

# TrueExpression Morphing Animator Plug-in

## Bottle Morph

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## General Information

Welcome to VIDI's new TrueExpression™ 3D object morphing capabilities.

TrueExpression requires Presenter Professional v3.2, which includes ModelPro, Presenter, the Morph  $\mu$  animator plug-in, the Raytracer  $\mu$  rendering plug-in, and the RenderMan  $\mu$  rendering plug-in (MacRenderMan available separately from Pixar). The other animator plug-ins have been updated to work with v3.2, and are included with this package.

TrueExpression starts in ModelPro, where you build your model (2D- or 3D-spline mesh), then convert it to the new data type—a Morphable Spline Mesh (MSM), depicted in the Groups palette by a bent pencil icon. The MSM data type can exist alongside all of the other data types in your database (model or scene composed of multiple pieces). You then bend, twist, stretch, and mold the MSM, creating a series of “targets” in the process. Next, you switch to Presenter where you apply the Morph plug-in animator (creates a key frame) to the MSM. Once you have applied the animator, you simply duplicate a few of that initial key frame, then go to the Morph animator settings for each key frame and combine the “targets” in various percentages; using the mini preview window to see how the MSM looks at that particular key frame. With all of the key frames set, you can then preview the morph in the Active Camera Window. If you don't like what you see, you can go back to a key frame or two and try a new combination of “target” percentages. In most cases, there's no need for more key frames to create smooth morphs; you may even find yourself deleting key frames, and saving valuable time in the process.

In order to fully explain the processes and features of TrueExpression, we will take you through three tutorials—BottleMorph, SpringMorph, and MoleMorph. These tutorials assume that you have a good working knowledge of the tools and features in both ModelPro and Presenter.

## BottleMorph

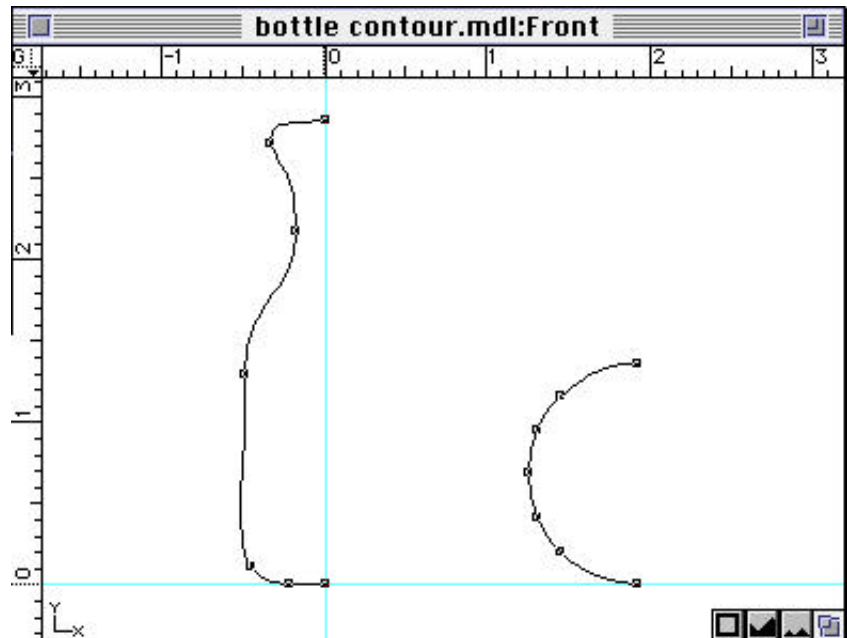
In this tutorial: we will create a spherical spline mesh; convert it to a Morphable Spline Mesh (MSM) data type; reshape it to match the shape of a bottle; apply the Morph animator to the MSM; preview the sphere-bottle morph; render the sphere-bottle morph.

### Morphing-ModelPro

Open the file titled "bottle contour.mdl" in ModelPro. If you want to get straight to the operation of the Morph plug-in, look ahead in this tutorial to "Morphing-Presenter".

