lower tool palette.



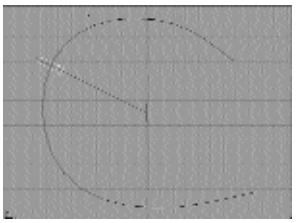




Control > Path/Unpath [Q]

Creates a hierarchy which links an object to a spline, using that spline as the object's motion path. If such a hierarchy has already been established, this tool breaks the hierarchical grouping of objects so that they operate independently once again.

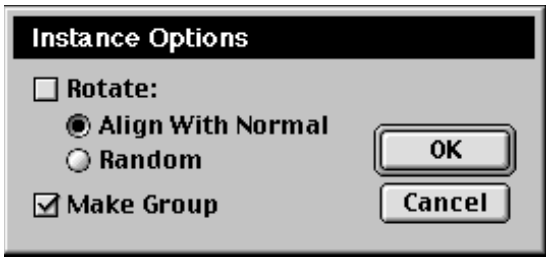
1. Select the object(s) to be pathed.
2. Shift + select the target object. This object should be highlighted in green. If it isn't, deselect everything and go to step 1.
3. Click *Control* in the main tool palette.
4. Click *Path/Unpath* in the lower tool palette.
5. To Unpath, hold option down click *Path/Unpath* in the lower tool palette.



Control > Instance [W]

Duplicates a selected object across the surface of a target object. One copy is created for and aligned with each vertex on the target object.

1. Select the object to be duplicated.
2. Shift select the target object.
3. Click *Control* in the main tool palette.
4. Click *Instance* in the lower tool palette.
5. Set any desired options.
6. Click OK to apply or click Cancel to abort.



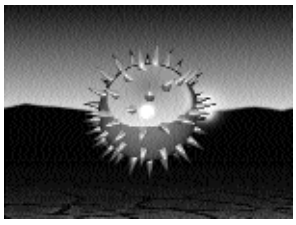
Instance Options:

Rotate – When instancing, rotate each duplicate as described below.

Align With Normal – The duplicates are rotated so that their z-axis' are aligned with the target object's vertex normals.

Random – Using a fractal noise, each duplicate is randomly rotated. This is a good option for simulating natural elements such as leaves on trees.

Make Group – All instanced objects will be linked to a newly created null object.



A cone instanced onto a sphere

Control > Copy Shader [E]

Copies the Shader definition from one object to another.

1. Select the object(s) you want to inherit the shader.
2. Shift + select the object whos shader you want to copy. This object should be highlighted in green. If it isn't, deselect everything and go to step 1.
3. Click *Control* in the main tool palette.
4. Click *Copy Shader* in the lower tool palette.

Control > Copy Shape [R]

Copies the Shape geometry from one object to another.

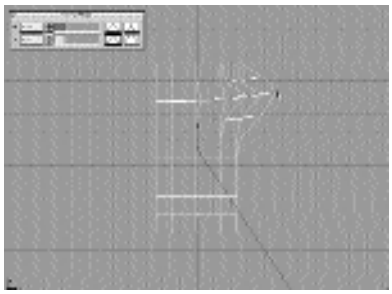
1. Select the object(s) you want to inherit the shape.
2. Shift + select the object whos shape you want to copy. This object should be highlighted in green. If it isn't, deselect everything and go to step 1.
3. Click *Control* in the main tool palette.
4. Click *Copy Shape* in the lower tool palette.

notes

Reshape > Push/Pull [a]

Use to grab any point or column on the mesh and drag it into a new shape.

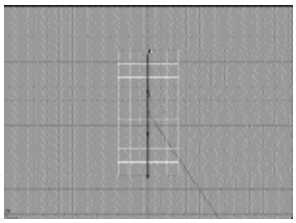
1. Select the object you want to reshape.
2. If desired, adjust the flexibility or tension of the object (see **Flex** in the **Window** menu). The area of effect can be limited using the tag option. Only tagged points will be altered if the tag option is invoked.
3. Click *Reshape* in the main tool palette.
4. Click *Push/Pull* in the lower tool palette.
5. Click on the vertex you want to move.
6. Drag with the mouse to push and pull that vertex into a new form.

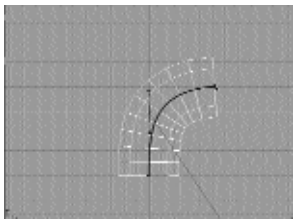


Reshape > Spline [s]

Uses the central Beziér curve present in every *PiXELS:3D* object to bend and reshape that object.

1. Select an object to deform.
2. Click *Reshape* in the main tool palette.
3. Click *Spline* in the lower tool palette. With a color monitor, the spline of the selected object will appear in red.
3. Click on any of the spline's 4 control points and drag to bend and curve the object along its *backbone.*

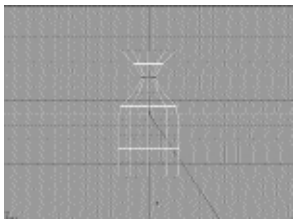




Reshape > Pinch [d]

Constricts all the points in the current v step by pulling them toward their absolute center.

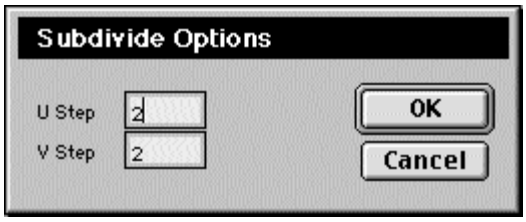
1. Select the object you want to pinch.
2. If desired, adjust the flexibility or tension of the object (see **Flex** in the **Window** menu).
2. Click *Reshape* in the main tool palette.
3. Click *Pinch* in the lower tool palette.
4. Click on any vertex in the v step you want to pinch. Use the *V Col* constraint to help you see which points will be pinched.
5. Drag the mouse up to bulge the points out, or drag down to pinch the points in.



Reshape > Subdivide [f]

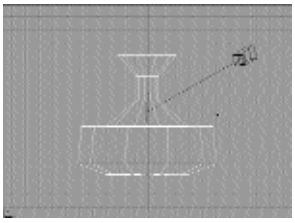
Divides a patch to create a more detailed, smoother, higher resolution object.

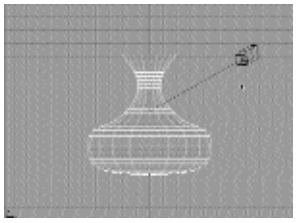
1. Select the object you want to subdivide.
2. Click *Reshape* in the main tool palette.
3. Click *Subdivide* in the lower tool palette.
4. Enter values for **U Step** and **V Step**.
5. Click **OK** to apply or **Cancel** to abort.



Subdivide Options:

U Step - Sets the number of intermediate points to add between each u step.
V Step - Sets the number of intermediate points to add between each v step.

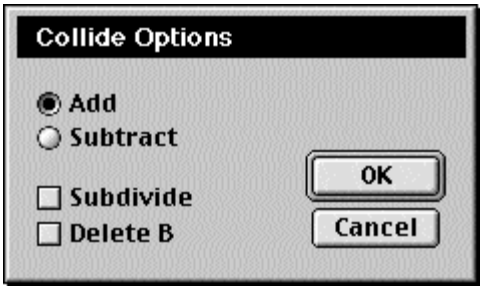




Reshape > Collide [g]

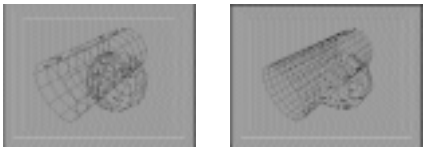
Provides the ability to *push* one object into or out of another to create dents and bumps.

1. Use the *Control* tools to line up the two objects to prepare for collision.
2. Selct the objects that you want to effect the final shape: **shift>select the first object and shift>select additional objects.**
3. The last object selected with **shift will be the object you want to bump or dent.**
4. Click *Reshape* in the main tool palette.
5. Click *Collide* in the lower tool palette.
6. Make the desired changes to the **Collide Options** parameters.
7. Click **OK** to collide or **Cancel** to abort.



