STRATA™ STUDIO *Pro*

version 2.5
MACINTOSH
WINDOWS

User Manual

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STRATA

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The JPEG support software is based in part on the work of the Independent JPEG Group.

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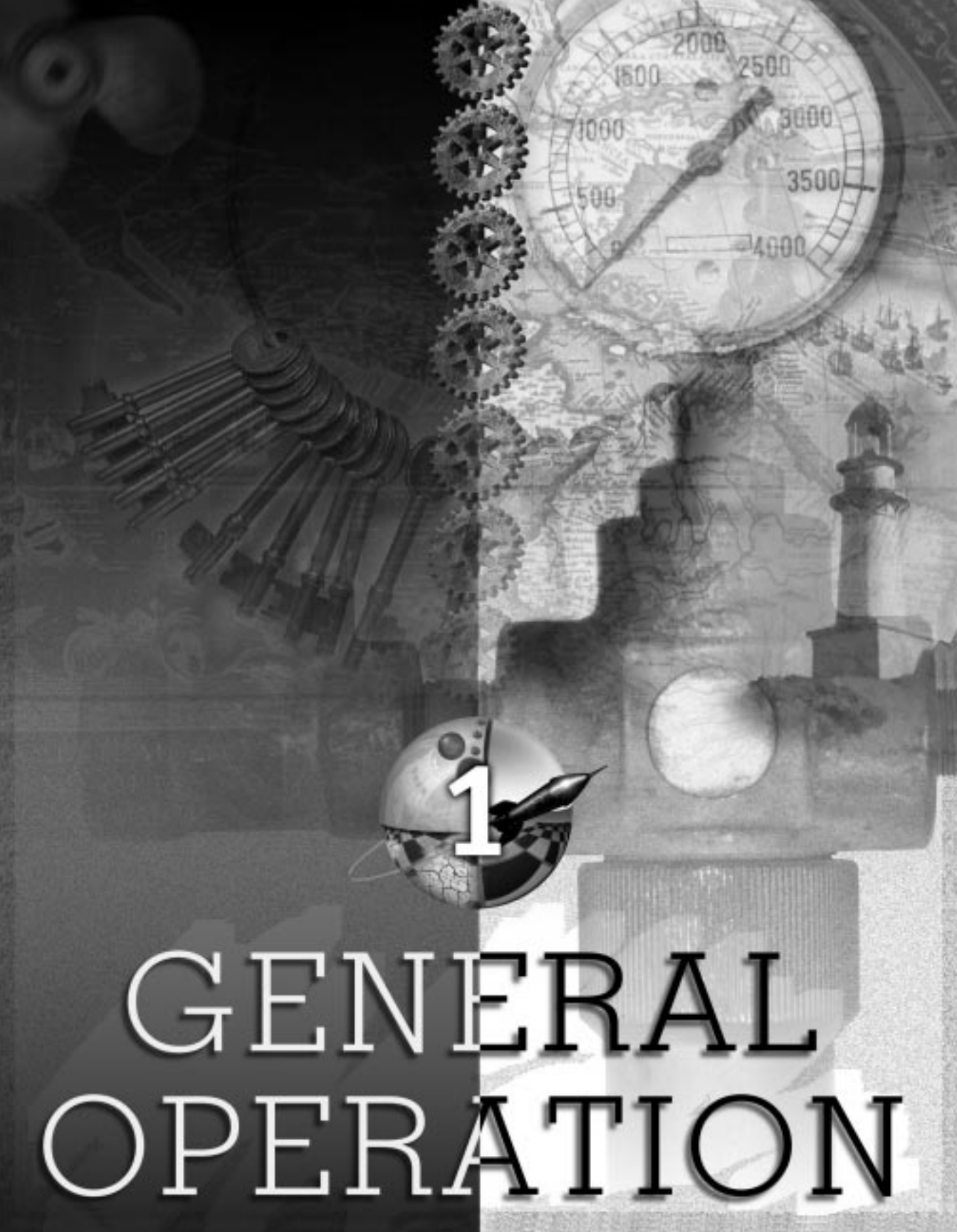

1
GENERAL
OPERATION

Frank Vitale

INTRODUCTION

Welcome to the wonderful world of 3-D modeling; and thank you for choosing Strata StudioPro™.

With the exciting new tools of StudioPro, you will be able to easily create photo-realistic or stylized images and professional quality animations.

Learning your way around a robust and powerful program like StudioPro can be frustrating, especially if you're the type that likes to dive right in without looking at the manuals.

Please, resist that temptation! Make it easy on yourself by looking at these brief explanations and exercises first. They will show you how to start modeling and animating simple projects right away.

For new users, and those new to 3-D software, we especially recommend the beginning tutorial in the latter half of this chapter. *See* **StudioPro Basics** *on page 14.*

More experienced users should feel free to skip any or all of this book, although there are several tutorials you may find useful, and many "how to" exercises.

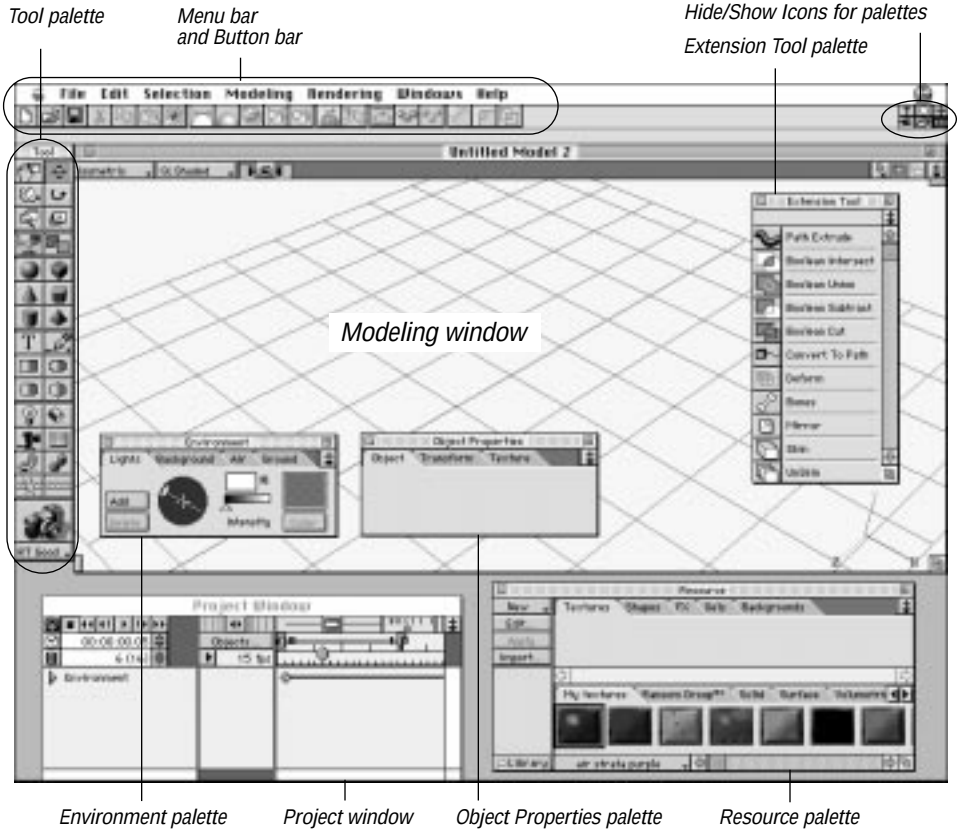
This book is designed to get you started using StudioPro as quickly as possible while explaining the major features of the software.

For more specific and complete information about StudioPro functions and features, see the **Reference manual**.

You're already on your way if you picked up this manual. When you have a clear idea of how StudioPro works, it will be easier to get great results, and have fun doing so.

ON SCREEN: TOOLS, MENUS AND PALETTES

In this section, we will describe what you see on your screen when you launch StudioPro, and give a brief explanation of what each interface feature does.



This is what your screen looks like when you launch StudioPro. Notice the Tool palette, Button bar, etc.

THE MENUS

When using StudioPro, you can choose commands from several different menus on the main Menu bar.

These commands prompt StudioPro to perform an action, display a submenu, or open a dialog box.

When more than one model is open, the commands and tools apply to the active model only.

Commands that are not currently available for use appear gray. Which commands are available depends on your particular modeling situation.

Keyboard shortcuts are shown in the menus. The Button bar also contains several shortcut buttons. Hold your cursor over the Buttons that appear black (available for use), and then check the feedback area directly under the Button bar and at the left.

The feedback area will tell you the name of the Button or Tool under your cursor, and it also tells you the exact location of your cursor in the modeling window.

Here is a quick overview of the options available on the main menu bar. Take a moment to look them over.

File Menu

The File menu is used for managing documents. It allows you to open, save, close, import, print, etc.

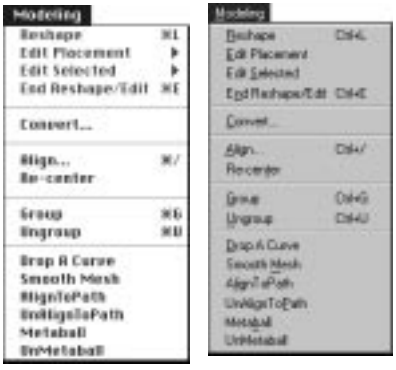
Edit Menu

The Edit menu includes commands for cutting, pasting, duplicating and replicating objects. You can also set the units of measure, change Preferences (the default specifications), access the clipboard, hide and show grids, and customize menus.

Selection Menu

The Selection menu commands make the handling of complex objects easier with selection, hide / show; and shy and construction object choices.

Modeling Menu



The Modeling menu contains commands for working with all types of objects, and for reshaping and converting these objects.

The commands in the lower section depend on which extensions are loaded.

Rendering Menu

The Rendering menu allows you to start or suspend a rendering, and access rendering options.

Windows Menu

The Windows menu allows you to control the display of windows and palettes on your screen. You can also adjust the view scale, and open camera, spotlight, and image windows.

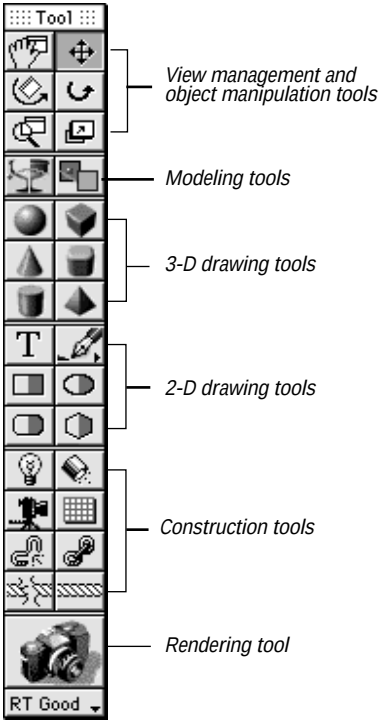
THE PALETTES

In addition to the Menu bar, StudioPro uses special purpose palettes with functions that are grouped according to their uses:

- Tool palette
- Extension Tool palette
- Resource palette
- Environment palette
- Object Properties palette
- Statistics palette

A brief description of the individual palettes follows. For a more detailed discussion, see specific chapters or the **Reference Manual**.

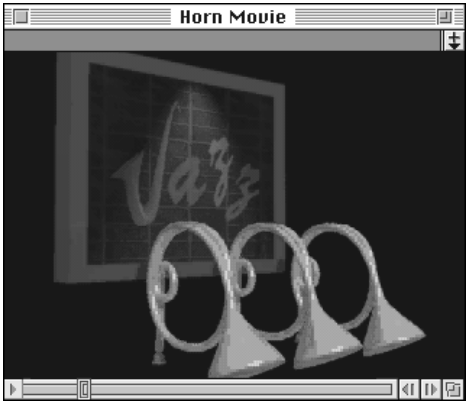
Tool Palette



The Tool palette contains StudioPro's drawing, rendering, and object management tools, grouped according to their function.

Many of the tools have a Tool Settings dialog, accessed by double-clicking the tool button. The settings vary with the tool.

Extension Tool Palette



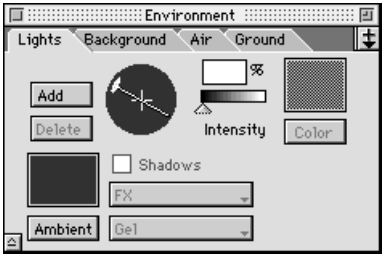
The Extension Tool palette contains special tools that assist in modeling and animation. StudioPro ships with several extension tools. This palette will change depending on the extensions that you have loaded with StudioPro.

Resource Palette

The Resource palette allows you to manage shapes, textures, special effects, gels and backgrounds.

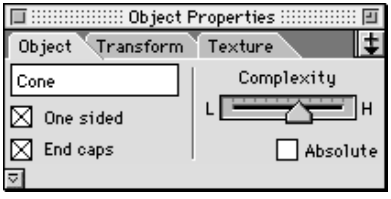
The palette can be displayed in its short form, showing loaded resources only, or showing all resources which are available. Click the **Library** button to Show / Hide the Library section of the palette.

Environment Palette



Each tab on the Environment palette can be accessed independently. These tabs allow you to create unique environments for your model. In some cases, the palette expands to show more options when you select the Expert Mode command from the Plus menu, or click the arrow in the bottom left of the palette.

Object Properties Palette

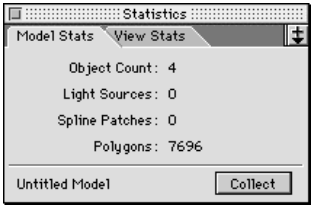


Once an object is inserted into the modeling window with one of these tools, you have access to its Object Properties palette.

This palette contains a wide range of editing functions. The options available depend on the type of object you have selected. In some cases, the palette expands to show more options when you select the **Expert Mode** command from the Plus menu, or when you click the arrow at the bottom left of the palette.

Statistics Palette

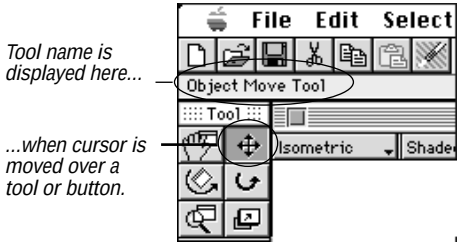
The Statistics Palette displays information about your entire model or your active view, depending on which tab you select.



OTHER FEATURES

In addition to the menus and palettes, there are three other helpful features that appear when you launch StudioPro: the Feedback area, the Button bar, and the Show / Hide buttons for the palettes.

Feedback Area



This useful feature helps you find and identify tools and buttons. The name of the tool or button your cursor moves over is shown in a field directly below the Button bar. Just like menu commands, buttons are grayed out when they are not relevant or available.

In addition, the feedback area will tell you exactly where your cursor is in the Modeling window, using the coordinates of the

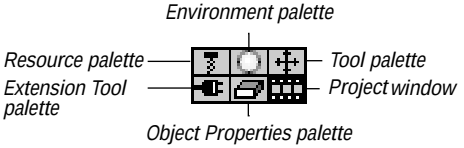
x, y and z axes. This is very helpful for precise modeling.

Button Bar

The Button bar is located right below the menu bar. Most of the buttons are shortcuts to tools and functions.

Show/Hide Buttons

Show/Hide toggle buttons in the far right corner of the Button bar give you easy access to the palettes and the Project window.



WINDOWS

Working with 3-D images is more challenging than working with 2-D images. To make things easier, StudioPro provides several window and viewing options.

These choices give you access to models, renderings in progress, still images, or animations to be played.You can move objects, assign textures, position lights, and take snapshots from various windows and views.

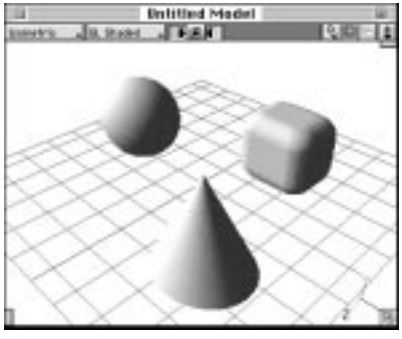
There are several types of windows in StudioPro:

- **Modeling**
- **Project**
- **Camera**
- **Spotlight**
- **Shape (and Group)**
- **Rendering**
- **Image/Snapshot**
- **Animation Playback**

Only one window can be active at a time; activate a view by clicking that window.

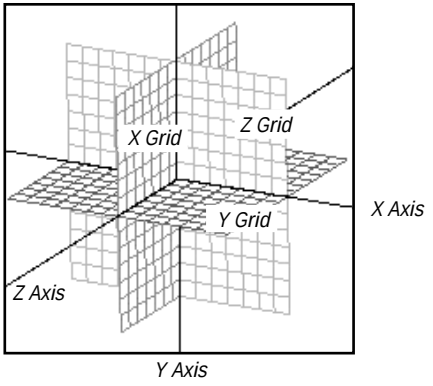
The initial view, display method, and other options can be changed in the Windows tab of the **Preferences** dialog. *See* **Setting Preferences** *on page 18.*

MODELING WINDOW



Most of your work will be done in the Modeling window. This is where you will create and modify your objects. Controls here make it easy for you to change views, change display methods, and change view orientation.

When you open a new window, you will see a grid. Grids help you model easily and place objects accurately.



The Modeling window contains three grids: the Z grid is tan, the Y grid is blue, and the X grid is purple. Usually only one of them is active.

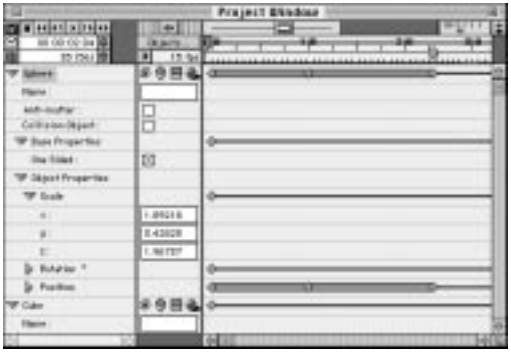
The most convenient way to use grids is to enable the Auto Grid checkbox in your Preferences. This feature will switch the grid automatically every time you change views. Advanced users may want to turn the Auto Grids feature off in certain situations.

PROJECT WINDOW

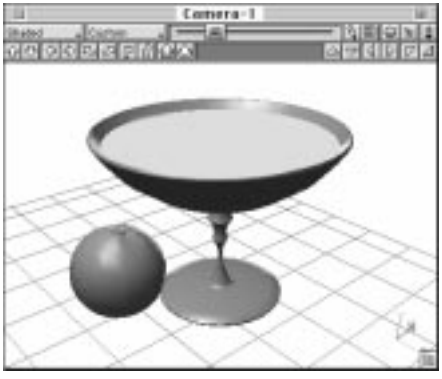
Animation usually means movement through space, but in StudioPro, many other attributes of an object can be changed over time as well: shapes, textures, special effects, lights, camera views, etc.

The Project Window gives you all the controls you need to work with all of these time-varying features in your model.

Use the Project window to control the timelines of all of your objects, and all of their attributes.



CAMERA WINDOW

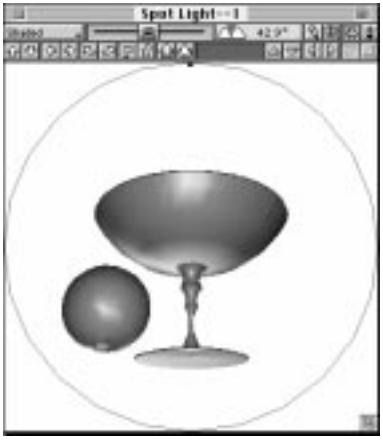


Camera windows give you a through-the-lens view of a camera object as it records your model. You can determine the type, angle, view and movement of the camera as it renders your model.

SPOTLIGHT WINDOW

The Spotlight window gives you a view of the area that a spotlight illuminates. The

controls are similar to those in the camera window.



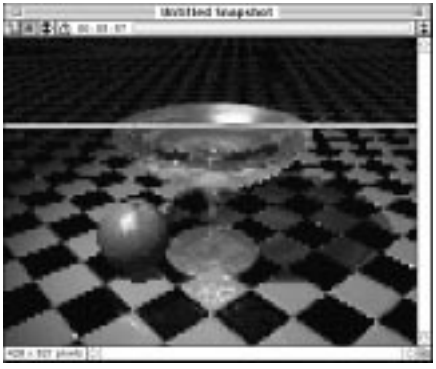
SHAPE WINDOW

The Shape window lets you create shapes, store them, and then insert them into your models by reference. This can save you a lot of memory and rendering time, because the information needed to describe the object is only stored once.

The Shape window works like a modeling window, but the name of your model will appear in parentheses before the name of your shape in the title bar. *See* **Shapes** *on page 63.*

RENDERING WINDOW

You can render images from the modeling window by using the Rendering tool from the Tool palette or selecting **Render** from the Rendering menu.

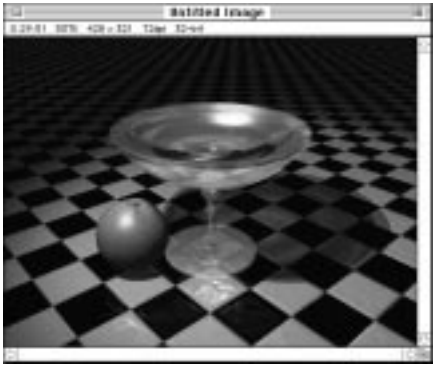


A separate rendering window opens when you initiate a rendering. These windows are like frames of film developing.

You can choose to render only a small part of your model; or the entire scene or animation. *See* **Rendering an Image** *on page 158.*

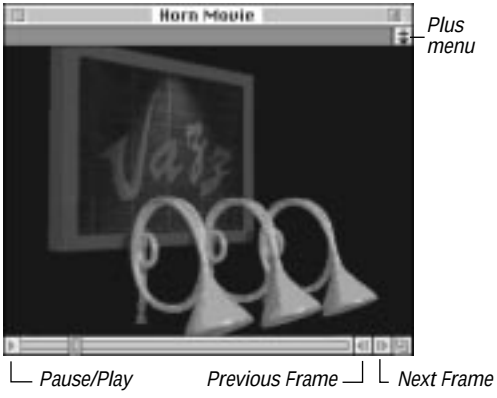
IMAGE WINDOW

An image window displays a completed rendering or snapshot. In this window, you may also open an image from any format supported by StudioPro.

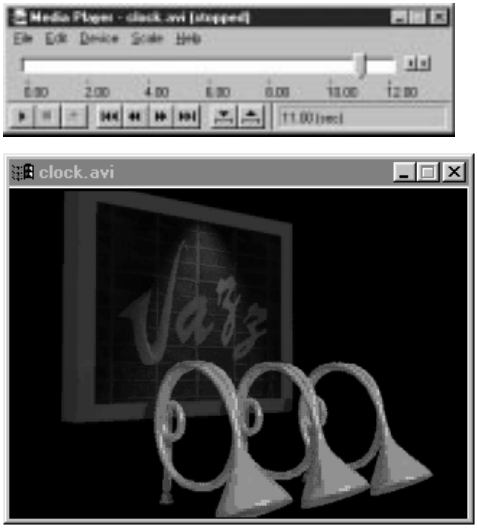


ANIMATION PLAYBACK WINDOW

With animation playback windows, you can play rendered animations that have been saved as movie files.



Macintosh

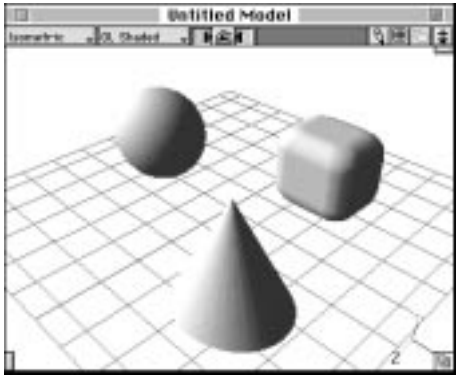


Windows

MANAGING FILES

StudioPro works with original models that you create and with files made in other applications.

Models are stored as files with all accompanying textures, effects and shapes. When a model is being worked on, it is loaded into RAM and is available for editing. You can create new models or load existing models, and then edit and save these models.



CREATING NEW MODELS

When you create a new model by selecting the **New** command from the File menu, the modeling window will open.

This window can be split to display two or more panes, and you can open other windows as needed.

LOADING MODELS

Use **Open** to open previously saved StudioPro models.

To open a model:

1. Choose *Open* from the File menu, or click on the Open icon on the Button bar. (It looks like a partially open folder.) The Open dialog appears.
2. Locate the folder that contains the file you wish to open.
3. Open the folder.

Use **Open As** to open files with crossplatform or nonstandard formats.

You may have more than one model open at a time, but only one model may be active at one time. Just click in a window to make it active.

SAVING MODELS

Models can be saved at any time. They will be saved with all files that relate to that model, including shapes, textures, effects, images, and lighting.

It is a good idea to save models often, but especially when you make major changes. This allows you to use the **Revert** command if you change your mind. Then you can restore the last-saved version of a model.

To save a new model:

1. Choose *Save* from the File menu, or click the disk icon on the Button bar.

   The *Save* dialog appears.
2. Give the model a name.
3. Choose the location for saving the document.
4. Click the *Save* button.

SAVING A COPY OF A MODEL

You can create and save copies of a model by using **Save a Copy As.**

SAVE AS

Use **Save As** to save the active document with a different name and location, or in another file format using a pop-up menu in the *SaveAs* dialog box.

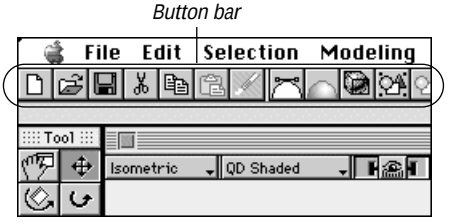
NOTE: *To make sure you don't lose any model data, always use the **Save** command (to save your model as a StudioPro file) before you **Save As** in a different file format. Other formats may **not** record **all** of your model's information.*

STUDIOPRO BASICS

The step-by-step instructions in this section will show you how to open a model, create a simple shape, use the Reshape mode, and apply textures. You will then make a simple animation with your object(s) and render a movie.

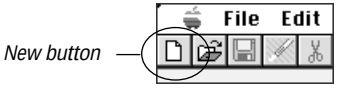
Open a new model

1. Find the Button bar at the top of your screen.



   The Button bar is used mostly for shortcuts to StudioPro features and functions.

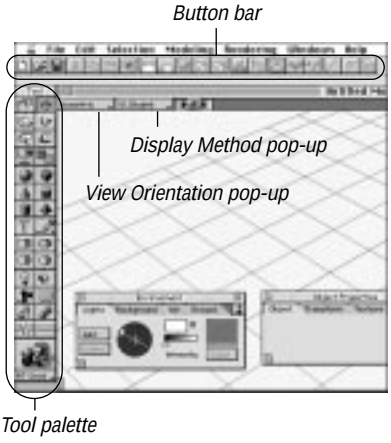
2. Click the *New* button on the Button bar to open a new Modeling window.



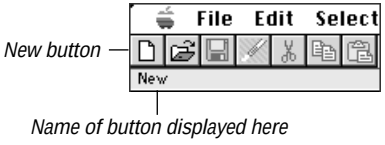
Look at the modeling window

When you open a new model, you will see the Modeling window.

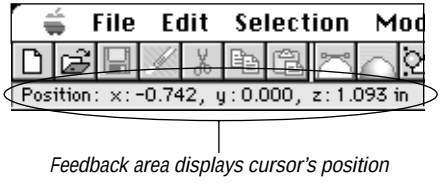
1. Find the Button bar, Tool palette, View Orientation and Display Method controls.



2. Find the Feedback area directly below the Button bar. This feature will name available tools and buttons as the cursor is moved over them.



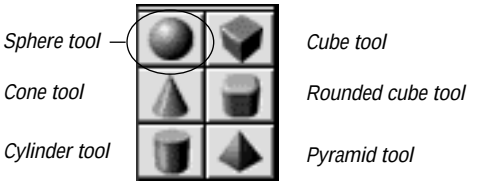
3. Move your cursor over the grid (in the Modeling window). The feedback area displays the precise location of the cursor - very useful for modeling.



Create two simple objects

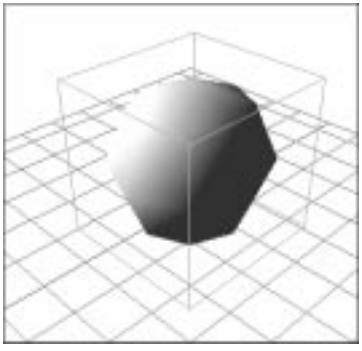
StudioPro provides six pre-made 3-D objects called Primitives. They are easy to use, and take up less memory than any other type of object. Use them whenever possible.

The Primitive tools are located on the third section of the Tool palette.

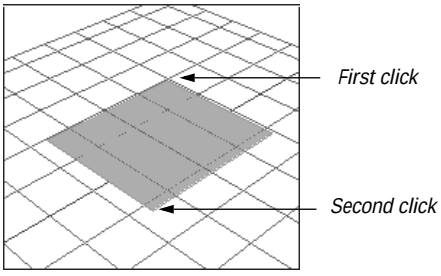


1. Click on the Sphere tool.

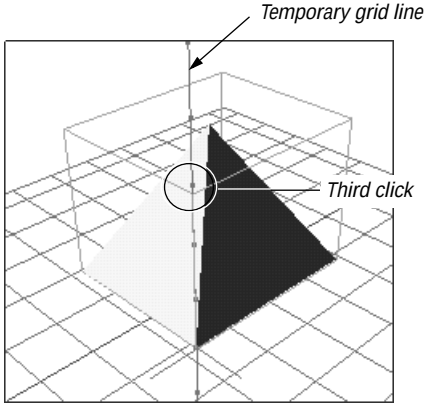
2. In the Modeling window, click-and-drag to define the size and shape of your sphere. This means click your mouse (Macintosh) or click with the left (primary) mouse button (Windows). Hold it down as you drag to make a sphere. When the dimensions of the sphere look good, release the mouse button.



3. Now click on the Pyramid tool. Define your pyramid another way: the three-step method. The first two clicks set the dimensions on the active grid.



4. When you make the second click, a green temporary grid line will appear. Use it as a guide to define the third dimension with the next click.



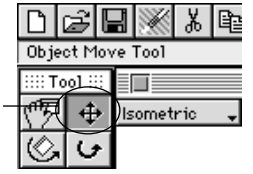
Go ahead and make several primitives.

Select, de-select, and delete

Now you need to select, then delete some of the primitives you made.

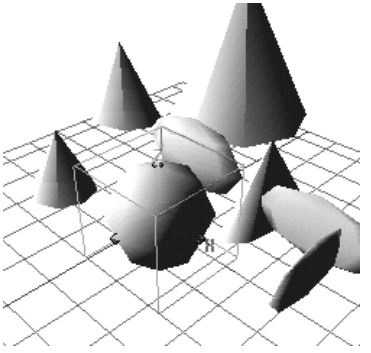
1. To select an object, click on the Object Move tool, or use the shortcut, which is

simply pressing a “1” on your keyboard or number pad.



Object Move tool

2. Your object should now be selected. You can tell by the blue bounding box and handles that appear.



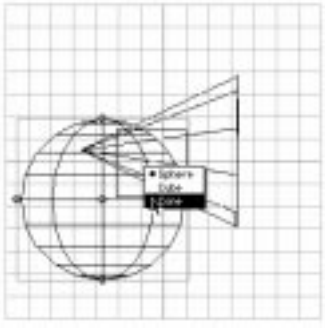
3. Click on and then off of your objects a few times for practice.

4. Now delete a few objects, by selecting them, then pressing the delete key.

Helpful hints

- Select several objects by using Shift-click; or by dragging a selection marquee.

- If one object is behind another, press the **Control** key (Macintosh) or the **right mouse** button (Windows) while clicking. This brings up a small pop-up menu of objects right in the modeling window. Use the pop-up to select one of the objects.

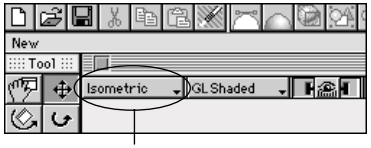


- While working in StudioPro, remember to think before you click. Make sure you have the right tool selected. The tool you are using will stay selected until you click on another tool.

Change your view

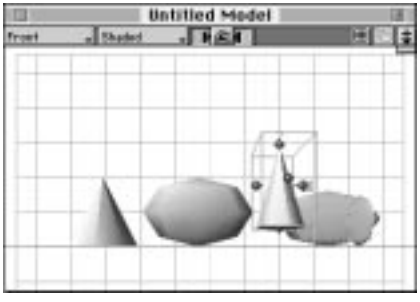
Look at the Modeling window, and find the View Orientation pop-up.

1. Pull out the pop-up menu.

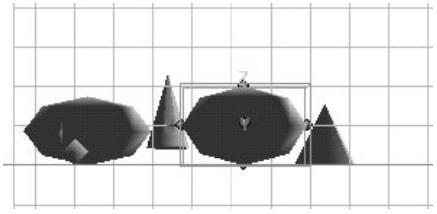


View Orientation pop-up

2. Select *Front*. Your view will change to the front view.



3. Change to *Back* view. Notice that your models are darker. This is because one global light is provided automatically in each model, and it is shining on the front of your objects.

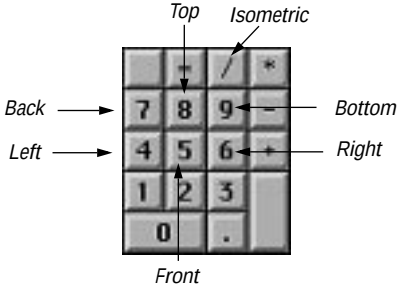


Hotkeys for view orientation:

Now change your view using the Hotkeys:

VIEW	HOTKEY
FRONT	5
BACK	7
LEFT	4
RIGHT	6
TOP	8
BOTTOM	9
ISOMETRIC	/

This makes sense when you look at the keypad.



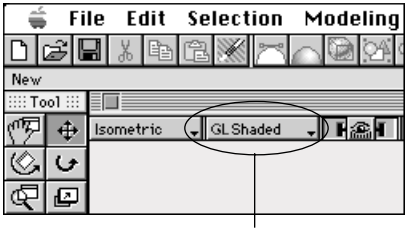
Try to get in the habit of using these hotkeys, they are much faster than using the pop-up.

Display method

StudioPro has several choices for displaying objects in the Modeling window. These options appear in a pop-up. The display methods available to you depend on what interactive renderer(s) you are using.

1. Make sure you still have two or three primitives in your model.

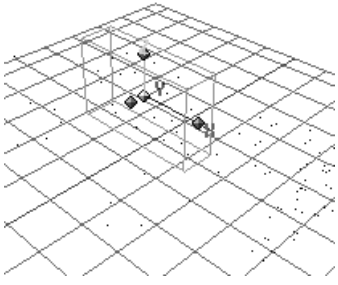
2. Find the Display Method pop-up, and choose *Shaded*, if it isn't already selected.



Display Method pop-up

3. Look at your objects.

4. Now check out Wireframe, then PointCloud, etc.



PointCloud display method

In the PointCloud display method, the object is represented by a cloud of points, but you can still see the bounding box and handles on selected objects.

Wireframe and Point Cloud are useful for selecting objects, handles, polygons and points which are hidden in other display methods.

Setting Preferences

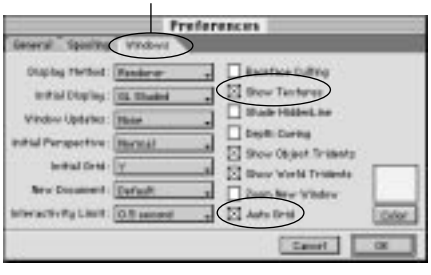
The Windows tab of the Preferences dialog gives you several options for your initial setup in the Modeling window.

1. Find the Edit menu, and choose *Preferences*.

Choose Preferences

2. When the Preferences dialog appears, click the *Windows* tab.

Click on the Windows tab



Enable Auto Grid and Show Textures

3. Make sure the *Auto Grid* checkbox is enabled (checked).

While there may be times you don't want to use them, we recommend that you use Auto Grids while learning StudioPro.

The Auto Grid feature works best in most modeling situations - by switching grids automatically as you move between views.

4. Enable the *Show Textures* checkbox.

5. Set Renderer to *OpenGL* by selecting it from the pop-up menu in the dialog.

Enabling *Show Textures* and *OpenGL* will allow you to see textures displayed in the Modeling window.

6. In the Window Updates pop-up, select *Live*.

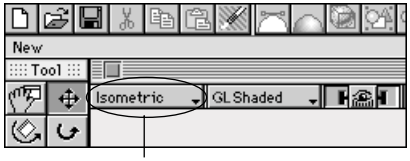
This makes all of your windows (Modeling, Shape, Camera, etc.) update as you make changes to your model.

NOTE: *This is the most memory intensive choice. For complex modeling, you may want to choose Auto or None.*

7. Click *OK*.

For more information on Preferences, see the **Reference Manual**.

8. Once you have changed your Preferences, go back to the *View Orientation* pop-up in the Modeling window.

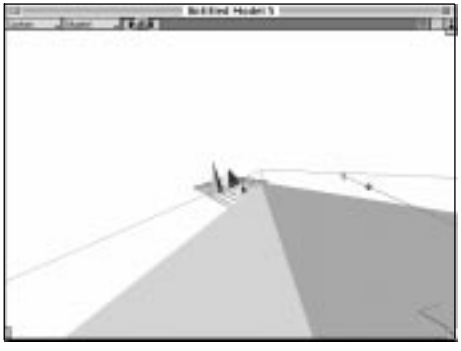


Check out the View Orientation options

Switch your view around a few times to see how the grid changes with the view.

Where's my stuff?