First, we want to make a bottle shape to use for comparison in reshaping the sphere.

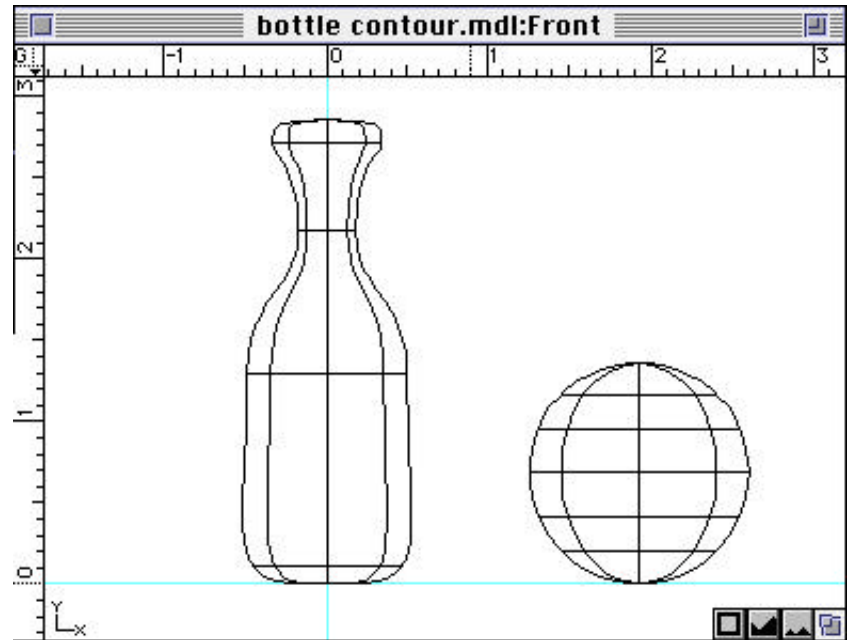
In the Front View window, make a simple spline path contour (7 points) and lathe it (360°, 8 Segments) to create a bottle-shaped spline mesh. Use the supplied contour; it will make things easier later on. Give the bottle a purple color. For now, lock the position, and turn off the display of the bottle.



Bottle and sphere contours.

Next, we want to make a sphere and convert it to a MSM.

In the Front View window, make a circle which has a diameter roughly half the height of the bottle. Use the Scissors tool to cut the circle in half vertically. Delete the right half of the circle. Use the Add Vertex tool to add two (2) points to the remaining semi-circle (now 7 points to match the bottle contour). Lathe the semi-circle (360°, 8 Segments to match the bottle-shaped spline mesh) to create a spherical spline mesh. Give the sphere an orange color. If you want to retain the shape in the normal spline mesh data type, you should make a duplicate at this point, lock it, and turn off its display. You may wish to give it another color, then use it (locked in position) as a template, or reference while you create and reshape targets.



Bottle and sphere contours.

If the sphere is not still selected, select it with the Selector tool, then choose Morph Object from the Groups menu. The sphere is now a MSM. To confirm this, notice that the icon for the sphere in the Groups palette is now a bent pencil.

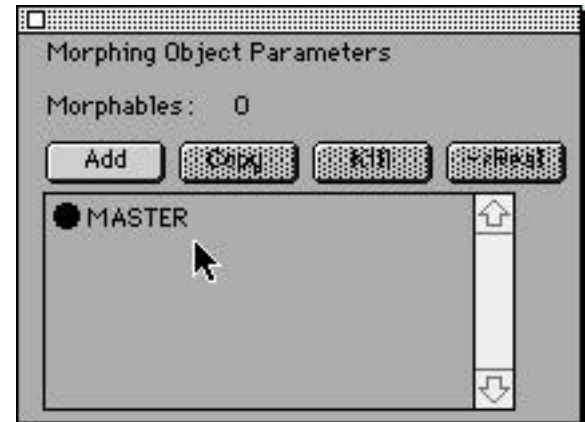
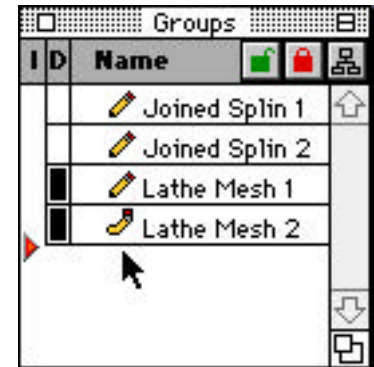
Group	
Group	⌘G
Ungroup	⌘U
Create Folder	⌘F
Information	⌘I
Morph Object	