Collide Options:

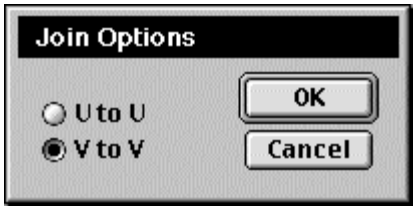
Add - Causes the collision to happen from the inside, pushing outward.
Subtract - Causes the collision to happen from the outside, pushing in.
Subdivide - When selected, causes the object being collided with to subdivide before collision detection. This provides a more accurate representation of the colliding shape, but takes longer to calculate and returns a more complex model.
Delete B - Discards the colliding object (the object used to make the dent) upon return.



Reshape > Join [h]

Bonds two objects together. Objects need the same number of points along the bonding axis to be joined.

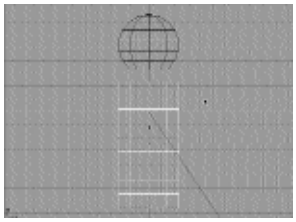
1. Use the *Control* tools to line up the two objects to prepare for joining.
2. **S**elect the first object you want to join. Select the object on the end you want joined.
3. shift select **the** object you want to join. Make sure you click on the end you want joined when selecting the second object..
4. Click *Reshape* in the main tool palette.
5. Click *Join* in the lower tool palette.
6. Set the desired parameters.
7. Click **OK** to join or **Cancel** to abort.

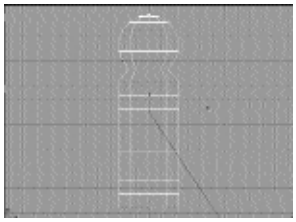


Join Options:

V to V - Joins the two selected objects while maintaining the step count of the v-axis.

U to U - Joins the two selected objects while maintaining the step count of the u-axis.

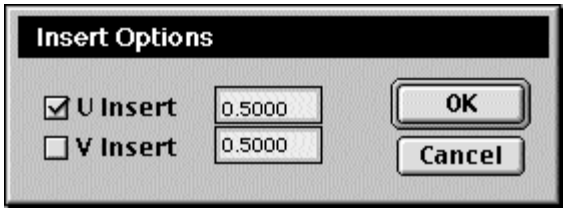




Reshape > Insert [j]

Adds a column of control points along the u and/or v-axis.

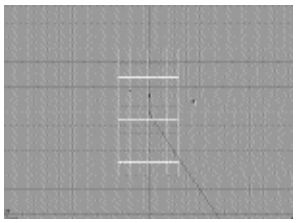
1. Select the object you want to insert points on.
   Inserted column of points will be between the currently selected point and the next point in line.
2. Click *Reshape* in the main tool palette.
3. Click *Insert* in the lower tool palette.
4. Set the desired parameters.
5. Click **OK** to insert or **Cancel** to abort.

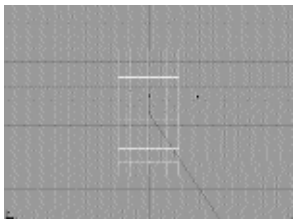


Insert Options:

U Insert - Adds a column of points along the object's u-axis. The number represents where the new column will lie between the current column and the next column in the patch.

V Insert - Adds a column of points along the object's v-axis. The number represents where the new column will lie between the current column and the next column in the patch.

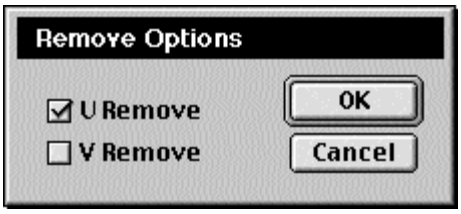




Reshape > Remove [k]

Removes a column of control points along the u and/or v-axis.

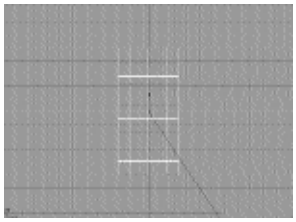
1. Select the object you want to effect.
2. Click on a point in the column you want removed.
3. Click *Reshape* in the main tool palette.
4. Click *Remove* in the lower tool palette.
5. Set the desired parameters.
6. Click **OK** to remove or **Cancel** to abort.

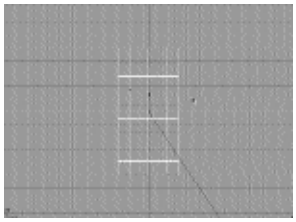


Remove Options:

U Remove - Removes a column of points along the object's u-axis.

V Remove - Removes a column of points along the object's v-axis.





Reshape > Flip [I]

Reverses the object across the x, y or z plane.

1. Select the object you want to flip.
2. Click **Reshape** in the main tool palette.
3. Click **Flip** in the lower tool palette.
4. Set the desired parameters.
5. Click **OK** to flip or **Cancel** to abort.

Flip Options:

Global Coordinates - Flips the object's position values as well as the geometry.

X Axis - Flips the object on its x-axis.

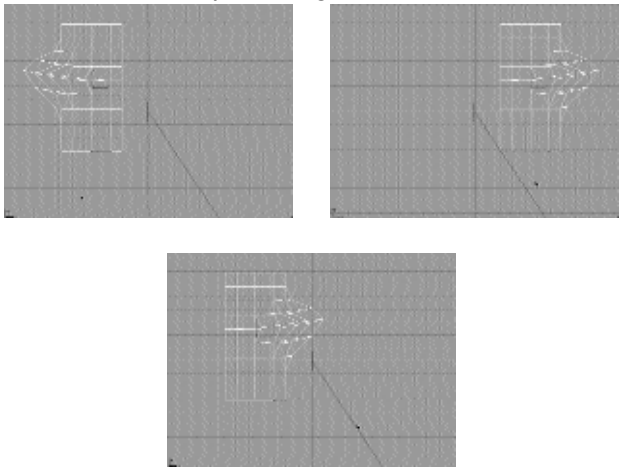
Y Axis - Flips the object on its y-axis.

Z Axis - Flips the object on its z-axis.

Stitch – Connects the original with the flipped state, creating a symmetrical object.

U to U – Connects the shapes along the U axis.

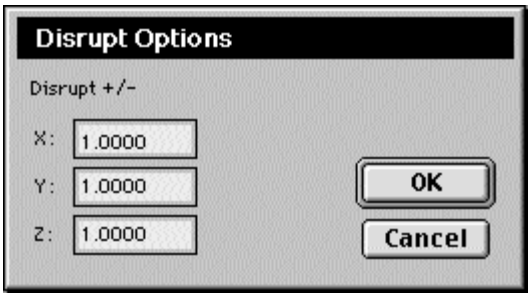
V to V – Connects the shapes along the V axis.



Reshape > Disrupt [A]

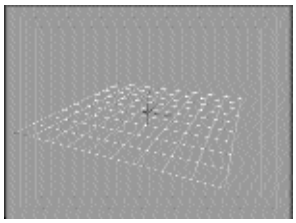
Randomly displaces every vertex on the selected patch.

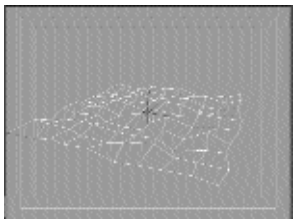
1. Select the object you want to disrupt.
2. Click *Reshape* in the main tool palette.
3. Click *Disrupt* in the lower tool palette.
4. Set the **Disrupt Options** parameters.
5. Click **OK** to disrupt or **Cancel** to abort.



Disrupt Options:

X - Sets the maximum displacement factor for X.
Y - Sets the maximum displacement factor for Y.
Z - Sets the maximum displacement factor for Z.