If you do **not** enable the Auto Grid checkbox, and you model edge-on to the grid, you could end up with objects that are way out of proportion, or lose sight of your objects completely.



Don't model with the grid edge-on!

If this happens, try the Undo command (**Command-Z** (Macintosh) or **Ctrl-Z** (Windows); or delete the object and start over.

To get back to a normal view, press the **Command+**= (Macintosh) or **Ctrl+=** (Windows). This is the shortcut for the **Fit Views To All** command.

You could also use **Command+-** (Macintosh) or **Ctrl+-** (Windows). This is **Fit Views to Selection**.

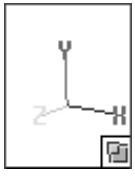
Both commands are also available in the Windows menu.

Tridents

Tridents are designed to help you model with grids - they are simply a visual indication of the orientation of grids and objects. In other words, they tell you which way is "up."

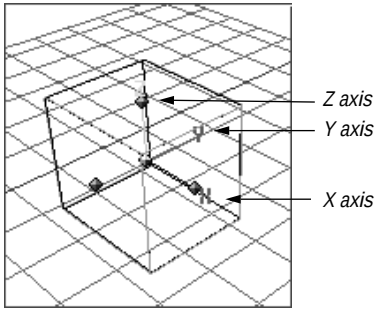
There are two types: Object tridents and World tridents.

World tridents are always located in the bottom right corner of the window.



The letters label the directions of the three World axes in your model.

Object tridents are displayed on an object's bounding box when it is selected.

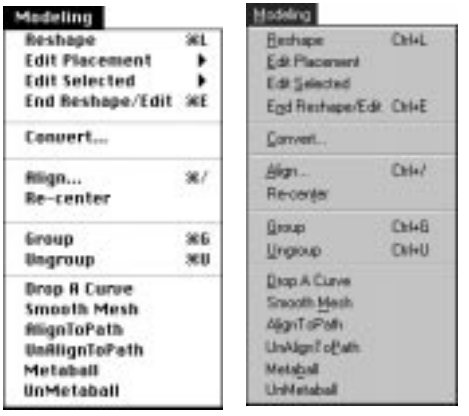


You may choose to hide or show both Object and World tridents in the Windows tab of the Preferences dialog.

Convert your object

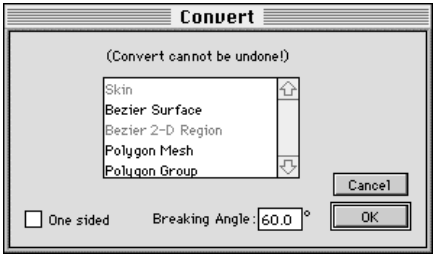
Now let's reshape one of your primitives. First, you will need to Convert your pyramid to another type of geometry. Primitives cannot be reshaped.

1. Select your pyramid by clicking on it with the Object Move tool (**Hotkey 1**).
2. In the Modeling menu, select **Convert**.



You could also use the Button bar icon to summon the Convert dialog.

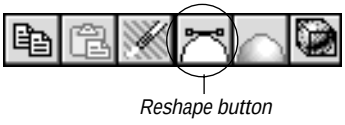
3. In the Convert dialog which appears, select *Polygon Mesh*, then click *OK*.



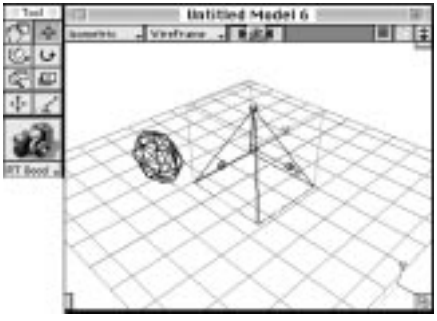
Reshape mode

Now you are ready to reshape your pyramid.

1. On the Button bar, click on the *Reshape* button.



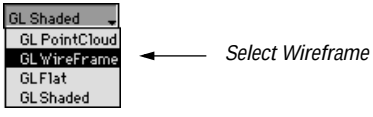
This is Reshape mode. It has a shortened tool palette that displays the tools needed for the type of object you are reshaping.



2. Move your cursor over the tools (without clicking), while watching the feedback area displaying the tool names.

   The top six tools are always the same as in the Modeling window (the View management and Object manipulation tools).

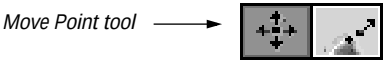
3. Select *Wireframe* from the Display Method pop-up in the Modeling window.



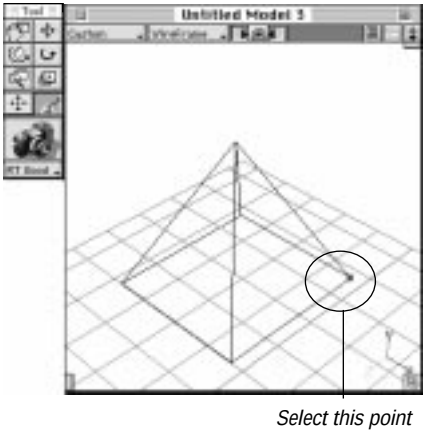
4. Click on the View Zoom tool (magnifying glass icon). Now click on your object to bring it in to a close view.

NOTE: *Double-click on the View Zoom tool to summon a settings dialog. Most other tools on the Tool palette also have tool settings dialogs.*

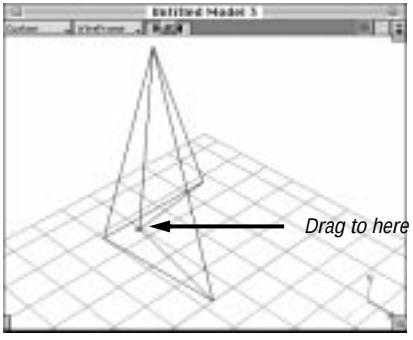
5. Now select the Move Point tool.



6. Click on a point at the bottom of your pyramid.



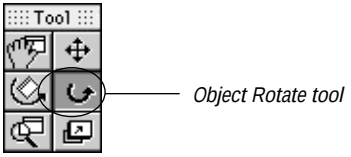
7. Drag the point to your left, then release.



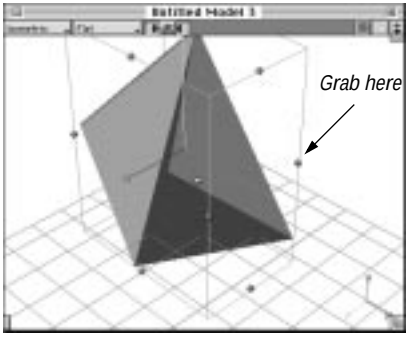
You've created a new object.

Rotate the pyramid

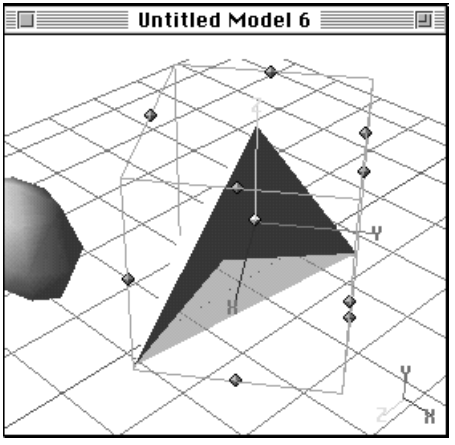
1. First switch to *Shaded* in the View Orientation pop-up.
2. Now select the Object Rotate tool.



3. Grab the middle handle on the right edge of the pyramid's bounding box.



4. Pull the handle toward the center of the screen to rotate the pyramid.



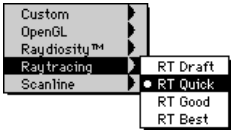
5. Rotate it around using the other handles to see the new object you have created.

Do a sample rendering

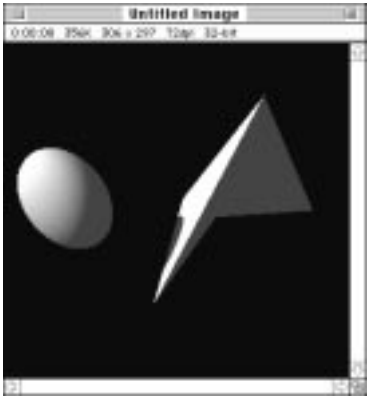
Now you will do a sample rendering to see if you like your object.

1. Still in the Reshape window, select the Camera tool.

2. Click the pop-up menu just below the camera tool. Select *Raytracing*, then *RT Quick*, or one of the Scanline options. Either would be a good choice for a sample that you want finished quickly.



3. Move your cursor over the window - it will change to a small camera icon.
4. Click once in the window to create a sample rendering.



Don't forget to change back to the Object Move tool, so you don't accidentally set off an unwanted rendering. If you do, just click the close button of the Rendering window to stop it.

5. Move the completed rendering snapshot to the side, off of your model.
6. Click anywhere in the Modeling window to make it active, then click *End Reshape* on the Button bar.

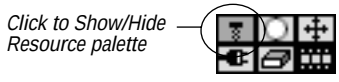
End Reshape button

7. Use the View Zoom tool while holding down the **Option** key (Macintosh) or **Alt** key (Windows) to enlarge your view to include all your objects.

Add textures to your objects

Now a fun part - adding textures.

1. To do this, you need the Resource palette. If you don't see it, you can click its Show / Hide toggle in the upper right corner of your screen.

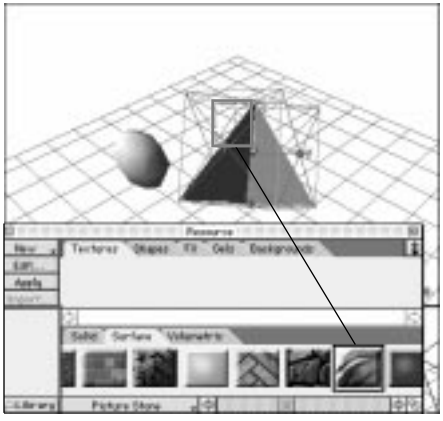


2. Now click on the Textures tab of the Resource palette to bring it to the front.

3. On the lower part of the palette, scroll through the Surface and Solid texture previews until you find one of each that you want.

4. Click on the *Brick and Stone* tab to bring it to the front. Select *Picture Stone* by clicking on its preview.

5. Now drag to your object. Hold the mouse button down until you see both bounding boxes highlight. Then release the mouse.



   If you are using an interactive renderer capable of displaying textures in the modeling window, and are using Shaded view, you will be able to see the texture.

6. Repeat steps 4-6 to apply textures to other objects.

Check your textures

You will probably want to see how the newly applied textures render. *See* **Do a sample rendering** *on page 22.*

Save your model

1. Save your model if you haven't already. Use the **Save** command from the File menu, or click the Save button on the Button bar.

Save button

2. In the dialog box which appears, give your model a name and specify a location.

3. Click *Save*.

NOTE: *To make sure you don't lose any model data, always use the* ***Save*** *command (to save your model as a StudioPro file) before you* ***Save As*** *in a different file format. Other formats may not record* ***all*** *of your model's information.*

Animation basics

There are only three basic steps to animation:

1. Move the Cut-out point to set the length of your animation.
2. Move the Current Time Pointer to set the length of time for this particular movement or change.
3. Move your object, or make any other change in the object's attributes.

When you move your object from Point A to Point B, StudioPro creates event markers and an animation path for you.

This is animation at its simplest level.

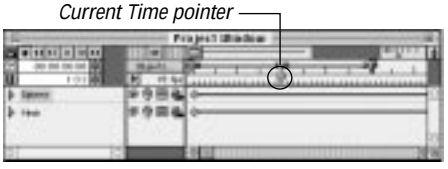
Make your own animation

Now try a simple animation. For this exercise you can use the model you have already created, or you can begin a new one. *See* **Open a new model** *on page 14.*

1. Create a small Primitive sphere with the Sphere tool. Make sure it is selected by clicking on it with the Object Move tool.
2. If the Project Window is not open, click its Show / Hide button.

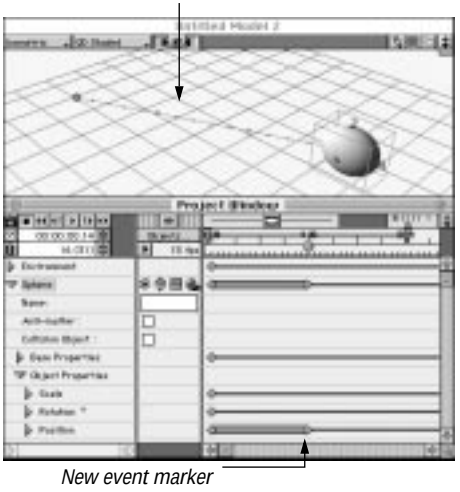
3. In the Project window, move the *Cut-out* point to two seconds.

4. Move the *Current Time* pointer to one second.



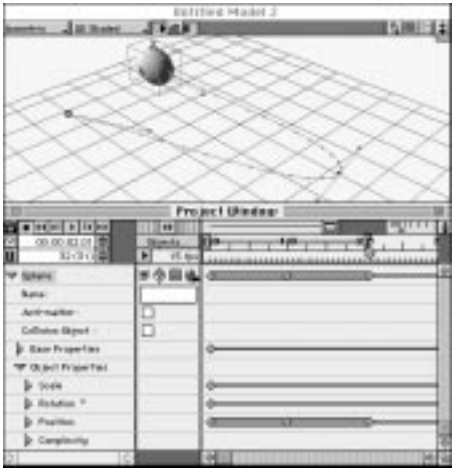
5. In the Project window, click once on the triangle to the left of *Sphere* to reveal its properties. Then click on the *Object Properties* triangle.

6. Move the sphere clear across your modeling window. Notice the new event marker on your sphere's timeline.

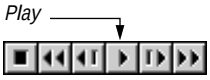


7. Move the *Current Time* pointer to 2.0 seconds.

8. Move the sphere back to the other side of the model.



9. The timeline controls on the left side of the Project window look like VCR buttons. Just push *Play* to watch your animation.

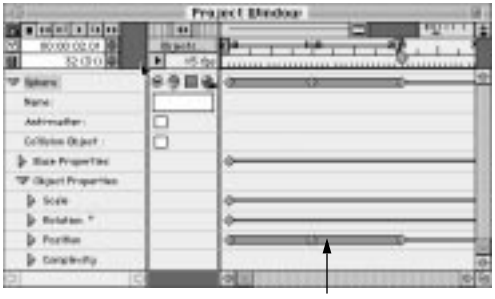


Edit the animation path

Let's begin by adding a couple of event markers to the sphere's animation path. Event markers are used to control an object's motion along an animation path.

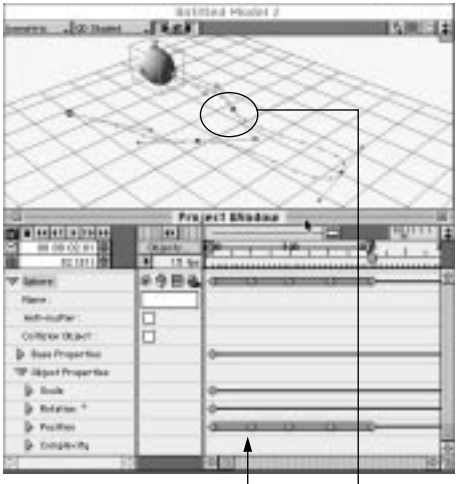
They act as key frames, telling the object where to be at a certain point in time. The object's movement is then interpolated (figured by StudioPro) in between event markers. This is called "tweening."

1. In the Project window, locate the Sphere's *Position* timeline. It's located under the sphere's Object Properties in the hierarchy.



Sphere's Position timeline

2. With the **Option** key (Macintosh) or the **Alt** key (Windows) held down, click on the *Position* timeline at about .5 seconds. This adds an event marker to the sphere's position timeline in the Project window.

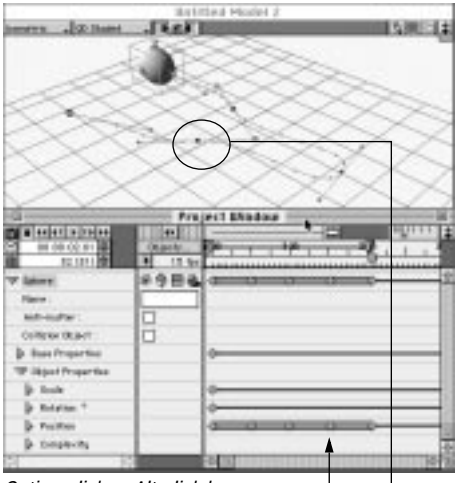


Hold down the Option key and click here to to add an event marker.

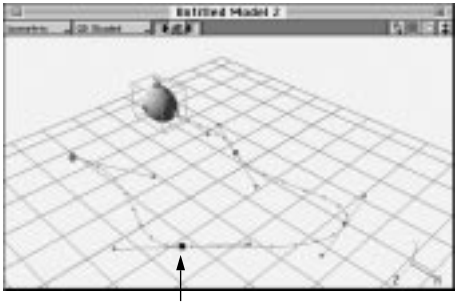
A control point is added to the animation path.

Notice that a new control point appears on the animation path in the Modeling window. (If the sphere isn't selected, select it now so you can see its animation path.)

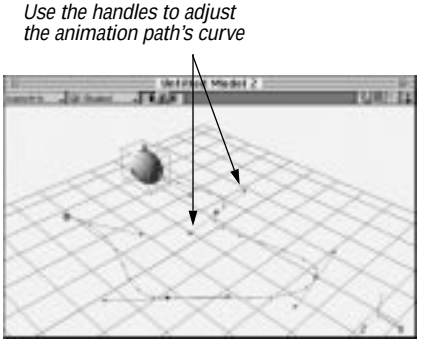
3. Add another event marker at 1.5 seconds on the sphere's Position timeline.



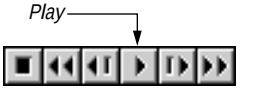
4. Now you can grab the new control point in the Modeling window and position them as desired.



5. You can use the handles on the control points to change the shape of the animation path. Grab a handle and move it around to see how it affects the curve of the path.

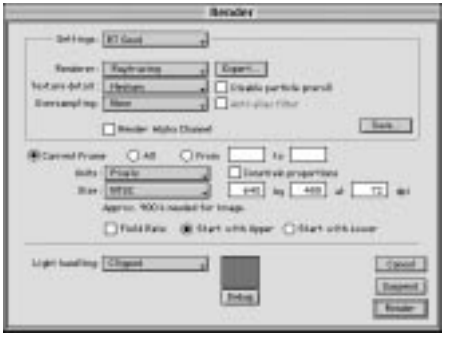


6. When you're finished reshaping the path, click the *Play* button on the controls to preview the animation.

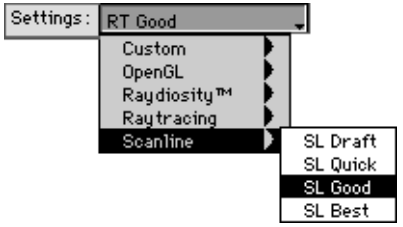


Render your animation

1. Select the **Render** command from the Rendering menu. The Rendering dialog will appear, allowing you to select the settings you need for the final animation.



2. Click on the Settings pop-up at the top of the dialog, and select Scanline > SL Good.



3. Enable the *All* radio button located in the center of the Render dialog to render all of the frames (of your animation).
4. Click *Render*. A dialog appears that lets you specify an name, location, and format for the Save operation.
5. Make your selection in the File Format pop-up. Click *Save*.
6. A second dialog appears that lets you choose compression and color depth settings. Click *OK*.

   When the animation finishes rendering, an Animation window replaces the Rendering window, allowing you to play back the movie you just created.

Congratulations! You have finished a small but complete project, using all of the basic steps you will need for a more complicated venture.

Now, do you start to see the possibilities of StudioPro?

QUICK REFERENCE

This section includes StudioPro's Button Bar and commands used in general operation.

BUTTON BAR

New creates a new document to model in.

Open opens existing documents.

Save saves an entire model with objects, animations, and all modeling information intact.

Cut removes selected information from the document and places it on the clipboard.

Copy places the selected information on the clipboard without cutting it from the document.

Paste takes the information from the clipboard and places it in the document.

Undo/Redo lets you undo the last action or redo the last undone action.

COMMANDS FOR GENERAL OPERATION

These commands are used during general operation. These are brief descriptions; detailed descriptions can be found in the **Reference Manual**.

Close (File menu) closes the active window. If the active window is a Rendering window, only that window is affected. If it has not finished rendering, you will be asked if you want to suspend the rendering.

Copy (Edit menu) places a copy of selected items on the Clipboard.

Customize Menus (Edit menu) lets you customize the keystroke equivalents used by menu commands.

Cut (Edit menu) removes selected items from the active document and stores them in the clipboard.

Delete (Edit menu) removes selected items from the active document without saving the items on the clipboard.

Exit (File menu, Windows) lets you exit StudioPro.

Fit Views to All (Windows menu) adjusts all views in the active window to include all objects.

Fit Views to Selection (Windows menu) adjusts all views in the active window to position around a selected object or set of objects.

Import (File menu) lets you import models and object data into the current model.

New (File menu) creates a new StudioPro model.

Open (File menu) lets you open an existing StudioPro model or other standard 3-D file formats.

Open As (File menu) lets you open files with nonstandard format designations.

Paste (Edit menu) places items contained on the clipboard in the active document.

Preferences (Edit menu) modifies settings for basic StudioPro functions.

Quit (File menu, Macintosh) lets you exit StudioPro.

Revert (File menu) discards the changes made to a model or image and restores the active document to the last saved version.

Save a Copy As (File menu) saves a copy of the current document under a different name without changing the current name and file path of the document.

Save (File menu) saves changes made to the active document.

Save As (File menu) lets you save the active document using a different name and location.

Set Units (Edit Menu) allows you to specify the units of measure for the model. This will apply to grids, object sizes and dialog settings.

Show/Hide (Windows menu) shows or hides your palettes and Project window.

Undo/Redo (Edit menu) identifies and reverses the last action performed.

2
MODELING

Roberto Carraro Gualtiero and Fulvio Massini

INTRODUCTION

This chapter consists of brief explanations and step-by-step exercises designed to help you learn or review the fundamentals of modeling with Strata StudioPro.

Remember, we highly recommend that you start with the extended beginning tutorial in Chapter 1 *(see* **StudioPro Basics** *on page 14)* before looking to this chapter for further details.

MANAGING PROJECTS

Once you are familiar with the basics of the modeling window, view management and the grid system, you will be ready to start thinking about a real project.

Before you start, though, keep these three principles in mind:

Plan ahead - sketch out your project before you start.

Model with textures instead of geometry wherever possible. Using textures is easier, faster to render, and takes less memory.

Use geometry only when you can't use textures.

Don't learn these things the hard way; it's much easier and faster to use textures than to try to model each object and its surface. Most times, the results are just as good. Save the extensive modeling for when you really need it.

Using textures instead of geometry will conserve a lot of memory, as well.

PLANNING AHEAD

An important part of any project is pre-planning. This can be as simple as thinking a project through in your mind, or as complex as a script and storyboard.

For complex modeling or animation, these steps could save you a lot of time and frustration:

- **Develop a story board** or hand-sketch a view of where the objects belong—their size and relationship to one another.
- **Make a detailed list** of objects and effects which will be in the model.
- **Write a sample scene** complete with lighting and camera angles if you are scripting an animation.
- **Pre-script** objects and their motion for the entire animation.
- **Plan the sequence of steps** to complete the project. Set up the models without textures to test the composition; lay down the textures; set up the lighting and special effects.

CONSERVING MEMORY

- **For memory efficiency, use primitives and instances as much as possible**. Many of the complex objects can be constructed with combinations of primitives or instances of shapes. An instance works much as an alias does - it references the original shape. (See Chapter 3). In StudioPro, these objects use less memory and render faster.
- **Use textures for surface detail** rather than trying to explicitly model the geometry. In addition to the extended modeling time needed, rendering time increases with the number of polygons and Bezier patches. Surface maps render faster.
- **Consider lower resolution and less detail for animations**. The eye is very forgiving of objects in motion. Screen resolution may be sufficient because nothing stays in place long. You might not even need to anti-alias images.

MODELING FUNDAMENTALS

BASIC OBJECT HANDLING

In this section we will review the fundamentals of creating and selecting simple shapes.

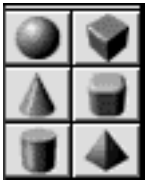
Creating Primitive Objects

Let's start by experimenting with some Primitive shapes.

Primitive shapes are available on the Tool palette and are quick and easy to use. They can be converted and reshaped to make other types of objects.

Also, they don't take up as much memory as more complex objects, so use them whenever possible.

Also, keep in mind that it is frequently possible to use a texture applied to a primitive to get the appearance that you want, rather than spending a lot of time and memory modeling specific geometry.



Create Primitive objects two ways:

- **Three-click method**. Click on the Primitive sphere tool to select it. Put the cursor on the grid where you want the object to start, and click.

  Click again where you want the next dimension to begin.

  A temporary guide will appear. Use this to set the third dimension. The third click completes the object.

  -or-

- **Click-and-drag method.** Click and drag in any direction on the active grid.

Move the cursor around until you like the dimensions, then release to complete your object. The **Shift** key constrains the object's proportions so the object is symmetrical.

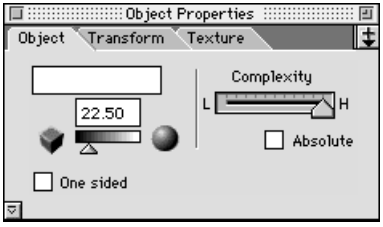
Tool settings are available for each Primitive tool. You can use the Tool settings dialog before you create your primitive object. Summon the dialog by double-clicking the tool icon.

These same settings are generally available to change at any time using the Object Properties palette.

Editing Primitives

To edit a Primitive after it has been inserted, use the Object Properties palette. This palette is a powerful editing tool and will be discussed in more detail later in this chapter. *See* **Object Properties Palette** *on page 43.*

Changes made in the Object Properties palette are not made until you click out of the field or press **Enter**, **Return** or **Tab**.



All Primitive objects contain a **Name** field and a **One-sided** checkbox:

Name. Give the new object an identity.

One-sided. The default setting is one-sided, which makes your object solid. Unchecking this option gives you a hollow (two-sided) object.

For example, a two-sided sphere with a transparent texture appears hollow, like a soap bubble.

Use one-sided objects for textures that are transparent with refractive properties, such as a crystal ball or a marble.

Also use one-sided objects if you want to apply a volumetric texture such as Fog. This gives the Fog a volume to reside in, rather than only a surface.

The Object Properties palette may also contain the following controls, depending on which kind of Primitive you are using.

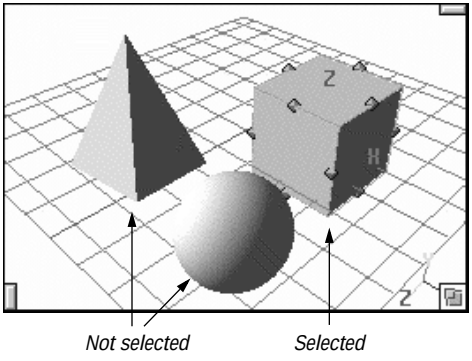
Complexity slider. The position of this slider determines the complexity, or amount of detail, with which the object is rendered, both in the modeling window and in the final image. It does NOT change the actual complexity of the object, but only the way the renderers display it.

Absolute checkbox. Unchecked, the slider shows complexity based on the renderer, the size of the object and its proximity to the view plane. Checked, the Complexity slider shows the EXACT percentage of the maximum complexity allowed. See the **Reference Manual** for more information.

Selecting Objects

Selecting the right object is important, because that is how you tell StudioPro what you want a tool, texture, operation, or linkage to apply to.

To select an object, choose one of the manipulation tools at the top right of the tool palette (the **Hotkeys** are **1**, **2** and **3**) and then click anywhere on the object. When you see the blue bounding box with handles, you will know that the object is selected.



To select more than one object:

- Hold down the **Shift** key and click the objects one at a time.

-or-

- Drag a selection marquee around the objects you want selected.

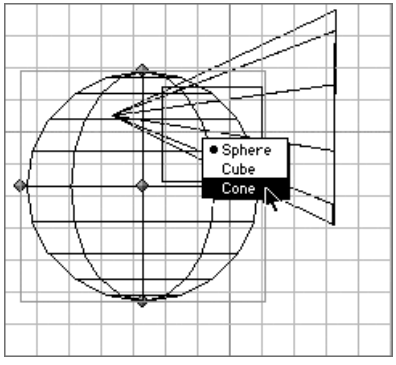
-or-

- Select all objects in the window with the **Select All** command in the Selection menu.

To select hard-to-reach objects:

- Select with the **Control** key (Macintosh) or **Right mouse button** (Windows) pressed to access a pop-up list of all objects under the cursor (on the depth axis).

  NOTE: *This pop-up list will also tell you what type of object you are selecting.*



-or-

- Move to another view, then select the object.

-or-

- Drag a selection marquee around the desired object(s), then use the **Shift** key to deselect unwanted objects.

-or-

- Temporarily hide objects that are in the way with the **Hide Selected** command.

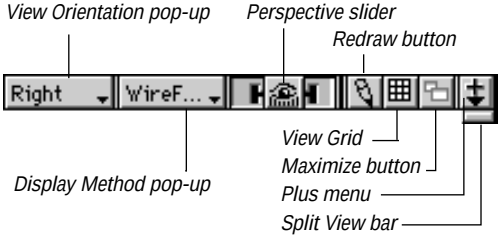
Deselect an object by clicking off of the object, or use the **Select None** command in the Selection menu.

MODELING VIEWS

Here we will explain the Modeling window and its features. StudioPro includes several great features to help you model by allowing easy access to different views, windows, displays and palettes.

These are the windows you will use most often, so you may want to take a few minutes to become familiar with their capabilities.

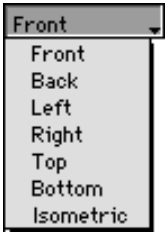
Modeling Window Controls



Modeling windows have special controls to adjust the way objects are shown. Most of the tools you will need for

handling views can be found within the window.

View Orientation. This pop-up shows the direction from which you are viewing the model: Front, Back, Right, Left, Top, Bottom, or Isometric. If you manually rotate the view, the pop-up will display Custom. Use the Split View bar to access more than one view.



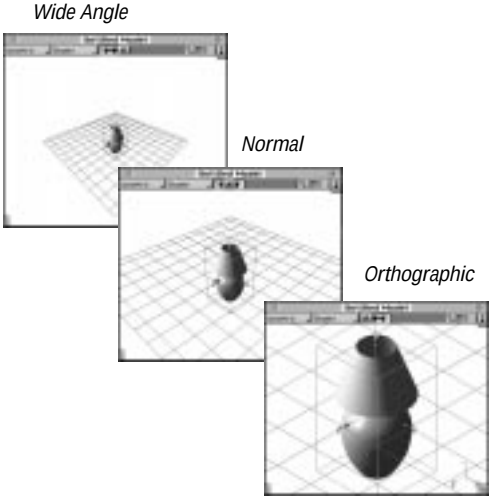
You can choose the way you view the modeling window in the View Orientation pop-up menu, or set custom views with the view manipulation tools.

Hotkeys are also available. *See* **Change your view** *on page 16.*

Display Method. This shows how the objects will be displayed in the modeling window. Use the pop-up menu to select your display method. The display methods available to you depend on what interactive renderer(s) you are using.

Perspective control. Perspective adds the element of depth to the views. Choose from: Orthographic (no perspective), Normal or Wide Angle.

Use the Perspective slider to make your selection, and check the feedback area for the name and other information.



Split View bar. Double-click this control to split the window into two windows of equal size. Or you can drag the control to split the window in any proportion. To delete a split view, click-and-drag its split bar to the window's edge.

Maximize View button. Use this control to toggle between single views and split views as you model.

Redraw button. This button allows you to force the window to redraw at any time.

View Grid button. Click this button to insert a View grid. View grids are view-relative, and track when you move in the window. Click this button again to return to the previous grid.

View Management Tools

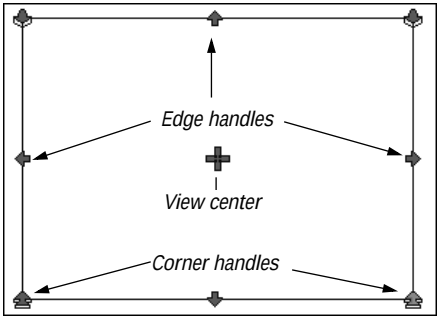
Along with the Modeling window functions, StudioPro also offers three View Management tools. They are located top left on the Tool palette.

These tools let you change the view of your models and objects, without changing their position. Using these tools creates a "Custom" entry in the View Orientation pop-up menu.

NOTE: *Switching back to one of the standard views eliminates your custom view setting.*

View Move tool

This tool lets you adjust your view of a model. With the tool selected, position the cursor anywhere in the active view, then click-and-drag in any direction.

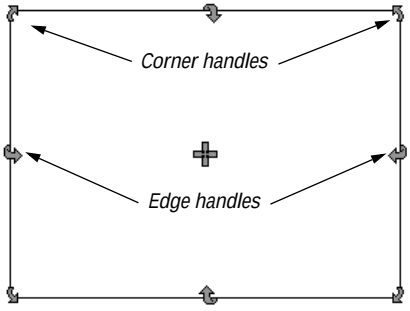


If you drag with an **edge handle**, you will limit the movement horizontally or vertically. **Free move** by grabbing anywhere else.

Use a **corner handle** to move the view in or out. Make sure you click **precisely** on the corner handle.

View Rotate tool

Use this tool to rotate your view of a model.



This only rotates the view, not the object. Rotation is indicated by the direction of the handles.

Shift key constrains the view rotation to 45° increments.

Option key (Macintosh) or **Alt** key (Windows) rotates the view in small increments.

View Zoom tool

The View Zoom tool magnifies or reduces the scale of the view of the image (not the object). It displays the standard magnifying glass.

To use the tool, click once in the window, or drag a marquee around the object.

You can change the percent of magnification in the Tool Settings dialog. Double-click the tool to summon the dialog.

Use the **Option** key(Macintosh) or **Alt** key (Windows) with this tool to reduce the image.

GRIDS

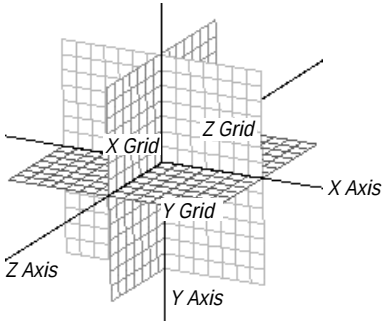
Understanding StudioPro's grid system is essential to successful modeling, because everything you create or animate will be done in relation to a grid.

We recommend that you spend some time getting comfortable with the grids. Using the grids will give you precise control over object sizing, placement and animation.

World grids

When you open a new model, the window automatically contains **World** grids. This is the kind you will probably use the most.

The grids form a three-axis coordinate system with the axes at right angles to one another. By default, X is horizontal, Y is vertical, and Z is depth.



We recommend you use the **Auto Grids** option in your Preferences. This feature automatically changes the grids to fit your view orientation. *See* **Setting Preferences** *on page 18.*

User-defined Grids

User-defined grids are useful for aligning and positioning objects with each other.

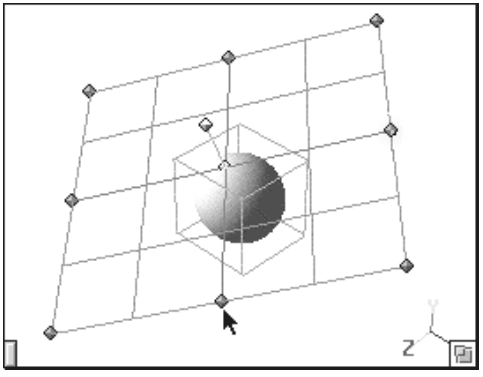
User-defined grids can be positioned anywhere in your model and are attached directly to an object. Once created, they can be scaled, moved and rotated.

To draw a User-defined grid:

1. Open a new model, and draw a Primitive shape.
2. Select the Grid tool from the Tool palette.

3. Click-and-drag on the object face to draw the grid.

The grid tool draws from the center. The grid is placed on the face of the object and perpendicular to the object. Handles appear for manipulating the grid. User-defined grids are orange.



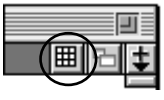
Drag the edge handles to size the User grid

The User grid appears with handles on the edges for resizing; and also two blue control handles in the center.

The blue handle which is on the object lets you move the whole grid; the blue handle above the object lets you rotate the grid. See the **Reference Manual** for more information.

View Grids

View grids are parallel to the view plane and are view relative. In other words, you are always looking at them straight on.



Display a View grid in the active window by clicking the View grid button.

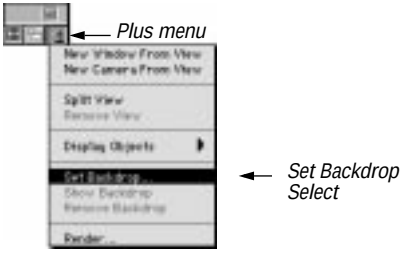
Clicking the View grid button again will turn off the View grid and make the previous grid active.

BACKDROPS

If you need to model objects and/or animations for use in a particular scene or movie clip, the Backdrop feature makes this easy. You can use a movie or image as a backdrop in your modeling window.

To set a Backdrop

1. Find and select *Set Backdrop* in the Plus menu of the Modeling window.



The Backdrop dialog will appear.

2. Click the *Load Backdrop* button.
3. Find and load the image or movie file you would like to use as a backdrop.
4. Click *OK*.

5. Use your View Manipulation tools (top left on the Tool palette) to position the grid the way you need it. The Backdrop does not move, and it does not render - it is for modeling purposes only,

Backdrop controls

In the dialog, the upper section shows information about the currently loaded backdrop. The middle section controls scale, aspect ration and opacity.

