Presenter Professional QuickTime VR Tutorial

QuickTime VR or QuickTime "Virtual Reality" is Apple's exciting new technology that simulates 3D environments using ordinary 2D images. It does this by reordering the frames in standard QuickTime movies and playing them back to you in a special QuickTime VR player. For more info on this, see "QTVR Introduction," an interactive introduction to QuickTime VR included on this CD.

In this tutorial, you are going to learn how to use Presenter Professional to create a 3D rendered, single node QTVR panorama movie and a simple QTVR object movie.

Included on this CD are models and textures ready to go to complete this tutorial.

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Getting Started

In this tutorial, we are not going to concern ourselves with modeling, shading, lighting and so on as you should already be familiar with these functions in Presenter in order to complete this tutorial.

In order to complete the tutorial, you need to copy the models on to your hard drive and place the textures into the "Pictures" folder inside "Presenter Plug-ins."

On this CD, you will find a folder titles "QTVR Tutorial." Inside this folder are two folders, "QTVR models" and "QTVR textures".
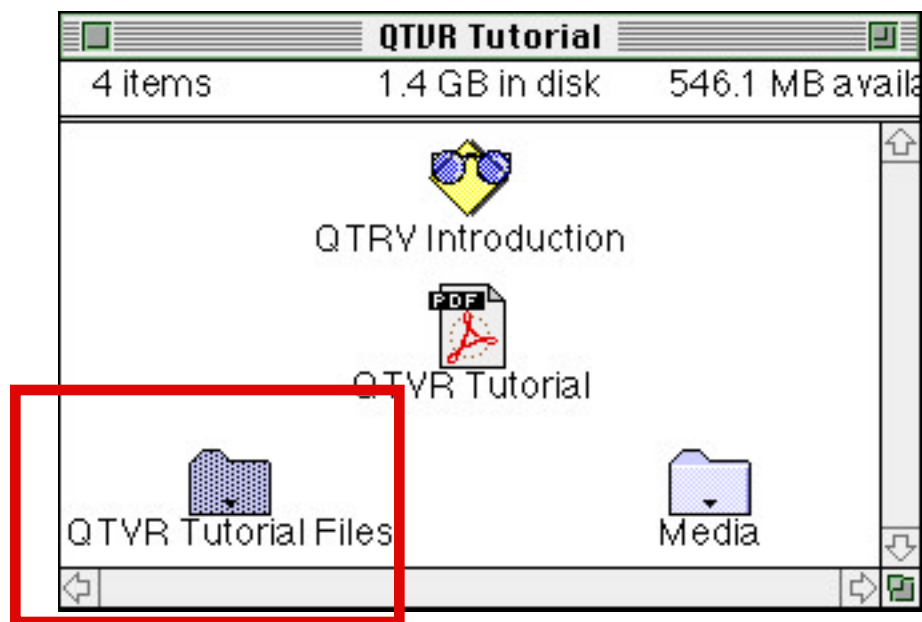
1) Copy the folder, "QTVR Tutorial Files" on to any local volume on your computer.

2a) Open up "QTVR Tutorial Files"

2b) Open "QTVR Textures."

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3) Drag the contents of "QTVR Textures" into the "Pictures" folder found inside the "Presenter Plug-ins" folder.
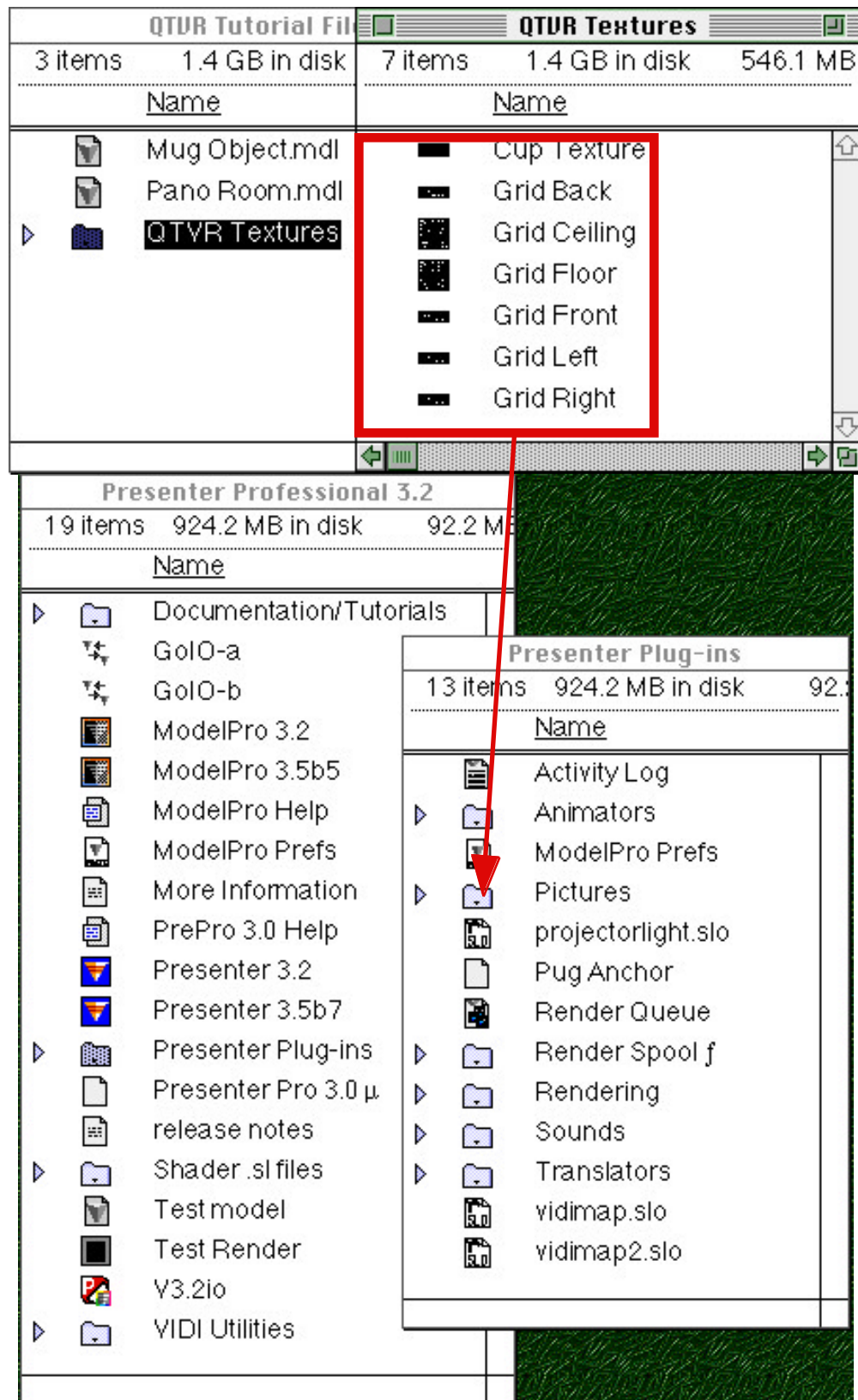
Creating a QTVR Panorama Movie

A note about panorama rendering:

Rendering panoramas in presenter can be very memory intensive - more so than normal movie rendering. This is because the whole model must be rendered in one shot. Also, the size of the panorama image you might render can be quite large and this too impacts memory requirements. It is a good idea to install 128 megabytes or more of RAM in your machine if you intend to render complex models with many textures as high resolution panoramas. The "gallery" panorama movie found in the "Interactive Introduction to QuckTime VR" is typical of the kind of project that will require large amounts of RAM.

For this tutorial, we don't need nearly that much however. Sixteen megabytes of RAM assigned to Presenter should be enough.

Placing the camera

4)   Double click on the model "Pano Room" found inside the folder "QTVR Tutorial Files" to launch Presenter.