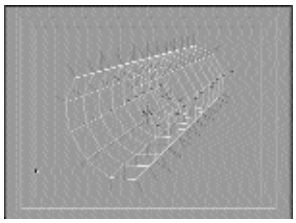
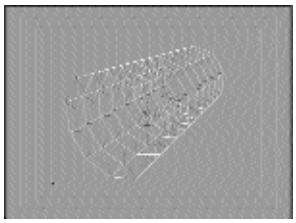




Reshape > Invert [S]

Reverses the surface normals.

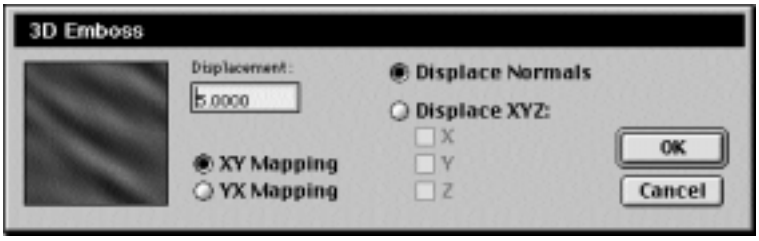
1. Select the object you want to invert.
2. Click **Reshape** in the main tool palette.
3. Click **Invert** in the lower tool palette.
4. The object's normals are now inverted. Use the **Window > View > Normals** (/) menu item to view the normals.

Reshape > 3D Emboss [D]

Uses the luminance values from any PICT image to displace the selected patch.

1. Select the object you want to emboss.
2. Click *Reshape* in the main tool palette.
3. Click *3 D Emboss* in the lower tool palette.
4. Set the **3 D Emboss Options** parameters.
5. Click **OK** to emboss or **Cancel** to abort.



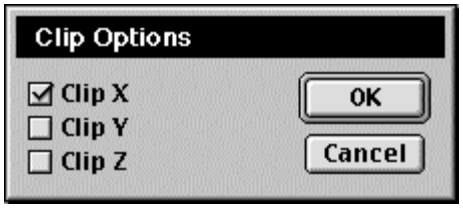
3 D Emboss Options:

Image Box - Displays the current PICT image. If none is selected, this box will display a message stating so. Click on this box to load a PICT image.
Displacement - The offset factor. This number is multiplied by the luminance of the displacement map at any given pixel to factor how far to offset each vertex. The luminance values are read as decimals ranging from 0 for pure black to 1 for pure white.
XY Mapping - Maps the x to u and y to v.
YX Mapping - Maps the y to u and x to v.
Displace Normals - Displacement will follow the surface normal.
Displace XYZ - Displacement will follow the selected axis.
X - Allows displacement along the x-axis.
Y - Allows displacement along the y-axis.
Z - Allows displacement along the z-axis.

Reshape > Clip [F]

Removes any portion of the selected object which lies in the negative coordinate area of a selected axis.

1. Select the object you want to clip.
2. If necessary, rotate or move the object so that the part of the object you want to trim off is positioned in the negative half of the coordinate axis you are going to use for clipping.
3. Click *Reshape* in the main tool palette.
4. Click *Clip* in the lower tool palette.
5. Set the axis you want to clip using the check boxes in the **Clip Options** dialog.
6. Click **OK** to clip or **Cancel** to abort.

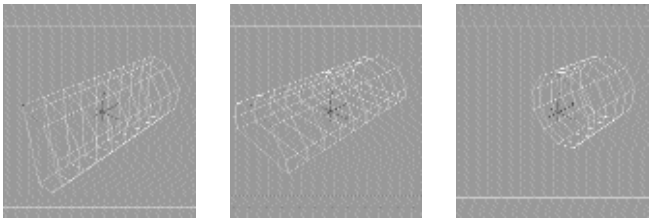


Clipping Options:

Clip X - Clips any portion of the selected model which lies below 0 along the x-axis.

Clip Y - Clips any portion of the selected model which lies below 0 along the y-axis.

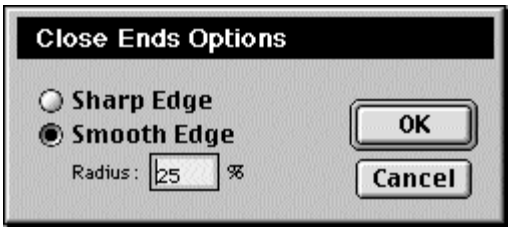
Clip Z - Clips any portion of the selected model which lies below 0 along the z-axis.



Reshape > Close Ends [G]

Adds flat or rounded end caps to the open sides of a selected object.

1. Select the object you want to close.
2. Click *Reshape* in the main tool palette.
3. Click *Close Ends* in the lower tool palette.
4. Set the **Close Ends Options** parameters.
5. Click **OK** to close or **Cancel** to abort.

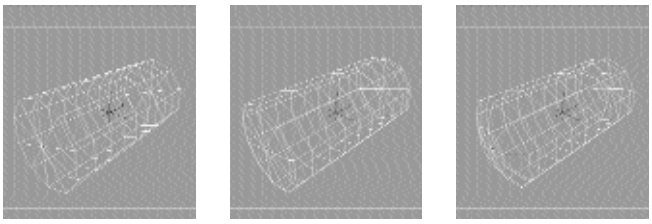


Close Ends Options:

Sharp Edge - Sets the angle between the end cap and object at 90°. For B-Splines and NURBs this option also doubles-up the vertices at the corner to sharpen it.

Smooth Edge - Sets the angle between the end cap and object at 45°. Also takes into account the Radius parameter when factoring edge smoothness.

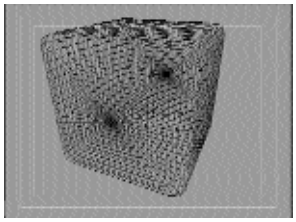
Radius - Sets the distance between the rounding vertices. The distance is equal to Radius multiplied by the distance to the end cap's center. Vertices closest to the end cap are moved in by this amount, all other rounding vertices are moved back by this amount.

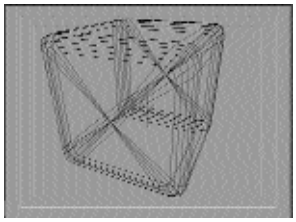


Reshape > Optimize [H]

Streamlines planar surfaces by removing redundant vertices that do not affect the object's geometry.

1. Select the object you want to optimize.
2. Click *Reshape* in the main tool palette.
3. Click *Optimize* in the lower tool palette.
4. The computer will display a progress bar to let you know it's working. When it's done, the model will be optimized.





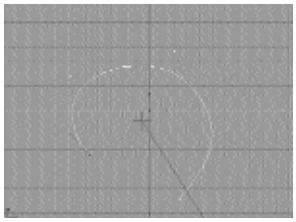
Reshape > Re-Order [J]

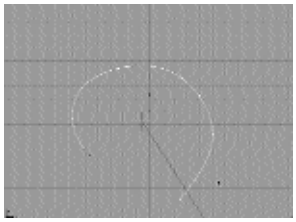
Recreates the existing spline as closely as possible using the desired number of vertices.

1. Select the spine you want to re-order.
2. Click *Reshape* in the main tool palette.
3. Click *Re-Order* in the lower tool palette.
4. Set the desired options and click **OK** to accept or **Cancel** to abort.

Reorder Options

Steps - Sets the number of vertices the resulting spline will have.
Uniform Spacing - The resultant spline will have evenly spaced vertices.
Random Spacing - The resultant spline will have randomly spaced vertices.