Start Time and **Frame Hold** allow you to control which part of a movie file you want to model with. Each time you move the Current time pointer, the backdrop will change to the appropriate frame of your movie file.

To edit a backdrop, select Set Backdrop again from the Plus menu.

To remove a backdrop, select Remove Backdrop from the Plus menu.

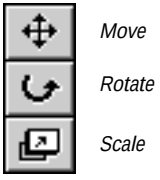
To hide a backdrop, select Hide Backdrop from the Plus menu.

For more information, *see the* **Reference Manual.**

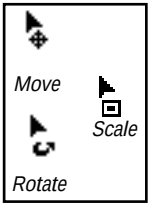
MOVING YOUR OBJECTS

Learning how StudioPro moves objects is important - and once you learn a few basics, it is easy. The most important things to ask are: Am I using the right tool? Am I using the right handle?

The Object Manipulation Tools are found in the upper right corner of the Tool palette. They are used to select and move 2-D and 3-D objects, light sources, and cameras.



When an object is selected, handles appear. When one of these tools is selected, the cursor changes shape to help you keep track of which tool you have selected.

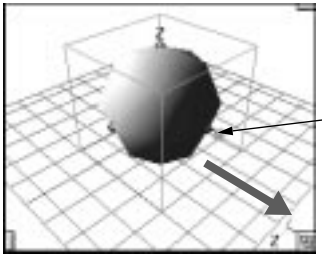


Object Move tool

This tool operates in the active view on selected objects.

You can move objects two ways: You can use one of the object's handles, to constrain the movement on the x, y, or z axis. Or you can just grab the object anywhere.

In the illustration, notice that there is one handle for each axis, and each one is labeled.



To move on the X axis, grab the X handle, and pull the object back and forth. Notice how the object moves relative to the grid: its movement is restricted to the X axis.

Open a model, draw a sphere, and practice a little. It's easy and precise. And you can still just grab and drag if you wish.

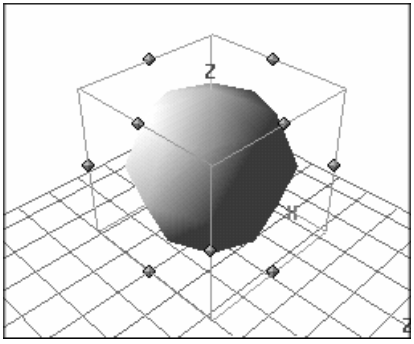
If you can't see the handle you need to use, switch your display method to Wire-Frame or PointCloud.

Command key (Macintosh) or **Ctrl** key (Windows) moves the object, but not its origin point. This is useful for certain animations. If you grab the origin point and move it with the **Command** or **Ctrl** key held down, the point will move; the object will not.

Option key (Macintosh) or **Alt** key (Windows) leaves a copy of the object in the original position.

Nudge keys are provided for positioning. Use the four arrow keys to move along the grid.

To nudge an object up (perpendicular to the grid) use **Command**+**Shift**+**Up Arrow** (Macintosh) or **Ctrl**+**Shift**+**Up Arrow** (Windows).



To nudge an object down, use **Command**+**Shift**+**Down Arrow** (Macintosh) or **Ctrl**+**Shift**+**Down Arrow** (Windows).

You can nudge any object that you can select. The amount an object moves can be set in the Nudge subdivisions field of the Set Units dialog, which is accessed through the Edit Menu.

Object Rotate tool

This tool is used to rotate objects.

To rotate an object, either drag the handles, or click-and-drag on the surface of the object. Using the handles constrains the object to one axis.

The object origin point is the rotation point. If you want to rotate the object around its geometric center without moving the origin point, group the object, rotate it, and then ungroup it.

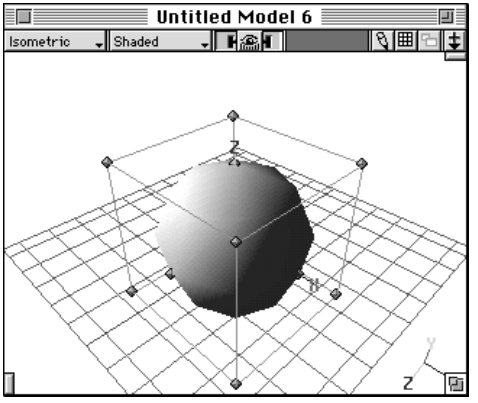
You can rotate on any of the object's three axes.

Option key (Macintosh) or **Alt** key (Windows) leaves a copy of the object in its original position.

Shift key constrains the rotation to 45° increments.

Object Scale tool

This is used to resize or scale objects. You can enlarge or reduce them in three dimensions. Use the cursor to grab a handle, or place the cursor on the object itself to scale freely.



Notice that handles are available on the X, Y and Z axes, as well as each corner.

The handles behave in the following ways:

If you select a **face handle**, the opposite face handle will become the anchor point.

If you select a **corner handle**, the opposite corner handle will become the anchor point.

Option key (Macintosh) or **Alt** key (Windows) scales an object from its geometric center.

Shift key maintains the object's proportions on all three axes.

Option+Shift (Macintosh) **or Alt+Shift** (Windows) scales the object proportionally with the geometric center as the anchor point.

Command (Macintosh) or **Ctrl** (Windows) scales the object in the direction the cursor is dragged, keeping the origin point stationary. These keys also move the origin point without moving the object if the origin point is selected instead of the object.

Space Bar toggles between the last used Object Manipulation tool and any other tool in the rest of the palette.

Use the Hotkeys: You can also access the Object Manipulation tools by pressing the number 1, 2, or 3 keys for Move, Rotate or Scale, respectively.

TAKE A SNAPSHOT

Rendering tool

This tool lets you render snapshots of the model or render complete animations. This can be done in any active window: a modeling window, a camera window, spotlight window, reshape window, etc.

To start a rendering automatically:

- **Single click** in the active window with the Rendering tool. This will render the entire active window, using the previously selected renderer.

-or-

- **Drag a marquee** with the Rendering tool. The size of the rendered snapshot is the size of the marquee.

To summon the Render dialog:

- **Use the Render** command from the Rendering menu. This will select the active window for rendering.

-or-

- Use **Shift** and single-click with the Rendering tool. This also selects the whole window for rendering.

-or-

- Use **Shift** and drag a marquee with the Rendering tool to select just part of the window.

After you select your rendering parameters in this dialog, click the *Render* button to start your rendering.

More information on this dialog can be found in Chapter 8 of this manual and in the **Reference Manual**.

REFINING YOUR OBJECTS

Once you have created a curve, line, or object, you can edit it extensively in two ways: the Object Properties palette or with the Reshape function.

OBJECT PROPERTIES PALETTE

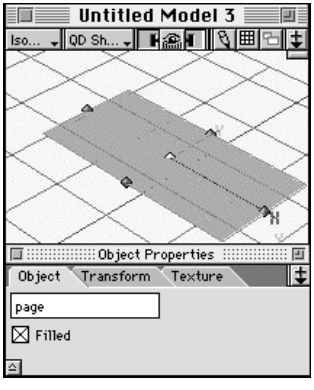
All objects have properties that can be changed in the Object Properties palette.

When you select an object, its properties appear in the palette, available for editing.

The Object Properties palette has Object, Transform and Texture tabs. Just click on the tab you want to bring it to the front.

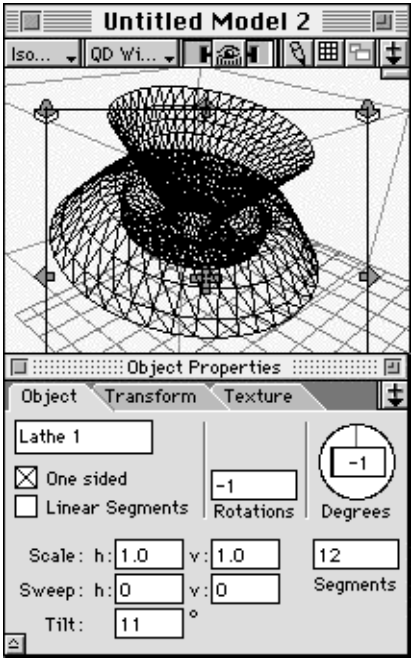
Object tab

The options available in the Object tab range from simple to complex, depending on the type of object you have selected.



This 2-D rectangle has only one editable property.

In the Object tab, you can select filled or unfilled, and give it a name.

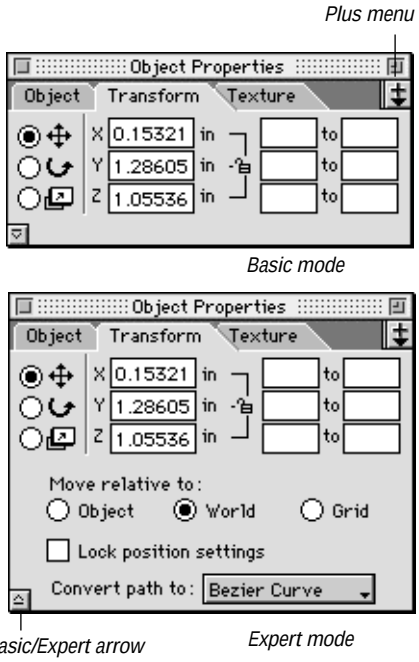


This lathed object can be edited several ways in the Object Tab of the Object Properties palette

Remember, the editable properties displayed in the Object Properties palette apply to the selected object only.

If the Object Properties palette is not visible, summon it by selecting **Show Object Palette** from the Windows menu, or by clicking the **Show Object Palette** button in the Show / Hide section of the Button bar (on the far right).

The Object Properties palette has a Basic mode, and an Expert mode. Select the Expert Mode command from the Plus menu to access the expanded portion of each tab.

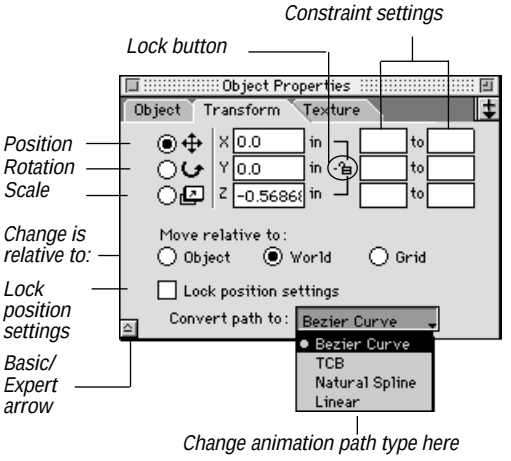


You can also use the Basic / Expert arrow at the bottom left of the palette.

For more information, refer to the type of object you need to edit, or see the **Reference Manual.**

Transform tab

The Transform tab allows you to change the position, rotation, and size of objects in the model; and specify constraints for these settings.

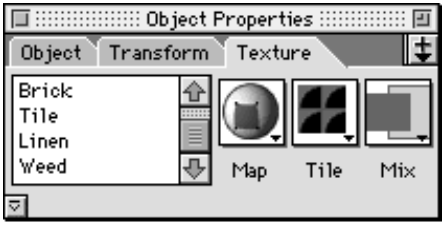


You can also change the type of an animation path, using the pop-up menu at the bottom of the tab.

Changes you make do not take effect on your object until you click out of the field; or press the **Enter**, **Return** or **Tab** key.

Texture tab

The Texture tab gives you various controls for textures. *See* **Making and Editing Textures** *on page 85.*



RESHAPING OBJECTS

With StudioPro's **Reshape mode,** you can modify the geometry of an object in the modeling window.

Reshape works with the vertices, or control points, of objects. You can push and pull vertices on any axis to mold an object's geometry in complex ways.

As you work with **Reshape,** you will find that some object types need to be converted before they can be edited.

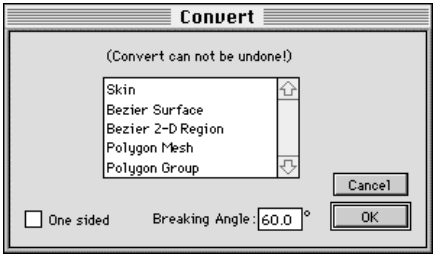
Convert

The **Convert** command shows a dialog listing the possible conversions for the selected object. Once you have converted it, you can use the tools on the **Reshape** tool palette to move points, add and subtract points, and push and pull vertices.

To Convert an object:

1. Select the object.
2. Choose **Convert** from the Modeling menu or select the **Convert** button from the Button bar.

When you select the **Convert** command, a dialog will appear that will give you access to all the available conversions for that object type.



Reshape Mode

Once you have converted an object, you can edit it with **Reshape**.

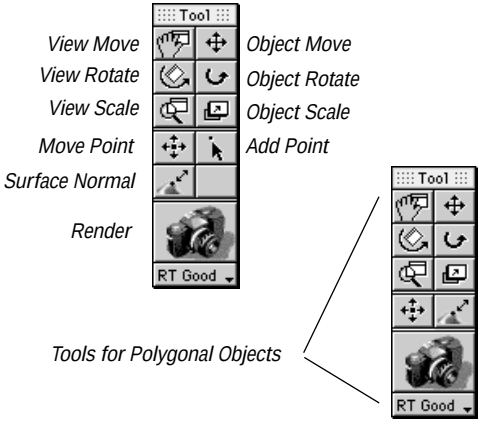
To open Reshape:

1. Select an object.
2. Click on the **Reshape** button,

   or select **Reshape** from the Modeling menu.

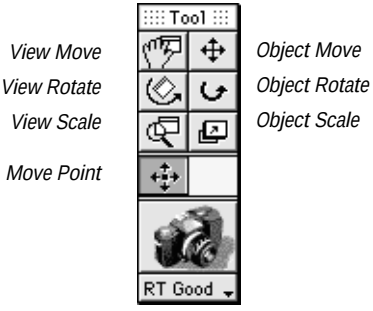
The tool palette will change to reflect the fact that you are in **Reshape** mode. If you are reshaping a 3-D object, the palette will look like the following illustration.

Tools for Bezier Objects



Notice that the top six tools are identical to those in the main modeling window. They work just the same in Reshape; the tools specific to Reshape are in the lower section of the tool palette.

The 2-D Reshape has fewer tools because you can only move handles or add points.



The **Reshape** tools are:

- **Move Point tool**. Use this to move the selected point perpendicular to the grid.
- **Surface Normal tool**. Use this to move the selected vertex point in a direction dictated by the surface normal for that point.
- **Add Point tool**. Use this to add another vertex point to the surface.

The Move Point and Surface Normal tools have Tool Settings dialogs. Access them by double-clicking the tool icon.

If you select one of the Mesh gravity options from the pop-up, pulling points will stretch the object in a proportional way. Without gravity (None), points will pull out sharply from the object.

To exit Reshape: Select **End Reshape** from the Modeling menu, or click the End Reshape button on the Button bar. (Use the Feedback area to figure out which one it is.) This takes you back to the main Modeling window.

To Reshape a line or curve:

1. Select the line you want to adjust.
2. Click the **Reshape** button on the Button bar, or select **Reshape** from the Modeling menu.

   The tool palette will change to reflect the fact that you are in **Reshape** mode.
3. Use the Pointer tool to drag one of the direction handles to adjust the curve, or pull out vertices to adjust line segments.

   If the handles aren't visible, click on the vertex point. If a handle is still not visible, hold down the **Command** key (Macintosh) or **Ctrl** key (Windows) while clicking and dragging the vertex point.

To hinge a vertex point so the handles can be moved independently, hold down the **Option** key (Macintosh) or **Alt** key (Windows) while dragging the handle you want to hinge. Once a point has been hinged, you can drag the handles independently.

To realign the handles, slowly move one until it is visually aligned with the other. They will lock into place.

If the handles are on different planes, use the **Align Handles** button as you click-and-drag to align.

To add points, select the line or path, hold down the **Option** key (Macintosh) or **Alt** key (Windows). Click to add a point.

To delete points, select the point with the Pointer tool, then press the **Delete** key.

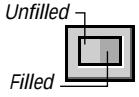
To convert a corner point to a smooth point, select the point, then hold down the **Command** key (Macintosh) or the **Ctrl** key (Windows) and pull the handles out of the point.

USING TOOLS AND MODELERS

2-D OBJECTS

In StudioPro, two-dimensional objects are often used as templates for other modelers. All 2-D objects are drawn with a click-and-drag motion.

These are the 2-D drawing tools.



To draw a 2-D object, simply click-and-drag to define the dimensions of the object.

You can make it filled or unfilled by selecting that side of the tool's button. The filled version has a surface; the unfilled version is hollow.

You determine the size and proportions of the object by clicking and dragging.

You can also draw a 2-D object with the two-click method. Click to set the first anchor point, then click to end the object.

Shift key constrains the object to equal proportions.

Option (Macintosh) or **Alt** (Windows) draws the object from the center.

Option+Shift (Macintosh) or **Alt**+Shift (Windows) draws an object from the center while maintaining proportions.

If you change your mind and want a filled object as opposed to an unfilled, or vice versa, you can edit your 2-D object in its Object Properties palette.

Rectangle/Square Tool

Use this tool to draw square or rectangular-shaped objects.

Change it from filled to unfilled in the Object Properties palette; there are no tools settings available.

Oval tool

This tool can draw exact circles or ovals of any proportion.

The Tool Settings dialog allows you to draw an oval with a hole in the center of it.

The default setting is zero; raising the percentage gives you the hole and sets it relative size.

You can also set the hole radius in the Object Properties palette and determine its filled or unfilled status there.

Rounded Rectangle tool

Use this tool to draw rectangles with rounded corners.

The radius of the corners is adjustable in the Tool Setting dialog.

The corner radius can also be set in the Object Properties palette, along with its filled or unfilled status.

Regular Polygon tool

Use this tool to draw multi-faceted shapes.

You can set the number of sides ahead of time in the Tool Settings dialog, or use the Object Properties palette.

TEXT

Text tool

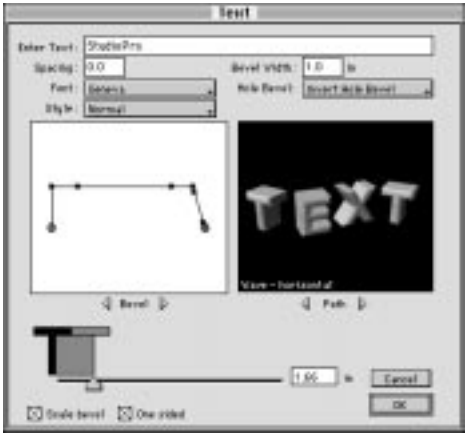
Use this tool to create extruded text.

To create text:

1. Select the Text tool.
2. Drag the cursor vertically in the active modeling window.

   This specifies the location and size of the text.

   When you release, the Text dialog box appears.
3. Enter a word or line of text in the Enter Text field.
4. Choose a font from the pull-down menu.
5. Select a style.



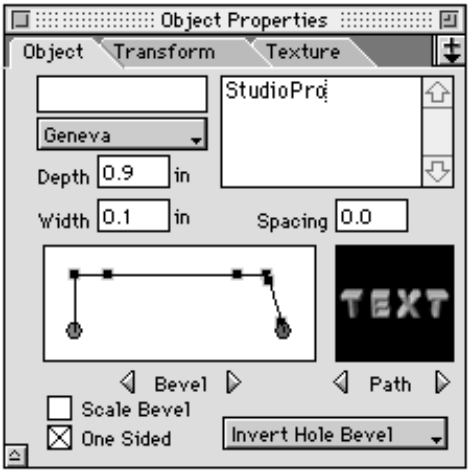
6. Choose the desired Extrusion Bevel and Path.

   You can edit the bevel by adjusting points along the path that describes it.
7. Set the depth of the extrusion.
8. Click OK.

   When you click OK, the characters are returned to the Modeling window as an extruded 3D object.

   Once text is created, it can be edited in the Object Properties palette.

   You can customize the bevel by choosing one from the Object Properties palette and changing its vertex points along the path that describes the bevel. You can also change the text, depth, font, path and select router or scale bevel in the Object Properties palette.



WORKING WITH BEZIER LINES

Bezier curves are not only useful, but a lot of fun as well. You can use them to create uniquely curved objects and templates; and complex, graceful animation paths.

Pen Tool

Use this tool to draw Bezier lines and regions. The line can appear as a straight line or a curve. Your method of drawing will determine what the finished line will look like.

The Tool Settings dialog for the Bezier Pen tool lets you automatically create an animation path and define the time between markers as you draw your line segment. Each click defines a control point.

When creating an animation path with the Auto motion-path feature, the first click as you draw must be on the object that will use the path.

If the line is not associated with an object, it is just a line, although it can later be converted to an animation path. *See* **Convert to Path** *on page 139.*

The line you draw with the Pen Line tool can be closed or open, and it may or may not be drawn in one plane (planar).

Two ways to draw Bezier lines:

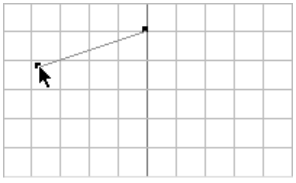
- Clicking only - this gives you straight segments with hidden control handles. You can always go back to the line to pull out the handles and make your line curve.

-or-

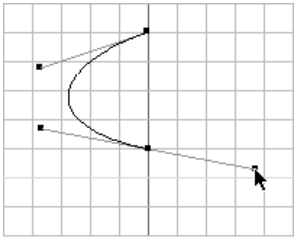
- Click, hold down the mouse button, and drag your curves. This is usually simpler, because the curves already have their basic shape; and because the handles are brought out in the process.

To draw a Bezier curve

1. Select the Pen Line tool.
2. Place the cursor where you want the curve to begin. Hold down the mouse button. The first anchor point will appear.



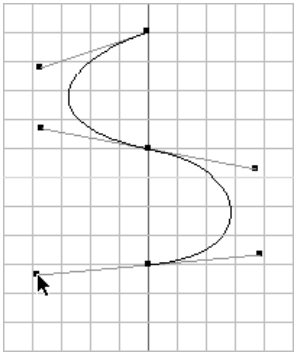
3. With the mouse held down, drag in the direction you want the curve segment to be drawn. Release the mouse.



   The shape of the curve will be determined by the length and slope of the direction line. This can be edited later.

4. Position the pen point where you want the curve segment to end and click-and-drag in the direction of the curve to complete the segment.

5. For each segment of a continuous curve, position the pointer where you want that segment to end and click-and-drag away from the curve.



To end the line:

- Press *Enter.*

-or-

- Double-click on the last point.

-or-

- Click on the first point.

To add on to your Bezier line, just click on the beginning or ending point. The line will highlight, and you can continue to draw.

FORMING A LINK

Link Tool

The Link tool establishes a link between objects, lights and cameras. This allows an object to follow another object, for example.

When using the Link tool, the order in which you link is important in determining how the linked objects behave.

The first object you select is the child object, and the second is the parent. After the link is made, moving the parent object causes the child object to move as well.

However, the child object can be moved without affecting the parent object.

You can preset link characteristics in the Tool Settings dialog. Use these to determine which of the characteristics the child object inherits from the parent object.

For more information, see the **Reference Manual**.

To Link an object to another object:

1. Select the Link tool.
2. Click on the first object (child) and drag the mouse to the next object (parent).
3. Release the mouse button.

   As the objects are linked, a line will form to show they have a parent-child relationship. Remember that the order in which you link the objects is important.

   Once they are linked, any move, scale, or rotate you perform on the parent object will be followed by the child object.

Unlink tool

Use the Unlink tool to sever the link between previously linked objects.

To Unlink objects:

1. Select the Unlink tool.
2. Click on the first object and drag the mouse to the next object.

   The objects will become selected.
3. Release the mouse.

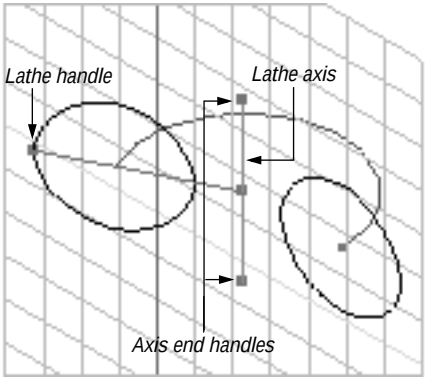
   The objects will unlink.

MODELING TOOLS

StudioPro offers you a wide range of modeling methods and tools. This section takes a look at the more powerful modeling capabilities of StudioPro, offers some guidelines for effective modeling, and explains how to use the various modeling tools.

Lathe

Lathe revolves 2-D objects through space to create 3-D objects. Any 2-D object can be used as a template. You can lathe either clockwise or counterclockwise. You can lathe a full 360° with a single click; or manually lathe in increments less than 360°. You can also move and tilt the lathe axis.

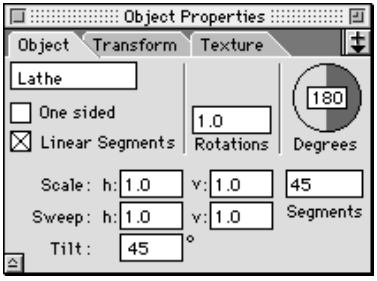


- Single click on a handle to automatically lathe 360 degrees.
- When you grab a handle, the opposite handle becomes the center point of the lathe axis.
- Use the Lathe handle to determine the degrees of rotation.
- Use the axis end handles to tilt the axis by clicking and dragging.
- Click and drag the lathe center handle to change the location of the axis.
- While clicking and dragging, use the axis center handle with the **Shift** key pressed to create a Sweep object.

  NOTE: *If you cannot see the lathe handles, click on the object, or change to Wire-Frame or PointCloud display method.*

If you are not happy with the results, you can use the Lathe tool to interactively change your lathed object, or you can use

the Object Properties palette to further refine it.



If you know you want a linear (straight between the edges) object and know how many segments you want your object to have, you can double-click the Lathe tool for access to the Tool Setting dialog.

The **Reshape** command lets you edit the lathe profile. If you want to edit any points on the completed lathe object to change its shape, you will have to convert it to an editable object, such as a Bézier mesh.

When you select **Reshape**, the Tool palette will change, giving you the tools necessary to edit the object.

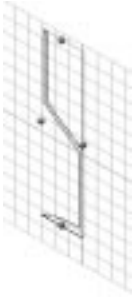
To make a Lathed object:

1. Select *Isometric* from the View Orientation pop-up menu in the Modeling window.

   It is easier to see the lathe action of an object if you view it isometric view.

2. Using the *Pen* tool, draw the outline of a goblet by clicking at each point.

3. When you release the mouse, the object will remain selected and show a bounding box with handles.

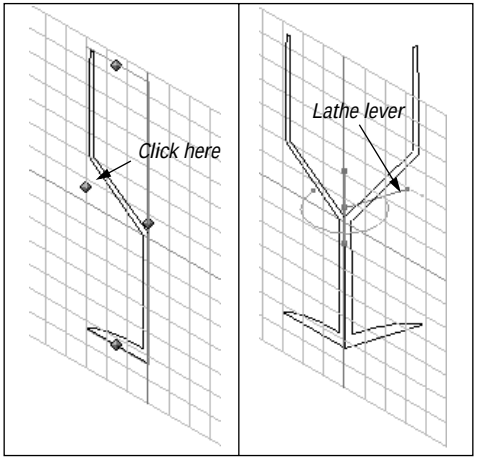


4. Select the Lathe tool. Handles appear on the object.

5. Click once on the handle opposite the intended lathe axis to automatically lathe 360 degrees.

   - or -

   Drag the lathe lever to the where you want it, then release the mouse button.



6. Click on another tool to end the lathe operation. The lathed object will be generated.

Sweep

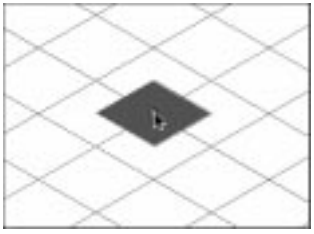
Once a lathe object has been created, you can perform a **Sweep** operation with the Lathe tool by holding down the **Shift** key and pulling the center handle up or down as you move it. You can add as many rotations as desired with the lathe handle.

Extrude tool

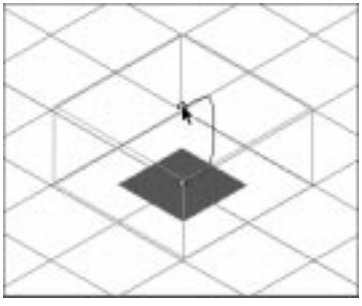
Extrude lets you take a 2-D object or 2-D group and extrude it into a 3-D object.

To create an Extruded object:

1. Draw a 2-D object in the modeling window.
2. Select the Extrude tool, then the 2-D object. A bounding box with a center handle appears.

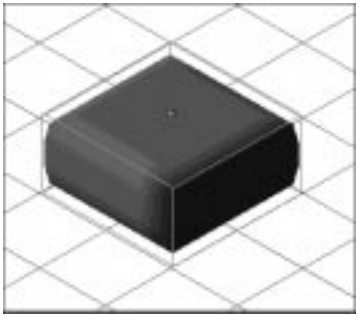


3. Click on the center handle and drag.

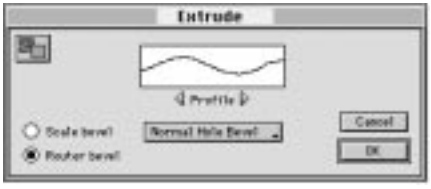


4. Release the mouse; the extrusion will be complete.

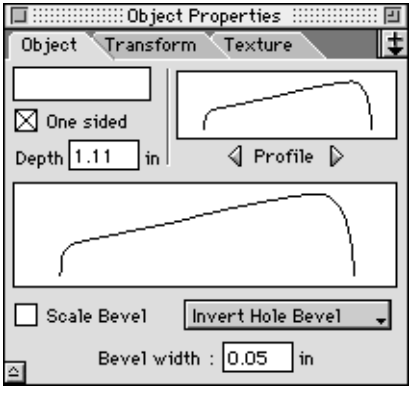
   The new object will have a bounding box and a default bevel.



A different bevel can be selected in the Tool Settings dialog before you extrude (double-click the tool).



The bevel can be edited in the expanded section of the Object Properties palette.



Using the **Reshape** command on an extruded object allows you to reshape the face of the object and edit the bevel.

Or use **Convert**, then **Reshape** to edit the whole object.

EXTENSION TOOLS

Tools on the Extension Tool palette give you the ability to perform specialized operations.

Extensions for the Extension Tool palette can be found in the Extension folder. This folder can store new extensions as they are added.

What appears in your Extension tool palette depends upon which tools you have loaded.

Skin/UnSkin

Skin is used to form a surface over two or more "ribs." The Skin tool works with any 2-D objects as a rib.

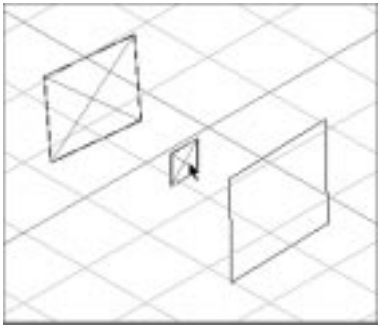
Unskin removes that section of the skinned object that is selected with this tool and leaves the ribs. The ribs are then available for editing or animating.

To create a Skin object:

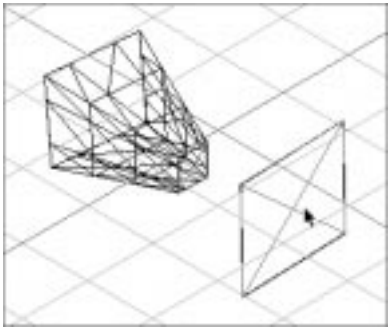
1. Draw a series of ribs with any 2-D drawing tool.

2. Select the Skin tool from the Tool palette.

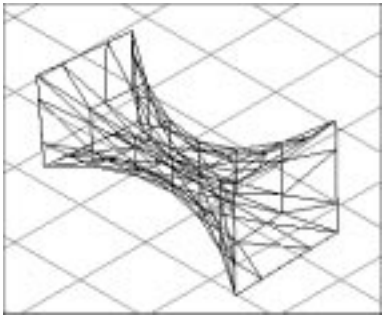
3. Click-and-drag between the ribs.



As you connect the ribs, they will become selected.

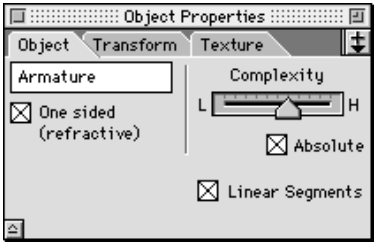


Skinning takes place when you release the mouse.



You can animate the ribs by changing their positions with the **Reshape** command. To reshape the geometry of the ribs, you will need to do an **Unskin**. The ribs will then be individually available for **Reshape**.

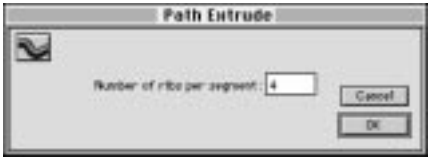
In the Object Properties palette, you can make the skin object one-sided and set the complexity level. If you click *Linear Segments*, the connecting lines will be straight instead of curved.



Path Extrude

Path Extrude allows you to extrude a 2-D object along a predefined path to create a 3-D object.

Path Extrude tool settings allow you to determine the number of ribs per segment for your object.



To extrude along a path:

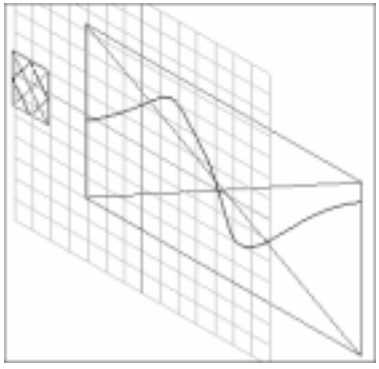
1. Draw or import a Bézier curve to be used as a path.

2. Draw a 2-D object in the modeling window.

3. Select the Path Extrude tool.

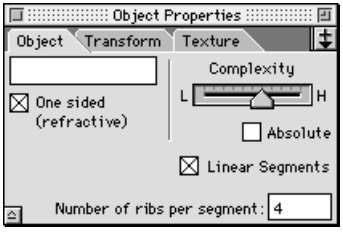
4. Connect the object and the path by first clicking on the 2-D object, then dragging the mouse pointer over the curve.

   The intended path will become highlighted.



5. When you release the mouse, the object will extrude along the path making it a three-dimensional object.

You can change properties of the object in the Path Extrude Object Properties palette.

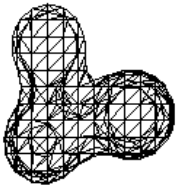


Use **Reshape** to edit both the curve and 2-D object.

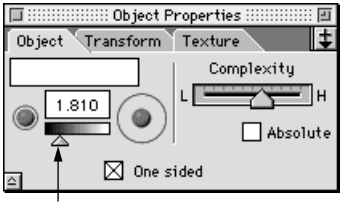
Metaballs

Metaballs is a great way to create objects. You specify the general shape of the object using spheres, then merge and connect them together.

As the operation proceeds, the objects will seem to melt into each other as they come close to one another, transforming separate spheres into a single entity.



Once you have created a Metaballs entity, you can edit it using the Object Properties palette.



You can use the *Radius Slider* bar to change the radius of influence. This determines when and to what extent the spheres will merge.

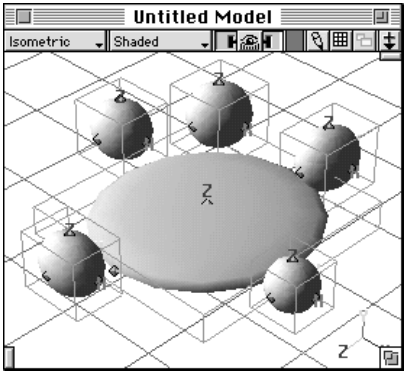
The *Complexity* slider determines the amount of detail in the rendered entity. Metaballs requires ungrouped spheres to perform the operation.

To use Metaballs:

1. Use the Sphere tool to draw a medium-sized sphere in the modeling window.

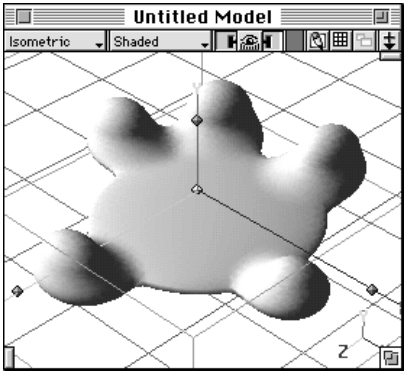
2. Flatten the sphere by selecting the scale tool, clicking on the top center handle, and pushing it down.

2. Place a few smaller spheres around the large one; close, but not touching.



3. Select all the spheres by drawing a marquee around them with the selection tool.
4. Click on the **Metaballs** button.

In the Object Properties palette, move the slider until you like the results.



To restore the original ellipsoids, make sure to select the metaball, then choose the **Metaballs Unjoin** button in the button bar.

Boolean Modeling

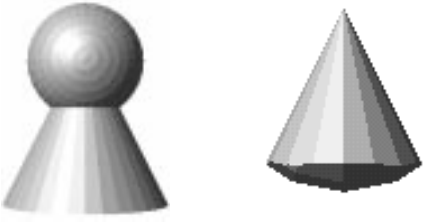
StudioPro performs four distinct Boolean operations: **Union, Subtract, Intersect, Cut**.

Boolean operations are performed with two objects. The objects must overlap one another for Boolean to have any effect.