A note about camera placement

When you set up a panorama scene, you place a camera exactly where you want the viewer to be in the room. It is important to keep in mind when designing a scene that the viewer is seeing a full 360 degree view of the room so, your scene should be complete all the way around - all walls, ceilings and floors must be present. Anything that might be visible in the scene from that point of view will be visible regardless of where the camera is pointed.
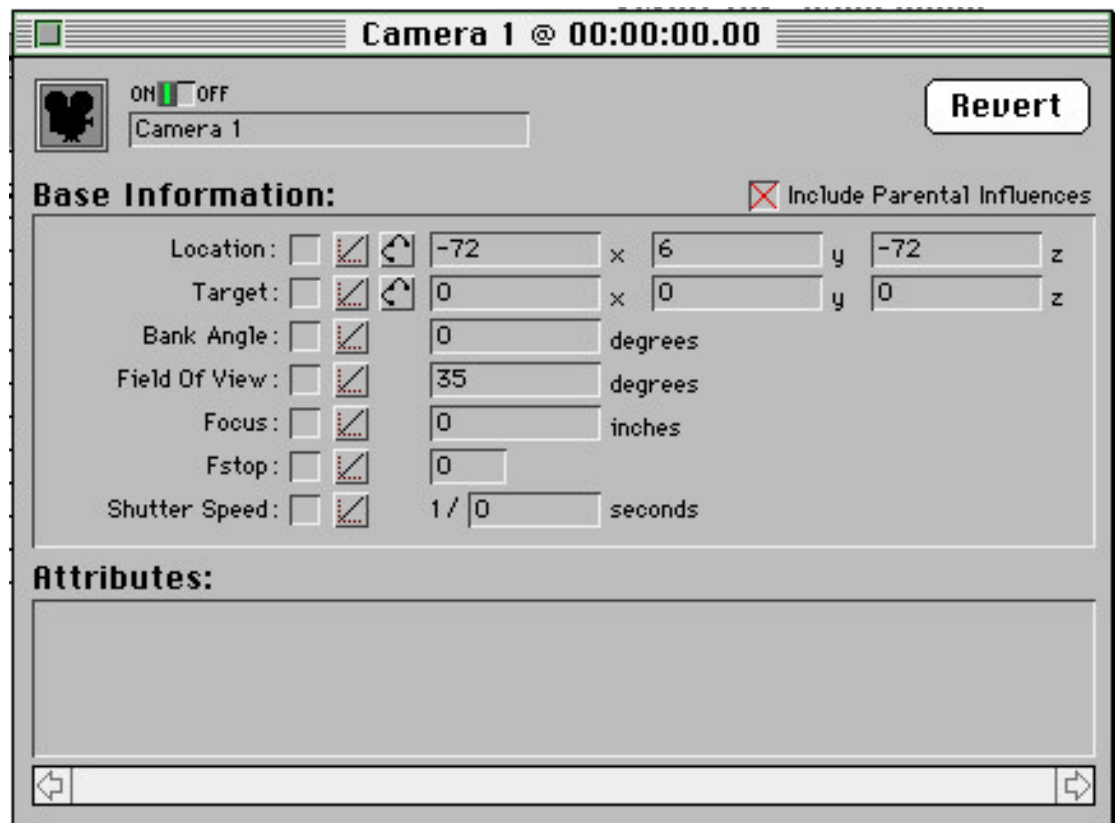
In the case of this tutorial, the viewer is going to be standing in the exact middle of the room

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5)   With the time marker at frame 0, double click on "camera 1."
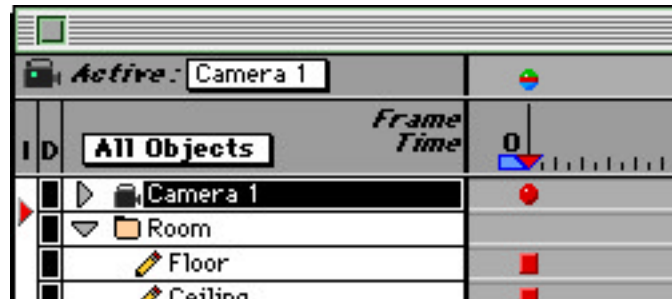
This brings up the camera dialog box.

6a)   In the "Location" fields, double click on the "x" field and type "0."
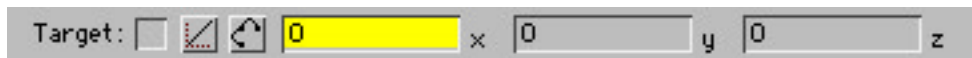
6b)   Hit the Tab key and tab to the "y" field and type "0" again; tab again to the "z" field and type "0" again.

The check box will be checked indicating you have entered values here.

This places the camera location at the center of the room. This is where we are going to be seeing the room from in the panorama.
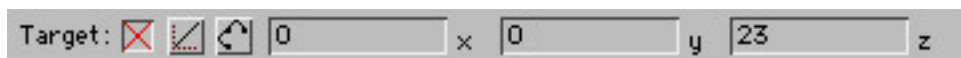
**7a)**   In the "Target" fields, double click on the "x" field and type "0."

7b)   Hit the Tab key and tab to the "y" field and type "0" again. Tab again to the "z" field and type "23."

The check box will be checked indicating you have entered values here.

This points the camera directly toward the "Back" wall of the room.

The target determines the mid point of the panorama. When Presenter renders a panorama, it starts from directly opposite the target point - directly "behind" the camera and renders clockwise from that point one raster line at a time until it makes a complete 360° sweep ending at the point from where it began.

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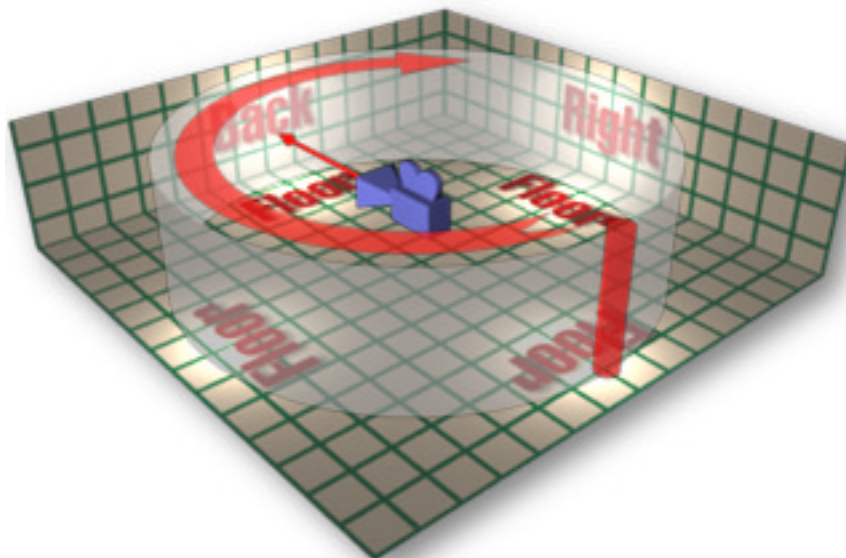
A note about camera FOV

> In Presenter, the field of view is measured vertically, not horizontally. That way, it is possible to enter a field of view or focal length. (Horizontally, the field of view would be 360°) regardless of how "wide" the image is.

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8) In the "Field of View" field, enter "90."

Field Of View : ☒ ◹   [90   ]   degrees

This sets the camera "lens" to the proper focal length for a standard QTVR panorama. The pre-set panorama sizes in Presenter are at an aspect ratio of 3.25:1. The proper field of view for this aspect ratio to prevent squeezing or stretching of the image is 90°.