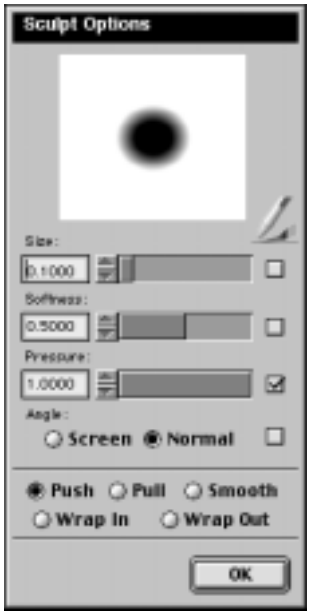
Reshape > Sculpt

Interactively paint surface deformations directly onto a selected object.

To use a Wacom Intuos Tablet with PiXELS:3D you will need to have the "Wacom Tablet" control panel version 4.2.0 or later in the "Control Panels" folder of the System folder of the startup disk of your Macintosh. Other tablets may work, but they have not been tested by Pixels.

The Wacom tablet is particularly useful with the PiXELS:3D "Sculpt" tool. Note that you must have the Studio version of PiXELS:3D to use the Sculpt tool. If you have the Standard version, the Sculpt tool will not appear in the tool palette.

When you select the Reshape>Sculpt tool, you will see the "Sculpt Options" dialog box. Along the right side of the dialog are a series of check boxes that control how the pen affects the Sculpt tool. The sliders for "Size", "Softness", and "Pressure" set the maximum values for each of those parameters when using the tablet. In other words they set the sensitivity of the pen for those parameters. When the "Angle" checkbox is checked, the angle of the pen modifies the base angle selected in the radio buttons to the left: "Screen" or "Normal". If "Screen" is selected the base angle is perpendicular to the screen. If "Normal" is selected the base angle is perpendicular to the object surface.



To use the Sculpt tool:

- Position the cursor over a selected object in the Camera view
- Depress the mouse switch (by depressing the pen or holding down the pen button, depending on how you've set up the "Wacom tablet" control panel).
- Move the pen around the area you want to affect. The Sculpt tool doesn't do anything when it is not moving.

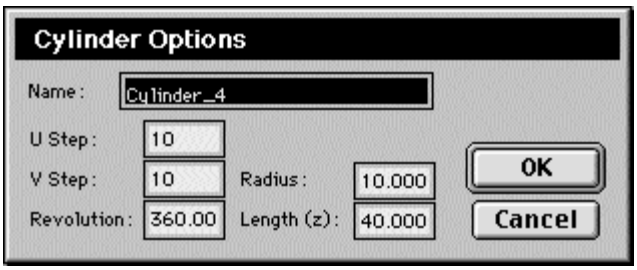
When you are interacting with the Sculpt tool, the selected object is drawn at a lower resolution to allow more responsive interaction. After each use of the Sculpt tool the object is redrawn at full resolution. If "Push" or "Pull" is selected at the bottom of the Sculpt Options dialog, you can turn the pen over and use the eraser to perform the opposite action. The same is true for the "Wrap In" and "Wrap Out" options. These allow you to use the pen to selectively control the Wrap tool described above.

notes

Shape > Cylinder [1]

A straight spline rotated 360° around an axis.

1. Click *Shape* in the main tool palette.
2. Click *Cylinder* in the lower tool palette.
3. Name the object. Naming objects makes them easier to select from the command line. This is nice when dealing with a large scene.
4. Set the **U Step, V Step, Revolution, Radius** and **Length (z)** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.



Cylinder Options:

U Step - The number of vertices circling the cylinder. A higher value makes the cylinder rounder but may take longer to redraw and render. The minimum number is 3.

V Step - Represents the number of rings this cylinder will have. A value of 1 will create a circle.

Revolution - How far to spin the spline which will form the cylinder. 360° represents a full, closed cylinder.

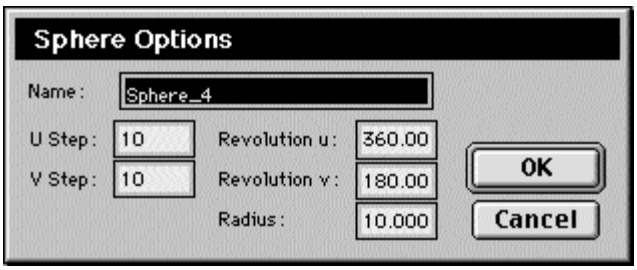
Radius - The width (x) and height (y) of the finished cylinder.

Length (z) - The depth (z) of the finished cylinder.

Shape > Sphere [2]

A semi-circular spline which has been rotated 360° around an axis.

1. Click *Shape* in the main tool palette.
2. Click *Sphere* in the lower tool palette.
3. Name the object. Naming objects now makes them easier to select from the command line. This is nice when dealing with a large scene.
4. Set the **U Step, V Step, Revolution U, Revolution V** and **Radius** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.



Sphere Options:

U Step - The number of vertices circling the sphere. A higher value makes the sphere smoother but may take longer to redraw and render. The minimum number is 3.

V Step - Represents the number of rings this sphere will have. The minimum number is 2.

Revolution U - 360 degrees forms a full sphere.

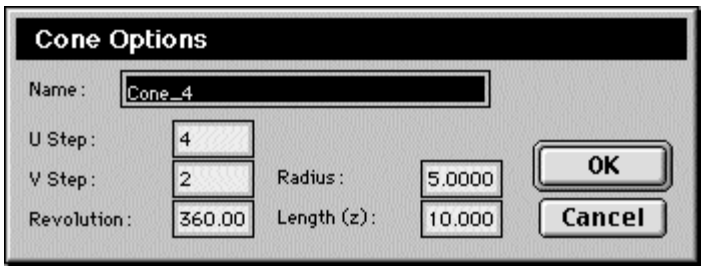
Revolution V - 180 degrees forms a full sphere from top to bottom.

Radius - The width (x) and height (y) and depth (z) of the finished sphere.

Shape > Cone [3]

A cylinder with the x and y axis scaled down to a point at one end.

1. Click *Shape* in the main tool palette.
2. Click *Cone* in the lower tool palette.
3. Name the object. Naming objects now makes them easier to select from the command line. This is nice when dealing with a large scene.
4. Set the **U Step, V Step, Revolution, Radius and Length (z)** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.



Cone Options:

U Step - The number of vertices circling the cone. A higher value makes the cone rounder but may take longer to redraw and render. The minimum number is 3.

V Step - Represents the number of rings this cone will have. The minimum number is 2.

Revolution - How far to spin the spline which will form the cone. 360° represents a full, closed cone.

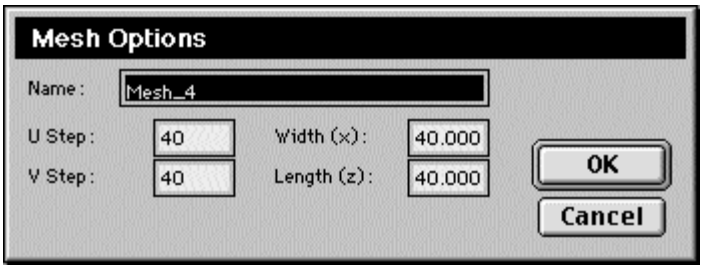
Radius - The width (x) and height (y) of the finished cone.

Length (z) - The depth (z) of the finished cone.

Shape > Mesh [4]

A flat plane which can be formed into a 3 D shape by pushing and pulling its points.

1. Click *Shape* in the main tool palette.
2. Click *Mesh* in the lower tool palette.
3. Name the object. Naming objects now makes them easier to select from the command line. This is nice when dealing with a large scene.
4. Set the **U Step, V Step, Width (x) and Length (z)** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.