Now, each time you click on the MSM sphere (or on a MSM sphere target) a display will show titled Morphing Object Parameters (MOP display).

Don't forget to Save often.

The MOP display, and its functions.

When you first click on the newly created MSM, the display indicates that there are zero (0) Morphables (targets); you have not created any yet. There are four buttons—Add, Copy, Kill, ->Real—with Add only available. There is a list with one item—Master—with its “light” on (filled black circle); this “light” indicates which item in the list is currently displayed, and editable in the View windows. You can have only one target, or the Master, selected/displayed at any one time. The Master is the original MSM; most often, you will not want to reshape the Master. You may move the MOP display about by dragging it by its top bar. Close the MOP display by deselecting the MSM, or by clicking on the close box in its top bar.



MOP display

## Renaming list items

To rename the Master, or any target, click on the name in the list; a tiny cursor (triangle) will appear below the name. Click at different places in the name to move the cursor. There are only two keyboard functions available: typing in characters; and deleting characters.

### Add

To create a target, that is initially a duplicate of the Master, click on the Add button. This will create a target item in the list—NEW 01—with its “light” on. To switch the display to the Master, click on the “light” next to the Master.

### Copy

To create a target, that is initially a duplicate of another target, select the desired target by clicking on the “light” next to it, then click on the Copy button. This will create a target item in the list with its “light” on. The new item will have a name identical to the target from which it was copied.

### Kill

To delete a target from the list, select the desired target, then click on the Kill button.



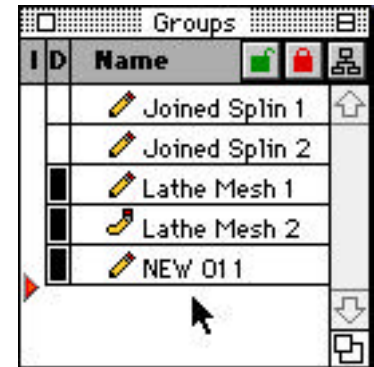
Adding a target



Copying a target

## ->Real

To transform a target into a normal spline mesh, select the desired target, then click on the ->Real button. This will create a duplicate of the target that is not a MSM data type. To confirm this, notice that the icon in the Groups palette for the new "Real" target is a straight pencil. You may wish to give it another color, then use it (locked in position) as a template, or reference while you create and reshape other targets.

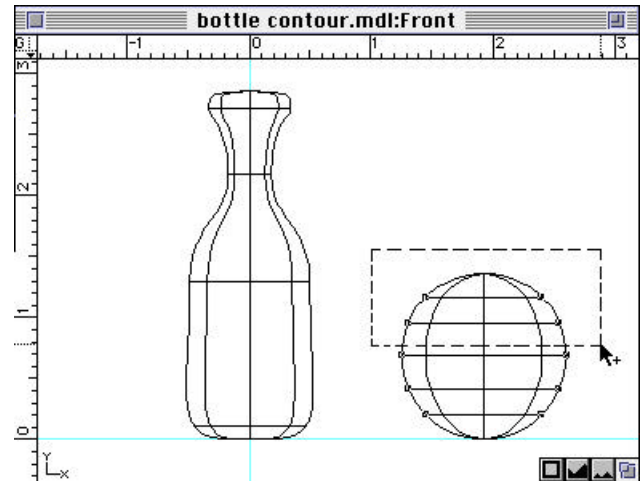


A target made "Real"