Union

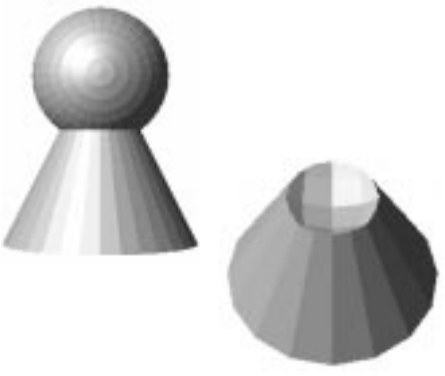
Union fuses two objects to create a single object, in this case, a cone and a sphere.

Intersect



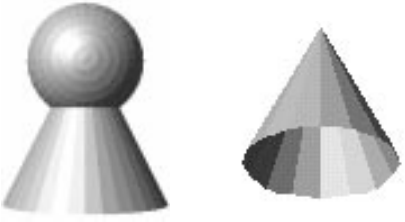
Intersect creates a single object from the intersecting point of two objects. The remaining geometry is the overlapping portions of both objects.

Subtract



Subtract removes the geometry of the first object from the second object and leaves a surface on the resulting object.

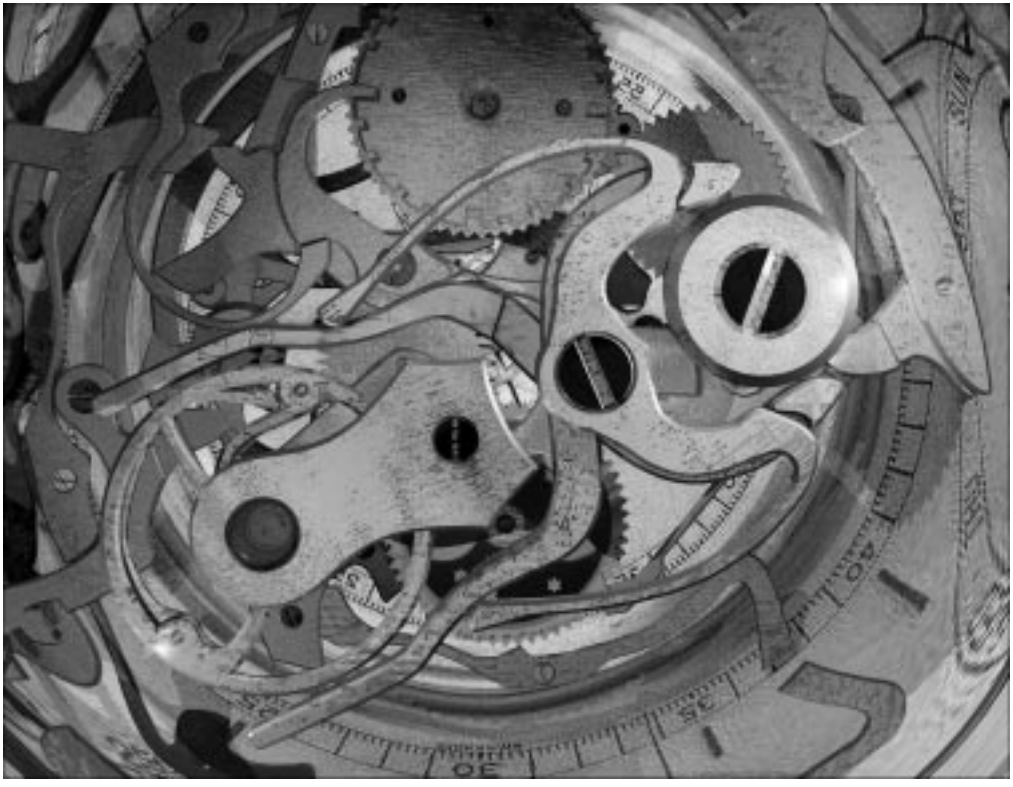
Cut



Cut creates a new shape by deleting all of both objects except that part of the first object which is inside the second object. It is important to select the objects in the proper order.

Unlike **Intersect**, the **Cut** operation does not supply any additional surfaces. A sphere cut by a plane will look like a bowl.

SHAPES



Peter Weishar

INTRODUCTION

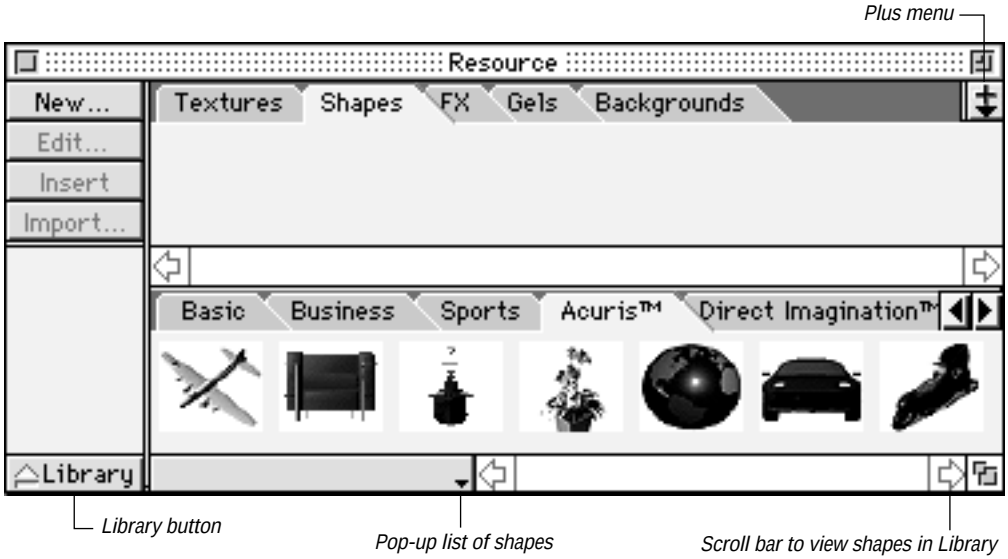
The time will come when you want to tackle a really big project, complete with fine detail, precisely placed multiple objects, and complex textures.

This chapter will show you a StudioPro feature called Shapes. This feature helps you to break down big models into smaller units.

The Shapes feature lets you set up logical groupings of objects, helps you to establish a structure for your project, and conserves memory. The bigger the project, the more helpful the shapes structure, or hierarchy, can be.

We will start this chapter with a brief description of how the Shapes tab functions, then discuss Shape hierarchy, and then move on to a couple of tutorials.

THE SHAPES TAB



The Shapes tab on the Resource palette gives you several options for handling shapes.

The tabs in the Library section contain several interesting pre-made shapes. These pre-made shapes can be used simply as objects inserted into a model, or can be made into hierarchal Shapes themselves. *See* **Shapes vs. Objects** *on page 66.*

The Shapes Tab contains preview images and a pop-up menu for each shape available on disk.

The condensed tab (top portion) contains only those shapes currently loaded into the model. When you click the Library button, the tab will expand vertically and you will have access to all shapes stored in the Shapes folder on your hard drive.

As you create new shapes, they also appear in the loaded area of the Shapes tab. Files imported into a model are shown on the pop-up list, and a preview image is automatically created for them.

How the Shapes Tab Works

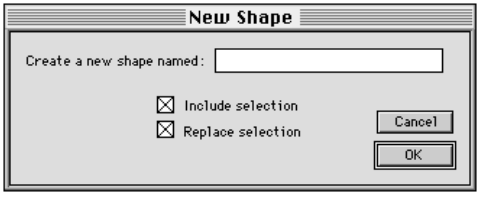
To select a shape on the palette, single click its preview image. A black rectangle will appear around the selected shape. You can also choose a shape by scrolling through the pop-up menu.

To load a shape from the palette, click the Import button. This loads the shape into the active model.

To insert a shape from the palette, select its preview on the palette, then click the Insert button, or simply drag-and-drop it in the active window.

To create a new shape, click the New button.

The New Shape dialog box opens where you can enter the name of the shape and indicate whether or not you want to include the currently selected objects in the new shape's work space.



If you choose to include the selected objects in the new shape, you can replace them with instances of these objects in the active work space.

In the Shape window, you can work with the shapes using StudioPro's object manipulation and modeling tools.

Textures can be applied to new shapes. When a texture is applied to a shape, it will also be applied to the instances of the shape.

Edit button. This button allows you to edit the selected shape. A window opens into the shape's work space. If a shape is not loaded, it will be automatically loaded first.

Insert button. When you click this button, you can insert a selected shape's instance into the active model. The instance's size is the same as the original shape.

Import button. Import lets you load shapes from the Library into the currently loaded model, but not the Modeling window. It places the shape into the top part of the Shapes tab.

Plus Menu. Commands in the Plus menu are relevant to the entire Resource palette. When the Shapes tab is active, the commands will apply to Shapes.

Shapes created or loaded into a model become part of that model. When you save the model, you save the shapes as part of the document. Shapes' work spaces are kept just the way you left them when you closed the window.

Loading Shapes

You can load shapes into a model at any time during the creation process. As you work with StudioPro, you'll build shapes that you'll want to save. A full Shapes library helps you to assemble ready-made building blocks very quickly into a complex model.

To load a shape into a model:

- **Double-click** its preview image in the Shapes tab. This loads the shape and opens its window for editing.

-or-

- Select a shape from the palette, then click the **Insert** button.

-or-

- Select a shape on the palette and click the **Edit** button. This loads the shape and opens its window for editing. It will not insert the shape into the model.

-or-

- Select a shape in the Shapes Library and click the **Import** button.

Adjusting the Scale of a Shape

Since StudioPro doesn't restrict the scale at which a model is constructed, it is inevitable that you will load shapes that are not the same scale as the model. And using the same scale for all your work is not always practical.

If you need to adjust the scale of a shape, you can edit the shape and change the size of the original object. Or, you can edit at any point in the creation process. Each instance, even instances of the same shape, can be a different scale. And everything about the shape is scaled with the instance, including its geometry and texture.

NOTE: *Changing the size of an instance does not affect the original object in the shape work space in any way.*

Deleting Shapes

Any shapes that aren't currently being used in the active model can be unloaded from memory by using the **Delete Unused** command in the Plus menu of the Resource palette while the Shapes tab is active.

Saving Shapes

You can save shapes as separate files. With the shape selected, choose the **Save** command from the Plus menu.

SHAPES VS. OBJECTS

In StudioPro there are two kinds of forms you can use while modeling.

First, there are objects. You make them, Reshape them, give them textures and animate them.

Second, a *Shape*. What's the difference? Shapes do everything that objects do, plus a lot more.

Using the Shape feature of StudioPro allows you to work on just one component at a time in its own separate work space, with its own window. Then you insert one or more *instances* of the shape into your model.

The instance is referenced, behaving like an alias or shortcut does on your desktop, with a path to the original shape. So

changes you make in the Shape window are automatically applied to each instance of the shape.

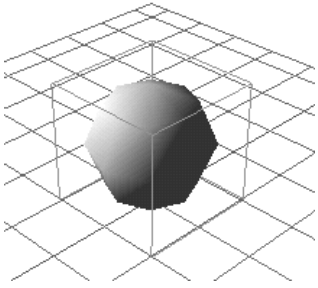
These changes can include several attributes: shape, of course; also size, texture, rotation, etc.

Here's a quick demonstration of how to work with Shapes. We will start with a primitive sphere, make it a Shape, edit it in Reshape, then save it for future use.

Working with Shape and Reshape

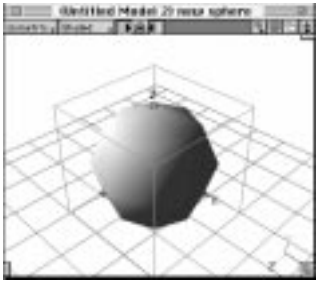
1. Open a new model, and select the Sphere Primitive tool from the main Tool palette.

2. Draw a sphere in the modeling window by clicking and dragging.



3. Select the sphere with the Object Move tool (**Hotkey 1**), then click the Shapes tab on the Resource palette to bring it to the front. Click the *New* button in the top left corner of the Resource palette.

4. In the New Shape dialog which appears, name it *new sphere*, and check both boxes. Click *OK*.

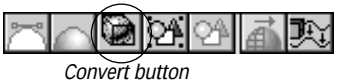


5. Notice the new window. You can tell it's a Shape window because the name of your model appears in parentheses before the name of your new shape in the window's title bar.

Convert, then Reshape your sphere

Primitives cannot be Reshaped until they are converted to another type of object, in this case, we will use Polygon Mesh.

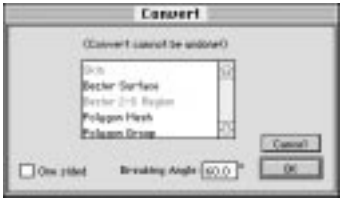
1. With your sphere selected, click the *Convert* button on the Button Bar.



Convert button

The Convert command can also be accessed through the Modeling menu on the Main Menu Bar.

2. In the Convert dialog, select *Polygon Mesh*, then click OK.

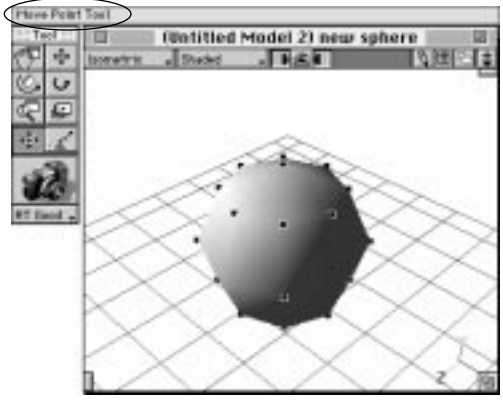


3. With the sphere still selected, click the *Reshape* button on the Button Bar. This command can also be accessed through the Modeling Menu.

Reshape

4. Notice that you are now in Reshape mode. The toolbar has changed to include only the special tools for Reshape. The feedback area will tell you the tool names when you move your cursor over them.

Feedback area



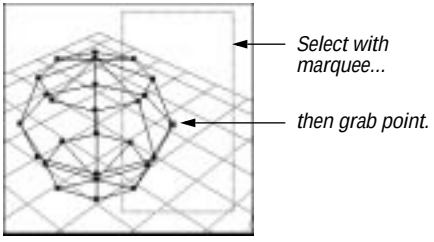
5. Double-click on the *Move Point* tool. This summons the tool settings dialog, where we will set the gravity. The Gravity setting determines how much the rest of the object moves when you select and move a point.

6. Select *Medium* from the pop-up. Click *OK*.

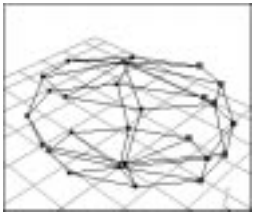
7. Change to WireFrame display method.

   Draw a selection marquee to select all of the points to the right of the center line of your sphere.

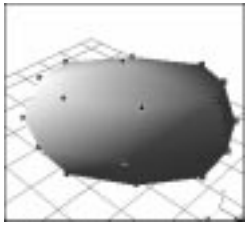
   NOTE: *If **Backface Culling** is enabled in your Preferences, you won't be able to select all of the vertices. See the **Reference Manual** for more information.*



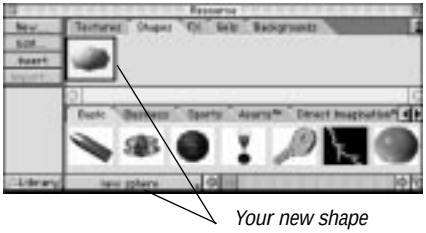
8. Now grab the selection point on the right end of your sphere and pull it to the right.



   Notice how the left side of the sphere stretches and follows as you pull: that is gravity. Switch to Shaded display to get the full effect.



9. Close your Shape window. Now look at the Resource palette.



Your new shape has loaded into the top part of the Resource palette. Click on its preview. It now appears in the pop-up list, as well.

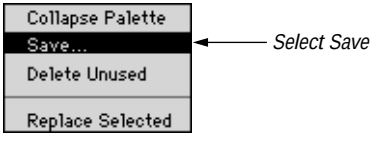
Now you can insert or edit it like all the other pre-made shapes. When you save your model, *new sphere* will be part of it.

Save your Shape

Here's how to save your new shape in your Libraries folder for future use in other models.

NOTE: *Saving a Texture, FX, Gel or Background to your Libraries folder works exactly the same way:*

1. Select *Save* in the Plus menu.



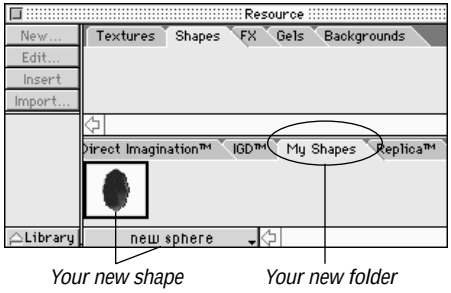
2. In the dialog which appears, find your StudioPro folder.

3. Open the StudioPro folder, the *Libraries* folder it contains, then the *Shapes* folder.

4. Make a new folder, and name it *My Shapes*, then name your new shape. Click OK.

5. Back in the Resource palette, click on the pop-up menu at the bottom of the Shapes tab. Notice a new entry: *My Shapes*.

6. To see your new folder in the Shapes palette, click to another tab in the Resource palette and then click back to Shapes.



SHAPES HIERARCHY

Any object that is constructed as a shape may be made part of another shape. Although the inserted shape has all the characteristics of the original shape, it is really only an instance of the original object. As an instance, it is not directly editable, but can be given additional transformations.

The transformations and texture applications at the instance level override those at the shape level, as the shape is considered a lower level than its instance.

A complex shape assembled with instances is hierarchical in nature. In these hierarchical models, the original object is called the root shape. You can have as many, or as few, root shapes as you need.

A root shape can be used in other shapes, or inserted directly into the model.

Saving Time With Instances

At any point in the construction of your model, you can change your mind about the properties of some of the objects—their geometry, texture, even the type of object used. Any changes you make to a shape will be reflected throughout the model wherever that shape was used.

Whatever you put in a shape's work space becomes part of its instance also. If you replace an object in the shape with another one, the new object appears in the instance in place of the previous object.

If you draw a new object into the Shapes work space, it will appear as an instance in the model at the point where the place is being held.

Saving Memory With Instances

In addition to making modeling easier, a shape instance takes much less memory than making copies of the original object does. You can use a shape as often as you need to and at multiple levels in the hierarchical structure of the model.

SHAPES TUTORIAL (ORIENTAL TEA SET):

This exercise will give you a basic understanding of how shapes work in StudioPro. You will learn how to load, copy, create, and edit shapes. You will also see how the shape hierarchy works.

Teapot

1. Open a new Modeling window.
2. In the Basic folder of the Shapes tab, select the *Teapot* by clicking on its preview.

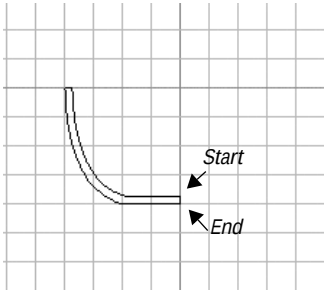
3. Insert the Teapot into the model space: With the Teapot selected in the Shapes tab, click the *Insert* button.
4. Select the Textures tab from the Resource palette. Click on the Brick&Stone tab and select the Marble - Green texture.
5. Click the *Apply* button.

Cups

1. Create a new shape work space by first clicking off the teapot to deselect it. Now click the Shapes tab to make it active, and click the **New** button.
2. In the New Shape dialog which appears, name the shape *Cup*, then click *OK*. A new Shape window will appear.

   Notice the name of your main model in parentheses in the window's title bar.
3. In the new window, draw a cross-section of the cup with the Bézier Pen tool. First switch to Front view, then select the Pen tool by clicking it.

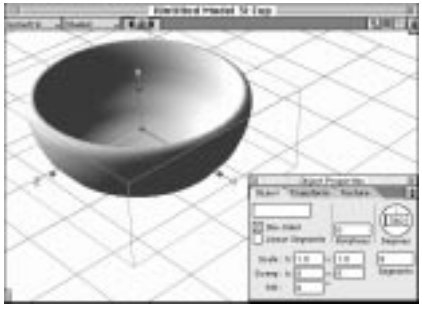
Your cup cross-section should look similar to the following illustration.



For more information on working with Bézier lines, *see* **Working with Bezier Lines** *on page 49. See also* **Fine-tune your Lathe template** *on page 99.*

4. To lathe the template, select the Lathe tool from the Tool palette and switch back to Isometric view (Hot key "/").

Move the Lathe handle around the template 360°. Check your rotation in the Object Properties palette, Object tab.



Don't forget to click another tool to signal you are through with the template and are ready to lathe. The lathed cup will then be redrawn in the shape work space. It should look similar to the illustration.

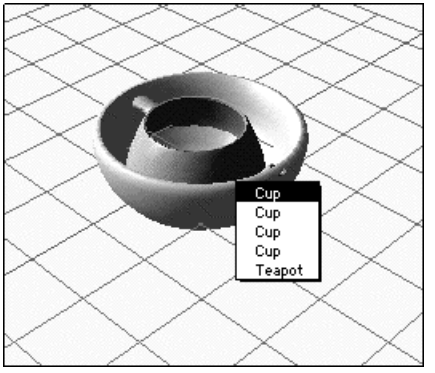
5. Apply the Green Marble texture from the Textures palette by selecting it, then clicking *Apply*. The texture should be listed in the cup's Object Properties palette, in the Texture tab.
6. Click the close box to close the Shape window. This saves whatever changes you have made to your new shape, and also loads it in your model (but not in the Modeling window). Notice it appears in the upper section of the Shapes tab on the Resource palette.

   This would be a good time to save your model: click the disk icon in the Button bar or use the File menu command.

Insert four cups

1. Insert a cup into the modeling window by selecting the cup on the Shapes tab of the Resource palette, then clicking the *Insert* button.
2. Notice this places the cup at 0, 0, 0 coordinates, probably right where you left the teapot. That's OK. Don't worry about the size of the cups, either.
3. Insert three more cups the same as you did in Step 1. Now, you have everything right in the middle.
4. Using the Object Move tool **(Hotkey 1**), summon a selection menu by selecting one of the cups by while you hold down the Control key (Macintosh) or the right mouse button (Windows).

This brings up a pop-up menu listing all the objects that could be selected where you clicked.



5. Select one of the cups from the pop-up. Switch to PointCloud display, then grab the X or Z handle and pull the cup off center.

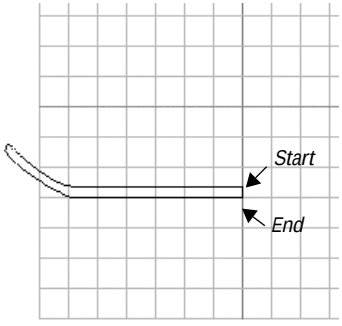
   Now repeat the process with the other three cups, pulling them in different directions as you place them around the teapot.

   When you are finished, switch back to Shaded display.

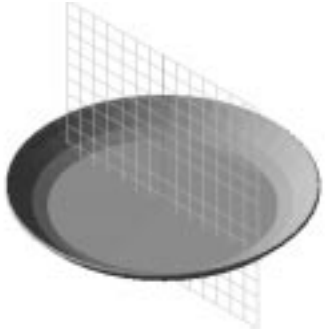
Tray:

1. Open a new shape window. Don't forget to deselect all objects in the Modeling window.
2. Name the new shape *Tray*, and switch to the Front view.
3. Use the Bézier Pen tool to draw a cross-section of the tray. Refer back to the cup lathe instructions if you need to.

   It should look similar to the following illustration.



4. Switch to Isometric to lathe the tray template.



5. Find the Gold texture from the Metal tab of the Texture tab and click on its preview. Drag the texture to your tray to apply it. Release the mouse when the tray highlights with a red bounding box.
6. Close the shape window to save your tray.

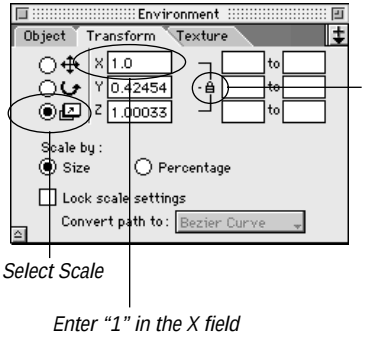
Putting it all together:

1. Insert the tray into the Modeling window.

Now that all the objects are in the model, you need to scale them to make their size proportional.

2. Open the Cup Shape window by selecting the Cup's preview from the top part of the Resource palette, then clicking the *Edit* button.

3. Select the cup, then find the Object Properties palette, and click on the Transform tab.



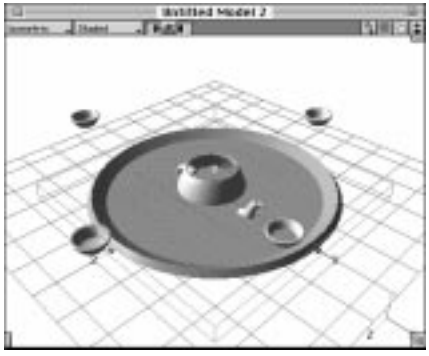
4. Click the *Lock* icon to lock the proportions of the cup. Click the *Scale* radio button. Enter *1* in the X numeric field.

5. Click *Enter*, *Tab* or *Return* to make the changes in the Object Properties palette take effect.

   NOTE: It is assumed that you haven't changed from *Inches* in the *Set Units* dialog. If you have changed the settings, scale your model accordingly.

6. Close the shape window to save your changes.

Notice that all cups (which are instances) reflect the changes you made in the Cup's shape window.



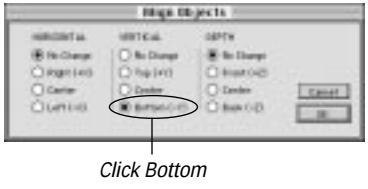
Scale the tray and the teapot in the same way if you wish.

Position your tea set

1. Select the Object Move tool (Hot key 1). Using the X and Z handles, place your cups around the teapot, on the tray. Don't worry about depth (Y handle) yet.

2. Drag a marquee around the whole tea set to select everything. Choose Align from the Modeling menu on the Main Menu bar.

3. In the Align dialog, change Y (Vertical) to bottom, and leave the other settings the same. Click *OK*. This will align everything on the Y axis.

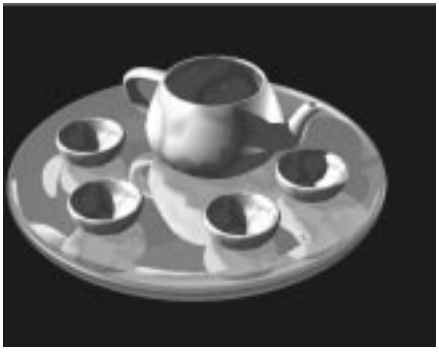


4. Click in the window to deselect, then select the tray. Switch to the Front View.

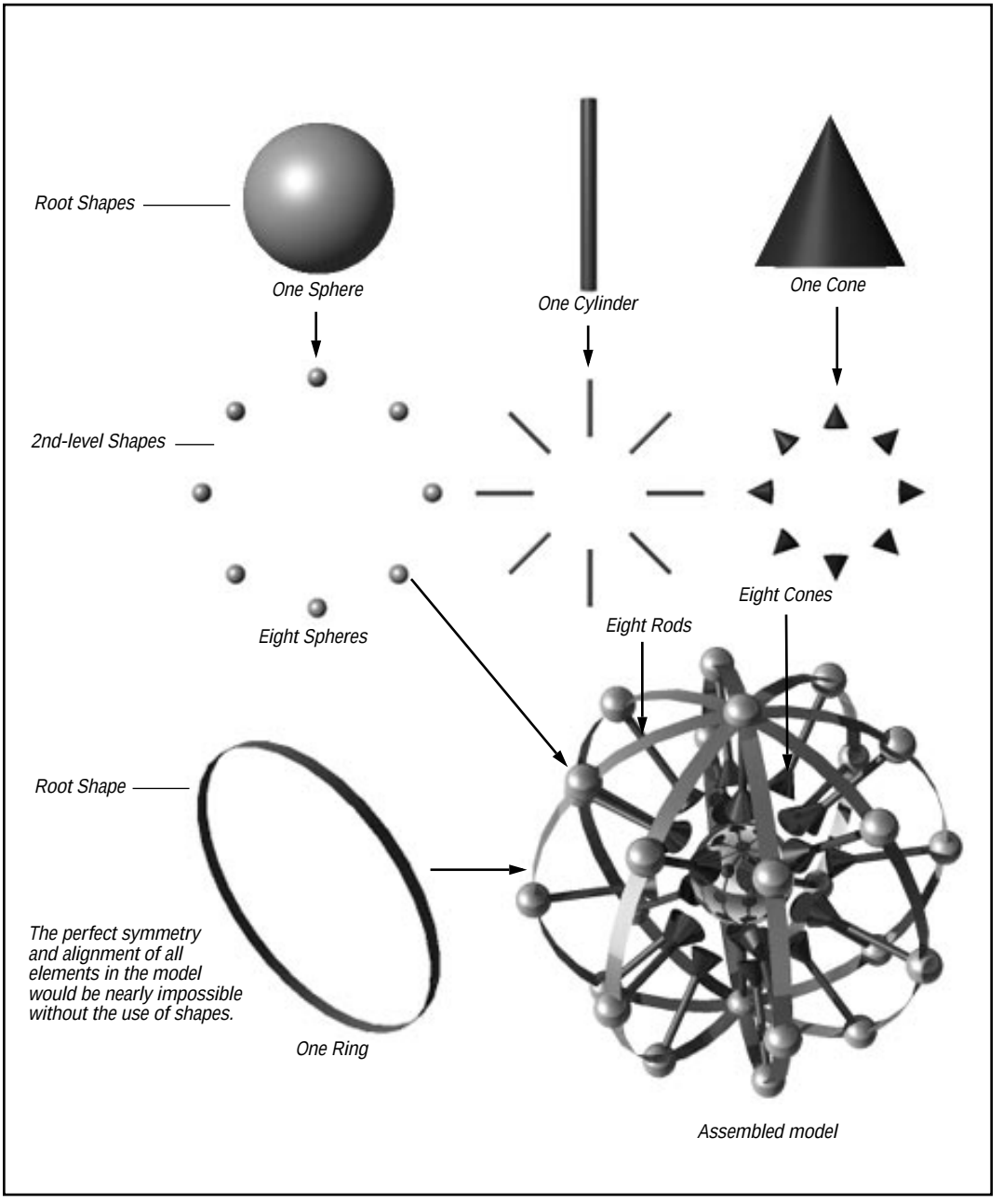
5. Using the Object Move tool, pull the tray down until the surface clears the teapot and cups.

   Check your positioning in Isometric View.

6. Render your model by clicking in the window with the Rendering tool.



SHAPES HIERARCHY TUTORIAL - ADVANCED



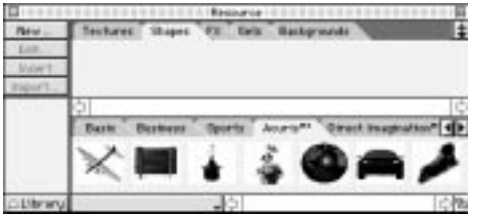
AN EXERCISE IN HIERARCHY

As you work through this more complex exercise, you will start to see the unlimited possibilities of shape hierarchies.

Before you begin this exercise, open a new modeling window.

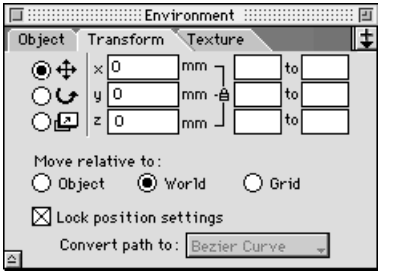
Building the root shapes

1. Click *New...* on the Shapes tab of the Resource palette.

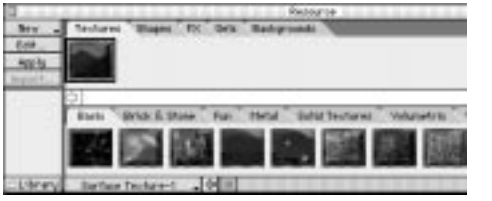


The New Shape dialog will appear.

2. Name it "One Sphere." Click *OK*. The shape window appears.
3. In the shape window, draw a symmetrical sphere with about a one-inch diameter by using the **Shift key** while drawing.
4. Click the Transform tab on the Object Properties palette and set the *Move* coordinates to 0,0,0. Be sure the *World* coordinate system button is enabled.



5. Click the *Scale* button, and make sure the size of the sphere is set to 1.0, 1.0, and 1.0
6. While the object is selected, choose a texture from the Texture tab on the Resource palette, then click *Apply*.



You can create your own texture following instructions in the chapter on textures, or select one from the Library section of the Texture tab.

7. Once the texture is applied, close the shape window by clicking the close button.

Create a cone the same way

1. Click the *New* button on the Resource palette to open a new Shape window.
2. Enter "One Cone" in the *Name* field, then click *OK*.
3. Draw a cone in the window.

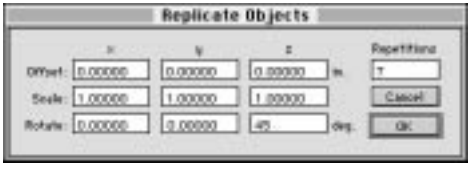
4. On the Transform tab of the Object Properties palette, move the cone to 0,0,0.
5. Set the scale of the cone to 1.0, 1.0, 1.0.
6. With the cone still selected, apply a texture to it.
7. Close the Shape window.

Create a cylinder shape

1. Use the *New* button to open another shape window following the same procedures. Name it "One Cylinder."
2. Use the three-click method to draw a cylinder approximately three inches tall and one-quarter inch in diameter.
3. On the Transform tab, place the cylinder at 0,0,0.
4. Click the *Scale* button. The dimensions should be X=0.25, Y=0.25, Z=3.0.
5. Apply a texture, and then close the window.

The next level

1. Click the *New* button on the Shapes tab. When the dialog appears, name the shape "Eight Spheres," then click *OK*.
2. Switch to the *Front* view by pressing the "5" hotkey.
3. From the Shapes tab select the *One Sphere* shape and click *Insert*.
4. In the Transform tab on the Object Properties palette, click the *Move* radio button and position the sphere at 0,6,0. Be sure the *World* coordinate button is enabled.
5. With the View Zoom tool selected, **Option**-click (Macintosh) or **Alt**-click (Windows) in the Modeling window to zoom out so you can see both the sphere and the center of the model space (0,0,0).
6. Switch to *WireFrame* display mode. Select the Object Move tool, and with the **Command** key (Macintosh) or **Ctrl** key (Windows) held down, move the sphere's origin point to 0,0,0.
7. While the sphere is selected, select **Replicate** from the Edit menu.
8. In the *Offset* fields enter 0,0,0. In the *Scale* fields enter 1,1,1. In the *Rotate* fields enter 0,0,45. In the *Repetitions* field enter 7.

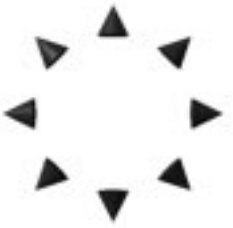


9. Click *OK*, then close the shape window.

Create a shape made of eight cones

1. Click the *New* button on the Shapes tab, then name the shape "Eight Cones."

2. Press the "5" hotkey to switch to *Front* view, and select *WireFrame* from the Display Method pop-up.
3. On the Shapes tab of the Resource palette, select the *One Cone* shape and click the *Insert* button.
4. In the *Move* field on the Transform tab, set the position of the cone at 0,3,0.



5. Move the cone's origin point to 0,0,0.
6. With the cone selected, select the **Replicate** command from the Edit menu.
7. You'll use the same settings for replicating the cones as you did for the spheres, so just click the *OK* button.
8. Close the Shape window.

Create a shape made of cylinders

Click the *New* button on the Shapes tab to create a shape named "Eight Cylinders."

1. Switch to *Front* view (Hot key "5"), and select *WireFrame* from the Display Method pop-up.
2. On the Shapes tab of the Resource palette, select the *One Cylinder* shape and click the *Insert* button.
3. In the *Move* field on the Transform tab set the position of the cylinder at 0,4.5,0.

   If you can't see both the origin point of the cylinder and the center of the model space (0,0,0), then select the View Move tool and move the view upward slightly.
4. Move the origin point of the cylinder to 0,0,0
5. With the cylinder still selected, select the **Replicate** command from the Edit menu
6. Again, you'll use the same settings, so you don't need to change any of the values in the fields. Just click the *OK* button.

7. Close the shape window.

Another root shape

1. Click the *New* button on the Shapes tab of the Resource palette. Name the shape "Ring."

   Be sure neither checkbox is enabled. When you have named it, click *OK*.
2. Switch to *Front* view by pressing the "5" hotkey.
3. With the 2-D Circle tool, draw an unfilled proportional circle with a diameter of 12 inches in the shape window.

4. Use the Transform tab to scale the ring to X=12, Y=12. This is a 2-D object, so leave the Z field (depth axis) as it is.

   You may need to select the **Set Views to All** command (Window menu) so you can see the entire ring.

5. Switch to *Isometric* view. (Use the "/" hotkey.)

6. Select the Extrude tool, and extrude the ring to approximately one-quarter inch, with a straight bevel.

7. With the extruded ring still selected, select the **Re-center** command from the Modeling menu. This places the origin point at the center of the object.

8. Use the Transform tab to center it at 0,0,0. Remember to enable the *World* coordinate system radio button.

9. Apply a texture, and then close the Shape window.

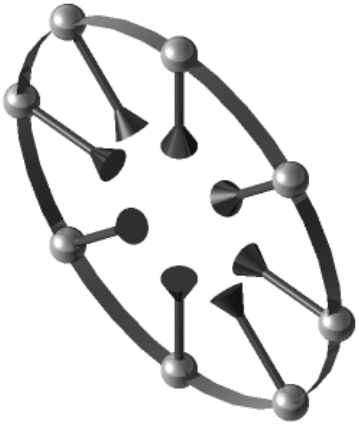
Third level

Make sure you're in the Isometric viewing orientation in the main Modeling window.