This is what you should see from the top world view:
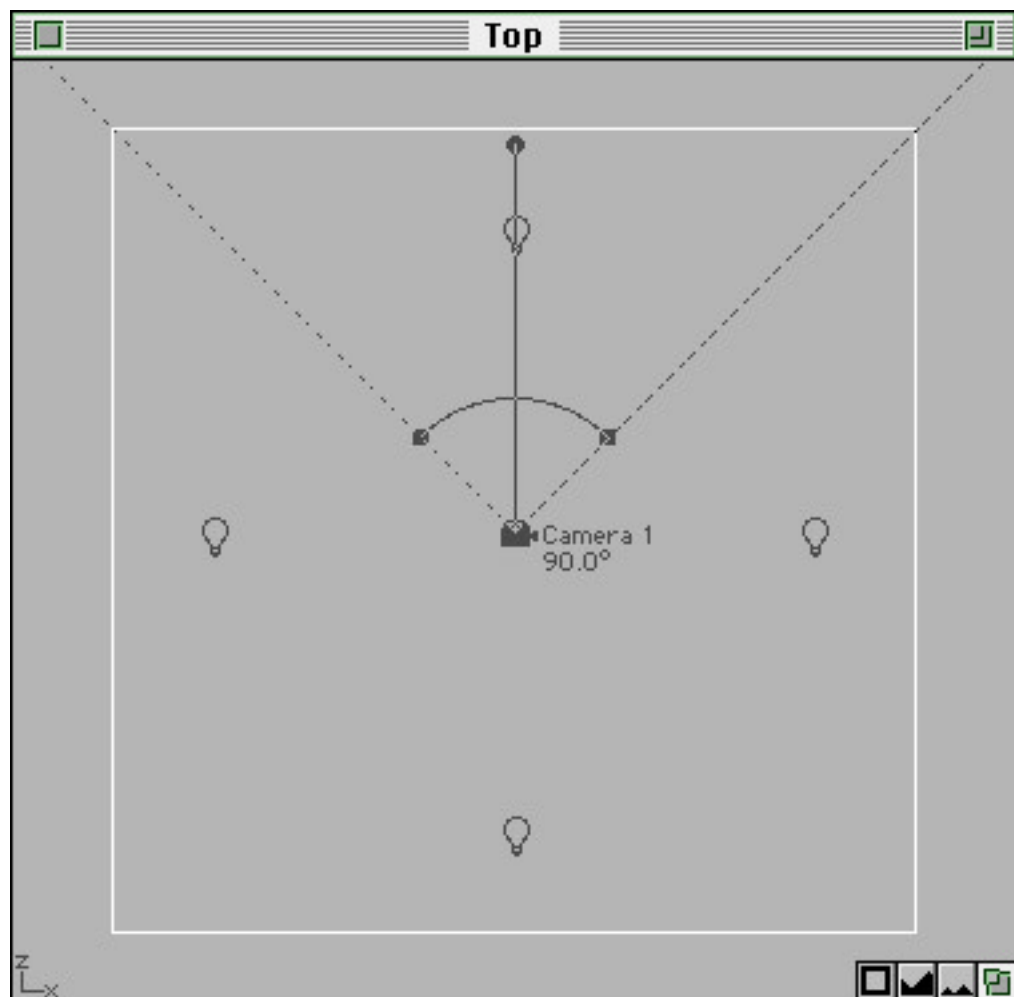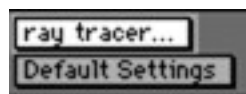
This is what you should see in the camera window. If either window does not look like these here, go back and check your settings.
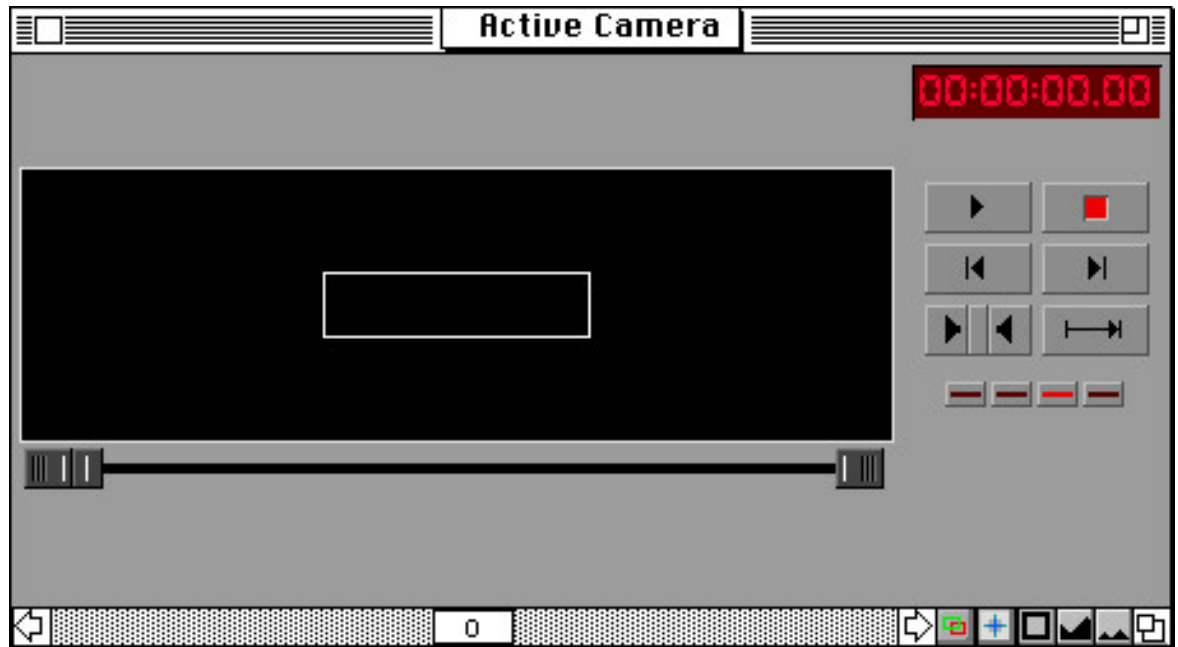
9)   Close the camera dialog box.

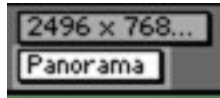
Rendering the Scene

10a) On the render control palette, click on the render type pull-down and select "Ray Tracer" if it is not already selected.
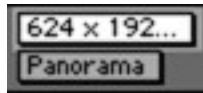

Presenter can only render panoramas with the ray tracer.

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10b) Click on the camera type pull-down and select "Panorama."

This calls up the "Panorama Tracer."

10c) Click on the frame size pull-down and select "624 x 192."

For the purposes of our tutorial, we will use this low resolution. Presenter also has medium resolution (1248 x 384) and high resolution (2496 x 768) settings. These are all Apple defined standard resolutions. You can also set your own custom panorama size settings though, you must save any custome sizes as a panoram PICT file (more on this later).

11) On the render quality buttons, turn on only "anti alias" and "textures" buttons, all others should be off. (This is just because we are not using the other features in this tutorial.)
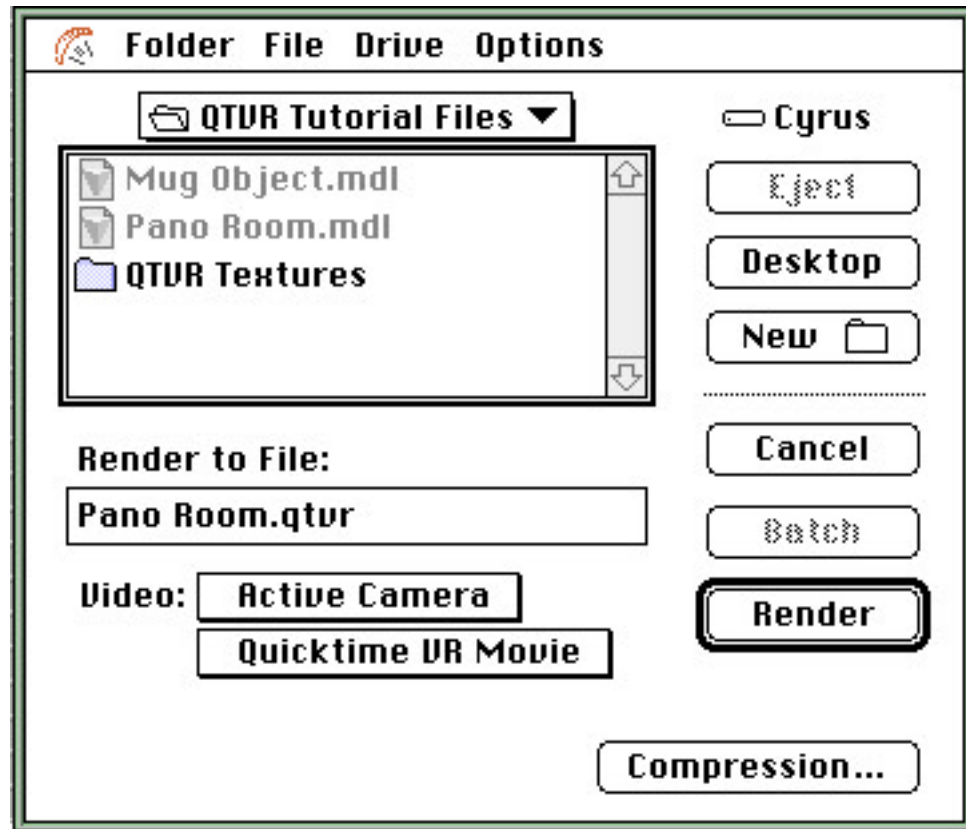
12) Click on the render still frame button.

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This brings up the render dialog box.

```
 Folder  File  Drive  Options

        🗀 QTVR Tutorial Files ▼         ▭ Cyrus

    ▼ Mug Object.mdl          ⬆         [  Eject  ]
    ▼ Pano Room.mdl
    🗀 QTVR Textures                     [ Desktop ]

                                        [ New  🗂 ]
                              ⬇
                                 .....................
    Render to File:                     [ Cancel  ]

    Pano Room.qtvr                      [  Batch  ]

    Video: [  Active Camera  ]          [ Render  ]

           [ Quicktime VR Movie ]

                                    [ Compression... ]
```

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A note about panorama output type:

Presenter give you two options:

  - to save as a complete, single-node QTVR panorama movie.

  - to save as a source PICT panorama that will later be made into a QTVR panorama movie.

When Presenter creates the QTVR panorama movie for you, it uses it's own default zoom, angle and window size defaults.

Presenters default settings are:

Starting angle - 0° horizontal and 0° vertical

Zoom - <Derek, what is the zoom default>

Window size - 640 x 480 for a 2496 x 768 panorama

   - 320 x 240 for a 1248 x 384 panorama

                - 160 x 120 for a 624 x 192 panorama

These are standard default settings defined by Apple. There is currently no way to change these settings from within Presenter.

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    - If you wish to use these settings, select "QuickTime VR movie."

    - If you wish to:

        - use other settings such as a different window size

        - add hotspots for object movies

        - build a "Multi-node" VR movie

select "Pict file" as your file type.

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13) Give your file a name. Name it something that makes sense such as "Pano Room." Save it some place you will remember.
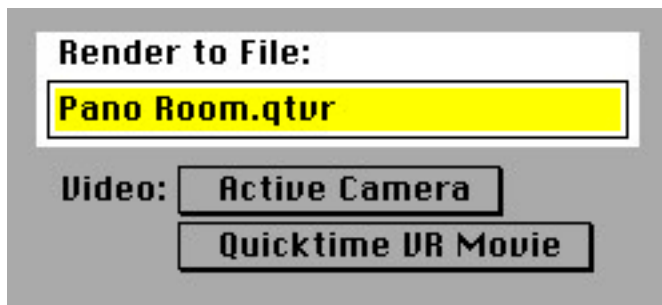
14) Click on output type and select QTVR movie.