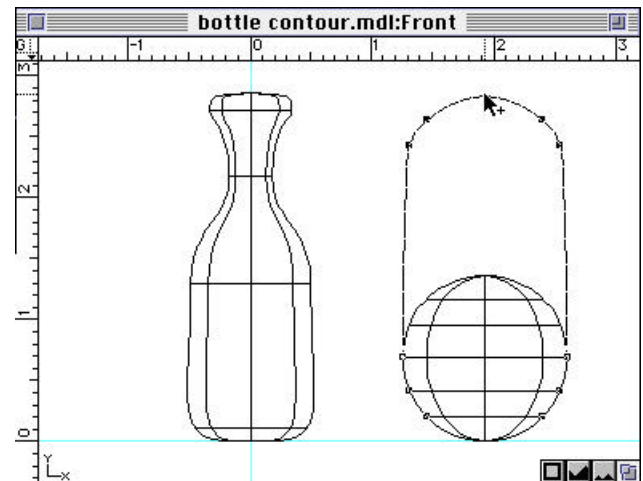
Now, we are ready to reshape the sphere to a bottle.

Turn on the display of the bottle that we will use for comparison, and position the sphere near to it. If the sphere is not still selected, select it with the Selector tool. The MOP display will appear with the Master selected. Click on the Add button. The new target will show in the list, and it will be automatically selected.

First, we want to move the horizontal ribs to match the elevation of the corresponding ribs on our comparison bottle. For example: with the Selector tool, in the Front view, draw a marquee that encompasses the top of the sphere and the top two horizontal ribs. Since the sphere was already selected, this marquee action selects all of the vertices that define the top part of the sphere. Now, drag one (all of the selected vertices will follow) of those vertices straight up so that the top of the sphere stretches to the same elevation as the comparison bottle. Continue this process of marquee/drag until you have positioned all of the horizontal ribs.



Drawing the marquee to select the vertices on the top part of the sphere

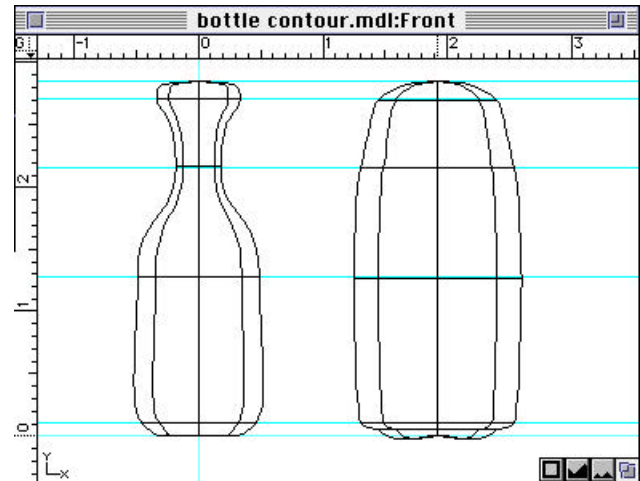


Dragging the vertices straight up

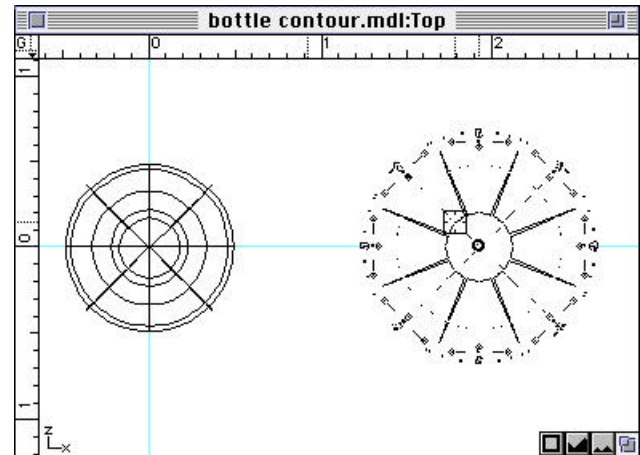


Next, in the Front view, select a horizontal rib as described above. In the Top view, use the Scale tool to reduce the diameter of the rib to match the diameter of the corresponding rib on the comparison bottle; use the Center Object(s) Anchor, then drag one of the vertices to resize the rib. Continue this process of marquee/scale until you have resized all of the horizontal ribs.