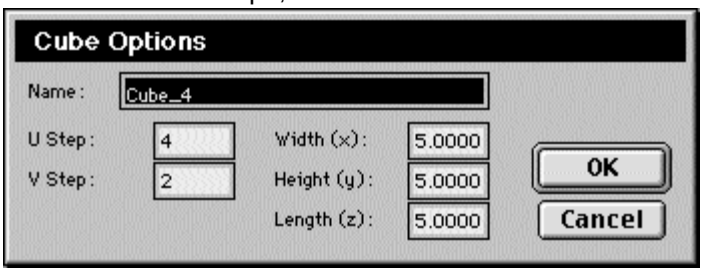
Mesh Options:

U Step - The number of vertices along the u-axis The minimum number is 2.
V Step - The number of vertices along the v-axis. The minimum number is 2.
Width (x) - The width (left to right) of the finished mesh.
Length (z) - The depth (front to back) of the finished mesh.

Shape > Cube [5]

A six sided solid block.

1. Click *Shape* in the main tool palette.
2. Click *Cube* in the lower tool palette.
3. Name the object. Naming objects now makes them easier to select from the command line. This is nice when dealing with a large scene.
4. Set the **U Step, V Step, Width (x), Height (y)** and **Length (z)** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.



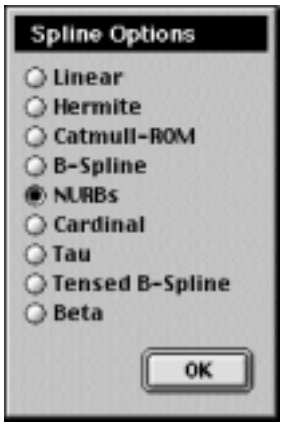
Cube Options:

U Step - The number of vertices along the u-axis The minimum number is 4.
V Step - The number of vertices along the v-axis. The minimum number is 1.
Width (x) - The width (left to right) of the finished cube.
Height (y) - The height (top to bottom) of the finished cube.
Length (z) - The depth (front to back) of the finished cube.

Shape > Spline [6]

The most basic primitive. This is the building block upon which all other shapes are based.

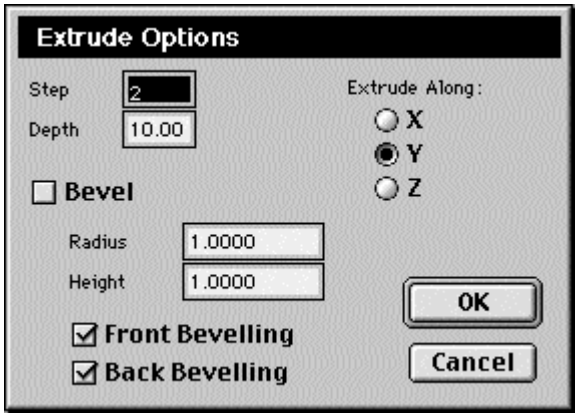
1. Click *Shape* in the main tool palette.
2. Click *Spline* in the lower tool palette.
3. Click in any window to enter drawing mode and start drawing. The first click defines the position of the first vertex. Each subsequent click will define the next vertex in line.
4. Double click to add the last vertex and exit drawing mode, or click on the first vertex to close the shape and exit drawing mode.
5. Use **Window > Object Info** to name the object. Naming objects now makes them easier to select from the command line. This is nice when dealing with a large scene.



Shape > Extrude [7]

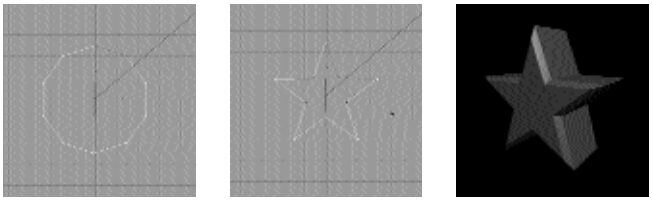
Pulls a 2-D spline into 3 D space along a pre-defined axis.

1. Select the spline to be extruded.
2. Click *Shape* in the main tool palette.
3. Click *Extrude* in the lower tool palette.
4. Set the **Extrude Options** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.



Extrude Options:

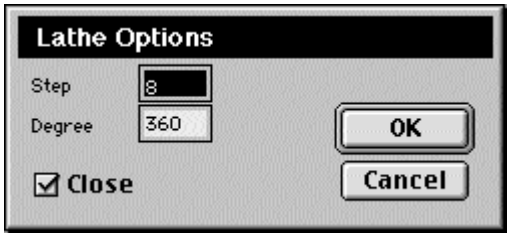
Step - The number of vertices along the v-axis The minimum number is 2.
Depth - The depth (front to back) of the finished object.
Bevel - Creates a 45° edge between both faces and the extruded object. This option will add v-steps to the finished object if needed.
Radius - How far the bevel pushes the surface out. A negative number will push the bevel inward.
Height - How far the bevel will extrude from the current face.
Front Beveling- Place a bevel on the front face of the extruded object.
Back Beveling- Place a bevel on the back face of the extruded object.



Shape > Lathe [8]

Spins a 2-D spline around the y-axis to create a new 3 D shape.

1. Select the spline to lathe. The spline must be drawn in the front or right window. The revolution is made around the y-axis.
2. Click *Shape* in the main tool palette.
3. Click *Lathe* in the lower tool palette.
4. Set the **Lathe Options** parameters as desired.
5. Click **OK** to create the shape, or click **Cancel** to abort.

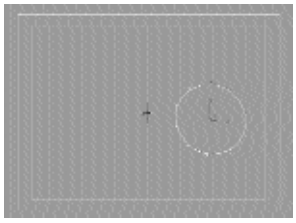


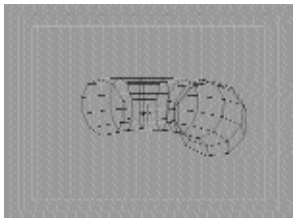
Lathe Options:

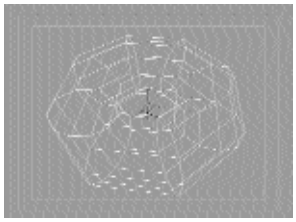
Step - The number of vertices along the u-axis The minimum number is 4. The higher this number, the *rounder* the final shape will appear.

Degree - The spline will revolve (counter clockwise) the number of degrees set around the y-axis.

Close - Closes the object ends.



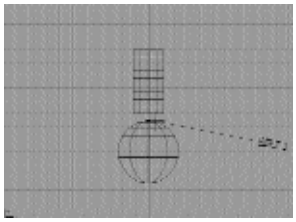
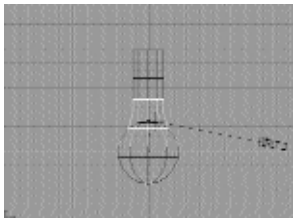
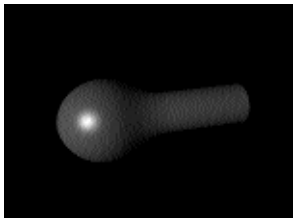




Shape > Loft [9]

Creates a 3 D object from a collection of splines defining "slices" of the object.

1. Draw or import a collection of splines representing different "slices" of the object (splines must contain the same amount of vrticies).
2. **select the first spline**.
3. Shift + select each additional slice, in order as they are to be lofted.
4. Click *Shape* in the main tool palette.
5. Click *Loft* in the lower tool palette.

Shape > Light [0]

Places a light source in the scene and sets its intensity. Any number of lights may be placed in a scene, and each can be colored and moved.

1. Click *Shape* in the main tool palette.
2. Click *Light* in the lower tool palette.
3. Use the **Control > Move** tool to place the object anywhere in the scene.

Shape > IK chain [!]

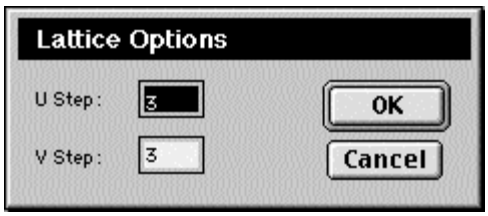
Allows you to draw kinematic chains. There is no limit to the number of joints allowed in a single chain.