1. Insert the "Eight Spheres," "Eight Cones," and "Eight Cylinders" into the modeling window at 0,0,0, coordinates. (Select the shape, then click the *Insert* button. Repeat for each of the above shapes.)

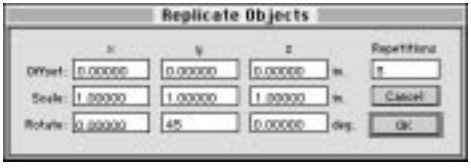
2. Insert the "Ring" shape into the window at 0,0,0.

3. Select all the shapes in the modeling window. Click *New* and make them a new shape. Call it "Ring with parts."



4. With the new shape selected, choose the **Replicate** command.

   The Replicate dialog will appear.



5. Enter 45 degrees on the Y axis in the *Rotate* field. Leave X and Z at 0.

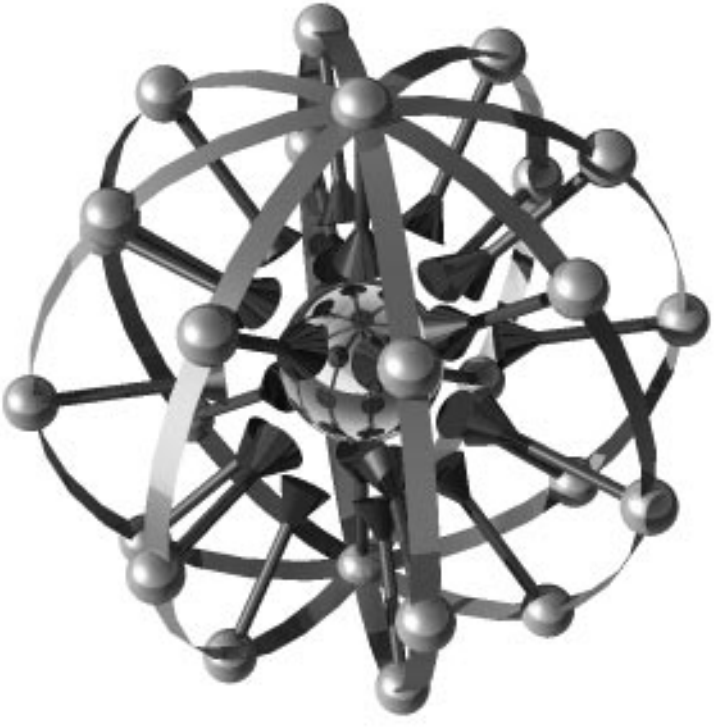
6. Set the *Offset* fields all at 0, and the *Scale* all at one (1). Enter 3 into the *Repetitions* field. Click *OK*.

7. With the Sphere tool, draw a 3 inch sphere off to the side of your model.

8. Apply a texture to the sphere.

9. Then, using the Transform tab, check its size and center it at 0,0,0.

You can now render the new model.



4
TEXTURES

Ransom Interactive

INTRODUCTION

One of StudioPro's greatest strengths lies in its extensive texture capabilities.

Using textures is often the best way to achieve realism in rendered images; it is faster and more memory efficient than trying to achieve the same effect with modeling.

This chapter will get you started learning texture creation and application skills. Once you know the basics, you can begin to experiment.

StudioPro supports solid, surface (mapping) and volumetric textures. Textures may be created in the active model at any time and are fully editable.

Solid textures like marble, wood and stone extend all the way through objects. They offer great technical precision, are efficient, and are infinite in resolution and size.

Surface textures offer the most variety and control over your final look, because images and movies can be loaded in any or all of the texture channels.

The volumetric textures Fog, Haze and Mist can be used on objects like the other textures; or they can be used globally, throughout your model.

With StudioPro's texture abilities, the possibilities are endless.

TEXTURE TAB BASICS

The Textures tab is found on the Resource palette. It contains a preview image and a listing in the pop-up menu for each texture in the Textures folder.

Only those textures that are actually loaded into your model will appear in the upper section of the palette.

If you load texture files from other sources, they will appear on the Textures tab also.

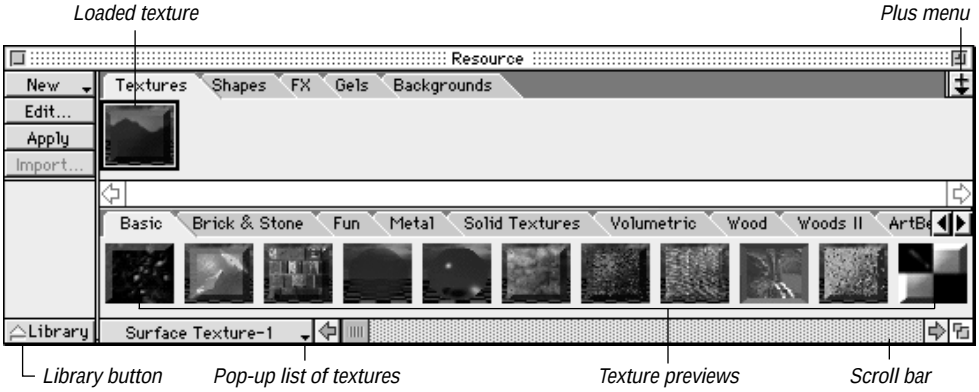
When you create a new texture in a model, it immediately appears on the Textures tab.

To expand the palette to include all textures found on disk in the Textures folder, click the *Library* button.

Textures created or loaded into a model become part of that model. When you save the model, you save its textures as part of the document.

Any texture, or number of textures, can be applied to any object; you decide which textures are suitable for your project.

While there are many pre-made textures available in StudioPro, you can also create textures for your model, or alter existing textures to suit your needs.



New button. Hold down this button to create a new texture.

Edit button. Use this button to edit the texture selected on the Textures tab. The Texture Editing dialog box will open.

Apply button. Use this button to apply a selected texture to your selected object.

Import button. Use this button to import (load) textures from the textures library.

Library button. Use this button to give you access to all textures in the library.

Textures pop-up menu. Choose a texture by name from this list.

Plus menu. Use this menu to **Collapse** (the palette), **Save** (a resource to disk),

Delete Unused (resources), **Replace Selected,** and **Exchange Selected**.

To apply a texture

1. Select a texture from the Resource palette. When you select a texture, a black outline will appear around it's preview.
2. Select your object by clicking on it with one of the Object Manipulation tools.

   Click the *Apply* button from the Textures tab.

   -or-

   Select the texture and then drag-and-drop it onto the object in the Modeling window. Release the mouse when you see your object highlight in red.

MAKING AND EDITING TEXTURES

Any number of textures can be created as part of a model. Any existing texture can be edited. The procedures to edit and create textures are basically the same, you just access the dialogs differently. Once created, they can be saved for future use with the Save command in the Plus menu.

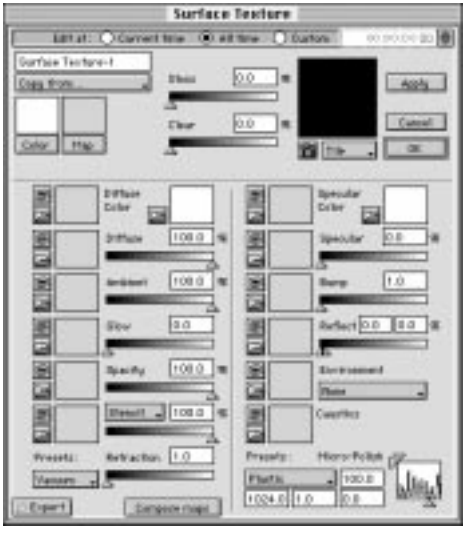
Creating a new texture

To create a new texture:

1. Hold down the *New* button on the textures tab of the Resource palette.
2. You will get a list of the possible texture types. Select one from this list.

   The appropriate Texture Editing dialog box will open. This illustration is for the Surface texture.

3. When the dialog opens for the first time, it will be in the shortened form displaying the Basic fields. You can use these basic fields to set the parameters for the new texture, or you can click the *Expert button*, and the dialog will expand to show more options.



When you are through editing, click *OK*.

4. After you have applied a texture, you may want to render all or part of the object.

Use the Rendering tool from the Tool palette. *See* **Take a Snapshot** *on page 42.*

Your new texture may be saved for use in other models. Select the **Save** command from the Plus menu.

Editing Textures

To summon a texture edit dialog:

- Use the *Edit...* button from the textures tab. *Edit...* opens the Texture Editing dialog for the selected texture.

-or-

- Use the Object Properties palette for an object with a texture applied. Select the texture you want to edit by highlighting it on the list. Then click *Edit* to access the texture editing dialog.

-or-

- In the Project window, open an object with a texture to access that object's properties (turn down the arrow).

-or-

- Select Edit Selected from the Modeling menu. Your textures will appear in the commands pop-up menu.

NOTE: *If you edit an existing texture without changing the name, the changes will affect every use of that texture in your model, and you will not have access to the original texture's settings.*

Use the ***Copy From*** *field to copy a texture's settings, then give it a new name in the name field. This will preserve the original, and help you keep track of which texture you have used on which object.*

When you click *OK*, the Texture Editing dialog closes, and the changes are saved.

Using Texture Maps

One of StudioPro's most powerful features is its surface mapping capability. Surface maps can be used in any of the mapping fields of the Surface Texture dialog.

These maps can be created in StudioPro or in a drawing program, or you can use existing image files.

Movie files can also be used as animated texture maps. For a discussion of the individual texture channels, see the **Reference Manual**.

Using an image as a texture map:

1. Select *New* from the Textures tab.
2. From the pop-up list, select *Surface Texture*. The basic Surface Texture editing dialog will appear.
3. Name the texture in the Name field.

Name your texture here

Click the Map button to summon dialog

4. Click the *Map* button. The Image Map dialog will appear.

Click to open Image Map dialog

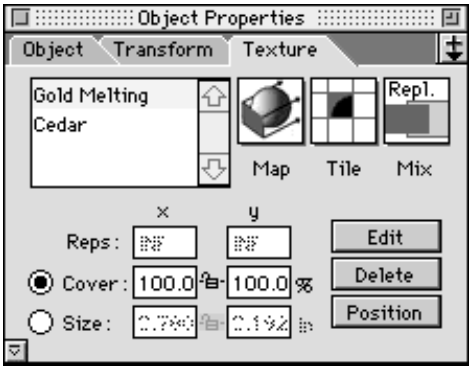
5. Click the *Load* button. In the dialog which appears, locate the image you want to use as a map.
6. Select it, then click *Open*.
7. Click *OK* in the Image Map dialog.
8. You will return to the Texture Editing dialog. Click *OK*.

Texture Placement

Once you have applied a texture, you can customize its placement on your object using the Object Properties palette.

These controls affect the texture's placement on just the selected object, not everywhere that particular texture is used.

Using the Texture tab of the Object Properties palette, you can control your texture's coverage, size, mapping, tiling, and mix. Don't forget to select the object first.



Or, using the Position button, you can adjust the texture's rotation, scale and position on the object (except for UV mapped textures).

If you have more than one texture applied to an object, select the one you want to edit from the list on the Object Properties palette.

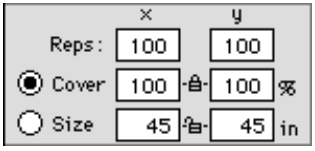
Once all editing decisions have been made, hit Tab, Return or Enter to execute the changes.

Coverage Versus Size

The *Cover* and *Size* radio buttons set the size of a surface texture as a percentage of object coverage or as a specific size. *Cover* reflects the percentage of the object coverage, while *Size* reflects the coverage of the texture as a specific size.

You can also specify the number of times a map will be repeated. Enter numeric

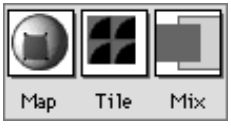
values in the *Reps* field. *Infinite* (INF) repeats the map infinitely across the object until the edge is reached



A special Fit Texture button is provided on the button bar that centers the texture on the object with 100 percent coverage. This is the default texture orientation.

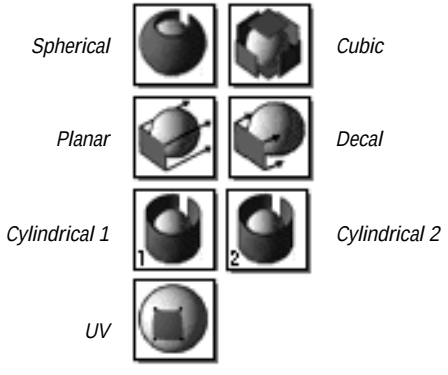
Mapping, Tiling, and Mixing

You can Map, Tile, and Mix Surface textures.

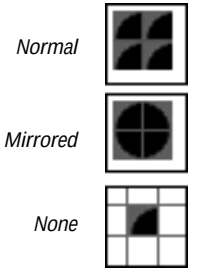


There is a pop-up under each of the buttons on the Object Properties palette which gives you options for each of these functions.

Map. Map your texture in Spherical, Cubic, Planar, Decal, Cylindrical, or UV.



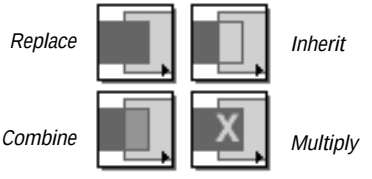
Tile. Tiling refers to whether the texture will repeat itself across the object. You decide if the tiling pattern should be Normal, Mirrored or None (no tile at all).



If you choose normal tiling, it is important that the maps match correctly at the seam, or the tiling will be obvious. Mirrored tiling can minimize the problem when the pattern doesn't match.

Mix. If you have more than one texture on your object, they need rules for interacting with one another.

Controls for this are found under the Mixing button.



When combining textures StudioPro uses these mixing rules:

Replace all other textures with this one.

Inherit all properties of the texture below.

Combine this texture with the texture below.

Multiply the values from this texture with the values in the texture below.

Texture Positioning

The Positioning tools allow you to adjust the texture's rotation, scale and position on the object.

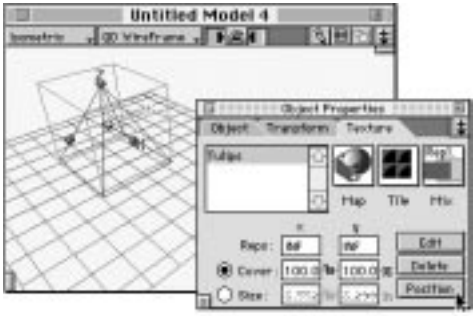
Texture positioning is available through the Object Properties palette *Position* button for all mapping styles except UV.

To position or scale a texture:

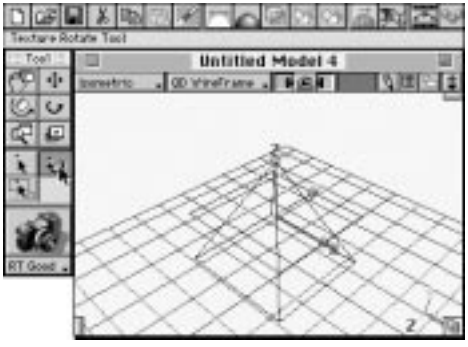
1. Create a new model, make an object, then apply one or more textures.

   Select the texture you want to position in the Object Properties palette, then click the palette's Position button.

   If you cannot see the Position button on the Object Properties palette, select the **Expert Mode** command from the Plus menu; or just click the arrow in the lower left corner of the palette. This will expand the palette to Expert mode and show all the texture editing options.



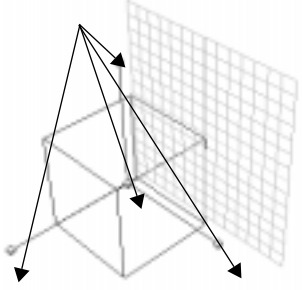
2. When you click the Position button, a new window appears. It has a shortened Tool palette with special texture-handling tools. You can use these tools to move and size the texture on the object.



3. Click one of the Position tools. Notice that handles for interactively positioning the texture will be displayed.

4. Grab and drag the handles to move, scale or rotate the texture.

Handles for positioning and scaling the texture



5. If you are using a display method capable of texture display in the Modeling window, such as OpenGL, make sure your display is in Shaded.

   Otherwise, click the Rendering tool to take a snapshot and check the texture's position.

   These positioning controls can also be accessed with the Edit Placement command in the Modeling menu.

TEXTURE TUTORIAL 1: MELTING OOZE

You can get exceptional results using StudioPro's Bump and Stencil texture mapping features, especially in animations.

In this exercise, we will create a simple cube, then animate a thick liquid texture covering the top and running down the sides.

This exercise demonstrates how to open a new model, make a primitive shape, create and apply custom textures, use the expert texture settings, work with animated texture maps, and use the Project window for a simple animation.

You will need the Melt Tutorial folder, which contains three files. It is found in the StudioPro Tutorial Folder.

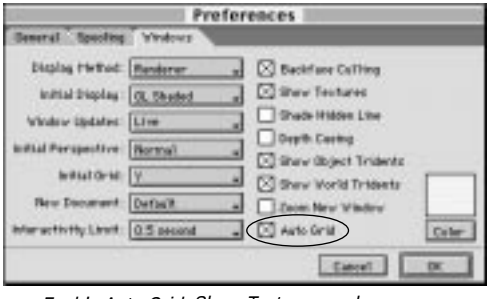
Melt Bump Small and MeltDown Stencil Small are movie maps for your melt texture. The third file, Melt Movie, is the finished melt tutorial.

Set your Preferences

You should make sure Auto Grids is enabled in your Preferences. Auto Grids automatically switches grids when you switch views.

1. Select *Preferences* from the Edit menu.
2. In the Preferences dialog, click the *Windows* tab to bring it to the front.
3. Click the *Auto Grid* checkbox to enable it.

   See the **Reference Manual** for more information on Preferences.

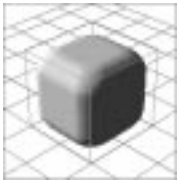


Enable Auto Grid, Show Textures, and select Live from the Window Update pop-up

Create a simple rounded cube

1. Open a new model with the *New* command in the File menu.
2. Click the *Rounded Cube* tool from the main Tool palette to the left of your modeling window.

3. Click-and-drag in the modeling window to size and complete your rounded cube.



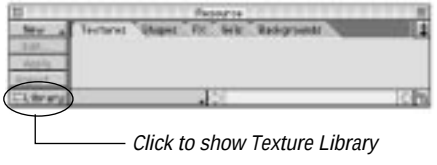
Apply the first texture

We will use Cedar for the base texture, although any Solid texture would work.

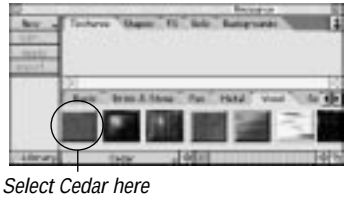
1. If the Resource palette is not showing on your screen, use the Show / Hide buttons at the top, far right of your screen.

   These six small buttons can be used instead of Windows menu Show / Hide commands to manage your palettes. The Show / Hide Resource palette button is the top left.

2. In the Resource palette, click the *Textures tab* to bring it to the front. If the Texture Library (of pre-made StudioPro textures) is not showing, click on the Library button at the bottom left of the Resource palette.

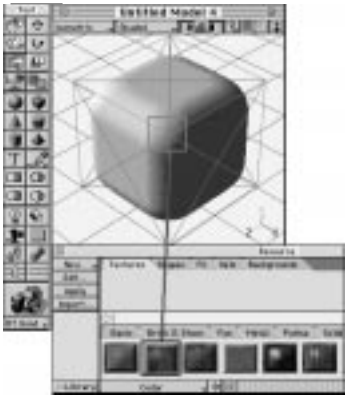


3. Click the *Wood* tab, and select Cedar.



4. Apply the Cedar texture by clicking and dragging it onto your cube. The texture will be highlighted by a black line when it is selected.

5. As you drag it to your rounded cube, the cube will also highlight with a selection marquee. When both are selected, release the mouse.

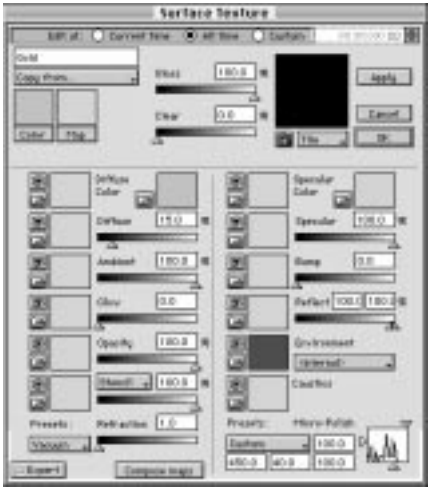


This applies the texture to your object, and also loads the texture into your model, placing its preview in the top section of the Resource palette.

Make the melting ooze texture

We will base the ooze on Gold, an existing StudioPro texture. Any surface texture would work.

1. Find and select *Gold* in the Metal tab. Click on the *Edit* button. The Surface Texture editing dialog for Gold will appear.



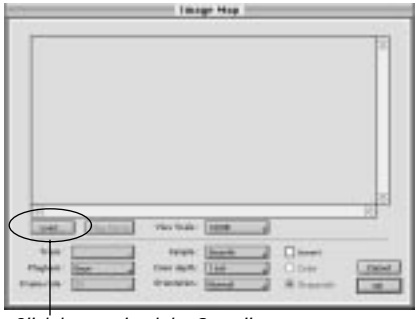
2. Click the *Expert* button to expand the palette and show all of your editing options.
3. In the Surface Texture editing dialog, find the Stencil channel settings.

   Leave the Stencil pop-up setting alone. It has no effect if you have more than one texture on your object.
4. Click on the mapping field (blank box).

Leave pop-up settings as is

Click here to summon Image Map dialog

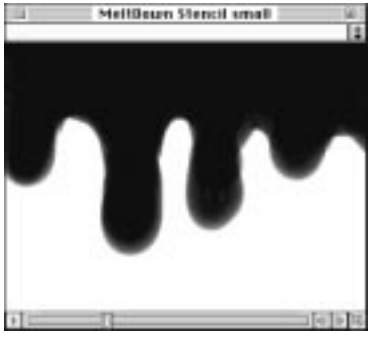
The Image Map dialog will appear. Click *Load*.



Click here to load the Stencil map

5. In the Load dialog, find and open the *Meltdown Stencil Small* movie file. The file should be in a folder inside the Tutorial folder.

   What appears in the Load dialog looks like just a big white stripe. Don't worry, it's not.
6. Play the movie, by clicking the *Play Movie* button in the Load dialog, to see what it looks like.



7. Close the movie. You will notice that the first frame of the movie is white. (That is what is showing in the preview window of the Image Map dialog.)

This would make the texture fully visible at the start, and then it would melt away to the texture underneath it.

This is not what we want, because the corresponding bump movie is designed to go with the inverse of this.

8. So - click the *Invert* checkbox in the Image Map dialog. Now the first frame should be black.
9. Click *OK* in the Image Map dialog. This takes you back to the Texture Editing dialog.

Load the bump movie

1. In Texture Editing dialog, click the mapping field labeled *Bump*.

Click here

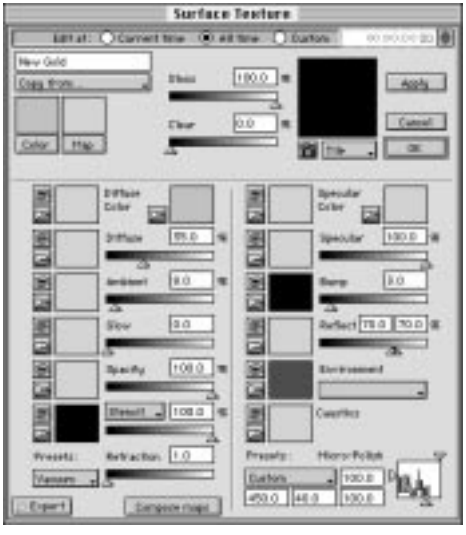
2. In the Image Map dialog which appears, click *Load*, then find the movie *Melt Bump Small*. Click *Open*.
3. DON'T invert this one, because the "drips" are white (or high). This is the effect we want as the fluid builds up at the leading edge of the drip.
4. Click *OK*. This takes you back to the Texture Editing dialog.

The numbers

Now, the fun stuff - using some of the specialized settings in the Texture Editing dialog.

1. Still in the Surface Texture editing dialog, move the *Bump* slider up to about 3.
2. Move the *Gloss* slider (at the very top of the dialog) all the way to the right - 100 percent, if it isn't already there.
3. Set the *Diffuse* slider to about 35 percent.
4. Move the *Ambient* slider to eight percent.
5. Now move both *Reflect* sliders to 70 percent.
6. Select Icelandic from the *Environment* pop-up menu.

   The Environment pop-up allows you to select a reflected environment for this texture only; and it can be different from a global reflected background. Global backgrounds are applied through the Environment palette. *See* **Backgrounds** *on page 151.*
7. Name the texture something clever and click OK.



If you edit an existing texture without changing the name, the changes will affect

every use of that texture in your model, and you will not have access to the original texture's settings.

To avoid losing the original texture, click the New button on the Resource palette. In the texture dialog, use the Copy From field to copy a texture's settings, then give it a new name in the name field. This will preserve the original, and help you keep track of which texture you have used on which object.

About stencil maps

Note that we already moved the Bump to 3; and the Specular was set to 100 percent by moving the Gloss slider.

Also notice that we did not alter the Stencil slider. Why? Keep in mind that the numerical values for all these fields simply sets the maximum value for each. For the Stencil channel we want the maximum value to be 100 percent where it is white and zero where it is black.

If you click on the preview button (the small camera icon below the big black box) in the Surface Texture dialog you will see - nothing! All that work for nothing?

But remember, the first frame of the Stencil movie was black after being inverted. This effectively sets the influence of the texture to nothing, revealing the default white color underneath.

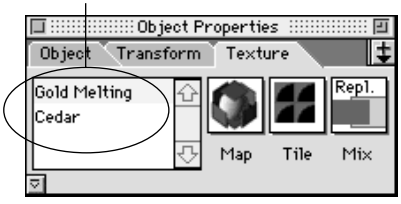
Apply your texture

1. Select your rounded cube, then click *Apply* on the Resource palette or drag-and-drop the melt texture to it.

   If your rounded cube was selected in the modeling window when you created the melt texture, it was applied automatically.

   Now look at the Object Properties palette. If it is not open, click its Hide / Show icon in the upper right corner of your screen.

   List of textures currently applied to your object



2. Click on the Texture tab to bring it forward. You should see the names of both applied textures in the scrolling list.

3. If you do not see both, drag and drop the missing texture from the Resource palette onto the cube.

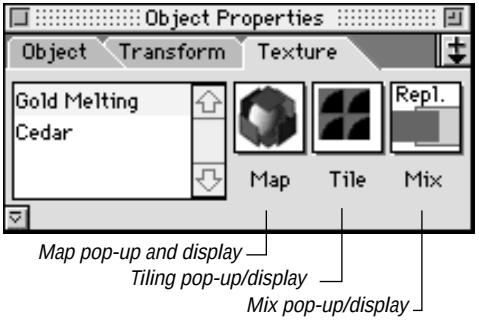
   If you have accidentally applied one of the textures twice, click the arrow at the bottom left to display the Expert settings. With the extra texture selected in the list, click the *Delete* button.

4. The Melt texture should be at the top of the list. If it is not, click-and-drag it to the top.

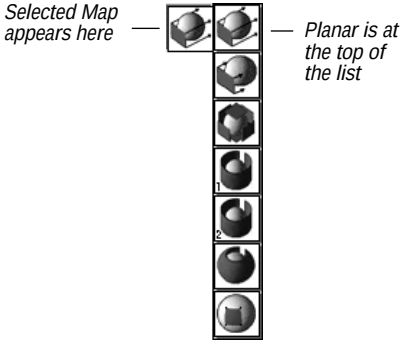
Check mapping, tiling and mix

Now you need to check your texture's Map, Tile and Mix. These controls are also

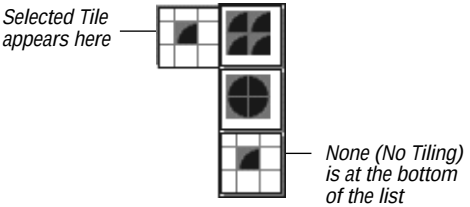
located on the Texture tab of the Object Properties palette.



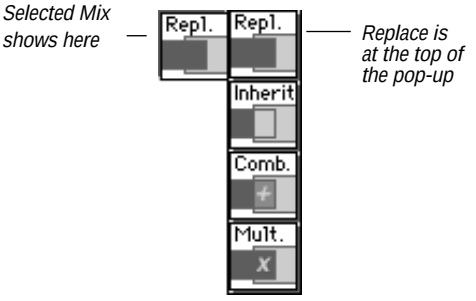
With your melt texture highlighted, make sure that the Map style is set to Planar. If not, select it in the pop-up menu.



5. Set the Tile field to None (No Tiling). The image will appear only once.



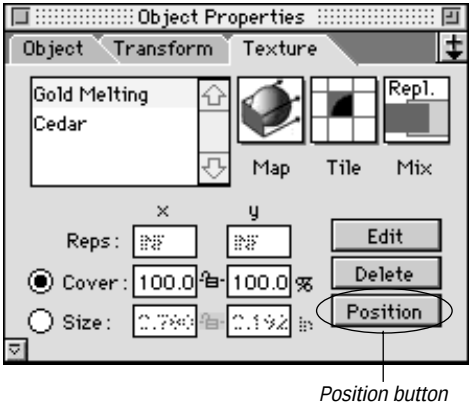
6. Make sure *Replace* is selected in the Texture Mix field.



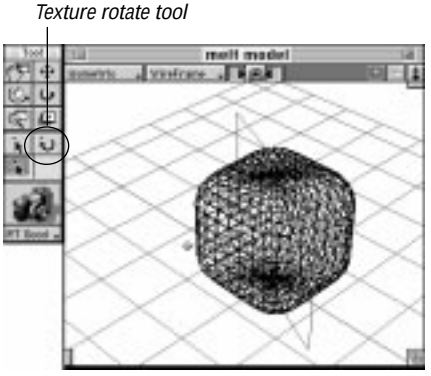
We are setting the texture up in this way so the Melt texture will look like it is melting down from all angles. Because Planar applies all the way through an object, this will give us the desired effect.

Adjust the melt texture's position

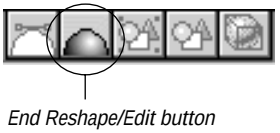
1. Still in the Texture tab of the Object Properties palette, click on the Position button (lower right). If you can't see the Position button, select the Expert Mode command from the Plus menu.



2. In the Texture Placement window which opens, switch to WireFrame or Outline to make it easier to see the texture control handles.



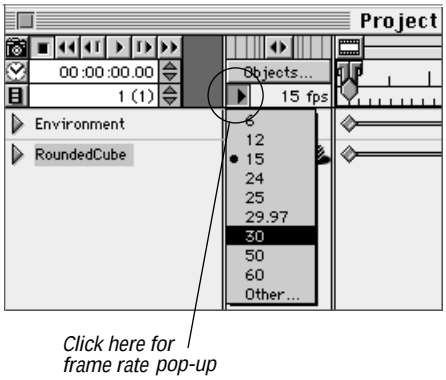
3. Using the Texture Scale tool (bottom left), make the texture a little bigger by pulling the handles out a little (away from the center of the cube). This ensures the cube is fully covered with the texture.
4. Using the Texture Rotate tool (bottom right on the special tool palette), rotate the texture about 40 degrees counter-clockwise. (Picture looking down on the model, but do the actual rotation from the Isometric view).
5. Select End Reshape / Edit from the Modeling menu, or click the End Reshape / Edit button on the Button bar.



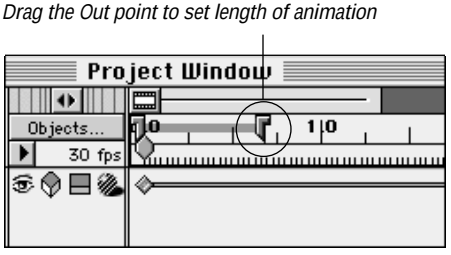
Animate

1. Open the Project window. Use the Windows menu or click on the Project window Show / Hide button.

2. Set the Frames per second (fps) in the Project Window to 30 to match the frame rate of the QuickTime movies in the texture.



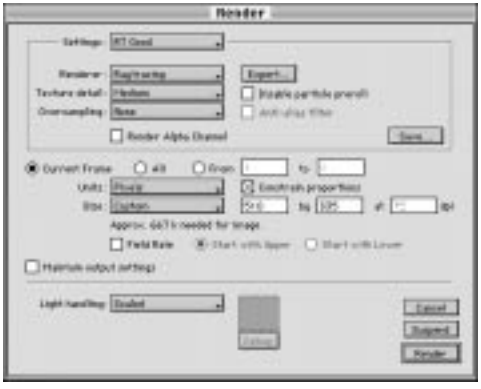
3. Set the animation length Out-point to about two-thirds of a second - for a total animation length of 20 frames.



Render

1. Hold down the Shift key and use the Render tool to draw a marquee around the object. Using the marquee lets you render just part of your model.

   The Rendering dialog will appear:



2. Click on the Settings pop-up, select *Raytracing*, then *RT Best* from the pop-up menu.

3. Enable the *All* radio button located in the center of the Render dialog; to render all of the frames of your animation.
4. Click *Render*. In the dialogs which appear, give the file a name, file format, location and compression settings.
5. When the rendering is completed, play your movie. Now play it for your friends and family.

   Movie maps like the ones in this tutorial can be used in a variety of ways: together with completely different settings and other maps such as for color, glow, etc. Or you can use them individually in any of the channels.

TEXTURE EXERCISE 2: WINE BOTTLE

Mastering StudioPro's texture capabilities will help you get the look you want for your project without spending a lot of time modeling.

In this exercise, you will make a wine bottle. You will create and fine-tune a template, lathe it into a wine bottle, and extrude a cork.

Then, you will learn how to use images created in 2-D drawing programs as maps to create your own surface texture for the bottle's label.

As you apply this newly created texture, you will be introduced to texture mapping, tiling, mixing and positioning: all important skills in texture handling.

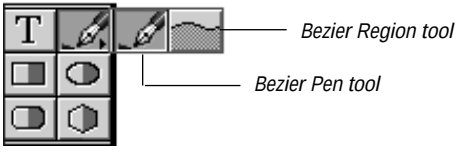
Draw an outline

First we will draw the outline of a wine bottle, which we use as a Lathe template a little later.

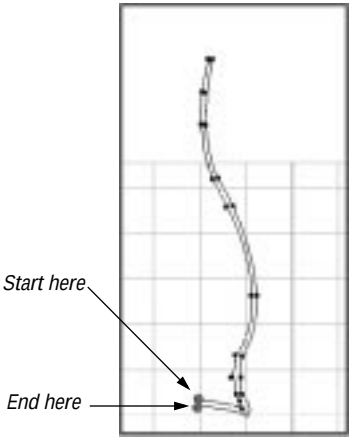
1. Open a new model by clicking the New button on the button bar.

   Change to *Front* view (**Hotkey** 5), or use the View Orientation pop-up.

2. Select the Bezier Pen tool from the Tool palette.



3. Starting at the bottom center, draw an outline that resembles one-half of a wine bottle. Your first click starts the Bezier line, and each click after that makes a vertex point. Dragging as you click draws a curve - you will see the handles on each vertex point.



4. Draw the line double-sided so it will have thickness, and leave a gap between the start and end points. Don't use a lot of points, and don't worry about making it perfect.

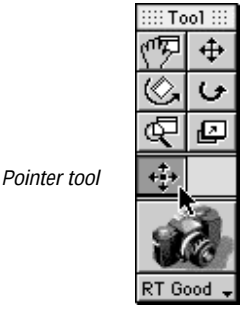
5. Double-click to end your Bezier line.

Fine-tune your Lathe template

1. Select the Object Move tool (**Hotkey** 1).

2. Go to Reshape mode by either clicking the button on the button bar or by selecting Reshape / Edit from the Modeling menu.

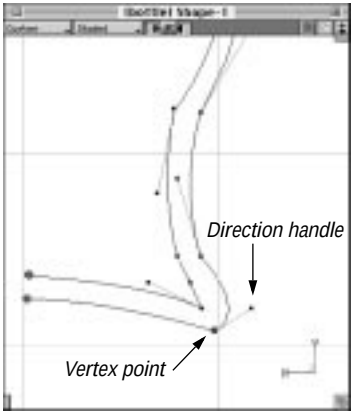
3. In Reshape mode, use the Pointer tool to adjust the vertex points on your 2-D line.



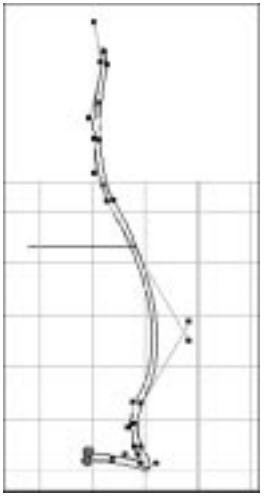
4. Use the direction handles to smooth out the curves on your template. Each vertex point has two direction handles, which can be selected and pulled out of the point.

   To select a hidden handle, hold down the **Command** key (Macintosh) or the

Ctrl key (Windows) while clicking and dragging the vertex point.



Continue r eshaping your template until you are satisfied with the results.

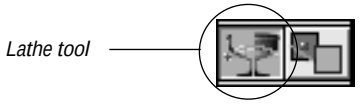


5. Select End Reshape from the Modeling menu, or click the button.

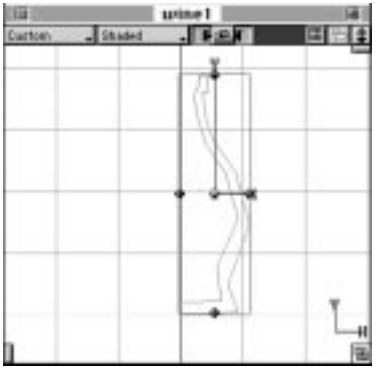
Lathe the bottle

Once you get your bottle template finished, it is easy to lathe the bottle shape. And if the finished bottle doesn't look like you want it to, you can always go back and edit the template.