To make the target very close in shape to the comparison bottle, we must reposition the handlebars for all of the vertices on our target to match the position of those on the comparison bottle. You may find it useful to employ the guides in this situation. Remember, there are two sets of handlebars for every vertex; we will only be repositioning the ones that extend upward and downward in the Front and Right view windows. If you used the contour provided for the comparison bottle, you will notice that the corresponding handle bars extend straight up and down.

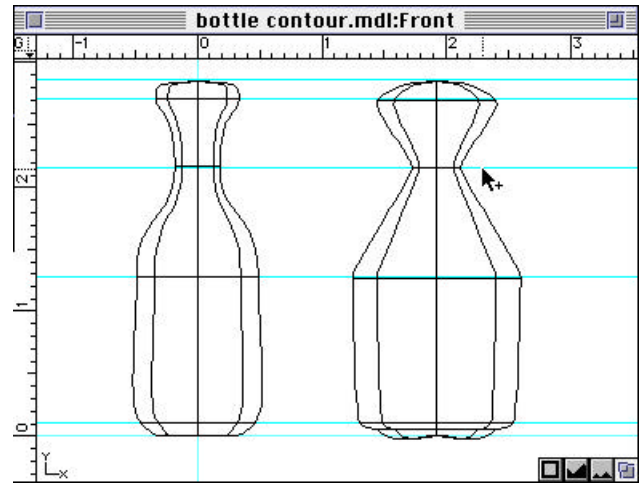


All of the horizontal ribs repositioned

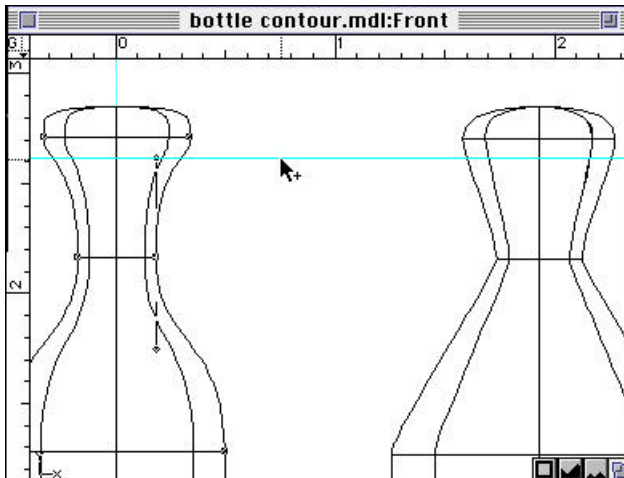


Rescaling one of the horizontal ribs

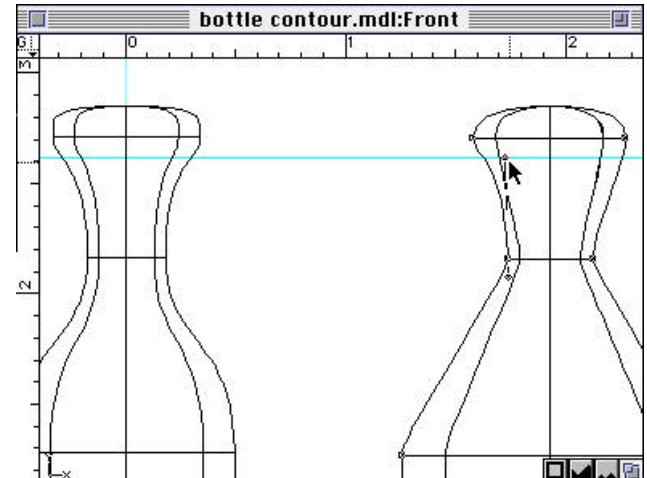
Select the comparison bottle, then select one of the vertices. In the Front and Right view windows, drag out a horizontal guide to each of the handlebar ends that extend upward and downward from the selected vertex. These guides are good to help reposition all of the handlebar ends for the corresponding horizontal rib on the target. Now, select the MSM sphere, then select a vertex on the corresponding horizontal rib; reposition the appropriate handlebar ends straight up and down from the vertex, and on the guides. Continue this process for all of the vertices on the rib. Repeat this vertex/guides process for all of the horizontal ribs on the target.