Presenter appends ".qtvr" to the end of what ever you named the output file. You can override this by simply re-typing the file name again if you wish.

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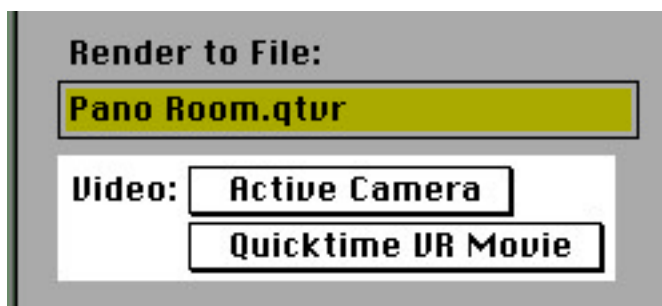
Note about additional software:

To do any of these things, you may need other software packages.

To create multi-node VR movies with links to VR object movies, you need the QuickTime VR Developers Kit from Apple computer. This can be purchased through the Apple Developer catalog.

Apple has also made available on-line two simple tools to convert panorama source picts into single node VR panorama movies and to convert source QuickTime movies into VR object movies.

Other tools you may need include:

- Adobe Premiere for editing, compositing elements in an object movie and compressing. and/or,

- Adobe After Effects for more sophisticated effects work, compositing and compressing.

- Adobe PhotoShop for panorama source pict editing and compositing as well as to add hot spots to a source pict.

- Apple Make QTVR Panorama and Make QTVR Object.

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A note about compression for QTVR panorama movies:

As a normal practice, as I am creating QTVR movies, I like to save the panorama movies uncompressed. This gives me a chance to modify the file later or to use a video editing tool to optimize the compression.

Apple recommends cinepac for cross-platform VR panoramas and it is the codec I normally use. The image quality is decent and the compression is good. When using cinepac however, you must make sure to disable key frames - force it to treat each frame as a key frame. This makes the movie playable forwards and backwards one frame at a time which is what QTVR is actually doing. You must use a video package such as Premiere or After Effects to do this however as these options are not available in Presenter.

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15) For this demo, we will use the animation compressor.
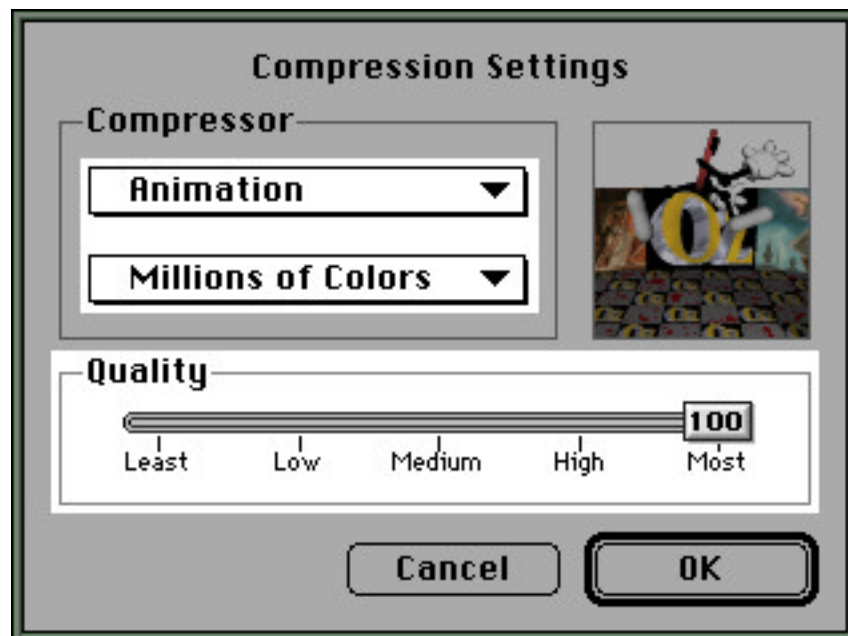Click on "compression."

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This brings up the QuickTime compression dialog.
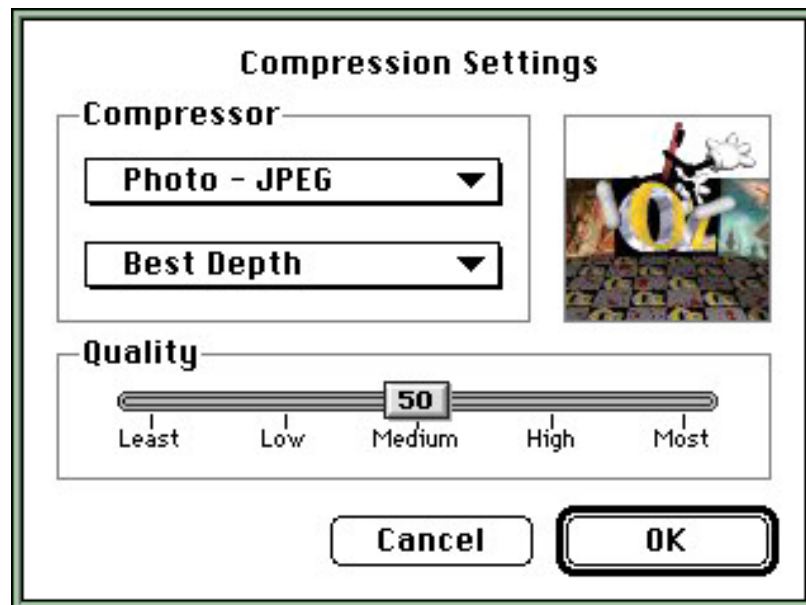
16) Set codec to "Animation", set color to "Millions of Colors", set Quality to "Most (100%)" and click "OK."

17) Click "Render."

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When Presenter renders a completed QTVR movie, it goes through the following steps:

- Renders the panorama PICT

- Dices and compresses the pict into a QT move and

- Compiles the movie into a finished QTVR panorama movie.

If you choose "PICT" output type, Presenter will render out a single, horizontally orientated panorama PICT file of the entire 360° view. You will then need to rotate it 90° counter clockwise and run it through Apple's "Make QTVR Pano" application to dice and compress it into a QT movie and then compile it into a QTVR panorama.

Congratulations! You have created you first QTVR panorama movie entirely from within Presenter Professional.

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Creating a QTVR Object Movie

Background

Creating an object QTVR movie is actually not really any different than creating a linear animation - you set your key frames and render the resulting animation - except one; you have to think on two axis instead of the one axis that you do with a linear animation.

Think of an object movie as a series of frames that exist on an X/Y grid rather than as one single, long strip. The animation score exists on one axis however, so you have to set up your animation with the "rows" stacked end to end.

Movie Frames on a "grid"
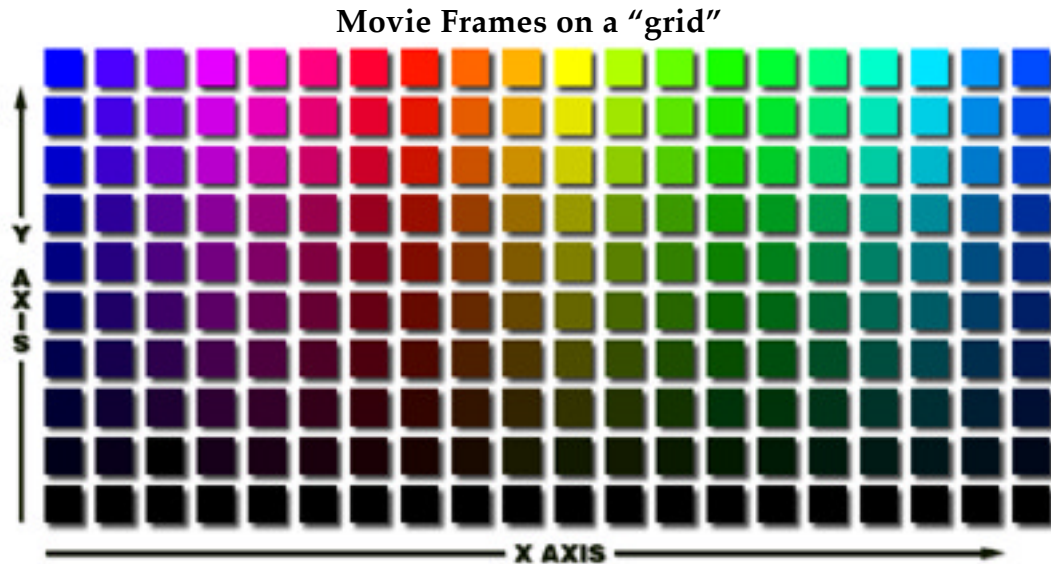
Movie "rows" as they would be rendered

This means you have to pay attention to the details just a little bit more than you would if you were setting up a linear animation.

Unlike panorama rendering, there are no special frame size, or camera field of view settings. You use the normal frame size and FOV settings that you would for a linear animation. There is one consideration however. Object movies can get pretty big, typically, much bigger than a panorama movie would be. In fact, a multi-node pano movie might be smaller than any single object movie. This is due to the large number of frames that can be typical of a full, two-axis object movie. Do the math; if you render an object movie with a full 360° horizontal rotation and a full 180° arc from top to bottom, divide both axis up in 10° increments, you get (360 / 10 = 36) x (180 / 10 + 1 = 19) = 684 frames. (90° to 0° to -90° in 10° increments is actually 19 steps.)