1. Click *Shape* in the main tool palette.
2. Click *IK Chain* in the lower tool palette.
3. Click in any window to enter drawing mode and start drawing. The first click defines the position of the first joint. Each subsequent click will define the next joint in the chain.
4. Double click to add the last joint and exit drawing mode.

Shape > Lattice [@]

A special primitive which resembles a cube. The lattice defines an area in 3 D space. This area can be deformed by reshaping the lattice. Any point on any object linked to this lattice, which falls within this lattice, will be remapped to the lattice's deformed 3 D space.

1. Select the object you want to create a lattice around.
2. Click *Shape* in the main tool palette.
3. Click *Lattice* in the lower tool palette.
4. Set the **Lattice Options** parameters as desired.
5. Click **OK** to create the lattice, or click **Cancel** to abort.



Lattice Options:

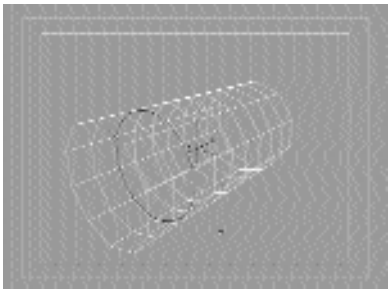
U Step - The number of subdivisions this lattice will have left to right and top to bottom.

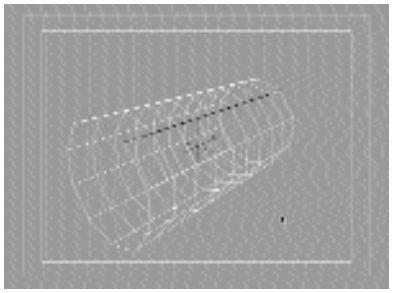
V Step - The number of subdivisions this lattice will have front to back.

Shape > Extract [$]

Copies the currently selected u-col or v-col and pastes it into the scene, creating a new 2-D spline.

1. Select the object and *col* to extract.
2. Select either *U-Col* or *V-Col* constraint. If neither is selected *V-Col* is assumed.
3. Click *Shape* in the main tool palette.
4. Click *Extract* in the lower tool palette.
5. The selected u-col or v-col will be extracted and become the currently selected object.

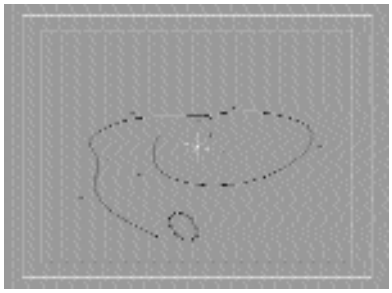


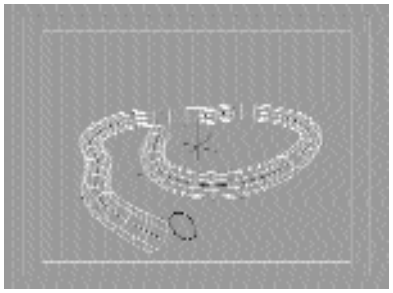


Shape > Path extrude [%]

Creates a 3 D object by projecting one spline along another spline which is used as a path.

1. Select the object to extrude.
2. **shift select the path.**
3. Click *Shape* in the main tool palette.
4. Click *Path Extrude* in the lower tool palette.





Shape > Null [&]

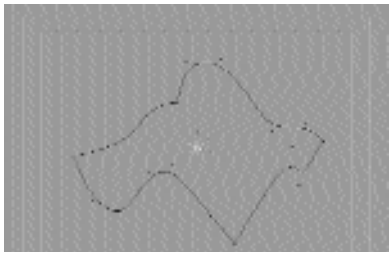
Creates a simple primitive which represents a position in space. A null does not show up when rendered.

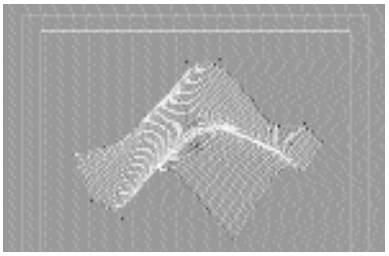
1. Click *Shape* in the main tool palette.
2. Click *Null* in the lower tool palette.

Shape > 4-Side Blnd [(]

Uses four user defined boundary curves to interpolate a patch.

1. Use the *Spline* tool to draw four boundary curves. The number of steps need not be the same in any of the splines, but the direction of the opposing curves (front/back and left/right) should be the same. If not, the resultant shape will have a twist.
2. Arrange the curves such that they define a boundary. The corners need not touch, but the closer they are the better.
3. Select the four boundary curves, making sure to select them in clockwise order.
4. Click *Shape* in the main tool palette.
5. Click *4-Side Blnd* in the lower tool palette.





Shape > Trim Surface

Converts a 2D spline drawn in the front (xy) view into a renderable surface with the same shape as the original spline. If additional 2D splines are linked to the spline being trimmed, they will be incorporated into the trim surface as well.

1. In the front view, draw a spline. If you prefer, splines can be imported from Adobe Illustrator.
2. With the spline selected, click *Shape* in the main tool palette.
3. Click *Trim Surface* in the lower tool palette.

Shape > Microscribe

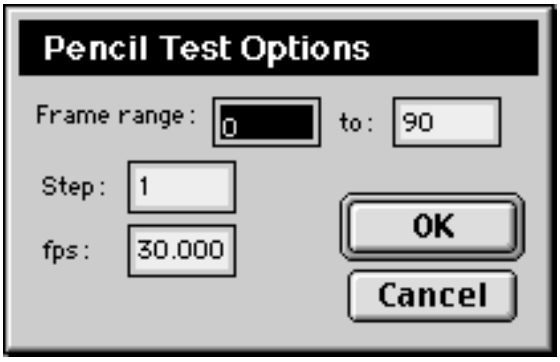
Works with the Microscribe digitizer from Immersion.

1. Make sure your digitizer is properly connected to your machine.
Note: you must be connected to the modem port.
2. Click *Shape* in the main tool palette.
3. Click *Microscribe* in the lower tool palette.
4. In the camera view, a null object should be visible.
If not, dolly out until it is visible.
This null object represents the tip of the digitizer.
5. Position the digitizer on the first point to digitize.
6. Press the **space** bar to insert a point.
7. Position the digitizer on the next point to digitize.
8. Repeat steps 6 & 7 until all points on this cross section have been digitized.
9. Press the **enter** key to finish a cross section.
10. Move to the next cross section.
11. Repeat steps 5 - 10 until all cross sections have been entered.
12. Hit the **escape** key to return to normal modeling mode.
13. Loft the cross sections.

Pencil Test [,]

Renders a B&W wireframe (depending on which Shaded Preview options are selected) of all the frames in an animation, then plays them back in real time.

1. Create an animation.
2. Click *Animate* in the main tool palette.
3. Click *Pencil Test* in the lower tool palette.
4. Set the **frame range** and **step rate** in the **Pencil Test Options** dialog. Click **OK**.
5. The computer will render each frame, one by one. When it is done, it will play them back at full speed.`
6. To stop playback, click the mouse.
7. To scrub through frames, hold down the mouse and move left to rewind or right to fast forward.



Pencil Test Options:

From - First frame in the Pencil Test Animation.
to - Last frame in the Pencil Test Animation.
Step - Forces renderer to draw every *n*th frame.
fps – Sets the number of frames displayed per second.

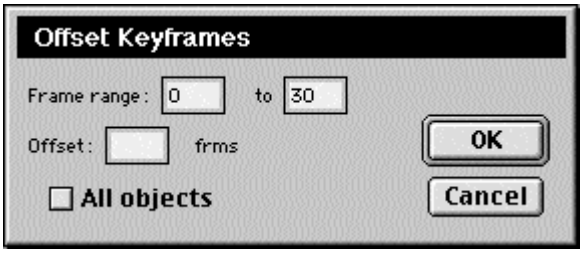
Offset Keys [+]

Moves all keyframes for the current object or all objects in a scene.