One of the horizontal ribs rescaled



Setting a Guide to align handlebar ends

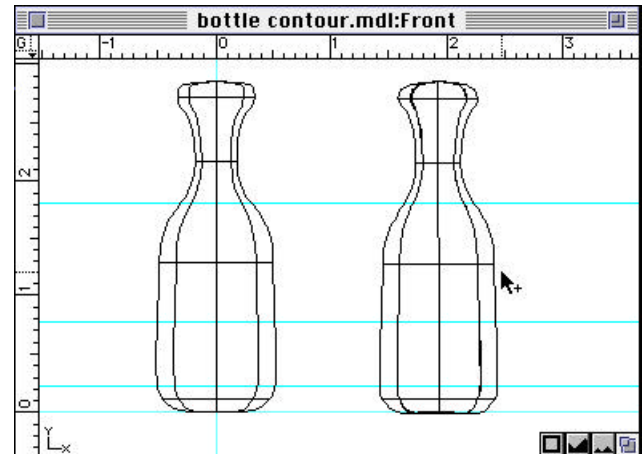


Aligning a handlebar end

The steps you have completed up to now exhibit some of the operations you can use to stretch, squeeze, and reshape your targets.

Don't forget to Save often.

Take notice when you set up targets in such a way that the shape will "cross" over itself from one target to any other target(s) (the vertices will morph in a straight line from one target to another). If you end up using any two or more such targets in combination (various percentages of each), you will get unpredictable results.

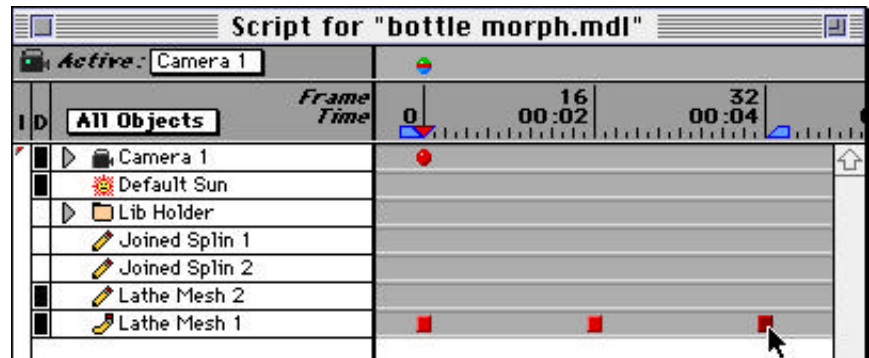


The comparison bottle (left) and the reshaped target bottle (right)