In the cast of the interactive intro included on this CD, over 110 megabytes of disk spaced were consumed - not by the panorama movies or even the linear movies, but mostly by the object movies. You might want to consider things like

smaller frame sizes and higher compression ratios to reduce disk space consumption in you projects.

In this tutorial, we are going to create an object movie of a coffee mug sporting a VIDI logo that we will be able to spin around and look at from just about any angle. We will be creating a movie that uses the settings sighted above (36 columns (X axis) by 19 rows (Y axis)).

The model, textures and lighting are already set for you as they were in the panorama tutorial.

Do the Math

1)   If not already running, start Presenter Professional.

2)   Open the file "Mug Object.mdl" located inside the "Tutorial Files" folder.

We first have to gather some numbers before we can set up our animation.

3)   Calculate the number of steps for the vertical (Y) axis.

In this case, we are going to use Apple's recommended standard of one frame every ten degrees. This is the minimal number of frames recommended to achieve an illusion of smooth rotation. We are going to render from directly above the mug to directly below the mug. This is from 90° to -90°. The standard tilting direction is from top to bottom for the "y" axis.

3a)   Add up the total degrees (90 + 90 = 180).

3b)   Divide by number of degrees per step or frame (180 / 10 = 18).

3c)   Add one additional step to the result to account for the "0°" middle step (18 + 1 = 19).

4)   Calculate the number of steps for the horizontal (X) axis.

Again, we are going to use Apple's recommendation of 10° per frame or step. We are going to render a full 360 degree rotation of the mug.

4a)   Divide the degrees of rotation by the number of degrees per frame (360 / 10 = 36).

This determines how many frames per revolution we are going to render. We are going to render 36 frames per revolution of the mug. At this point we now know how long the animation is going to be (36 x 19 = 684 frames)

Since we have to render out each "row" linearly, one after another, we have to rotate the mug a full 360° for each vertical step. This means we have to calculate how many total degrees we have to rotate the cup.

5) Calculate the number of degrees to rotate the cup. Multiply 360 by the number of vertical steps (360 x 19 = 6840°). (The standard is to rotate clockwise for the "x" axis.)

We now have all of the information we need to set up the animation. We know that:
- the total number of frames = 684
- the total degrees we are rotating the mug = 6840°
- the number of rows = 19
- the number of columns = 36
- the number of frames per row = 36 (The number of columns and the number of frames per row are always the same.)

Setting Up the Animation

First, we must set the frame rate. The frames per second is really irrelevant for an object movie. However, I have found that setting an odd frame rate causes strange behavior when the movie is converted into an object movie. I like to use 10 frames per second. This makes is easier to se what frame number you are on. The active camera window does not display frame numbers, only time code, but, time code based on whatever frame rate you have set. You can see what frame number you are on by just ignoring the "0" left of the right-most digit.
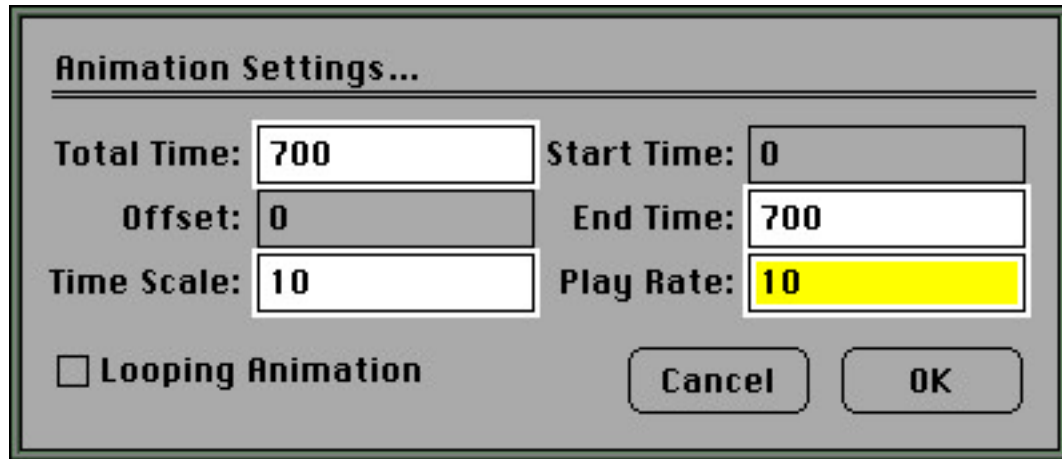
We are on frame 35

6) Under the "Edit" menu, select "Animation settings."

7a) Set "Total Time" to 200, "Time Scale" to 10, "End Time" to 200 and "Play Rate" to 10.

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Animation Settings...

Total Time: 700        Start Time: 0
    Offset: 0            End Time: 700
Time Scale: 10          Play Rate: 10