1. Select an object.
2. Click *Animate* in the main tool palette.
3. Click *Offset Keys* in the lower tool palette.
4. Enter an offset value and a frame range. To alter all objects in a scene, enable the All objects option. Click **OK** to accept or click **Cancel** to abort.
5. All keyframes for the current object, or all objects, between the inpoint and the outpoint will be offset by the value defined.

Offset Keys Options:

Frame range - Defines a range of frames which this function will effect.
Offset - Defines an offset which the keyframes' position in time will be offset by.
All objects - When enabled, forces the function to effect all objects in a scene.



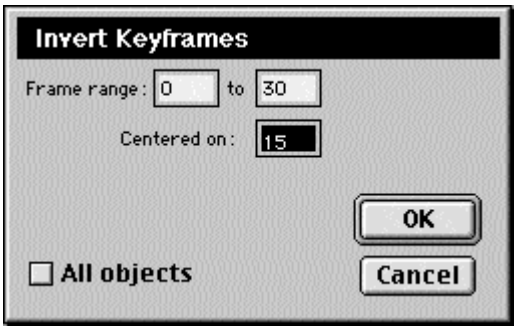
Invert Keys [<]

Flips all keyframes for the current object or all objects in a scene.

1. Select an object.
2. Click *Animate* in the main tool palette.
3. Click *Invert Keys* in the lower tool palette.
4. Enter a frame range. To alter all objects in a scene, enable the All objects option. Click **OK** to accept or click **Cancel** to abort.
5. All keyframes for the current object, or all objects, between the inpoint and the outpoint will be inverted.

Invert Keys Options:

Frame range - Defines a range of frames which this function will effect.
Centered on - Defines a pivot point around which the keyframes will be flipped.
All objects - When enabled, forces the function to effect all objects in a scene.



Scale Keys [–]

Scales all keyframes for the current object or all objects in a scene.

1. Select an object.
2. Click *Animate* in the main tool palette.
3. Click *Scale Keys* in the lower tool palette.
4. Enter a scale factor value and a frame range. To alter all objects in a scene, enable the All objects option. Click **OK** to accept or click **Cancel** to abort.
5. All keyframes for the current object, or all objects, between the inpoint and the outpoint will be scaled by the value defined.

Scale Keys Options:

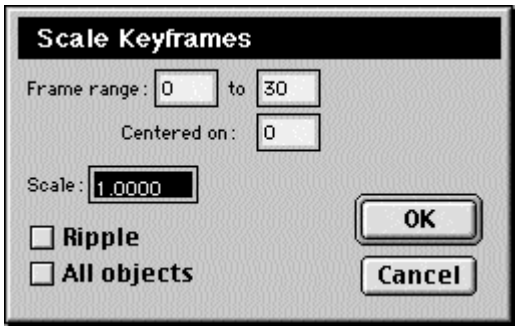
Frame range - Defines a range of frames which this function will effect.

Centered on - Defines a reference frame for scaling.

Scale - Defines a scaling factor which the keyframes' position in time will be scaled by. (i.e. a value of 0.5 = 50%)

Ripple All frames after the last frame scaled will be offset such that they remain sequenced with this last frame.

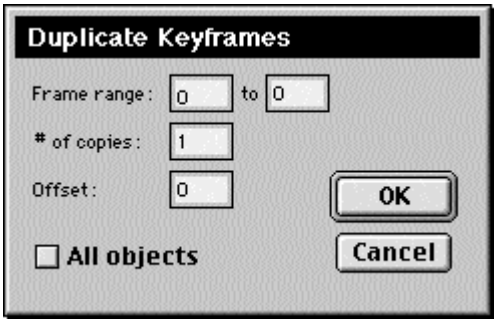
All objects - When enabled, forces the function to effect all objects in a scene.



Dup. Keys... [>]

Used to duplicate a set of keyframes for action that repeat in an animation.

Duplicate Keys Options



Frame range From To - Specifies the range of frames from which keyframes are copied.

# of copies - How many copies to make.

Offset - If offset is zero, copies will be appended to the existing function curve. If some non-zero value is specified for Offset, each copy will be shifted forward that number of frames.

All Objects - Copy keyframes for all object or just the selected one.

notes

View PICT

A simple utility which allows you to quickly preview any PICT image.

1. Click *Utility* in the main tool palette.
2. Click *View PICT* in the lower tool palette.
3. Use the standard **Open** dialog which comes up to locate and select a PICT file.
4. Click the **Open** button to accept.
5. A window containing your selected image will appear centered on the main screen.
6. Click in the image window to return to normal operation.

View TIFF

A simple utility which allows you to quickly preview any 24bit TIFF image.

1. Click *Utility* in the main tool palette.
2. Click *View TIFF* in the lower tool palette.
3. Use the standard **Open** dialog which comes up to locate and select a TIFF file.
4. Click the **Open** button to accept.
5. A window containing your selected image will appear centered on the main screen.
6. Click in the image window to return to normal operation.

View PICTS

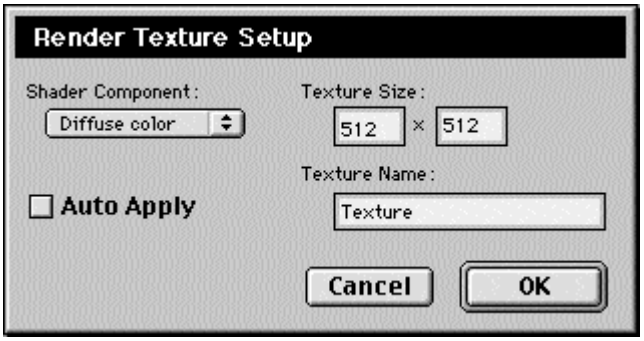
A simple utility which allows you to load and playback a series of PICT frames.

1. Click *Utility* in the main tool palette.
2. Click *View PICTs* in the lower tool palette.
3. Use the standard **Open** dialog which comes up to locate and select a the first frame of your animation. NOTE: the file name must match standard *PiXELS:3D* file naming conventions for sequentially numbered PICTs - file name.#####.
4. Click the **Open** button to accept.
5. A window containing your selected image will appear centered on the main screen. Each frame in turn will be loaded and displayed. After all frames have been loaded into memory they will be played back at the speed set under **File > Render Setup**.
6. To stop playback, click the mouse.
7. To scrub through frames, hold down the mouse and move left to rewind or right to fast forward.

Render Texture

Allows complex procedural Shaders to be rendered out to uv maps which can then be applied to the model.

1. Click *Utility* in the main tool palette.
2. Click *Render Tex* in the lower tool palette.
3. Set the desired options.
4. Click the **OK** to accept or **Cancel** to abort.



Render Texture Setup Options:

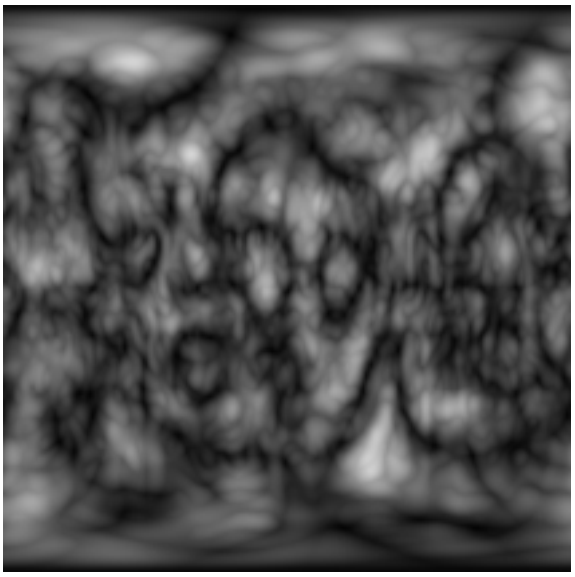
Shader Component - A pop up menu which lists all the base ShaderMaker nodes. Any one of these can be rendered out.