## Morphing-Presenter

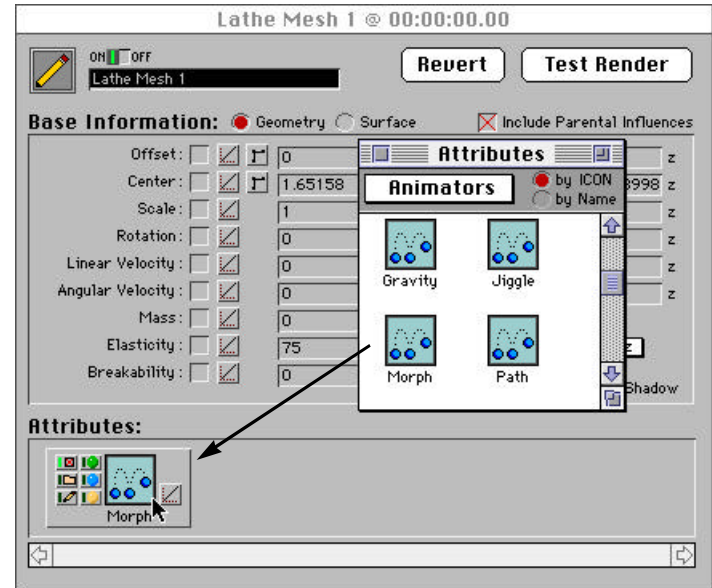
Launch Presenter and Open your model file. If you skipped the section titled Morphing-ModelPro, then Open the file titled "bottle morph.mdl" in Presenter.

In the Script window item list the MSM sphere is represented by the bent pencil icon. Set the Insertion Pointer to time 00:00:00.00.



Script window showing the MSM sphere (Lathe Mesh 1)

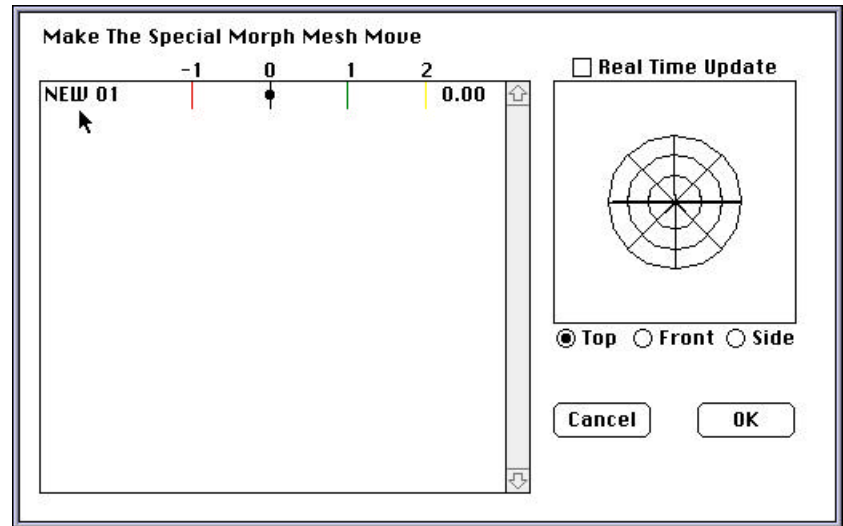
Double-click on the sphere item to open its Attributes dialog box. Open the external Attributes window, and drag the Morph animator icon to the Attributes bin for the sphere. This action will generate a key frame marker in the sphere channel (Script window) at time 00:00:00.00. You may want to copy a duplicate(s) to other times in the channel now (Option-drag key frame marker). If so, make a copy at time 00:00:02.00 and at time 00:00:04.00.



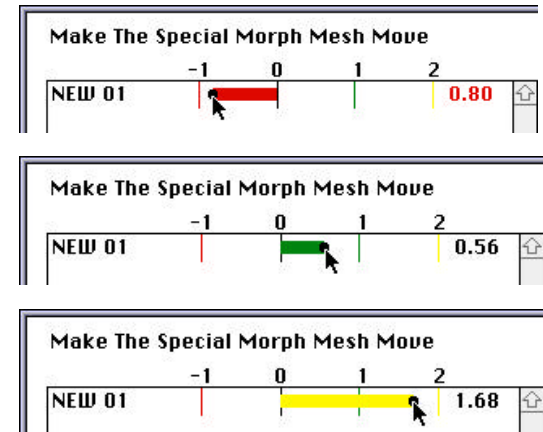
Applying the Morph animator to the MSM. Double-click on the expanded icon in the bin to expose the Morph Control window.