1. Make sure the template is selected, then click on the Lathe tool from the main Tool palette.

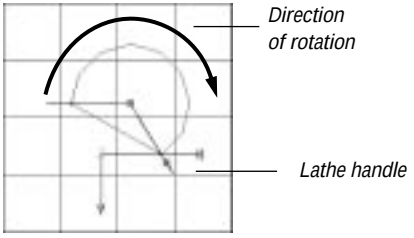


2. You will see a Lathe frame around your template.



3. Single-clicking on one of the Lathe handles will **automatically** lathe the object 360 degrees.

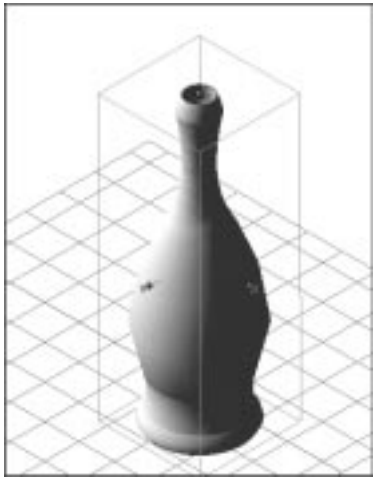
Or, you can **manually** lathe the template. First switch to Top view (**Hotkey** 8).



Grab the Lathe handle and pull it around in a circle. Make sure you rotate the template 360 degrees, by watching the Rotation feedback area below the button bar. When you get it just right, release the mouse button.

4. Select any other tool from the Tool palette: in this case, choose the Object Move tool. This completes the Lathe operation.
5. Switch back to *Isometric* view (**Hotkey** /). Your bottle should look something like the illustration.

   If your bottle has a visible seam, you may have rotated the lathe handle more or less than 360 degrees. To fix this, go to the Object Properties palette and change the value in the *Degrees* field to 360.

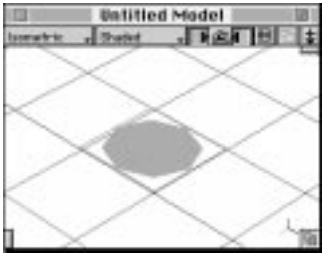


6. With your bottle selected, choose Recenter from the Modeling menu. This moves the origin point from the center of the lathe template to the center of the new object. This is important for use of the Align command, which is coming up a little later.

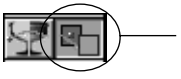
Make the cork

1. In your model, select the Filled Oval tool. The Oval tool is divided into two parts; filled and unfilled. Filled is on the right side.

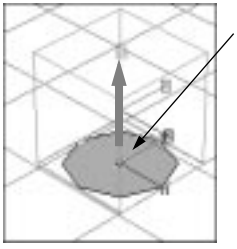
2. Draw a small filled oval using the Shift key to constrain the dimensions. This will give you a perfect, filled circle.



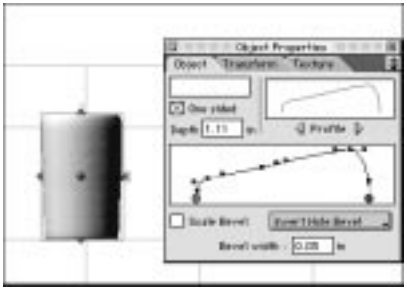
3. Switch to the *Top* view so you can see the top of the bottle. Then select the Object Scale tool (**Hotkey** 3). Scale the oval, using Shift to constrain the dimensions. Look at the top of the bottle to estimate what size the cork needs to be.
4. With the circle selected, choose the Re-center command from the modeling menu.
5. Switch back to *Isometric* view.
6. Make sure the oval is selected, then click the Extrude tool.



7. Grab the single handle and pull it until your cork is approximately the right size.



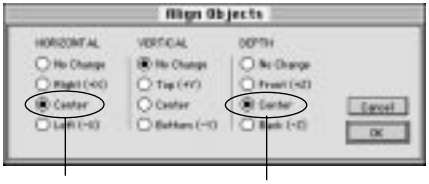
8. On the Object tab of the Object Properties palette, adjust the bevel of your cork until it looks like the one below. Press Enter or Tab to make the bevel changes affect the cork.



Align the bottle and the cork

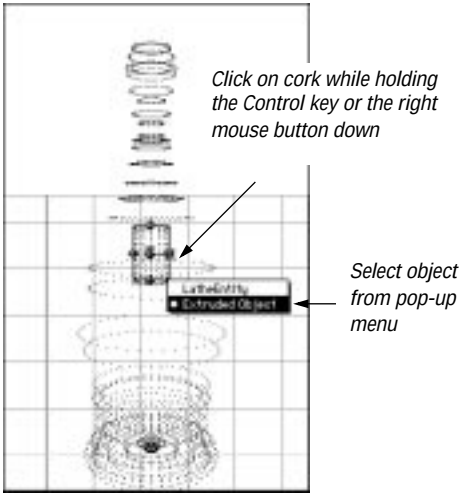
1. Switch to *Front* view.
2. Select both the bottle and the cork by clicking and dragging a marquee, or by Shift-clicking on the second object.
3. Using the Align command from the Modeling menu, center the cork with the bottle on the X and Z axes. Leave the Vertical choice as *No Change*, and

select *Center* on the Horizontal and Depth axes. Click *OK*.



Center the cork and bottle on the X and Z axes

4. Switch to *Wireframe* or *Point Cloud* so you can see the cork (it should be inside the bottle.) To select the cork, use Control-click (Macintosh) or right mouse click (Windows), and make your selection in the small pop-up menu.



5. With the Object Move tool, adjust the cork's location until it is nested in the bottle top.

Make the label texture

1. If you were creating your own label from scratch, you would first create an image map.

   This can be done in any 2-D drawing program.

2. Save it as a PICT.
3. Now create a stencil map in the 2-D drawing program.

   A stencil map is a grayscale map that defines the area of the surface map to use in the texture definition.

   Black areas of the stencil map allow the texture below to show through. White defines the area of the surface texture that are used.

   Gray areas of the map mix with the texture below, according to the level of gray.

4. Save it as a PICT.

Use the maps to create a label

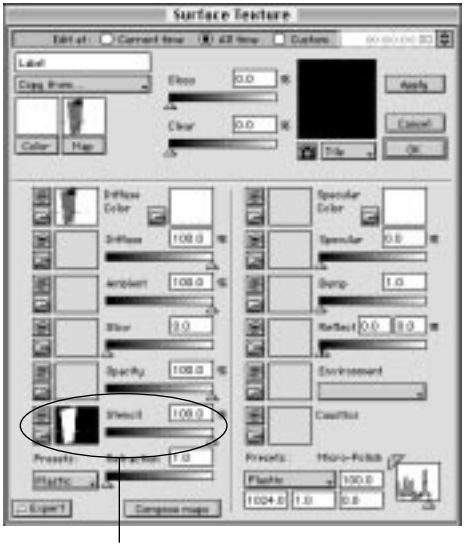
1. Back in StudioPro, find the Resource palette and click the Textures tab to bring it to the front.

   Now click the *New* button, and select *Surface Texture* from the pop-up.

2. In the Surface Texture dialog which appears, click the Map button at the top next to the Color field. This summons the Image Map dialog.
3. Click the *Load* button, then find and open the Surface Texture map named Natures Vineyards. (It is located in the Wine Bottle Tutorial folder.)
4. Click *OK* in the Image map dialog.

Click Load, then find and open your map

5. In the Surface texture dialog, click the mapping field for Stencil.



Stencil map controls

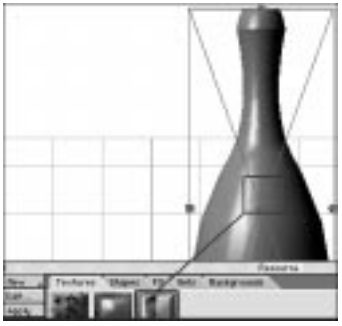
6. Click *Load*, find and open the stencil map called *Nature's Vineyards stencil*.
7. Click *OK*.
8. Leave the other Surface Texture settings as they are, and click *OK*.

Apply your textures

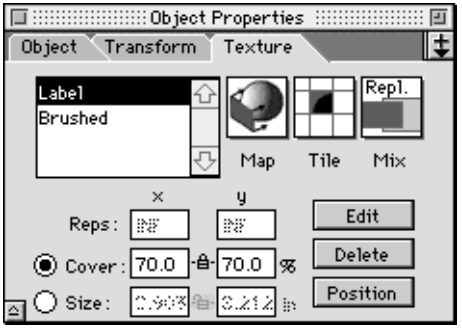
1. From the Textures tab on the Resource palette, click the Wood tab to bring it to the front. Select the *Cork* texture, and drag it to your cork.
2. Select the *Brushed* texture from the Metals tab, then drag it to the bottle.

   To apply the textures, you could also select the object, and then the texture, and then click *Apply* on the Resource palette.

3. Apply the Label texture to the bottle by clicking and dragging from the Resource palette.



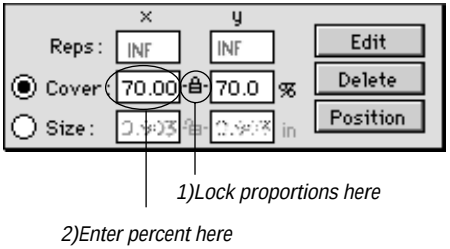
4. On the Texture tab of the Object Properties palette, make sure that Label and Brushed are both applied and that the Label texture is at the top of the list. If it isn't, click and drag it to the top.



Check Tile, Map and Mix

You should still be in the Textures tab of the Object Properties palette.

1. **Make sure Label is highlighted on the list!**
2. Lock the label's proportions by clicking on the padlock symbol between the two Cover fields. Then set the *Cover* to 70 percent, and hit the Tab key to activate the setting.



3. In the Mapping pop-up menu, select *Decal*.

4. Set the Tiling to *None* (no tiling.)

5. Set the mix to *Replace*.

6. Click the *Position* button on the lower right of the Texture tab. Or use the Edit Placement command from the Modeling menu.

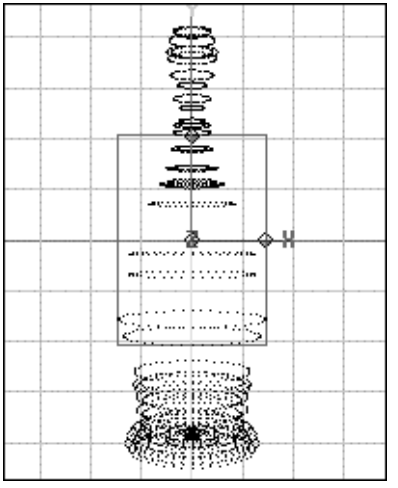
   This puts you in a special mode in which you can adjust the texture's position on your model.

Adjust the label's placement, scale

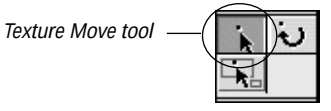
You will need to fine-tune your texture's placement and scale. The exact placement will depend on the shape of your wine bottle.

1. Select the Texture scale tool, and switch to PointCloud display method.

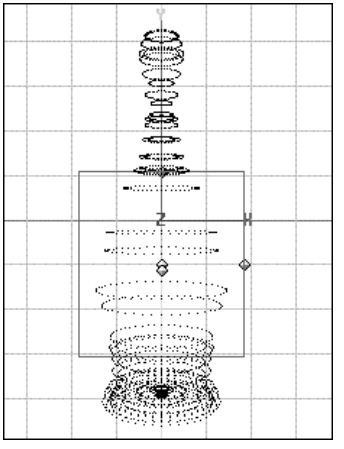
2. Scale the label texture like the illustration below.



3. Select the Texture move tool.

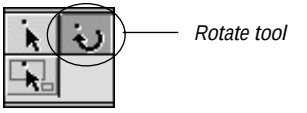


4. Switch to the *Front* view. Grab the blue center handle, and position the texture so that it is centered on the widest part of your bottle.



Rotate the label texture

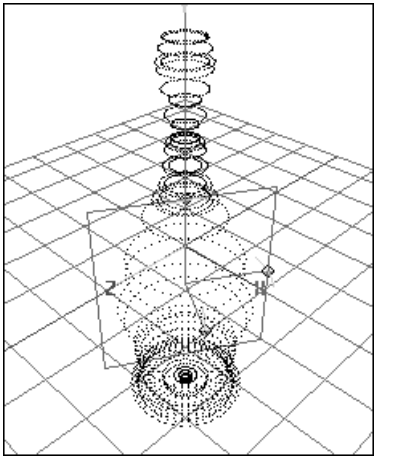
1. Select the Rotate tool from the Edit Placement tool palette.



2. Check the texture in Shaded display, if you are using an interactive renderer capable of displaying textures in the modeling window. Or, do a test render to see if the texture needs to rotated, and in what direction. You should only need to rotate on the Y axis.

3. Switch to *Point Cloud* in the Display pop-up, and Isometric in the View Orientation pop-up. This makes it easier to see the Rotate handles.

4. Each Rotate handle shows the direction of rotation as small green arcs. Make sure the bottle is selected, then find the Rotate handle. Grab it and pull it around as shown.



5. When you are happy with the results, select **End Reshape/Edit** by clicking the button on the Button bar, or by selecting the command from the Modeling menu.

   NOTE: *When using Decal mapping, the texture map is placed on the front face of the object in World coordinates, as shown in this tutorial. If your texture is not on the front face, you may need to rotate it on another axis.*

Render

Now, you will probably want to render an image of your finished model.

1. First, switch to the Front view.
2. Select the Rendering tool from the tool palette.

3. While holding down the Shift key, draw a marquee around your wine bottle with the Rendering tool. The Rendering dialog will appear. Or select Render from the Rendering menu to summon the dialog.
4. Select *RT Best* from the *Settings* pop-up menu at the top of the dialog. Or choose your own settings. But keep in mind that the small lettering in your label will not render clearly unless you choose a high resolution renderer: RT (Raytracing) Best or better.
5. Click *Render* in the bottom right of the Render dialog to start the rendering.

Alec Syme

INTRODUCTION

Dramatic lighting effects add impact and realism to rendered images. Subtle effects can be equally effective.This chapter provides you with the necessary information to add realistic lighting to your models.

We will start with some general information.

Next, an easy lighting tutorial will walk you through the basics of different lighting

methods, including visible light. More specific information will follow in the last section.

There are four different ways to use light in your model: Directional, Ambient, Point Lights and Spotlights. These can be used in any combination to meet the specific needs of your project.

Global lights. These illuminate the entire model, like sunlight striking the Earth.

Ambient. This is non-directional background lighting.

Ambient and global lights are controlled with the Environment palette. For more information, *see* **Lights** *on page 150*.

Spotlight. These lights shine in one direction only, and have a control for setting the cone angle.

Point light. These lights shine in all directions from the point of illumination.

Spotlights and Point lights are inserted into the model with a single click. They have icons, or markers, that appear in your model, with tools and controls similar to those used for working with objects.

You can add light sources to the model in any number and combination, and change their location and properties over time.

Just remember that the more light sources you add to the model, the longer it takes to render.

In the modeling window, the shaded and flat modes show lighting; however, you will not be able to truly see most lighting effects until the model is rendered.

A BASIC LIGHTING TUTORIAL

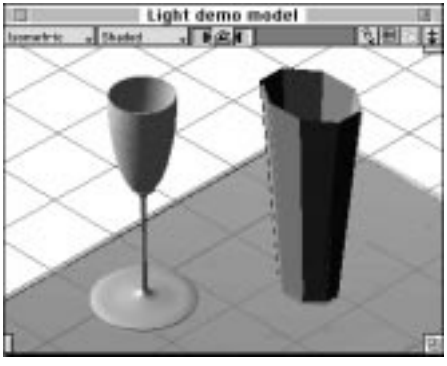
In this step-by-step demo, we'll create a model, and then experiment with some different light sources. We'll create a visible beam of light, as well.

Create a model

1. Open a new model by clicking on the *New* button on the Button bar.

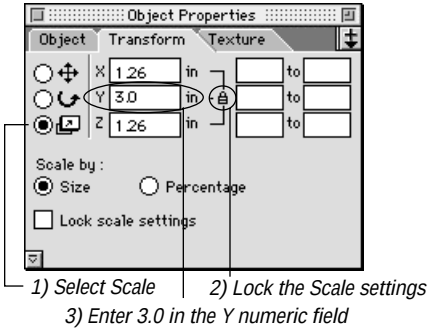
2. Insert a few interesting shapes: we're using Glass O Wine; and a vase and Liberty Rug from the Replica™ tab of the Resource palette.

   Select the shape by clicking its preview in the Shapes tab, and then clicking the *Insert* button on the left side of the palette.



NOTE: *These are Shapes and can be edited in their own Shape windows. See* **Shapes vs. Objects** *on page 66.*

3. You may want to make the vase larger: first select it in the modeling window, then find the Object Properties palette.

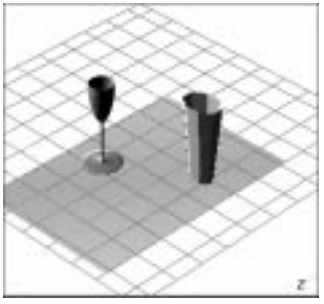


   Select the Scale radio button, then lock the Scale settings. Now enter 3.0 in the Y numeric field. Hit the Tab key to make your changes effective.

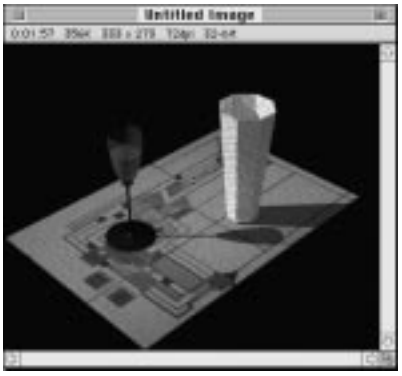
4. Your shapes will be inserted at the 0, 0, 0 coordinates of the grid, so you will want to position the glass and the vase so that they rest on the rug.

   Select the *Object Move* tool (**Hotkey 1**) and grab the top center handle to pull them up on the Y axis. Then use the X and Z handles to move your objects from side to side.

   If you need to adjust your view of the Modeling window, use the View Move tool.

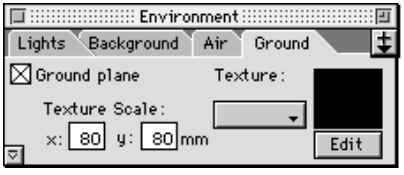


5. Now do a sample rendering. Select the Render tool, select *RT Quick*, then click in the window to start a rendering.

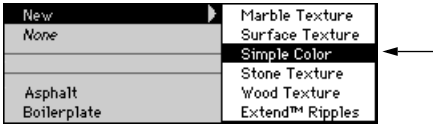


   Pretty dark, eh? That is partly because of the black background which is the default rendering background.

6. To set a ground plane, find the Environment palette, click on the Ground tab, and then click the *Ground plane* checkbox. This will give you the default - a light gray ground plane.

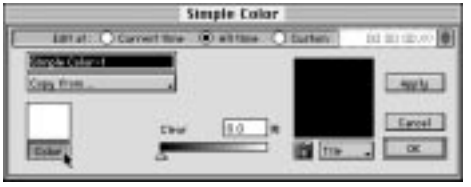


7. In this model, we will use a pale yellow Simple Color ground plane. Using the Texture pop-up, select New > Simple Color.



8. In the dialog which appears, click on the Color field to summon the color picker. Select the color you want for the

ground plane, then click OK. Click OK again in the Simple Color dialog.

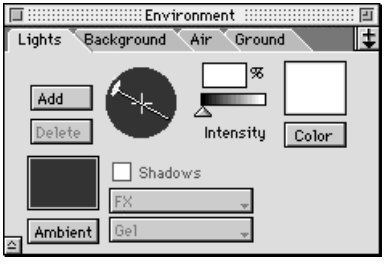


For information on other ground plane options, *see* **Ground Planes** *on page 155*.

Add a Global light

But your model could also use some more light. We'll start with a Global light source.

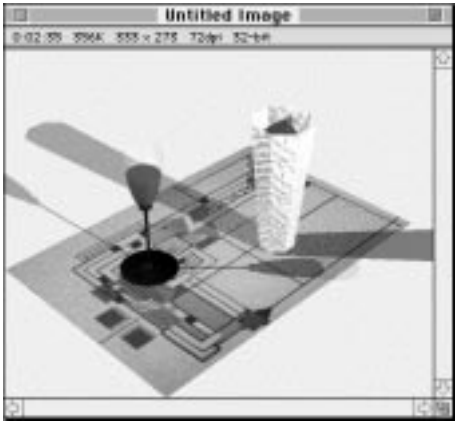
1. Find the Environment palette, and click on the Lights tab to bring it to the front.



   Select the Expert Mode command from the Plus menu. This will expand the palette so that you can see all of the controls. You can also use the arrow at the bottom left of the palette.

2. Click the *Add* button. Notice the new Global light that appears in the circle. Grab it and drag it around; when you release the mouse, the effect of the new Global light will show in your modeling window, as long as you are in Shaded or Flat view.

3. Move the new light to the center right of the circle, then do another quick rendering to check the lighting.



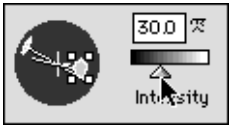
   Notice the new light shining on the right sides of your objects. You now have two global lights casting shadows.

Lower the Global lights

Since we now have two Global lights, we should decrease their intensity. The default setting for a Global light is 80, having two of them set at 80 will be too much.

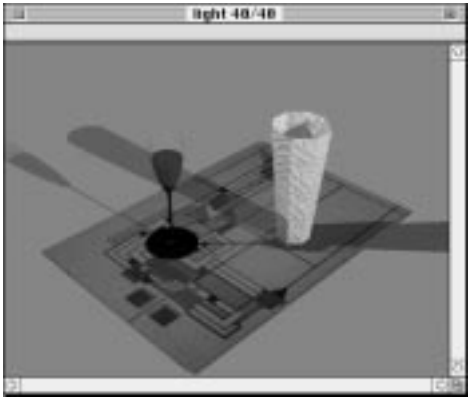
1. Click on the left Global light to select it.
2. In the intensity field to the right of the lighting sphere, use the slider or the

numeric field to set the light intensity to about 30.



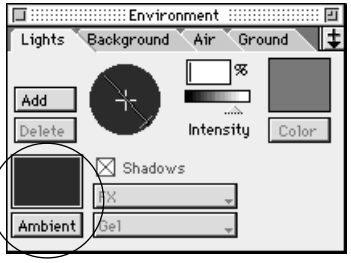
3. Repeat the process for the other Global light.

4. Do a test render.



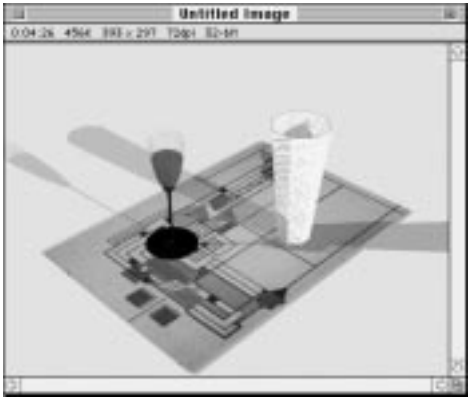
Change the Ambient lighting

1. Click the *Ambient* button or field in the Environment palette.



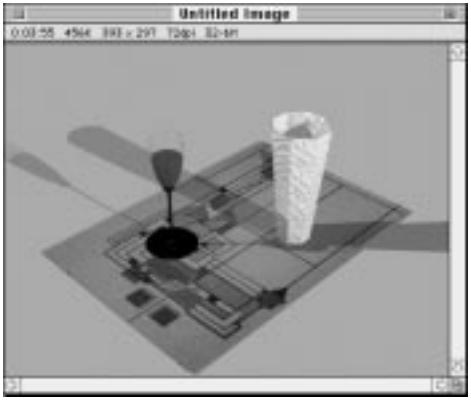
2. In the color picker dialog which appears, choose a new color for the Ambient light.

3. Click *OK*, and do another quick render.



4. Hmmm.... Maybe you don't like the color. Click on Ambient again and change it if you want.

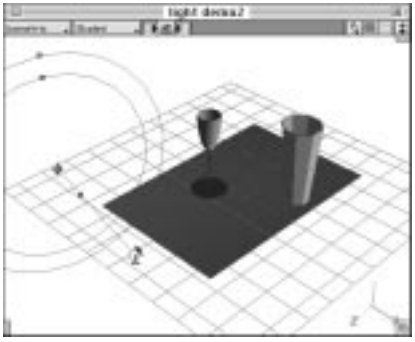
5. Now do a final rendering using Ray-tracing Good or Best: use the pop-up below the Render tool to select *RT Good*, then click in the window with the Rendering tool.



Make a spotlight visible

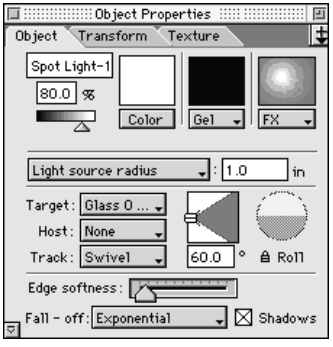
1. Select the *Spotlight* tool, then click in your window to insert a Spotlight.

2. With the Object Move tool, grab the spotlight and place it to the left of your objects, just above the plane of the rug.

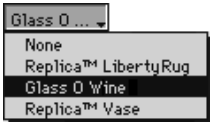


You may need to switch to Front and / or Top views to place the Spotlight precisely where you want it. When you are finished, go back to Isometric.

To aim the Spotlight, make sure it is selected in the Modeling window, then find the Object Properties palette. Click the Object tab.



In the *Target* pop-up list, select *Glass O Wine*.

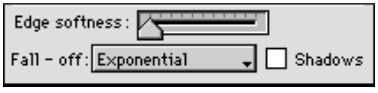


Your Spotlight will point itself at the wine glass.

NOTE: *To aim a Spotlight at an object, you must first name the object in its Object Properties palette before it will show up in the Target pop-up.*

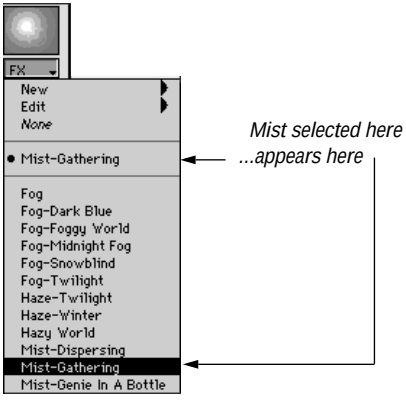
Pre-made Shapes like the ones you used in this model are already named. Shapes that you create are also named automatically. *See* **Shapes vs. Objects** *on page 66.*

3. To make a sharp edge on your Spotlight, move the *Edge softness* slider all the way to the left.

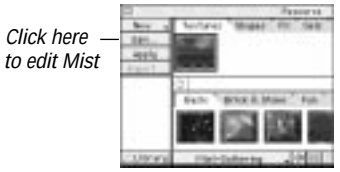


Notice that the Illumination Adjustment rings move together in the Modeling window. This is a visual indication that you have set the edges of the spotlight to end abruptly.

4. Now we'll add a Mist to the Spotlight to make it visible. In the Object Properties palette, select the FX pop-up and use it to select *Mist-Gathering*. Once selected, it is automatically applied, and will appear in its own section of the pop-up with a bullet beside it.



5. Find the Resource palette; notice that Mist-Gathering is now loaded in the top section. Make sure it is selected, and click the *Edit* button.

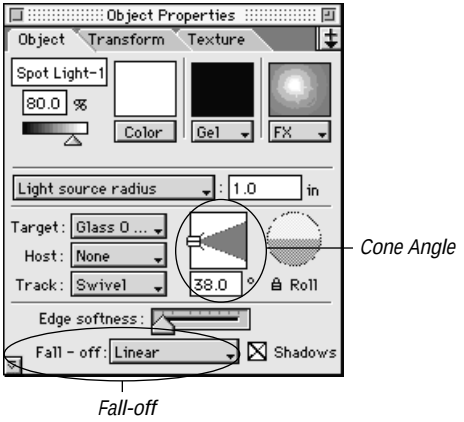


6. In the Mist editing dialog, increase the *Detail* and *Density* a little. Move the Detail to around 65. For Density, drag the right slider to about 50, but leave the left one where it is. Click OK when you are through editing the Mist.

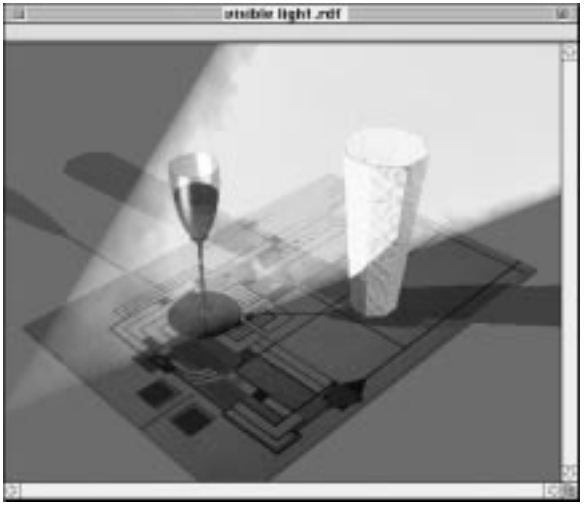
Set Detail and Density in the Mist editing dialog

7. In the Object Properties palette, change the *Fall-off* to *Linear* using the pop-up menu.

8. Change the *Cone Angle* to around 40 by clicking and dragging the angle display; or by entering 40 in the numeric field below the display.



9. Now you get to render. Select *RT Good* from the Rendering tool pop-up on the Tool palette, then click once in the modeling window. Voilá! Visible light!



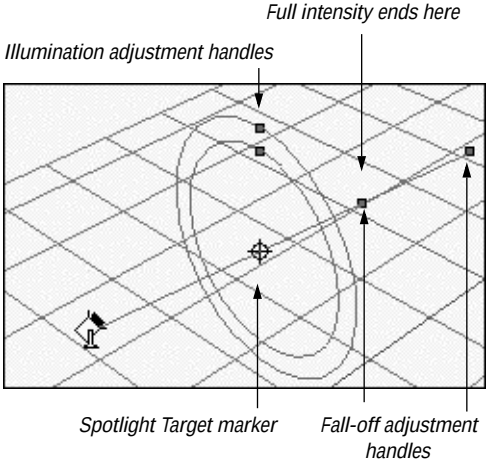
USING SPOTLIGHTS AND POINT LIGHTS

SPOTLIGHTS

A Spotlight is a local light source that shines in one direction, and originates from a single point.

The Spotlight is inserted into the model with the Spotlight tool; just click once.

When you select the Spotlight marker by clicking on it, you will see this:



The red line extending from the Spotlight icon shows the direction it is aimed.

The red circle with cross hairs is the **Target marker**, which is used to aim the light at a specific object.

To aim the Spotlight: Grab the Target Marker, and drag it to an object. When the object highlights in red, release the mouse button.

Then, if you move either the Spotlight or the object, the Spotlight remains pointed at the object.

Illumination adjustment rings. The two circles show the area of illumination. The rings can be moved with the Object Move tool. The inner ring shows where the light is at full intensity, and the outer ring shows the outer limit of the light.

The area in between the rings is in partial shadow. If you want the light to end abruptly, move the two rings together until you can only see one ring.

The two markers on the red line are the **Fall-off adjustment handles**. The outer one is the **Fall-off point**, which is the outer range of the light. The marker which is closer to the object is where the light first begins to fade away.

Option key (Macintosh) or **Alt** key (Windows) while positioning the target arrow highlights objects in green and ignores them, allowing you to aim at a position in space.

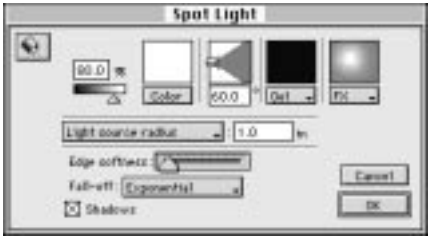
Command key (Macintosh) or **Ctrl** key (Windows) moves the spotlight closer to or further away from the target object along a straight line connecting the two.

Command + Shift keys (Macintosh) or **Ctrl + Shift** keys (Windows) move the Spotlight perpendicular to the grid.

Spotlight Controls

You can use the Tool settings dialog to preset a Spotlight's characteristics, or you can edit them in the Spotlight's Object Properties palette.

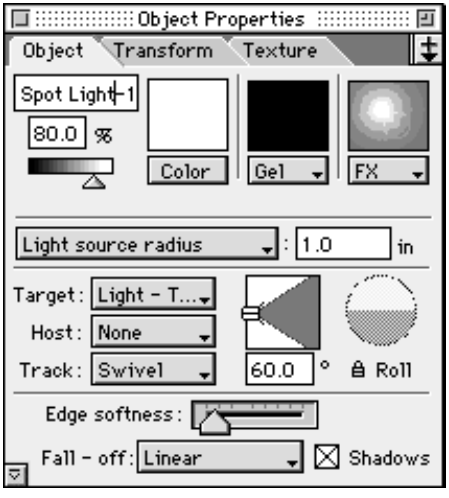
To summon the Spotlight Tool settings dialog, double-click on the Spotlight tool.



Tool settings dialog

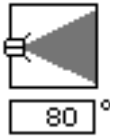
In the Object tab of the Object Properties palette, you can edit color, intensity, FX, or add a gel.

You can link the spotlight with a host or target, set edge softness and the angle of illumination, and determine whether fall-off will be linear or exponential. You can also rotate a gel.



Setting Intensity. You can adjust the Spotlight's intensity with a slider or by entering a value in the Intensity field. The Intensity settings are in the top left corner.

Setting Cone Angle. This can be adjusted by entering a number into the field.



Zero shuts off any illumination coming from the Spotlight, regardless of the intensity setting.

The illumination striking the object depends on both the cone angle and the Spotlight's distance from the object.

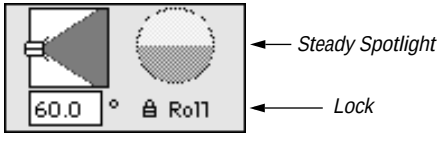
A Spotlight can be moved closer to or farther away from an object to adjust the size of the spot of light.

Setting Edge Softness. This slider allows you to set hard or soft edges on the cone of light as it strikes objects. The Spotlight's area of illumination can also be set with the Illumination Adjustment handles in the model.

Setting FX. If you want a special effect to emit from your light source, you can select from those in the FX pop-up. Adding a Mist, for example, will make the light appear visible.

Rotating a Gel. To rotate a Gel that has a directional pattern, first disable the Steady Spotlight lock on the Object Properties palette.

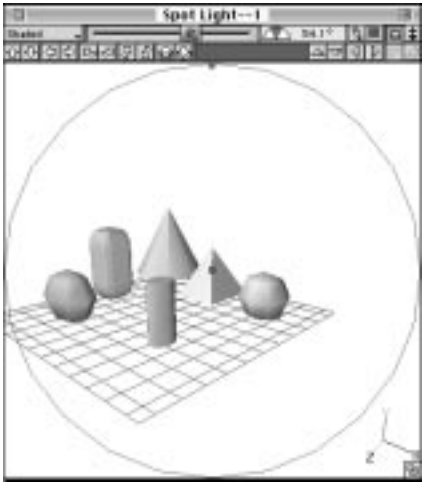
Just click on the lock, it toggles from locked to unlocked.



Then grab the half-circle, and rotate it to the desired position.

Spotlight Windows

You may want to view the area the Spotlight illuminates. To do this double-click on the Spotlight marker in the Modeling window, or select it from the Spotlight Window's pop-up in the Windows menu.



This will open a new window showing the view from that particular spotlight.

The angle of illumination is displayed graphically in the feedback area of the window and is controlled by a slider.

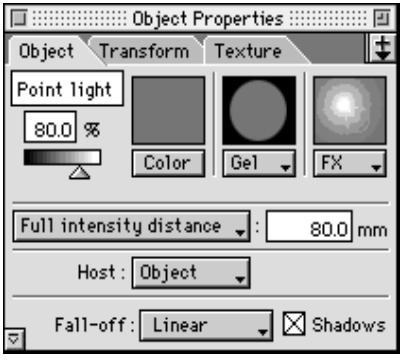
The other controls in the Spotlight window work just like in the Camera window. *See* **Cameras** *on page 156.*

POINT LIGHTS

A Point Light is a local source of illumination. It shines in all directions from a single point contained within the Point Light icon.

Insert a Point Light into the model with the Point Light tool. Click once in the model where you want the light. A Point Light marker will be placed in the model. It can then be moved with the Object Move tool.

In the Object Properties palette for the selected Point Light, you can set intensity, color, and add an atmosphere. You can apply a gel or special effects, such as Lens Flare. You can also link the light to a host.

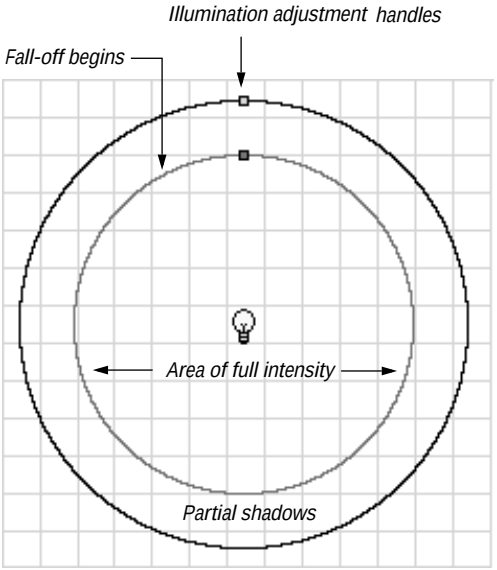


Setting Intensity. You can adjust a Point Light's intensity with the slider control or by entering a number from zero to 100 in the Intensity field.