☐ Looping Animation      ( Cancel )  ( OK )
```

7b) Click "OK."

This sets the total animation length a bit longer than we will need to give us some room (I just like to do this). It also sets the frame rate to 10 fps. This gives us a decent frame rate to view the movie to check our results but, also to make the "Active Camera" window trick mentioned above to work.
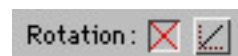
Rotating the Mug

8) Place the time marker at frame 0.

9) Double click on "Mug" folder.

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This opens the "Mug" info dialog box.
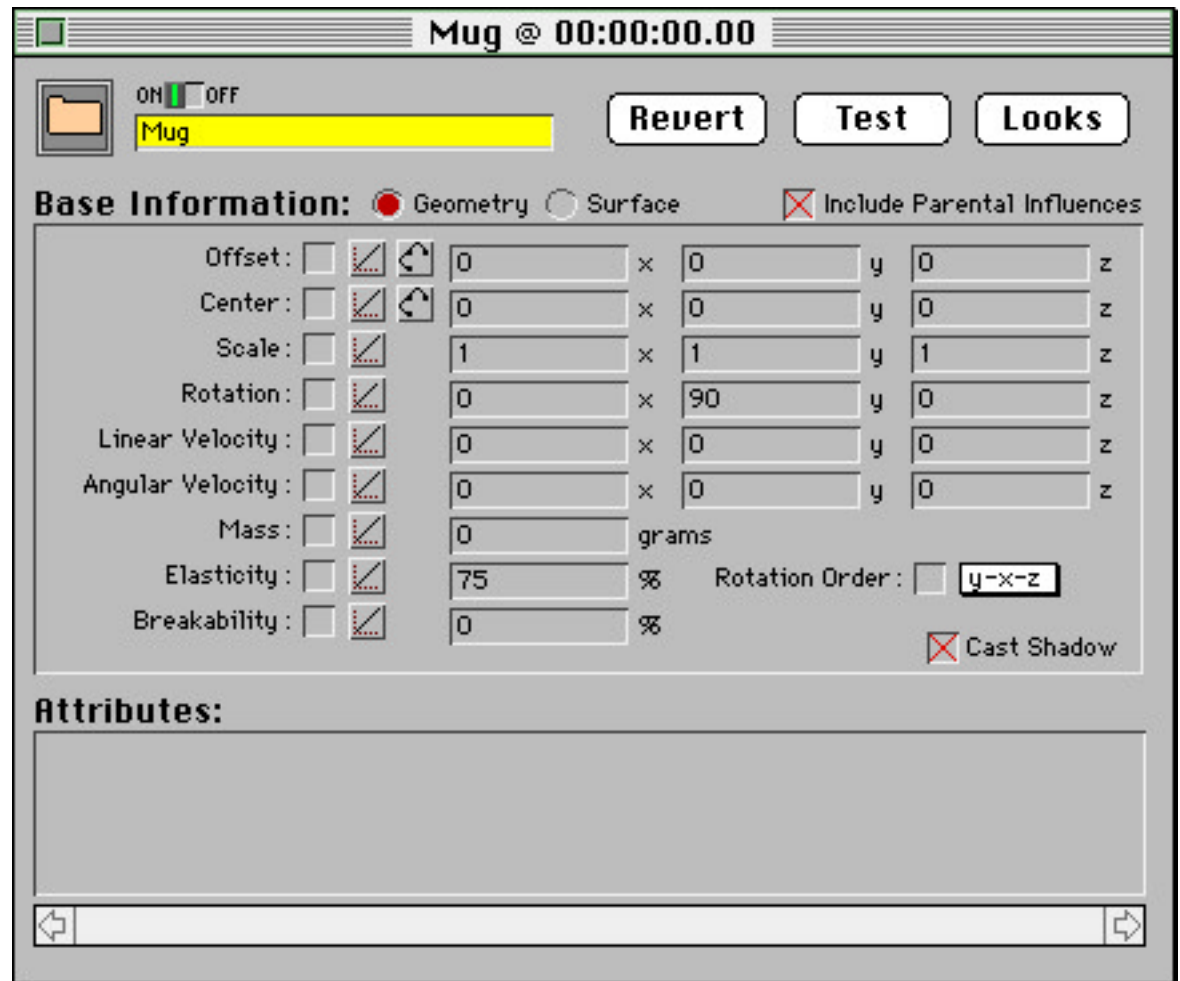
10) Check the rotation box left of the rotation fields and close the dialog.

This sets a beginning key frame for the mug rotation.

11) Move the time marker down to frame 684.

12) Double Click on "Mug Folder" on the time line again.

This opens up the "Mug Folder" info dialog for frame 684.

13) Enter "6930" in the "y" rotation field and hit the Tap key. (Since the "y" rotation field already had 90° entered, we had to add 6840 + 90 for a total of 6930°. Close the info dialog box.

This checks the box next to the rotation fields and sets the end key frame for the mug rotation.

| Rotation: ☒ ◺ | 0 | x | 6930 | y | 0 | z |

Placing the Camera

Because of the location/target type of camera used in Presenter, there is no direct way to rotate the camera by a specific number of degrees. To overcome this, we will place the camera inside a folder, we will then rotate the folder giving us a perfect arc from top to bottom. Before we do this, we must first place the camera at a "home" position.

14) Move the time marker to 0.

15) Double click on "Camera 1" to open it's dialog box.
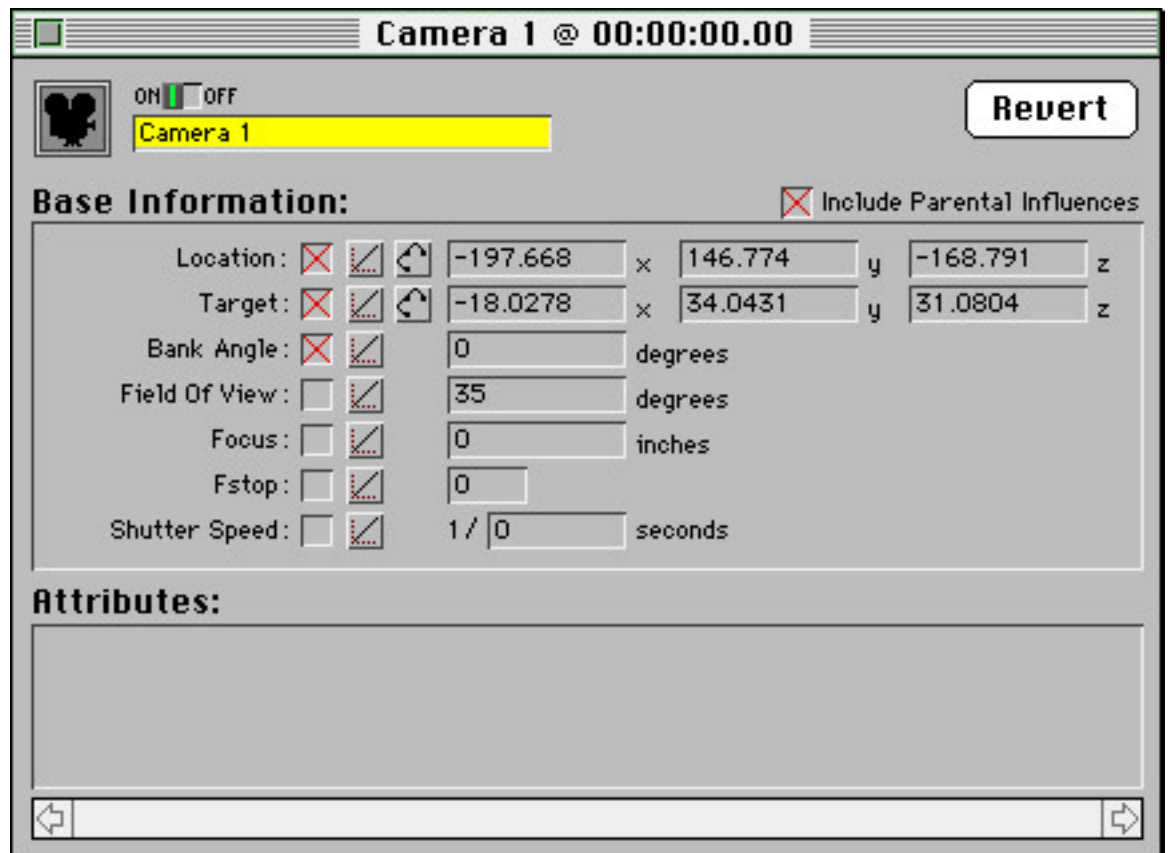
16a) Enter "0", "0", "-290" for the "Location" fields.

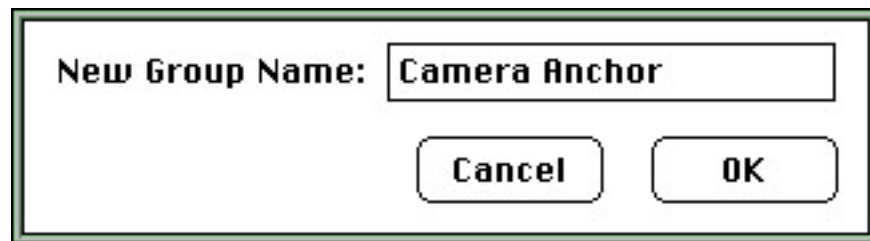**16b)** Enter "0", "0", "0" for the "Target" fields.

16c) Close the dialog.

Location: ☒ ◹ ↻ [0]   x [0]   y [-290]   z
Target: ☒ ◹ ↻ [0]   x [0]   y [0]   z

The camera is now placed at a starting or "home" position. The target point is also now place at the center of the object and will be the point that we pivot the camera on.

We must now create a folder to place the camera in and place it at the pivot point.

17) Under the "Action" menu, select "New Folder" and name the folder "Camera Anchor."
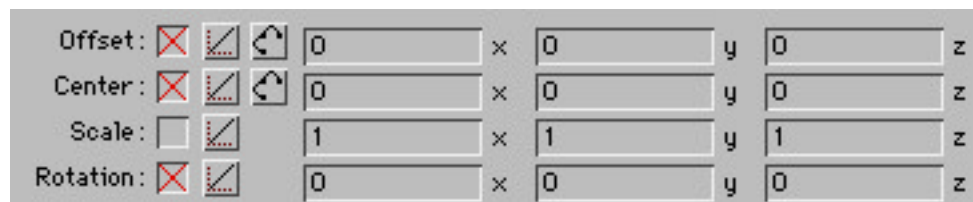
New Group Name: | Camera Anchor

Cancel   OK

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18) Double click on "Camera Anchor" to open it's dialog.
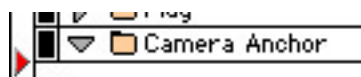

19) Check the "Offset" box, the "Center" box and the "Rotation" box.
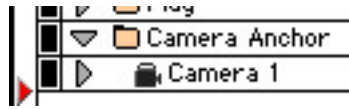

This establishes a key frame for the "Camera Anchor" folder for the location, center and rotation attributes. The "Camera Anchor" folder is now at the center of the Mug object - the pivot point for the camera.

20) On the score, click the twirly triangle for the "Camera Anchor" folder to open it.

21) Drag "Camera 1" into the "Camera Anchor" folder.

22) Close the "Camera Anchor" folder.

23) Double click the "Camera Anchor" folder to open it again if it is not still open.

_____

Rotating the Camera

Here is where we are going to complete the animation. We are first going to rotate the camera to 90° on the "x" axis then every 36 frames, rotate it down 10° until we have reached -90° We can't actually start at 90° however as the camera will get comfused. You can never place the camera exactly on the top or the bottom of a scene. Instead, we will come close. We will use 89.9° and -89.9°. The effect will be the same.

23) The time marker should still be at 0. Enter "89.9" into the "x" rotation field.
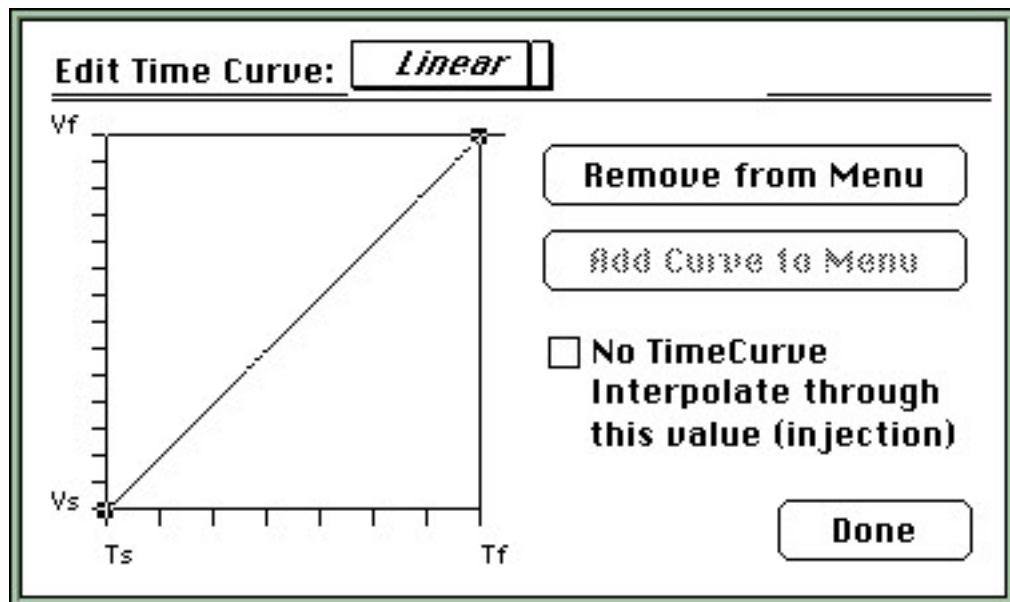

We have to enter 89.9 - not 90 - in order to prevent the camera from becoming confused and "flipping."

24) Click on the "Velocity Curve" button.

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This brings up the velocity curve dialog.

25a) Click on the "Time Curve" pop-up and select "Sticky."
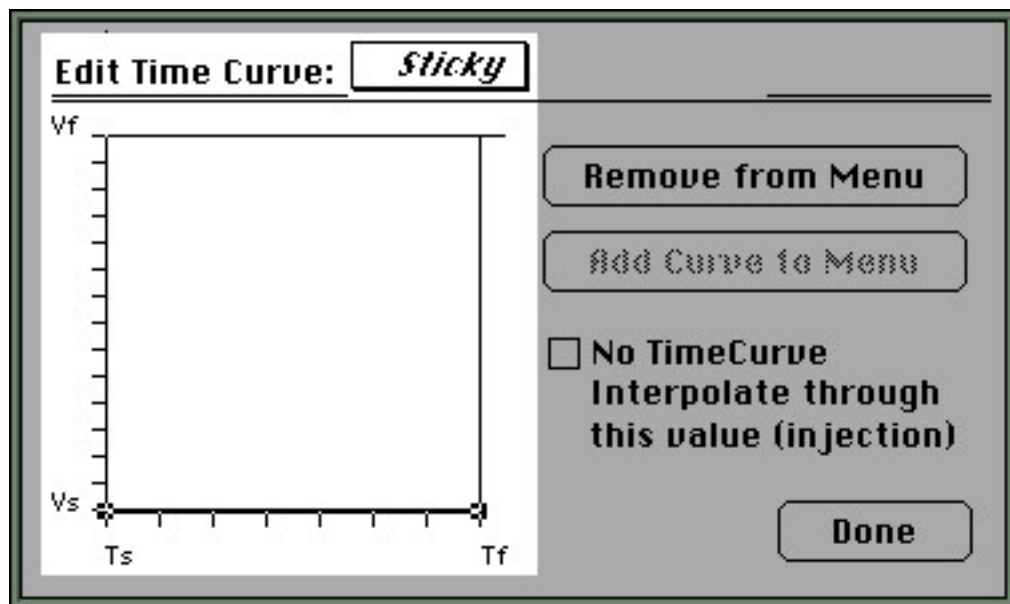
25b) Click "Done."

This forces Presenter to maintain exactly 89.9° in the "Rotation" field until the next rotation key frame is encountered. The "Velocity Control" button next to "Rotation" should now look like this:

26) Close the "Mug Folder" dialog.

27) Put the time marker at frame 36.

28) Double click on "Camera Anchor" to open the info dialog for frame 36.

29) Enter "80" into the "x" rotation field and close the dialog.
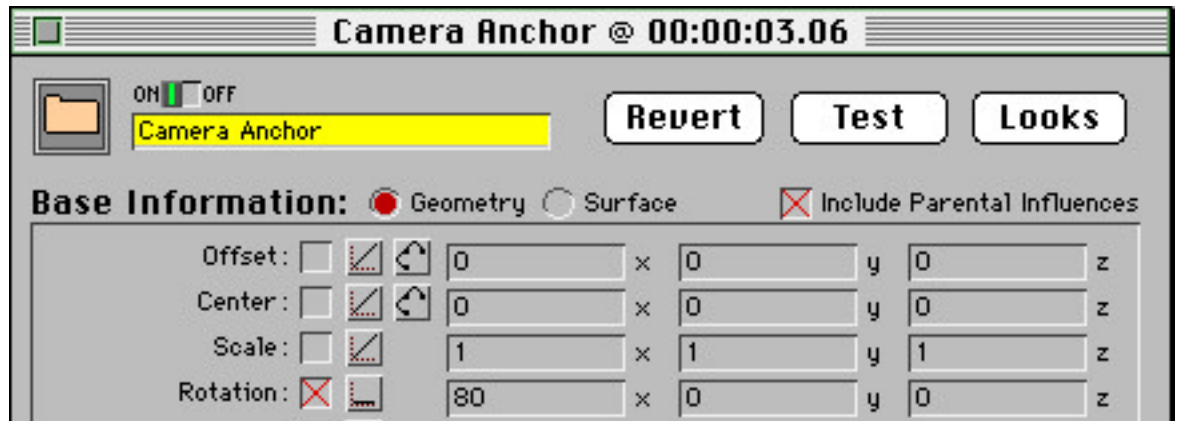
You should now see a new key frame at frame 36.

The camera view should look like this:

We are going to repeat this step every 36th frame up through frame 648. At each key, we are going to reduce the "x" rotation setting by 10.

Notice that the velocity curve control is set on "Sticky" each time you set a new key frame. Do not change it, this is what we wa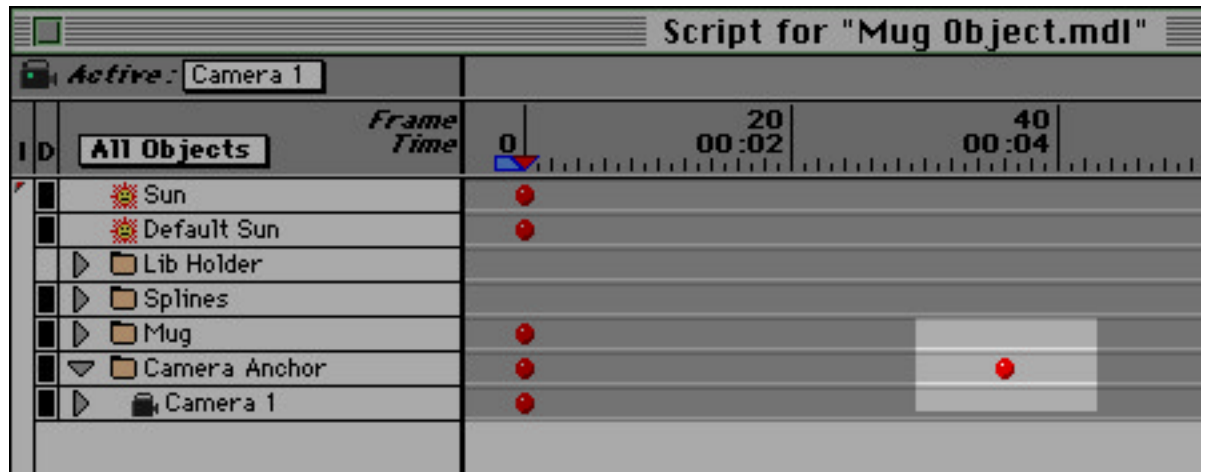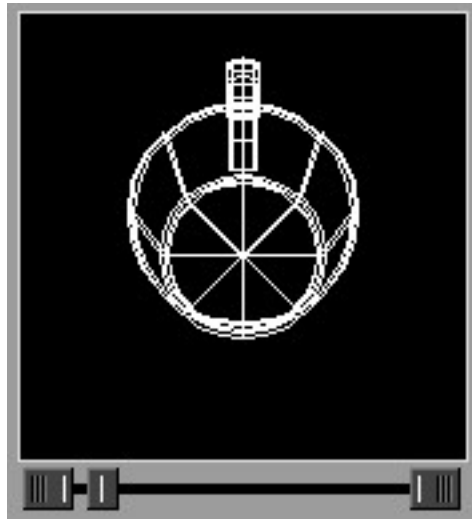nt. Each time you set a new key frame, whatever the velocity curve setting was for the previous key frame will be the setting for the next key frame.

30) Place the time marker at frame 72 and enter "70" in the "x" rotation field. Repeat this step every 36th frame up through frame 648. Decrease the "x" rotation setting by 10° each time. Your settings should be the following:

Frame	Angle	Frame	Angle	Frame	Angle	Frame	Angle	Frame	Angle
0	89.9	144	50	288	10	432	-30	576	-70
36	80	180	40	324	0	468	-40	612	-80
72	70	216	30	360	-10	504	-50	648	-89.9
108	60	252	20	396	-20	540	-60		

At each key frame, look at the camera view window and make sure that the mug handle is directly in back of the mug. If it is not, make sure you are on one of the frame numbers indicated above. Or make sure the mug "y" rotation is set properly.