Auto Apply - After rendering, the uv map is loaded into memory and applied to the selected Shader component. Note: the procedural shader used to render this map will be overwritten. If you wish to keep this, the Shader must be saved first.

Texture Size - The size, in pixels, of the resultant texture map.

Texture Name - The file name given to the resultant texture map.

The Render Texture tool has many uses. When dealing with complex Shaders, this tool can be called upon to create a texture map which renders much faster than a procedural Shader. If a procedural Shader is being used on an object with an animated deformation, the Shader may appear to slide through the object. Rendering a uv map resolves this problem.



Reset Schematic

If you have moved objects around in the Schematic view, this command restores them to their original positions.

notes

Point [Z]

Puts the *Push/Pull* tool into single point mode. The scene will reflect this by highlighting only the point currently selected.

1. Click *Point* in the Constraints palette.

U col [X]

Puts the *Push/Pull* tool into *U Col* mode. The scene will reflect this by highlighting the point currently selected and all points sharing that point's u-step. This tool can help orient you if you're having trouble seeing the difference between u and v.

1. Click *U Col* in the Constraints palette.

V col [C]

Puts the *Push/Pull* tool into *V Col* mode. The scene will reflect this by highlighting the point currently selected and all points sharing that point's v-step. This tool can help orient you if you're having trouble seeing the difference between u and v. It can also be useful in conjunction with the *Reshape > Pinch* tool to help you visualize which points will be pinched.

1. Click *V Col* in the Constraints palette.

Mir U [V]

Mirrors all *Push*/*Pull* deformations across the u-axis to help in the creation of symmetrical shapes. NOTE: If a shape has an uneven number of u-steps or if you have *inserted* u-steps on one side of a model and not the other, this tool will not work properly. The starting shape MUST be symmetrical to get predictable results.

1. Click *Mir U* in the Constraints palette.

Mir V [B]

Mirrors all *Push*/*Pull* deformations across the v-axis to help in the creation of symmetrical shapes. NOTE: If a shape has an uneven number of v-steps or you have *inserted* v-steps on one side of a model and not the other, this tool will not work properly. The starting shape MUST be symmetrical to get predictable results.

1. Click *Mir V* in the Constraints palette.

Mir UV [N]

Mirrors all *Push*/*Pull* deformations across an axis perpendicular to the u-axis to help in the creation of symmetrical shapes.

1. Click *Mir UV* in the Constraints palette.

X axis [z]

Turns the x-axis on or off. Objects can only be transformed along axes that are "on" (their buttons are pushed in). Works in conjunction with the control tools to constrain movement.

1. Click *X Axis* in the Constraints palette.

Y axis [x]

Turns the y-axis on or off. Objects can only be transformed along axes that are "on" (their buttons are pushed in). Works in conjunction with the control tools to constrain movement.

1. Click *Y Axis* in the Constraints palette.

Z axis [c]

Turns the z-axis on or off. Objects can only be transformed along axes that are "on" (their buttons are pushed in). Works in conjunction with the control tools to constrain movement.

1. Click *Z Axis* in the Constraints palette.

Tag [v]

Sets the transformation selection mode to *points* rather than object.

1. Click *Tag* in the Constraints palette.
2. Hold down the key and click on any point to select it.
   OR hold down the key and click and drag a rectangle around any points you want selected.
   OR hold down the +shift keys and click on any point to toggle it. (If it's selected, it will become deselected. If it's deselected it will become selected.)
   OR hold down the +shift and click and drag a rectangle around any points you want toggled.
3. Use any of the transformation tools to scale, move or rotate the selected points.

OR use the **File > Export > Tag Map** (PICT) tool to create a 2-D image of the surface for texture map creation. (See **File > Export > Tag Map** (PICT) for more info.)

The *Tag* tool will only work when the *Control* tool group is selected. To select points on objects other than the currently selected object, add the **option** key to any key combination listed above.

Glossary

Align specified parameters. In PixelPutty, objects are aligned with their center points.

Bevel The detailing of small angles where edges meet to soften and appearance of the model. Bevels are also used to catch and reflect light.

Bezier spline Defines a curved surface by interpolating the first and last control points along with the inner two points governing the curve's direction.

Bias The symmetry of the spline near a control point. A very biased curve will be flatter on one side than the other.

Clipboard A temporary storage area on the computer to hold the last item that was cut or copied from the model. The Clipboard is a standard feature on all Macintosh computers.

COI Center of Interest. A point in 3D space which the camera looks at.

Control points Points on the surface of the object that determine the underlying geometry of the object. The curve of a spline is determined by four or more control points.

Default Commonly preferred options set at program startup. Defaults may be manually changed.

Displacement Map The gray level information of any PICT image applied to an object to deform its geometry.

DXF Drawing Exchange Format, a file format widely-used for architectural drawings and other polygonal primitives.

Export Saving files in a different format for use with other software applications.

Extrude The modeling process of pulling 2-D outlines or profiles into 3-D shapes.

Freeform Unique shapes that can be designed from drawn 2-D outlines.

Gouraud shading Rendering technique which varies brightness across each surface polygon to produce a smooth appearance.

Grid The horizontal and vertical lines in the background that help place the model in a perspective setting. The grid does not print.

U Step Coordinate space along the horizontal plane of the surface mesh.

Hidden line Built-in rendering of the surface mesh of an object with overlapped or obscured areas hidden.

Interpolation Calculation of intermediate points between specified control points to approximate and smooth the distance between the end points.

Keyboard shortcuts Keyboard equivalents that can be used as alternatives to pull down menus and the mouse.

Lathe The modeling process of creating a 3-D object by revolving an outline around an axis.

Loft Stretches a skin between 2-D shapes placed on a path to create a new 3-D shape.

Menu bar The row of pull down menu names at the top of the screen.

Mesh The two-dimensional undersurface grid applied to the model for shaping purposes.

NURBs Non-uniform rational B-splines which require an explicit specification of the parameters that trace out the surface.

Photo realism A high level of realism accomplished by applying lights, shading, and textures to the
3-D model.

Phong shading Rendering technique which produces shiny surfaces.

PICT A graphics file format used by many computer applications. PixelPutty can export rendered images into PICT formats.

Primitives Common geometrical forms which are used as 3-D building blocks to make more complex shapes.

Proxy An approximation of the skeletal structure of the model without all the wireframe details. PixelPutty uses this feature to shorten redrawing time as changes are made to the model.

Render The process of recalculating all the specified geometry and drawing the model with highlights and shading, color, reflections, refractions, texture and other surface qualities is called rendering. The rendering process gives the 3-D model a finished look.

Reshape Modifications and alterations to a model that affect its geometry.

RIB RenderMan Interface Bytestream protocol, the format generated and required by MacRenderMan to render an image.

Screen refresh Redrawing the screen image after changes or new commands are made.

Shader A procedural (mathematically-based) 3-D surface description.

Spline A curve that is defined by four control points.

Subdivisions the division of surface polygons into smaller polygons to create a smoother finished appearance of the object.

Symmetry Changes to the model which affect the shape along the X and Y axes equally.

Surface Normal A vector perpendicular to the plane of every surface polygon used by the computer to calculate brightness, highlights, reflections, and distortions of the model.

Texture mapping A two-dimensional pattern applied to or wrapped around the surface of a three-dimensional computer-generated model.

Toggle Command Operates like an on/off switch. Click on it to enable and click again to disable.

Tool Palette Modeling tools to shape, move and alter and manipulate 3-D forms.

V Step Coordinate space along the vertical plane of the surface mesh.

Wireframe The undersurface skeletal structure of the model.

Z axis The coordinate used to determine the depth of a model.

3DGF 3-D Geometry File format that supports spline-based architecture but does not carry shader information.