Setting Color. Like directional lights, the color is set with the standard color picker dialog box when you click the *Color* button in the Object Properties palette.

Setting Attenuation. The value in the *Fall-off* field of the Object Properties palette is the maximum distance at which an object will receive any light at all.

You can also adjust the area of full intensity and the fall-off point interactively. When you insert the Point Light icon, you will get Illumination Adjustment handles which allow you to do this. Use the Object Move tool to adjust them.

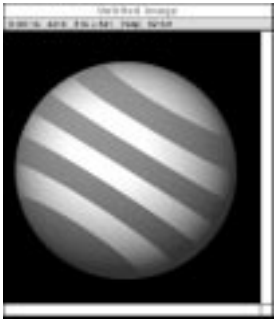


You can delete any local light source by selecting it and using the **Delete key** or by choosing **Delete** from the Edit menu.

GELS

Gels are special textures designed specifically for light sources: the mapping and scale information is pre-set. Gels simulate light passing through something: a window, blinds, stained glass, etc.

With a gel, the light source projects the pattern or image onto the objects that the light source is illuminating.



This is a Horizontal Blinds gel applied to a spotlight, and shining on a Primitive sphere.

Gels can be applied to selected light sources from the Resource palette or from the Object Properties palette.

StudioPro includes several built-in gels. You can access them through the Gels pop-up list on the Object Properties palette for that light source or the Gels tab on the Resource palette.

To apply a gel to a light source:

1. Select the light source.
2. Select a gel from the pop-up list on the light source's Object Properties palette.

StudioPro loads the gel and applies it to the light source.

To edit a gel

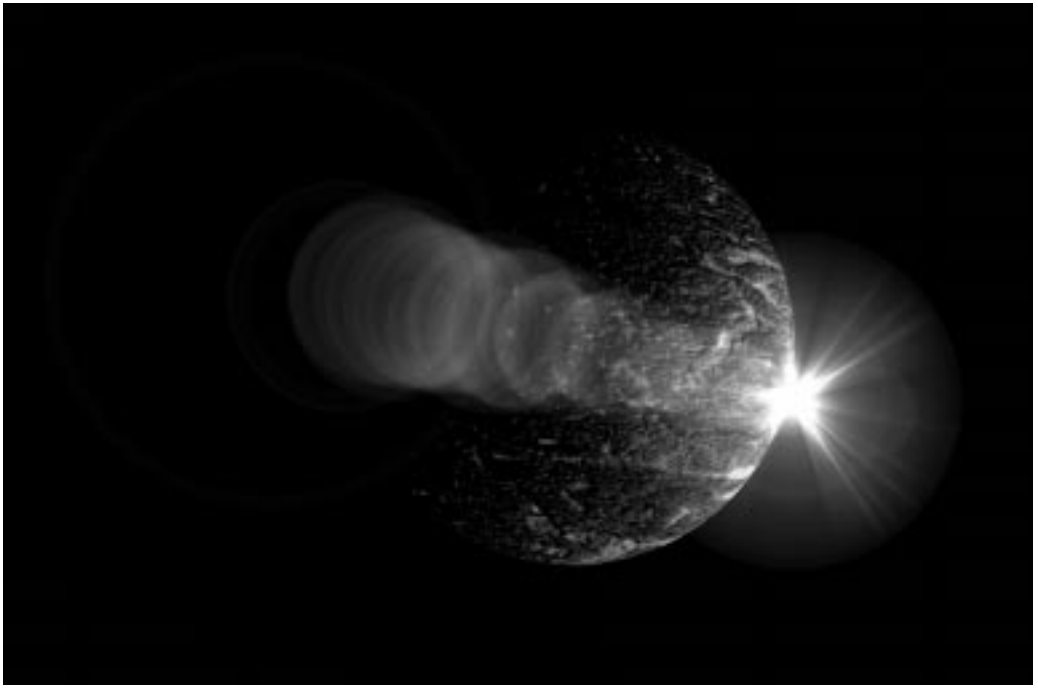
Rather than using the pre-loaded gels, you might want to customize or create gels of your own.

1. Select the Gel you want to edit, then click the *Edit* button on the Resource palette. The Gel editing dialog will appear.
2. If you want to keep the original intact, select New, then use the *Copy from* field and give it a new name.
3. Make the changes you want, and click *OK*..

To create a new gel:

1. Select *New* from the pop-up *Gel* list on the Object Properties palette for that light source. The Image Gel dialog will appear.

2. Select the properties of the gel. Here you can import a PICT or animation as a map.
3. Click *Apply*, then *OK*.



INTRODUCTION

Once you have created your model, given your objects textures, and placed lighting, you might also want to add some special effects.

StudioPro has provided you with a full complement of special effects. This chapter tells you what they are and how to get started using them.

THE FX TAB

This tab gives you access to some killer effects: Fountain, Auras and Lens Flares; and Fire&Smoke, HotSpots, Hair and PixieDust for Power Module 1 users. (See the Power Module documentation.)

FOUNTAIN

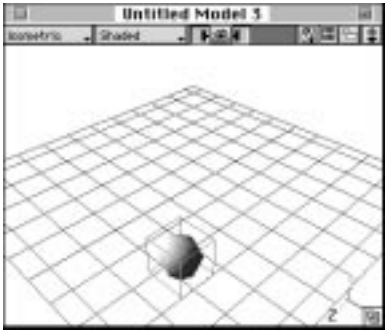
When you apply the Fountain effect to an object, you can set it to emit particles which fall to the ground and then bounce.

Or have them defy gravity and float away on the wind.

Make a bubble fountain

1. Click *New* on the Button bar to open a new model.

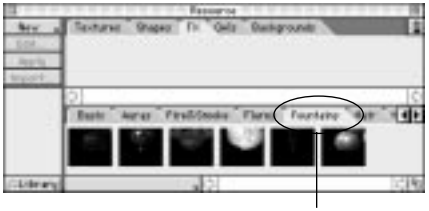
2. Select the *Sphere tool*, and draw a sphere in the modeling window.



3. With the sphere still selected, choose *Make Construction* from the Selection menu on the Main menu bar.

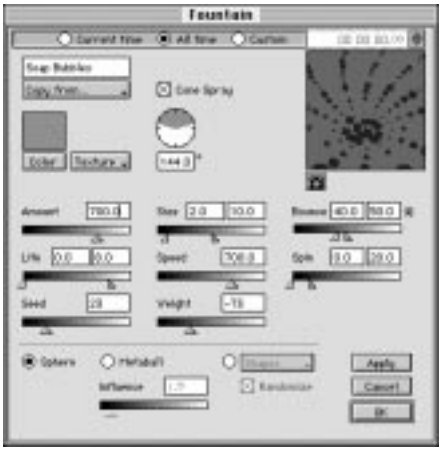
   Your fountain effect has to be applied to an object, and construction objects are not visible when rendered. This will make your sphere invisible when rendered, so you will just see the Fountain.

4. On the *FX tab* of the Resource palette, click on the Fountain tab to bring it forward.



Click the Fountains tab

5. Select *Soap Bubbles* by clicking on its preview, then click *Edit* on the Resource tab to summon the Fountain editing dialog.



6. Set *Amount* to 700, move the *Life slider* to 0 and 8, and set the *Size* sliders to 2 and 10. Set the *Speed* to 700, *Seed* to 23, *Weight* to -71 and *Angle of Spray* to about 145 degrees.

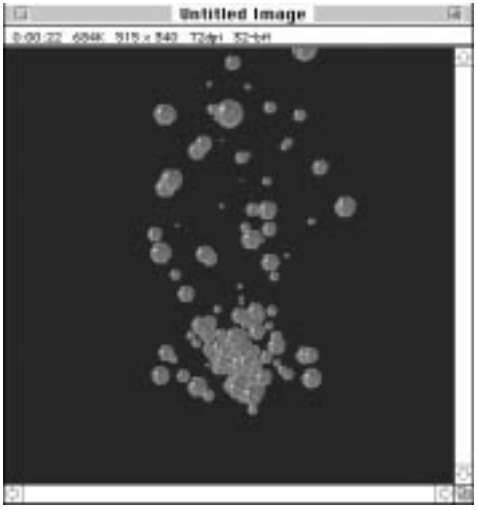
   Click *OK*.

7. Find the Air tab of the Environment palette. Click the Expert mode arrow in the lower left corner of the palette. Set the *Wind Intensity* to 0.

8. Now find the *Project Window*; click its Show / Hide icon if you need to. Set the *Cut-out Point* and the *Current Time marker* to 5 seconds.

Cut-out point and Current Time marker

9. In the Modeling window, select the *Render tool*, then click in the window to render your Fountain.



Or, if you would like to render the one-second animation, select Render from the Rendering menu on the Main menu bar.

In the Render dialog, click the *All* radio button, then *Render*. Specify a name and location, and the compression settings as the dialogs appear.

SETTINGS

All of the FX dialogs have these fields in common:

Name field. Enter a name for your new effect.

Copy from... Select an effect from this list. Only effects that are loaded will show up in this list.

Animation time settings.You can use the default settings or edit the animation effect with these settings.

Preview area.Preview your FX settings here.

Color. Most dialogs will have a color setting in some form. When its button is clicked, the color picker will appear. Fields in the Fountain Editing dialog allow you to use the existing effect or modify it to create specialized fountains. You can set the color, emission velocity, acceleration, and spread. If you check the *Cone spray* checkbox, the particles spray out in a cone.

Fountain Settings

Angle of Spray. The pie-shaped field allows you to set the cone angle of the spray coming out of the fountain.

NOTE: *Angle of Spray displays in the color of the effect. In Soap Bubbles and other nearly transparent FX, it is a very pale color. You may have to look closely to see it.*

Amount. The amount of particles emitted.

Size. The minimum and maximum size of the particles.

Seed. The uniqueness of each fountain.

Speed. The initial speed at which the particles are emitted.

Cone spray checkbox. If this box is checked, the water sprays out along the perimeter of the cone like an old-fashioned lawn sprinkler.

Texture/FX pop-up. Apply any listed texture or effect to the fountain.

Spin. Use the sliders to give the particles spin.

Bounce. Use the sliders to determine how much energy the particles have.

There are also three radio buttons which allow you to select the type of particles which are emitted from the Fountain.

Sphere. Selects spheres of varying size, depending on your settings.

Metaball. The Spheres which are emitted from your Fountain will melt together, just like the Metaball modeler. The slider sets the Radius of influence. *See* **Metaballs** *on page 57.*

Shapes. This option lets you select shapes to be emitted as Fountain particles. Use the pop-up menu to select one or more shapes.

Randomize. If you have selected more than one shape (see above), enabling this checkbox causes the shapes to be emitted in a random, rather than regular, order.

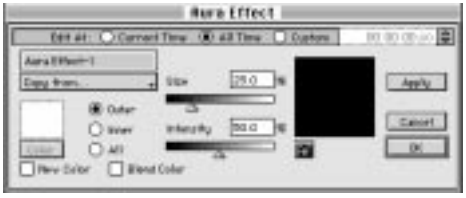
Wind speed and **Gravity** also affect a Fountain. These controls are found in the Air tab of the Environment palette. *See* **Gravity and Wind** *on page 155.*

To delete a Fountain, use the Texture tab of the Object Properties palette. In the Texture list, highlight the name of the Fountain or other effect, then click the *Delete* button.

AURA

The Aura effect adds a glow, or halo, around your object. In the Aura dialog box, you can control the color, size, placement, etc. of your halo. Or use the pre-sets in the FX tab of the Resource palette.

Fields in The Aura Dialog



Outer, Inner, and **All radio buttons**. These buttons determine which section of the aura will be visible. The *Outer* aura is visible at the edges of the object it is applied to. The *Inner* aura overlaps the boundary between the object and the background. *All* will cover the object and extend beyond it.

Size. The size of the aura.

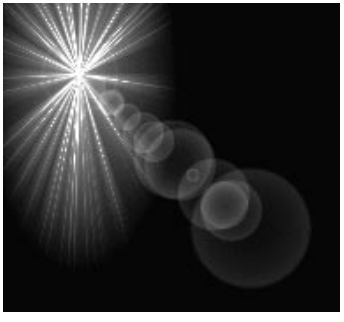
Intensity. The opacity of the aura.

New Color checkbox. A color for the aura other than that of the object.

Blend Color checkbox. The color in the Aura and the color of the object will be blended.

LENS FLARE

The Lens Flare effect lets you affect the rendering of an object as if there were a flare from the camera lens.



To create a Lens Flare:

In this exercise, we will create a scene with a pre-made shape from the Shapes palette. Then we will insert a Point light, and apply a lens flare to it.

1. Open a new model by clicking *New* on the Button bar.

2. From the Shapes tab of the Resource palette, select any shape you find appealing. We used the Acuris™ Flower. Click the *Insert* button on the Resource palette to put the shape into your model.

3. Select the Point light tool, then click in the left half of the Modeling window to insert the light.

4. Select Top from the View Orientation pop-up, or press **Hotkey 8**.

   Press **Command+**= (Macintosh) or **Ctrl+=** (Windows) keys to bring your object and light into view. This is the same as the **Fit Views to All** command in the Windows menu.

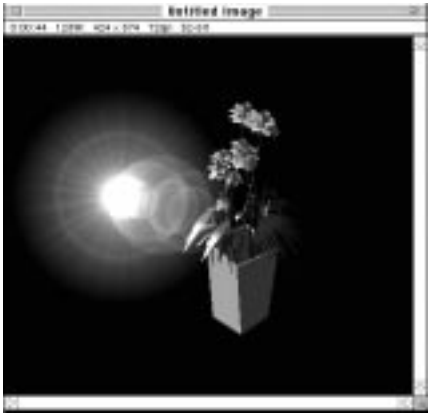
5. With the Object Move tool, place the light to the left of your object.

6. From the FX tab of the Resource palette, select *Flares* by clicking it. Then select a flare.

7. Make sure your Point light is selected, then click *Apply* in the Resource palette.

   Or, you can select the flare from the Object tab of the Object Properties palette. Just click the FX pop-up, then scroll down the list and select. We used the Dog Star flare.

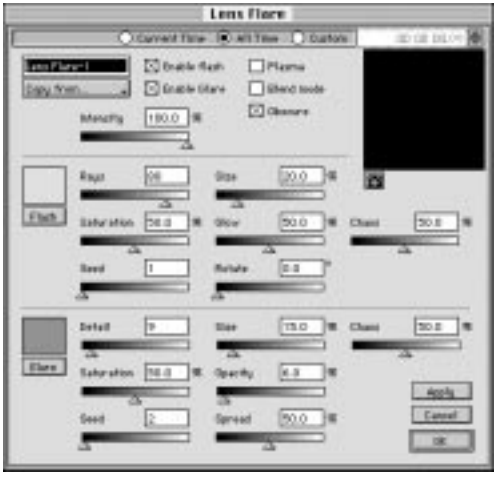
8. Return to Isometric view (**Hotkey /**), then render a snapshot using the Rendering tool.



As you can see, it's easy to get great visual effects with Lens Flare.

Lens Flare settings

Lens Flares have two parts, Glare and Flash. When you open the Lens Flare dialog, you will see there are two sections.



Flash

Flash is the bright spot right over the light source. Use these fields to control your Flash:

Enable Flash. Turns the flash off or on.

Enable Glare. Turns the glare on or off.

Plasma. Makes the flash appear to have substance and look less like an optical effect.

Blend mode checkbox. The color of the object and the color of the Lens flare will be blended.

Obscure. Obscures the flare when it is hidden behind objects in your model.

Saturation. How white-hot the center looks.

Chaos. How disorderly the rays appear around the light.

Rays. The number of rays or spokes of light that radiate from the light.

Glow. Soft illumination around the flash.

Seed. The uniqueness of the effect.

Rotate. This rotates the flash of the Lens Flare.

Intensity. Applies to the entire Lens Flare.

Glare

Glare consists of the rings, rainbows, and halos which also appear with a Lens Flare. In addition to the controls we have already explained, the Glare section of the dialog contains these options:

Detail. The total number of glare elements in the Lens Flare.

Opacity. How transparent or opaque the lens flare is.

Spread. The maximum spread of the flare.

FOG, HAZE AND MIST

Fog, Haze, and Mist are volumetric textures and can be used to create special effects in your model, either globally or when applied to individual objects.

To apply Fog, Haze or Mist globally, you must use the Environment palette. These effects can be created or edited in the Resource palette, but all global effects, including light, wind, gravity, backgrounds and ground planes; and Fog, Haze and Mist, are applied in the Environment palette.

Fog, Haze and Mist are applied globally by selecting them in the pop-up lists available in the Air tab of the Environment palette.

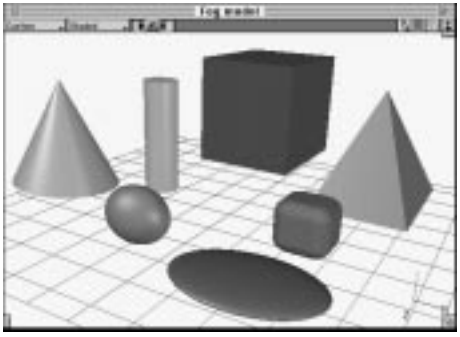
To apply Fog, Haze or Mist to an object, the effects must be contained within a single-sided object. *See* **Editing Primitives** *on page 33.* They can be combined with other textures if the texture is transparent.

For example, you could use a transparent glass texture and also apply a Fog. The end result would be a glass object filled with fog. To apply Fog, Haze or Mist to an object, use the Textures tab of the Resource palette.

Fog, Haze and Mist are somewhat similar; this tutorial will get you started. We will insert a few objects, apply a global Fog, select a Ground Plane, and then render the final image.

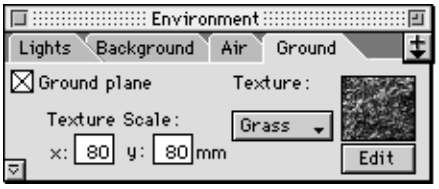
Make a foggy model

1. Open a new model by clicking the *New* button on the Button bar. Insert a few Primitive shapes by clicking and dragging with a Primitive tool.



2. Using the Object Move tool (**Hotkey 1**), move the objects to various depths in your model.
3. Apply various textures to your primitive objects. Select Resource palette > Texture tab, then drag-and-drop the textures onto the objects.
4. Add a Ground plane by selecting *Brushed* from the Metal Texture folder, then clicking *Import*. This loads the Ground plane into the model, making it easier to find in the next step.

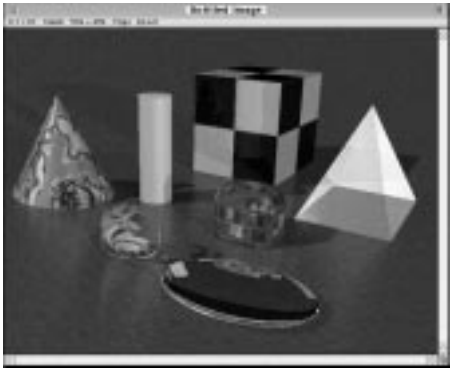
5. Click the Ground tab of the Environment palette, then enable the *Ground plane* checkbox. Use the pop-up list to select *Brushed*.



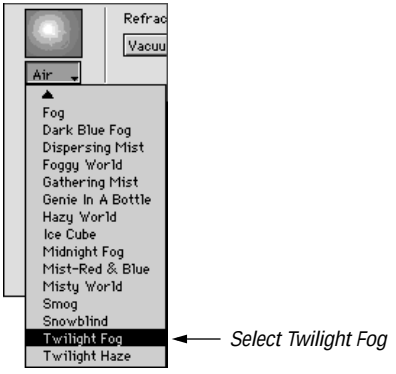
NOTE: Any texture is available to use as a Ground plane through the pop-up list in the Environment palette. Selecting and loading it first simply made it easier to find: it appeared at the top of the pop-up, right under the top section containing New and None.

6. Add some light to your model by selecting the Lights tab of the Environment palette, then increasing the Ambient light. *See* **Change the Ambient lighting** *on page 113.*

7. Now render your model by selecting the Render tool, then clicking in the Modeling window. This is your "Before" image.

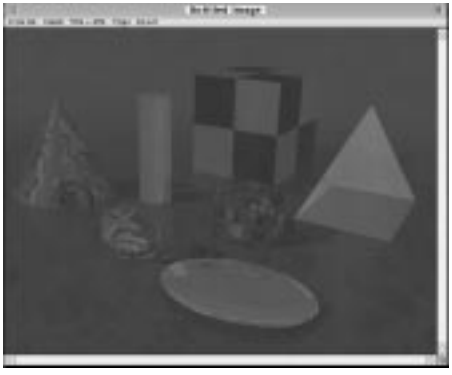


8. Click on the Air tab of the Environment palette.



Use the Air pop-up list to select Twilight Fog.

9. Now render your model again.



MORE ABOUT FOG

With this effect, you can create realistic (or surrealistic,) fog for your model. There are several pre-set fogs available, or you can create your own. Fog is located in the Volumetric folder on the Textures tab of the Resource palette. To summon the dialog,

click *New* or *Edit*, or simply double-click on the preview of the Textures library.

Fields in the Fog Dialog

Color. The color that will be transmitted through the fog. Any color but white will obscure objects seen through the fog.

Direct. The color of light reflected from directional light sources.

Ambient. The color of the light that is reflected from ambient light sources.

Link colors checkbox. All colors in the Color, Direct, and Ambient fields will be the same. The color in the Color field will be the one used.

Max depth. This allows you to see the background through the fog.

Start depth. The distance at which the fog begins.

Density. How much the fog will obscure with distance.

Logarithmic button. This produces a natural looking fog that trails off with distance.

Linear button. This produces a very simple fog that obscures evenly over distance.

Enable Shadows checkbox. This allows object shadows to be visible within the fog.

HAZE

Haze lets you create layers of fog; like smog over a city, or fog in a valley. When you edit Haze, all fields in the top section except *Name* and *Copy from* apply only to the selected layer. In the bottom section, only thickness applies to the layer. To edit other layers, first select them in the pop-up.

Fields in the Haze Dialog

Color. The color that will be transmitted through the haze. Any color but white will obscure objects seen through the haze.

Direct. The color of light reflected from the directional light source.

Ambient. The color that is reflected from the ambient light on the selected layer of haze.

Link colors checkbox. All colors in the *Color*, *Direct*, and *Ambient* fields will be the same. The color in the *Color* field will be the one used.

Add layer. Add layers to the haze.

Delete. Delete layers of Haze.

Layer. The active layer of Haze. The current settings apply to this layer only.

MIST

With Mist you can create patchy fog-like clouds.

Fields in the Mist Dialog

Color. The color that will be transmitted through the mist. Any color but white will obscure objects seen through the mist.

Direct. The color of light reflected from directional light sources.

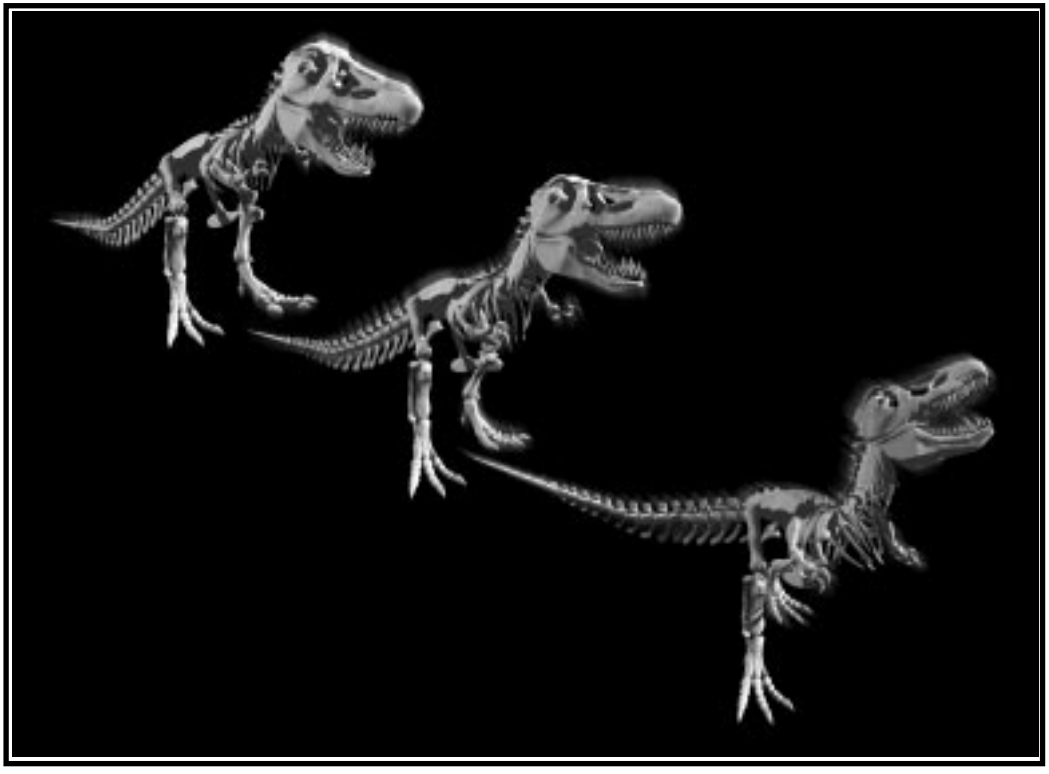
Ambient. The color of light reflected from ambient light.

Link colors checkbox. All colors in the *Color*, *Direct*, and *Ambient* fields will be the same. The color in the *Color* field will be the one used.

Detail. The amount of detail in the mist effect.

Density. The levels of density between the patches of mist.

Fields in the Expert (lower) section of the dialog let you set maximum depth of the mist, its scale, and how it will evolve over time. See the ***Reference Manual*** for settings in the expert section.



INTRODUCTION

Animation may sound complicated, but it isn't. It is simply change over time.

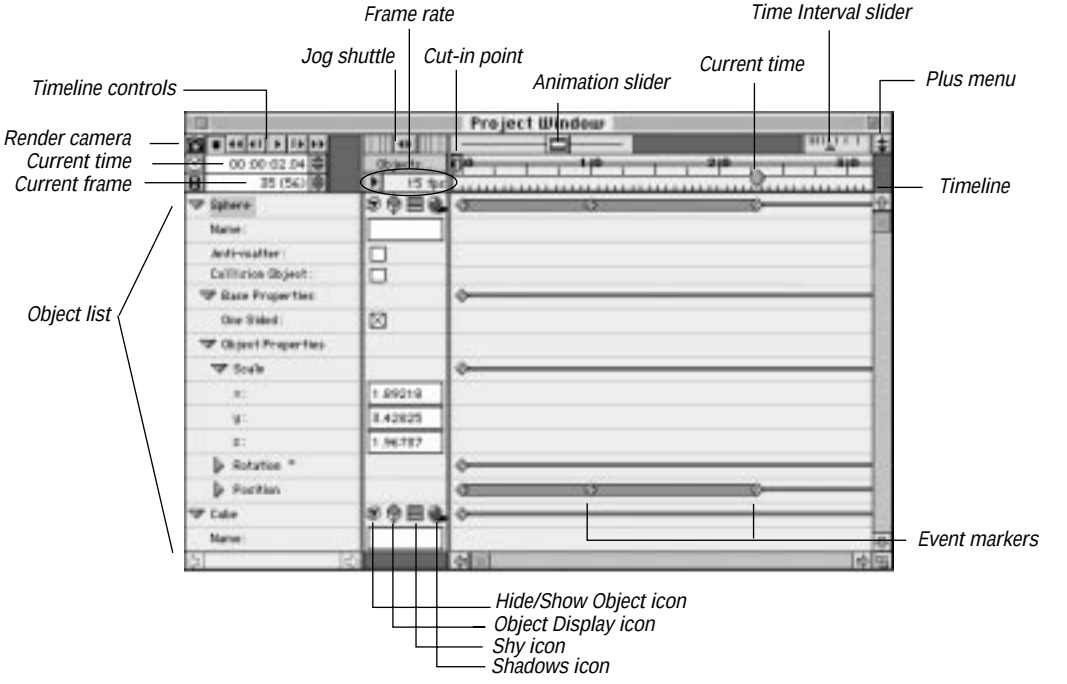
In StudioPro, "animation" includes changing textures, effects, lighting and backgrounds as well as objects moving and changing shape.

StudioPro's animating capability is very powerful. But there are only three basic steps:

1. Set the length of your animation, using the *Cut-out* point.
2. Set the length of time for a particular movement, by moving the *Current Time Pointer.*
3. Move your object. Or make the change in your texture, lighting, etc. And that's all there is to it!

Take a quick look at the first section describing the Project Window and its controls, then work through the simple tutorials to start animating right away.

ANIMATION FUNDAMENTALS



PROJECT WINDOW

The Project window gives you all of the controls needed to create an animation in one convenient location.

To access every property of each object, click on the arrow beside the object's name in the list. Once open, many of the object's properties can be edited over time in the project window.

- **Animation slider**. This control moves the *Current Time Pointer* manually.
- **Animation Timeline.** Contains the event markers. Usually, event markers are created automatically when you change an object's position or attribute.
- **Anti-matter checkbox**. With this checkbox, you can create Boolean renderings. *See* **To use Anti-matter** *on page 145.*
- **Collision checkbox.** If checked, particle effects such as Fountain will bounce when they come in contact with the object.

- **Current Time**. Shows you where (actually when) you are in your animation; located on the left side of the window.
- **Current Frame**. Displays the current frame numerically: 10 (210) means frame 10 of 210.
- **Current Time Pointer**. A visual indicator of the current time (on the timeline).
- **Objects... button**. This lets you decide what kind of objects will be shown in the Project window. This dialog appears:

  You can select *All* or choose from cameras, lights, shapes, and groups. This is helpful for managing large projects.
- **Cut-in Point.** Set this at the position on the timeline where you want the animation to begin.
- **Cut-out Point.** Set this point at the position on the timeline where you want the animation for that entire model to end.
- **Event markers**. Script the animation paths of objects, textures, cameras, light sources, and object attributes in a model. These can be moved manually.
- **Frame Rate**. Use to set the frames per second.
- **Jog Shuttle.** This control lets you move the animation forward or backward manually.
- **Object list**. Use to select objects and their attributes in the model. Clicking an object's name selects that object in the model.
- **Render Camera**. This summons the Render dialog where you can render one frame or the whole animation. (Click the *All* radio button to render every frame.)
- **Show/Hide icons**. These control whether objects are visible in the rendering and modeling windows:

  Hide/Show icon. You can show an object in both the modeling and rendering windows or hide it in both the modeling and rendering windows.

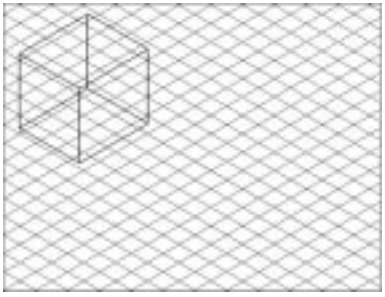
  Object Display icon. Use to display objects as bounding boxes by clicking the icon on the left.

  Shy icon. The first icon (far left) allows you to show an object in both the modeling and rendering window. The second icon hides an object in the modeling window, but it will show in rendering. The third icon shows the object in the modeling window, but it won't render.

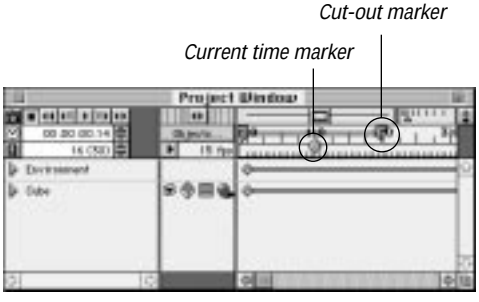
  S**how Shadows icon**. The first icon (far left) forces an object to have shadows even if the shadows are disabled elsewhere. The second icon forces an object to be shadowless, and the icon on the right returns things to normal -no overrides.
- **Time Interval Display**. This control lets you compress or stretch out the displayed timeline.
- **Timeline Controls**. These are the standard VCR-type controls. The *Play* button lets you preview your animation.

To make an easy animation:

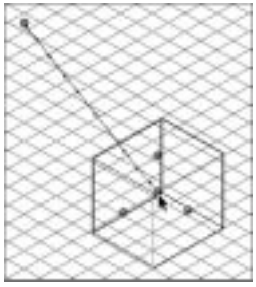
1. Open a new model. Use the *New* button on the Button bar, or select New in the File menu.
2. Select the Cube primitive tool, and draw a small cube in the corner of the modeling window.



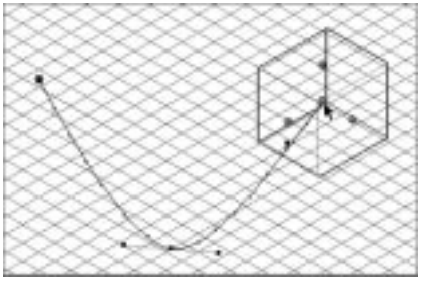
3. Find the Project window. If it is not already present, use the Show / Hide icon in the upper right corner of your screen.
4. Move the *Cut-out marker* to two seconds, and the *Current Time marker* to one second.



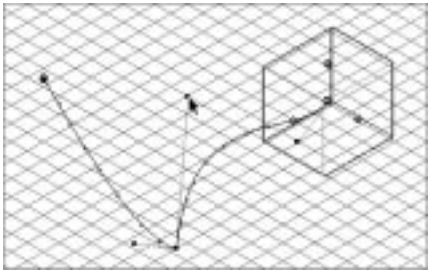
5. Drag the cube to the lower center of the modeling window.



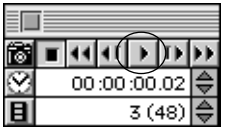
6. Advance the *Current Time* marker to two seconds.
7. Drag the cube to the upper right corner.



StudioPro automatically smooths the animation path. The default path type is Bezier. You can adjust the path with handles at this point.



8. Click the *Play* button to preview your animation in the model window.



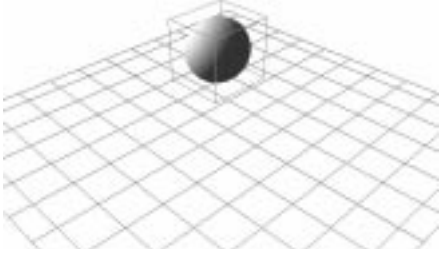
CONVERT TO PATH

Convert to Path lets you create unique animation paths. Any 2-D object can be easily converted into an animation path.

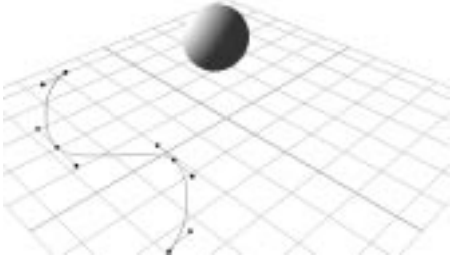
First, make and / or select the object you want to become a path. Then click the tool on the Extension Tool palette. Now select the object you want to use the animation path, and drag it to the new path. Release the mouse when both the object and the path highlight.

To convert a line into a path

1. Open a new model, and draw a primitive sphere in the Modeling window.



2. With the Pen tool, draw a wavy line on the grid. Use four clicks. This will create four event markers.



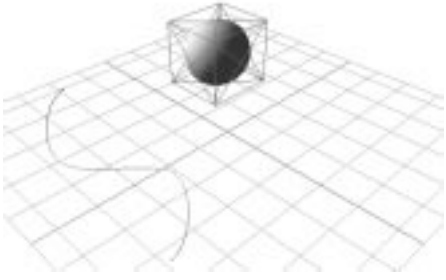
3. Double click the Convert to Path tool on the Extension Tool palette to display the dialog.

4. The *Remove Curve* checkbox should be checked. Change the *Time Interval* to 0.25 seconds. Then click *OK*.

   NOTE: *If the Remove Curve is not checked, you will get an animation path and a line of the same dimensions.*

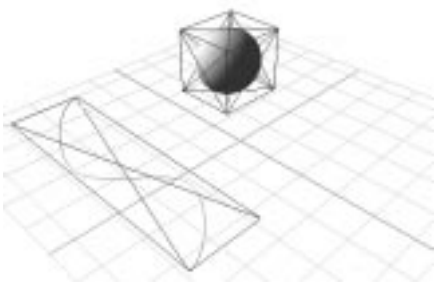
   This is useful if you want a particular object to trace a path around the outside of another object - a mouse around a rug, or a train around a track, for instance.

5. With the Convert to Path tool still selected, click on the sphere.

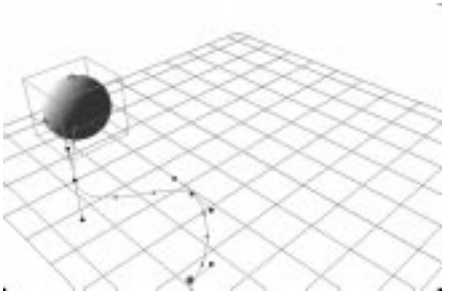


6. When the sphere highlights, do not release the mouse button. With the

mouse button still depressed, drag the cursor to the 2-D line.



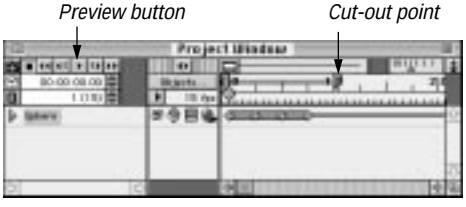
7. When both the sphere and the line are highlighted, release the mouse button.