31) Place the time marker at frame 683 and drag the "out" marker to the time marker.

This sets the animation to end at frame 683. (Frame 0 - 683 = 684 frames.)

If you zoom the score all the way out, it should look something like this:
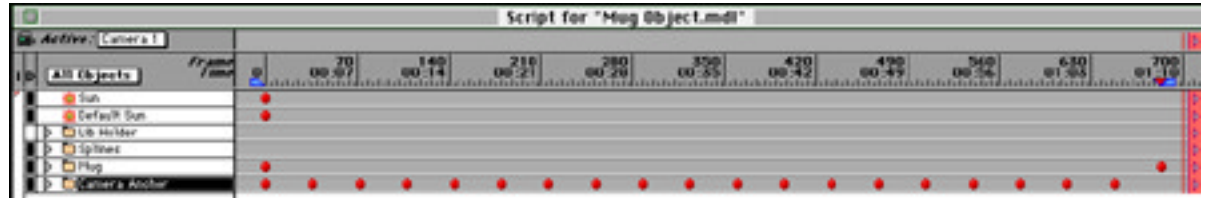
Setting window size

In order to minimize the size of the movie and to speed rendering, we need to reduce the size of the window size to be rendered.

32) Click on the frame size pull-down and let go.

This brings up the custom window size dialog.

33) Enter "160" and "160" in the image size fields, Click "OK."

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Rendering the Movie

34) Click on the "Render Movie" button on the "Render Control" palette.

35) Give the movie a name such as "Mug.obj", leave all other settings at their defaults.

36) Click the compression button.

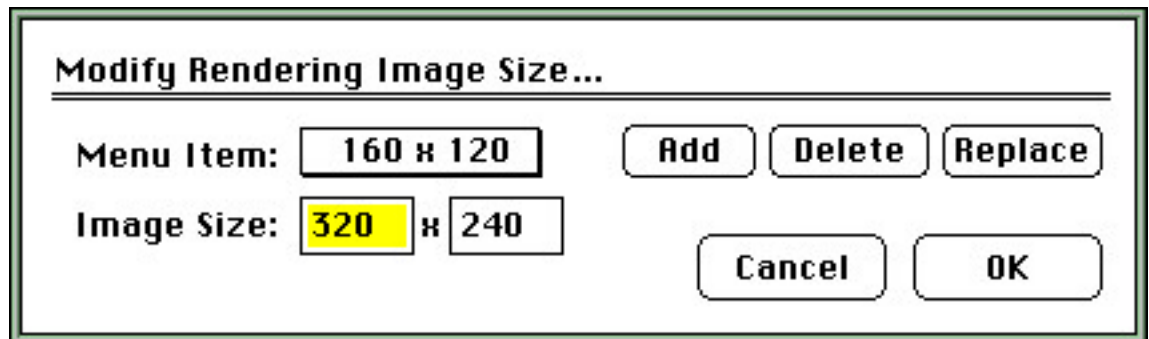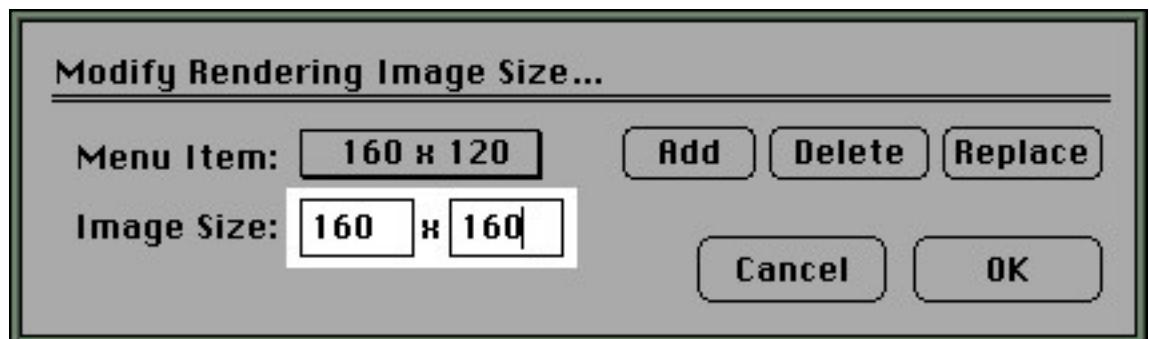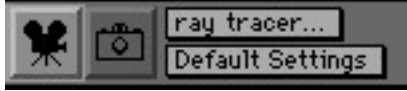- -

A note about compression for QTVR object movies

You can use any QuickTime compressor to render a QuckTime object movie. The recommended ones are Cinepac or Video. These both give decent image quality and compression. These are also the codecs that work for cross-platform QTVR movies. For either codec, you must have key frames turned off.

Part of how compression works for these codecs is known as "interframe" compression, it uses "key frames" to store a complete image and then stores only what has changed for any subsequent frames until the next key frame is encountered. This works great going forwards as you would with a linear movie, but not so well when you are going backwards and sideways as you are with an object movie. This of course reduces the amount that the movie is able to be compressed thus part of the reason object movies can grow so large.

Because you do not have access to key frame settings in the QuickTime dialog from within presenter, it is necessary to render out uncompressed using the animation codec and then compress it in another tool such as Adobe Premiere or After Effects. For the purposes of this demo, the Animation compressor will work just fine. We are using a small enough window size - no need to compress it later.

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37a) Select "Animation" for the compressor type.

37b) Select color depth.

If you wish to composite the movie with a background or any other elements, select "Millions +" to save the alpha channel, otherwise, select "Millions."

37c) Set "Quality" to "100" or "Most."

37d) Click "OK."

38) Click "Render."

This will take some time to render. Go and have a coffee break or a lunch break or, heck, go home and get some sleep.

Finishing the project

It is necessary to complete the project using another tool to convert the rendered linear movie into an object movie. Apple has made available on line two free tools for creating QTVR movies. They are "Make QTVR Panorama" and "Make QTVR Object." You will also need the "QTVR Player". You can download these files off the Internet at "http://qtvr.quicktime.apple.com/dev/tool.html".

These aren't real big files and won't take forever to download.

39) Launch "Make QTVR Object."

40) Open the file you just rendered.

You can now play the movie as a standard QuickTime movie. Do so to make sure no errors have occurred during rendering.

41) Under the "Edit" menu, select "Ad Object Data."

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A note about object data

All of the settings in the "Ad Object Data" dialog effect how the object movie will behave. Most of the settings have no absolute "correct" setting, i.e. they can be played with.

The three radio buttons on the left affect how the movie is manipulated. "Object" gives you one set of cursors, "Scene" and "Object in Scene" give you another. They also affect how the movie pans and tilts. Try different settings to get the behavior you like the best.

"Field of View" affects how "sensitive" the mouse will be overall while dragging the object. Smaller numbers make the mouse less "sensitive." Try different settings until you find a "feel" you like.

"# Of Rows" and "# Of Columns" are the only numbers that require an exact setting. You simply enter the number of "Rows" you rendered and the number of "Columns" you entered.

"Loop Size" and "Loop Ticks" are used in object movies that have movement. It is possible to create a movie with animation that can be seen from any view. "Loop Size" is for number of frames, "Loop Ticks" is for frames per second - 1 tick is 1/60th of a second.

"Start HPan" and "End HPan" is for horizontal movement. In theory, you would enter the actual start and end pan angles you used but, in reality, the only effect is as a switch, 0-360 will make the object infinitely panable horizontally, any other setting will make it hit stops at each end. You always use the lower angle setting for "Start pan." A smaller range will also make horizontal panning more sensitive.

"Start VPan" and "End VPan" are for vertical movement. The main effect here is to set how "sensitive" the mouse is for tilting the object. You always use the higher angle setting for "Start Pan."

After you have completed the tutorial, go ahead and play with the settings. You can change any of the settings in an object movie any time from within "Make QTVR Object" by simply re-selecting "Ad Object Data" under the "Edit" Menu.

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42) Set the following settings:
- •   "Object"
- •   # Of Rows - 19
- •   # Of Columns - 36
- •   Start VPan - 90
- •   End Vpan - -90