The object moves to the first point on the animation path.

Notice that the Bezier curve is no longer present in the model. This is because the *Remove Curve* checkbox was checked in the Tool Settings dialog.

8. Go to the Project window and move the *Cut-out* point to 1.0 second, then click the *Preview* button in the timeline controls.

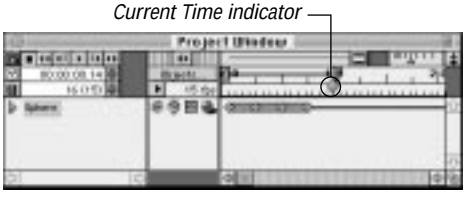


The sphere travels along its new path in the Modeling window.

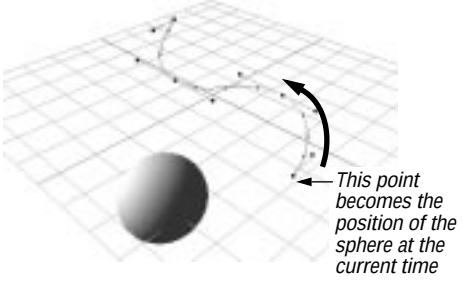
To add to an animation path

StudioPro lets you convert additional 2-D lines into paths and append them to an existing animation path.

1. Move the *Current Time* indicator to the 1.0 second mark in the Project window.



2. With the Pen tool, draw a line at the position in your model where you want the animation to continue.

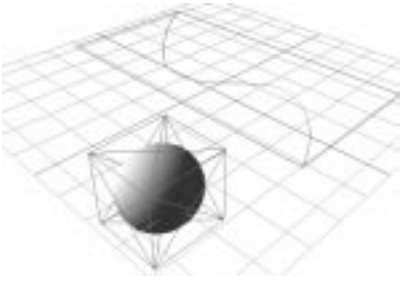


Remember that the first point on this line becomes the position of the sphere at the current time indicated in the Project window.

3. Double click the Tool Settings dialog. Make sure the *Append path at current time* box is checked, and that the time

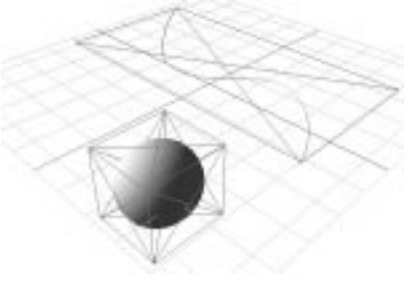
interval is set to 0.25 seconds. Then click *OK*.

4. Select the sphere with the Convert to Path tool.



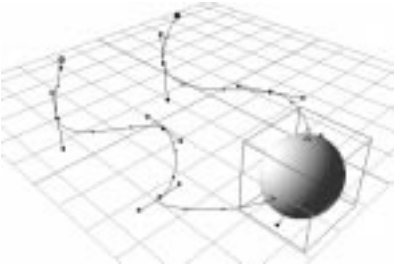
Don't release the mouse button when the sphere highlights.

5. Drag the cursor to the line you just created. When both the sphere and the line are highlighted, release the mouse button.



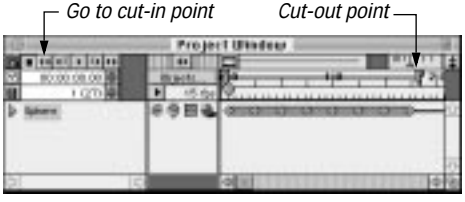
The sphere moves to the position of the first point on the new section of the animation path.

6. With the Object Move tool, select the sphere.

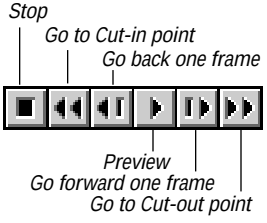


The animation path is visible when the object is selected.

7. In the Project window, move the *Cut-out* point beyond the last event marker, then click the *Go to Cut-in Point* button. This button moves the *Current Time* pointer to the beginning of the animation.



To preview the animation, click the *Preview* button in the timeline controls.



Don't throw away the model yet, you can use it in the next step-by-step exercise.

DROPPING A CURVE

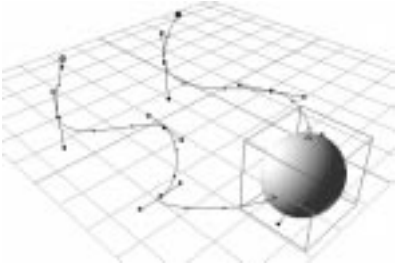
This feature makes it easy to create identical, but separate, animation paths.

Using the **Drop A Curve** button, you can create a curve using any animation path in your model as a template. This creates an exact copy of the original path. You can then use the Convert to Path command to change the curve into a animation path.

Using Drop A Curve

Use the model you created in the previous exercise.

1. Select the sphere.



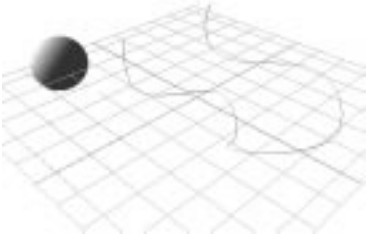
The sphere's animation path appears.

2. Click the **Drop A Curve** button on the Button bar.

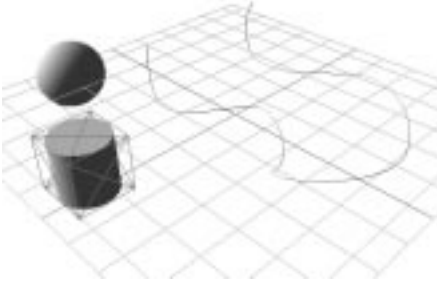
A Bezier curve is placed directly below the sphere's animation path.

3. Click away from the sphere to deselect it. The animation path is no longer visible, but you can see the Bezier curve. Select the curve.

4. Move the curve away from the sphere with the Object Move tool.

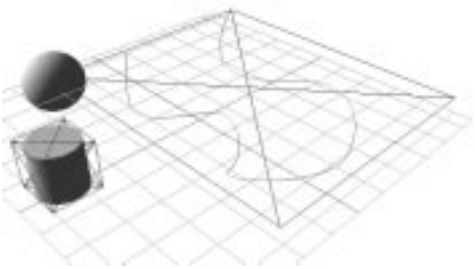


5. Select the Cylinder tool from the Tool palette, then draw a cylinder in the Modeling window.



6. Set the *Current Time* pointer to time zero.

7. With the Convert to Path tool, select the cylinder. When it highlights, drag the cursor to the curve.



8. When both the cylinder and the curve highlight, release the mouse button. The curve is converted to a path.

9. Move the *Cut-out* point beyond the last event marker, then click the *Preview* button.

   Both objects move together in unison.

ALIGN TO PATH

Align to Path lets you align an object to its animation path.

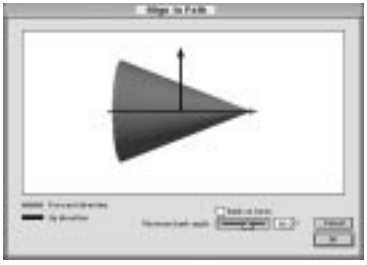
In other words, it lets you control which direction the object is pointing as it travels along the path.

Align to Path can be accessed on the Button bar and in the Modeling menu.

To align an object with its path:

1. Create a primitive cone.
2. With the cone selected, click **Align to Path** from the Button bar.

The Align to Path dialog will appear.



3. Use the object's bounding box handles to align the object to the path. Click *OK*.

If you are not happy with the results, select **UnAlign to Path** from the Modeling menu; then try again.

CYCLING ANIMATIONS

StudioPro lets you cycle an animation sequence in two ways: over and over again; or from its beginning to ending point and then back to the start.

Cycle attributes are added to objects in the Project window.

First select the object, then select the **Cycle Attribute** command from the **Add Attribute** submenu in the Project window's Plus menu.

You can set the number of repetitions you want: an object can repeat its motion a

single time, or it can cycle endlessly through the entire animation.

For more detailed information, see the Reference Manual.

USING EVENT MARKERS

The primary timeline for the object contains all of the animation markers for any attribute of the object that you have edited over time. Keep in mind, the primary timeline is a summary of all the other markers.

This gives you the advantage of selecting and moving those markers together, but should you select them and delete, all of the attributes' changes will be deleted together.

To edit a specific object property or attribute, it is important to find the individual timeline containing only the property you want to change. All timelines are found in the Project window.

For example, open your object (by clicking the triangle), then open the Object Properties, then find Position. This is the timeline for your sphere's motion. Open Position, and you will find numeric fields for the X, Y and Z axis.

Select an event marker by clicking on it. The inset will change to red. Select multiple markers by holding down the **Shift** key.

You can move the object's pacing and sequence in the animation by moving its event markers along the timeline.

Delete an event marker by selecting it and pressing the Delete key, or selecting **Delete Event Marker** in the **Plus menu**.

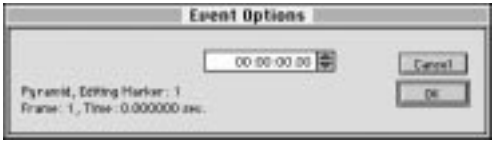
Shift key allows you to select multiple markers.

Option-click (Macintosh) or **Alt-click** (Windows) creates a new event marker**.**

Option-drag (Macintosh) or **Alt-drag** (Windows) leaves the original event marker in place and creates a copy as you drag it to a new location.

Command key (Macintosh) or **Ctrl** key (Windows) moves the Current Time Pointer to the position on the timeline where you click.

Event markers can be individually edited to alter their position. You do this by double-clicking on the event marker you wish to edit. The appropriate dialog appears.



If the event marker applies to the motion of the object, the *Event Options* dialog provides additional settings. See the Reference Manual for more information.

BOOLEAN RENDERING

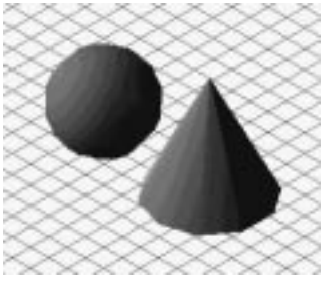
To create a Boolean rendering, first designate an object as anti-matter by checking the Anti-matter box in the Project Window.

When that object overlaps or comes into contact with another object, it will eat away the second object where it touches or overlaps.

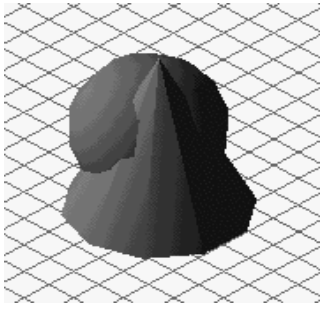
The surface (and texture) of the anti-matter object will be left behind on the second object.

To use Anti-matter

1. In the modeling window, draw a sphere.
2. Be sure the view is in Isometric; and draw a cone.



3. Apply textures to both objects.
4. Move the cone so that it is inside the sphere.



5. Open the Project window and click on the triangle next to the cone object. Enable the Anti-matter checkbox.
6. Render the objects to see the effect.

Mettle Communications

INTRODUCTION

Ah, rendering. The fun part; your finished product.

StudioPro has several built-in rendering options for previews, scene construction, fine-tuning, and finished renderings.

Rendering, itself, is easy. But getting the results you want takes a little planning.

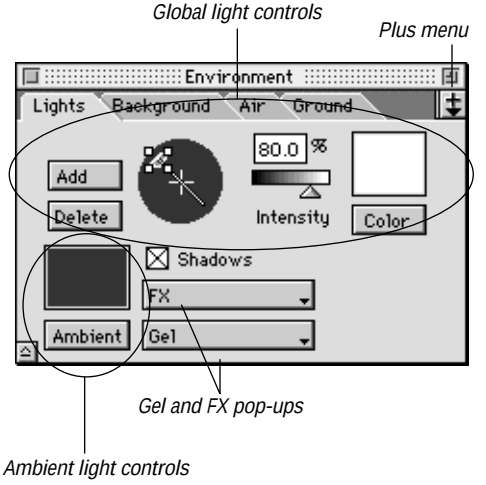
In this chapter we will show you how to set the stage for your rendering with light, atmosphere, backgrounds and ground planes.

Then we will show you how to render; and the advantages of some of the different renderers and settings.

SETTING THE STAGE - ENVIRONMENTAL EFFECTS

Before you do your final rendering, you will want to incorporate some environmental effects into it.

StudioPro's Environment palette gives you access to several options: global and ambient lighting; visible and reflected backgrounds; ground planes; and globally applied air, wind and gravity. These features let you easily add some great finishing touches to your models and animations.



LIGHTS

Global lights and Ambient lights are controlled through the Lights tab on the Environment palette. *See* **A basic lighting tutorial** *on page 110.*

Global Lights

Global lights are not really in the model; more accurately, they are placed around the model. They shine toward the model from a source outside the model space. They are intended to simulate the way sunlight strikes the earth in rays that are parallel to each other.

When you open a new model, a single global light source is automatically present in the Environment palette. The illumination is set to come from the upper left front quadrant, at 80 percent intensity, and the color is white.

The position, intensity and color of this default global light can all be changed, and new global lights added.

To add a global light, click the *Add* button.

To delete the selected global light, click the *Delete* button.

To move a global light, grab the icon in the circle and drag it to where you want.

To set intensity, use the Intensity slider, or enter a percentage in the numeric field.

To set color for global lights, click the Color button. This summons the color picker dialog.

Both special effects and gels can be applied to Global lights by using the pop-up menus at the bottom of the Lights tab.

To add a Gel or FX, select from the pop-up lists. The selected Gel or FX will appear in its own section of the list with a bullet next to it.

To delete a Gel or FX, select it again in the pop-up list. The Gel or FX will still appear in list, but without the bullet next to it.

Ambient light

Ambient light is non-directional background lighting.

Click on the **Ambient** button or the color field to summon a color picker, where you can set color, hue, saturation, and lightness.

BACKGROUNDS

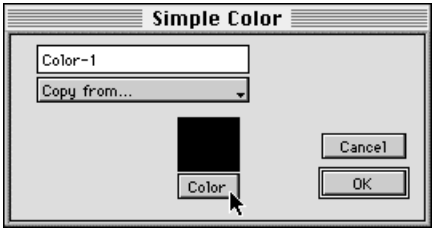
Backgrounds can be created, edited and loaded into your model using the Background tab of the Resource palette. However, Backgrounds can only be applied through the Background tab of the Environment palette.

Remember - Backgrounds are not visible in the modeling window.

To apply a color background:

1. Find the Environment palette, and click on the Background tab to bring it to the front. Select Vis. > New > Color.

2. In the Simple Color dialog which appears, click on the Color field to summon your color picker.



3. Choose a color in the color picker, then click **OK**. Click **OK** again in the Simple Color dialog. Remember, Backgrounds don't show until you render.

All the different backgrounds have previews in the Resource palette, but your selection is made with the Environment palette.

However, selecting a background in the Resource palette and then clicking the Import button loads it into your model. This makes it visible on the top part of the Resource palette, and makes it easier to

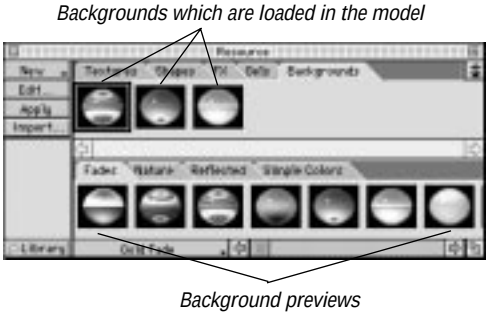
find in the Visible Background pop-up on the Environment palette (See Step 2).

Reflective backgrounds work the same way.

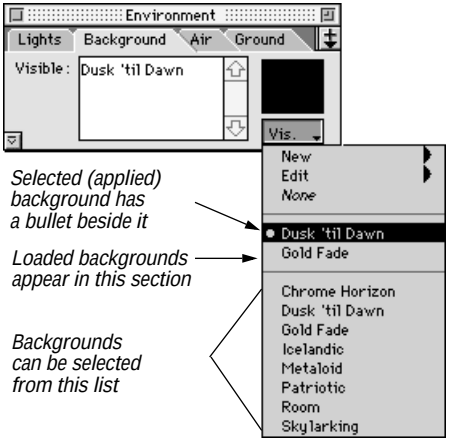
Loading from the Resource tab

You can create a background from the Resource palette or from the Environment palette. Once the background is created, it will appear on the Resource palette for that model. If you want to save it for future use, select it in the Resource palette and use the **Save** command in the Plus menu.

1. Look at the background previews on the Resource palette to get an idea of what you want. When you find one you like, click on its preview, then click the *Import* button to load it into your model.



2. Switch to the Environment palette, Background tab. In the Visible pop-up, select the background. Loaded backgrounds will appear in their own section of the list, below *New, Edit* and *None.*



Applied backgrounds appear in this list with a bullet beside them. To remove a background from your model, select *None*. Or you can highlight it on the list. It will be de-selected, but will remain loaded.

To create a new background:

1. With the Background tab active, hold down the *New* button on the Resource palette.

-or-

Select *New* from the pop-up list on the Background tab of the Environment palette.

2. In the pop-up which appears, select the type of background you want to create: Cubic, Horizon, Color or Spherical. Each has its own dialog, which will appear when you select the type.

3. In the Environment palette, select your new background in the *Visible* pop-up list to apply it to your model.

To edit a background:

1. With the Background tab of the Resource palette active, select the background you want to edit. Click the *Edit* button.

   -or-

   In the Background tab of the Environment palette, select Vis. > Edit, then select the background from the list.

2. Use the dialog which appears to edit the background. When you click OK, the changes are made in your background, which remains applied.

You can **delete** a background by selecting it again in the pop-up list. Notice the bullet is removed from beside the background's name.

To remove it from your model, choose the **Delete Unused** command in the Plus menu.

Spherical Backgrounds

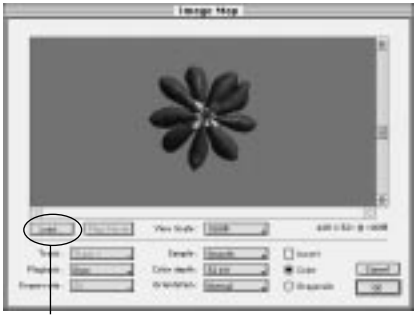
To create a Spherical background:

1. Select *Spherical* from the pop-up list.

   The Spherical background dialog will appear.

2. Click the *Map* button.

   The Image Map dialog will appear.



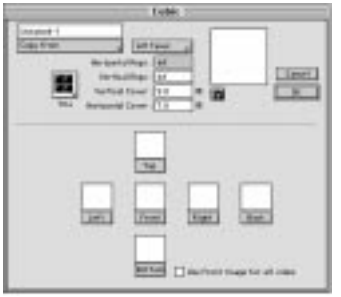
Load button

3. Click the *Load* button to locate an image you want to use as a background.
4. In the dialog which appears, find the image you want, and select it. Then click *Open*. This loads the image into the Image Map dialog.
5. Click *OK* in the Image Map dialog. You will return to the Spherical dialog. Click *OK* again, and you are through creating a new background.
6. Now apply your new background by selecting it in the Environment palette's Visible Background pop-up list.

Cubic Backgrounds

You can also create a cubic environment for your background. The Cubic back-

ground dialog allows you to load six different maps, one for each of its six sides.

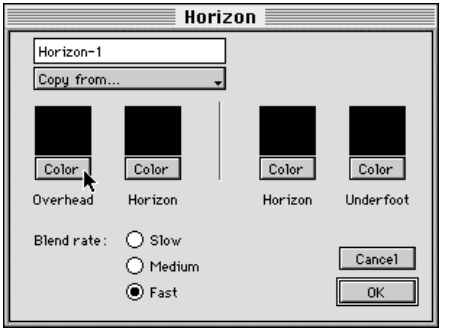


To create a cubic background select *Cubic* from the pop-up list. In the dialog, use the map buttons to load images.

You can load different images for each side or use the same one for each of the six sides.

Horizon background

To create a Horizon background, summon the dialog just like Cubic or Spherical. In the dialog, select your colors by clicking on the Color field or word.

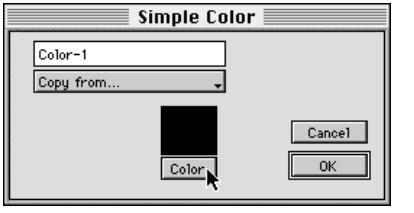


Then set the Blend rate to determine the rate at which your colors blend with each other.

Color background

To set a Color background, summon the dialog just like the other backgrounds.

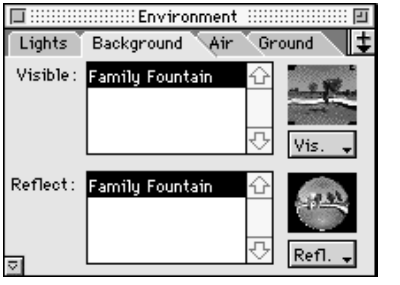
In the dialog which appears, click on the Color field or word to select a color.



Reflective Backgrounds

You can also select a background to reflect in your objects. Reflective backgrounds work the very same way as regular backgrounds.

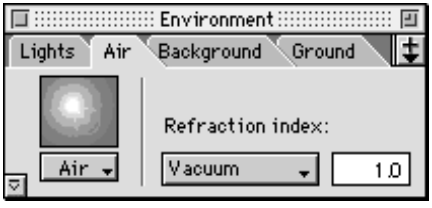
Use the *Reflect* pop-up to select the same background as you did in Visible. Or for a unique effect, select or create a different reflective background.



Don't forget to expand the palette if the Reflect options aren't showing. The pop-up list that appears includes all backgrounds contained within the Backgrounds folder.

AIR

Using the Air tab, you can give your model atmosphere, wind and gravity.



The Air pop-up allows you to add atmospheric effects to your model, such as fog or mist.

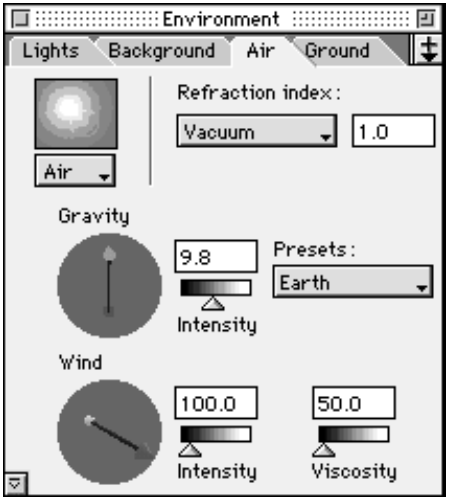
The Refraction index pop-up and numeric field lets you set a global index of refraction for your model.

To add an atmosphere to your model, hold down the *Air* button, select *New*, to create your own effect, or select an effect from the pop-up list.

Once you select an effect, its editing dialog will appear. You can use the default settings, or edit them using the *Copy From* field.

Gravity and Wind

With Gravity and Wind, you can control StudioPro's particle effects, such as Fountain.



Gravity and wind can both be edited interactively by grabbing and moving the directional arrow in the dialog box.

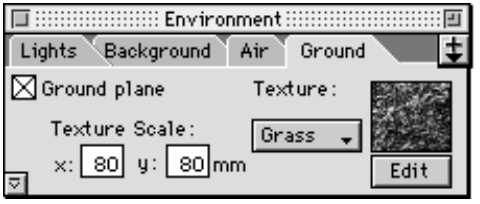
Gravity can be set through the pop-up list, but your choices are limited to planets in this solar system. However, you can enter a higher number in the field if you wish.

For Wind, two sliders are available, along with numeric fields for both **Intensity** and **Viscosity**.

GROUND PLANES

StudioPro allows you to set a ground plane for your model. You can access this

feature on the Ground tab of the Environment palette.



In this tab you can select any texture to use as a ground plane. You can also create a new texture from this dialog, or select **None**. Select only one texture from the pop-up list on the Ground tab.

Although the ground plane is infinite, you can set the scale for the texture you apply in the *x* and *y* fields.

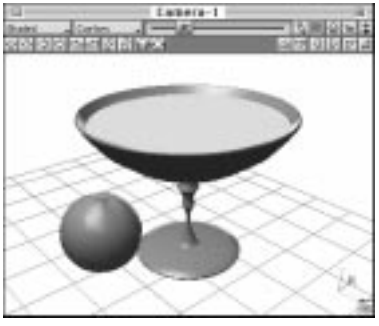
Remember - ground planes are not visible until you render.

CAMERAS

StudioPro's Camera feature can add a lot of pizzazz to your final rendering by allowing you to control your view precisely. This can range from a high-speed "fly by" effect in an animation to a worm's-eye view of a company logo.

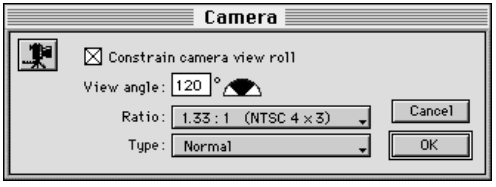
Cameras are placed in your model using the Camera Object tool from the Tool palette.

Once in the model, cameras can be animated, targeted, panned, etc., giving you the best possible view of the action.



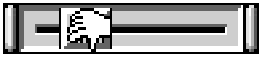
Several parameters are set when a Camera Object is inserted, including the position and orientation of the camera, and the size and focal length of the camera's view.

These parameters can be pre-set in the Camera's Tool Settings dialog. Summon this dialog by double-clicking the Camera tool icon on the Tool palette.



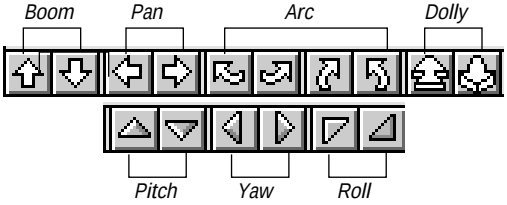
You can enable the Steady Camera control (which constrains the camera view roll), adjust the view angle, set the aspect ratio for the frame, and select the type of camera used.

Perspective. The perspective appearance in a camera window depends on the view angle, the magnification, and the distance of the view from the objects.



The perspective control is slightly different in a

Camera movement. The camera window has special controls for adjusting the movement and view of the camera. Don't forget, every camera attribute can be animated.

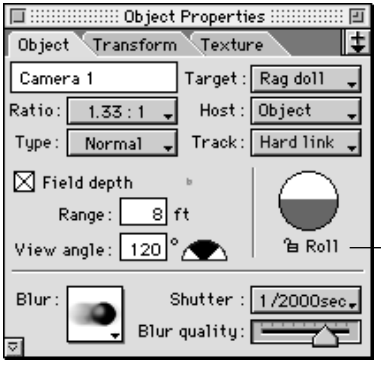


To insert a camera, select the Camera Object tool, then click in the window where you want the camera.

This inserts a marker which you can adjust for accuracy.

There is no limit to the number of camera markers you can insert into the model.

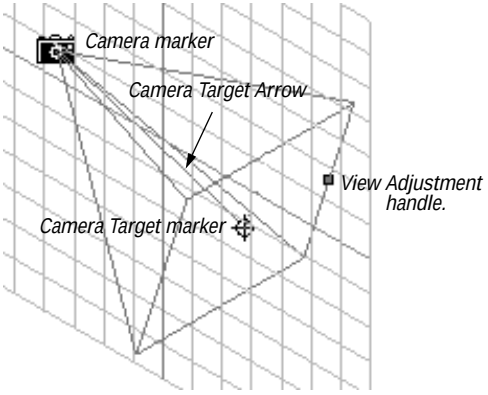
Object Properties palette. Once you have inserted a camera object into a window, you can change its properties in the Object Properties palette.



You can set aspect ratio, type of camera, field depth, range, view angle, and shutter speed. You can add motion blur, and determine a target and host for the camera. In the *Track* pop-up menu, you can determine the type of tracking between the camera and the host.

Motion Blur. This feature produces the same effect as that of a camera moving while its shutter is open. You can select the type of blur from the pop-up menu. You can also adjust the shutter speed and the blur quality.

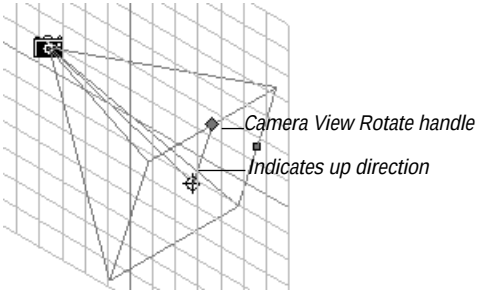
Aiming your camera. Insert a camera into your model, then select its icon. Notice the view angle that it projects. In the center of the view angle is a Camera Target marker. There is also a rectangular bounding box with a View Rotation handle**.** This is only available if Roll is unlocked.



You can adjust the view size by grabbing the View Adjustment handle.

If you disable the Steady Camera, you will be given a Camera View Rotate Handle

which allows you to interactively rotate the view.



To aim the camera: grab the Camera Target Marker and drag it to an object.

When the object highlights, the object is a potential target, release the mouse.

You can move a camera freely. The camera and target marker can be moved independently, or they can be moved together by moving the line connecting them (the Camera Target Arrow).

To move the camera manually, use the Object Move tool.

To aim the camera at a position in space rather than at an object, use the **Option** key (Macintosh) or the **Alt** key (Windows) while positioning the target arrow. The arrow will highlight in green and ignore all objects.

Shift key constrains movement horizontally and vertically in 45° increments.

Command key (Macintosh) or **Ctrl** key (Windows) moves the camera closer to or farther from the target object along a straight line connecting the two.

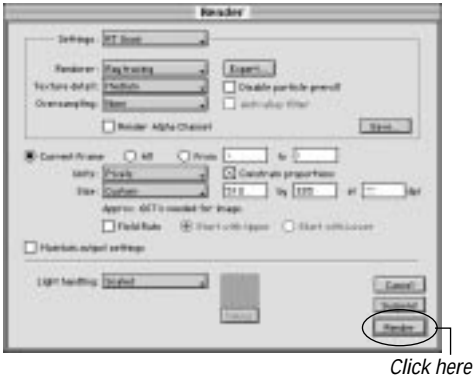
To adjust the view angle of the camera, grab the View Adjustment handle and drag it to the desired position.

RENDERING AN IMAGE

Once you have decided to render an image, the process is simple.

To render an image:

1. Select Render from the Rendering menu on the Menu bar.
2. Set the render parameters in the Render dialog, then click *Render*.



Fields in the Render Dialog

These brief directions will get you started rendering. For more information, see the Reference Manual.

Settings. This pop-up menu is similar to the one on the tool bar. It allows you to choose a previously defined set of specifications for rendering. Just like the Rendering tool, there are a variety of choices ranging from high speed with lower quality, to higher quality with longer rendering times.

Or use these fields:

Renderer. This field allows you to select the rendering method. There are pop-up menus for setting texture detail and image quality and an *Anti-alias filter* checkbox.

Texture detail. Select from *Fine, Normal, Medium, Coarse.*

Oversampling. This field determines the detail for the quality of the rendering. To smooth the edges, check *Anti-alias filter.*

Select **Current Frame, All** or **Frame Range**. You can choose to render only the current frame, all frames, or selected frames.

Rendering Animations

To render an animation:

1. Select Render from the Rendering menu on the Main menu bar.
2. Enable the *All* button in the *Frame Range* field.
3. Set any other rendering settings that you need.
4. Click Render.
5. The *Save Animation* dialog will appear.
6. Select a location to save the file, then select the file format.
7. The Compression Settings dialog appears. Click *OK* to start the rendering.

CHOOSING THE RIGHT RENDERER

StudioPro has several different rendering options to provide you with images of varying resolution and detail.

The lower-level renderers - PointCloud, Outline, Wireframe, Flat, and Shaded - are used primarily for displaying objects in the modeling views, but they are also renderers in their own right and are useful for fine-tuning animations. The higher-level algorithms provide smooth shaded surfaces for image realism.

Raytracing gives you true reflectivity, refractive transparency, and shadows. It also supports surface mapping and environmental mapping in its effects.

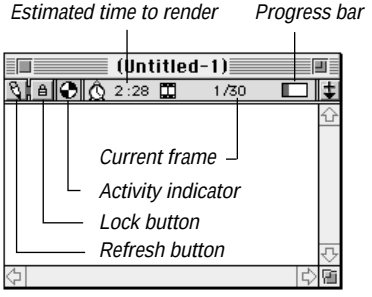
Scanline provides photo-realistic rendering and supports shadows, and environmental reflectivity. This renderer is fast, but is not the best choice if you have transparent objects or need refraction.

Raydiosity is the highest quality renderer and will produce the most life-like images.

For more information, see the **Reference Manual.**

RENDERING WINDOWS

When a rendering is initiated, a separate window opens. The windows are like frames of film developing and you can watch the progress, or speed it up by turning off the Continuous Rendering Feedback (Lock Button).



Refresh Button allows you to update the rendering window display as often as you like.

Lock button eliminates continuous feedback, allowing for faster rendering**.**

Activity Indicator is in the shape of a beach ball which rotates as the rendering progresses.

Estimated Time To Render is continuously displayed and updated.

Progress Bar moves horizontally as the rendering proceeds.

When you render an animation, a combination of numbers appear between the time estimate and the progress bar. They indicate the current frame being rendered.

Plus Menu contains items specific to this window. They are: **Suspend Rendering, Suspend and Continue, Zoom In,** and **Zoom Out.**

Rendering in the Background

You can initiate several renderings at the same time within the limits of available memory.

Background rendering does free up your computer to work on other tasks. However, if there are a substantial number of renderings to complete, it may be more productive to suspend the renderings, then queue them up for rendering one at a later time.

Suspending and Restarting

You can suspend and restart renderings as often as you like. The benefits to this are:

- The original model does not have to be open to restart a suspended rendering.
- You can restart the suspended rendering on another machine.
- Restarted renderings automatically save upon completion, replacing the

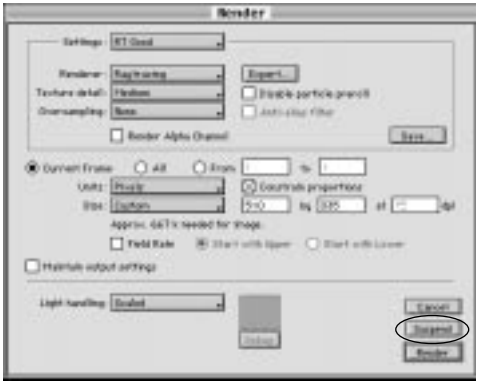
suspended rendering file with a finished image.

To suspend a rendering:

1. Hold down the **Shift** key while clicking in the active view with the Rendering tool.

   -or-

   Select the **Render** command from the Render menu.



2. In the Render dialog, select the rendering settings, then click *Suspend*.

   A directory dialog appears asking for the name of the rendering file and where you want to save it.

To suspend a rendering in progress:

1. Make the rendering window the active window.
2. Choose *Suspend Rendering* from the Rendering menu.

   The Suspend Rendering dialog appears. Select a name and location.

3. Click *OK*.

For an animation, the completed frames and the suspended frames will be in separate files.

If you enable the **Collect** checkbox, the completed frames will be copied to the same location as the suspension file. The files are renamed with the same name as the suspension file and the file type is appended to the end. The original frames remain in the original location.

If **Collect** is not enabled, the files will remain separate and will have to be combined manually.

You can also suspend a rendering in progress by simply closing it. If it has been rendering for more than 30 seconds, an alert will appear that allows you to suspend the rendering, close it, or continue rendering.

A rendering queue is established when one or more suspended renderings are added to the job list in the Rendering Queue dialog.

If you quit StudioPro while renderings are in the queue, they are deleted from the queue.

As the frames of an animation are rendered, they are placed into a self-contained file. This file can be played as if it were the complete animation.

QTVR

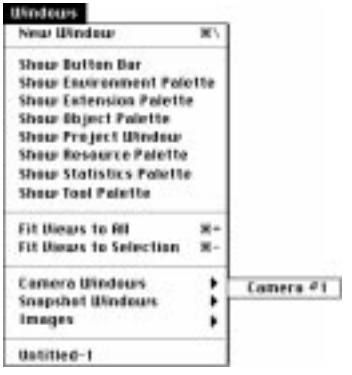
PANORAMA

The QuickTime VR Panorama simulates an actual camera with a 360° panorama, and must be rendered through a camera window.

The object can then be viewed interactively from any angle using VRML files created in StudioPro.

To create a QTVR Panorama:

1. Insert a camera object into the scene.
2. With the Camera object selected, choose *Panoramic* in the *Type* field of the Object Properties palette.
3. Open the Camera window using the *Camera Windows* command, or by double-clicking the camera object.



   A Camera window will appear showing the view from the selected camera.

4. With the slider bar, set the lens control to 15 millimeters.
5. Use the Plus menu to open the Render dialog.
6. Select *Panorama large* or *Panorama small* in the *Size* pop-up in the Render dialog.

CREATING A QTVR OBJECT MOVIE

Any 3-D object can be rendered in StudioPro to create a QuickTime Movie that can be viewed interactively using Apple's QuickTime VR Navigable Movie Player. This allows the viewer to manipulate the object in any direction, and view it from all angles.

The object movie is created by using a pre-scripted camera to capture views of the object from all directions. The renderer will take a picture of your object every 10 degrees, starting directly overhead, for a total of 684 frames.

Rendering time will depend on your machine, the complexity of the model, and number of colors you specify. To reduce rendering time, keep complexity as low as is practical for your project.

You can create an object movie of more than one object, as long as all are within the boundaries of the cube which comes with the pre-scripted camera. The objects will function as a group, not independently.

NOTE: *Hide the cube before rendering.*

You can now convert your object using Apple's QTVR utilities.

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