```
=================== Add Object Data ===================

   Version #          1            # Of Rows      [19        ]

                                   # Of Columns   [36|       ]
   ○ Scene
                                   Loop Size      [1         ]
   ◉ Object
                                   Loop Ticks     [0         ]
   ○ Object in Scene
                                   Start HPan     [0.0       ]
   Field Of View   [180.0    ]
                                   End HPan       [360.0     ]

                                   Start UPan     [90.0      ]

                                   End UPan       [-90.0     ]

   [ Load From Object Movie... ]        [ Cancel ]  (( OK ))
```

43) Click "OK."

You should now be able to manipulate the object movie viewing the cup from any angle.

The last step is to set the poster frame. The poster frame is the frame that will be seen when you first open an object movie, the starting point.

44) Manipulate the mug to orient it to the view you want the movie to open up to.

45) Under the "Edit" menu, select "Set Poster View."

31

The End

Congratulations! You have completed you first QTVR Object movie!

Now all you have to do is let your imagination fly. There are many possibilities with QuickTime VR. Object movies in particular are wide open. There are two axis that can be used and those axis can contain *anything*. If you have not done so, look at the "Interactive Introduction to QTVR" included on this CD for some examples.

This is the end of this tutorial. Hopefully you have learned enough to now go forward and dazzle the world with the many creative possibilities available with Presenter Professional and your imagination.