## The Morph Control Window

Double-click on the expanded icon in the bin to expose the Morph Control window. The window is titled "Make the Special Morph Mesh Move". There is a large box listing all the target(s) that we have generated; we only created one in this case. When you are finished with this tutorial, go on to the SpringMorph tutorial to see how to handle multiple targets. The smaller box is the morph target preview.



The targets list displays the name of each of the targets down the left side of the box. Next to each target name is a slider set at zero (0). You can move the slider by dragging the black dot either left or right (- or +) away from zero. Most often, you will want to set the slider to the right (+). The slider is a graphical display of the percentage of the particular target that will be used to set the key frame. You may set the slider from -1 (-100%) to +2 (+200%). Settings less than zero (0), and settings greater than 1 will employ an internal interpolation algorithm to morph the shape beyond the parameters defined by the target. The percentage is displayed to the right of the slider.

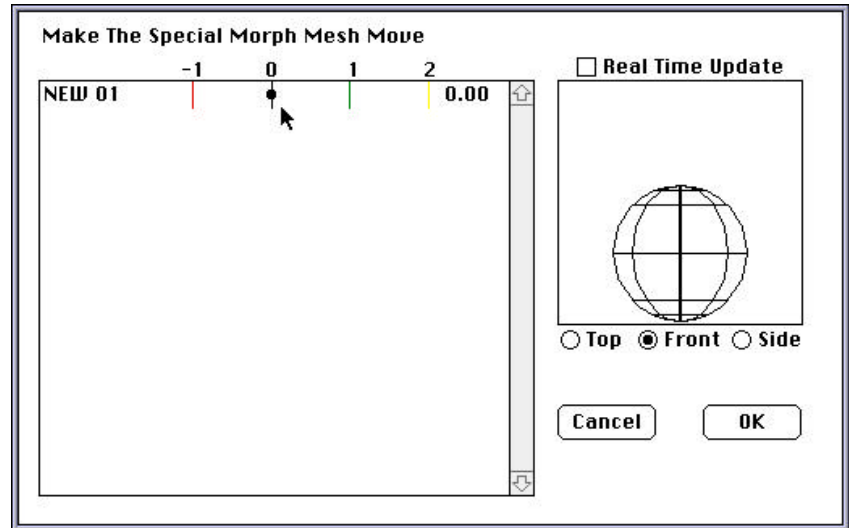


Using the slider to set the target percentage

If all of the targets are set to zero (default), then the shape of the Master is maintained.

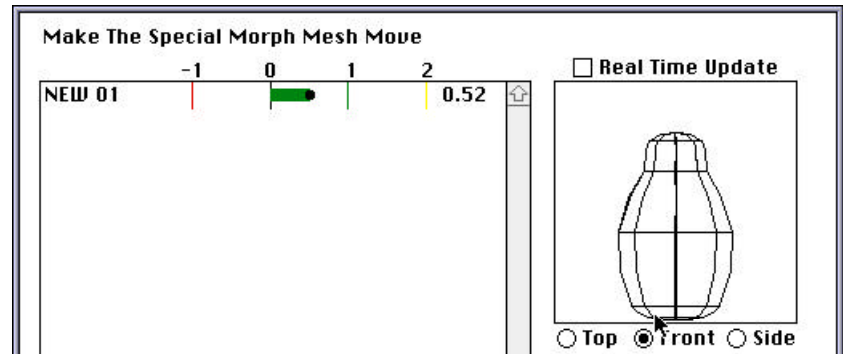
By using various percentages of multiple targets, you create a “pseudo-target”. This use of psuedo-targets is the real power of TrueExpression; it allows you to fine-tune the morph without creating additional targets. Don’t be fooled by the use of percentages; it is possible to make a pseudo-target that is a combination of 30% of one target, 110% of another target, and -45% of yet a third target (it doesn’t have to add to 100%).

Take notice when you set up targets in such a way that the shape will “cross” over itself from one target to any other target (the vertices will morph in a straight line from one target to the next). If you end up using any two or more such targets in combination (various percentages of each), you will get unpredictable results.

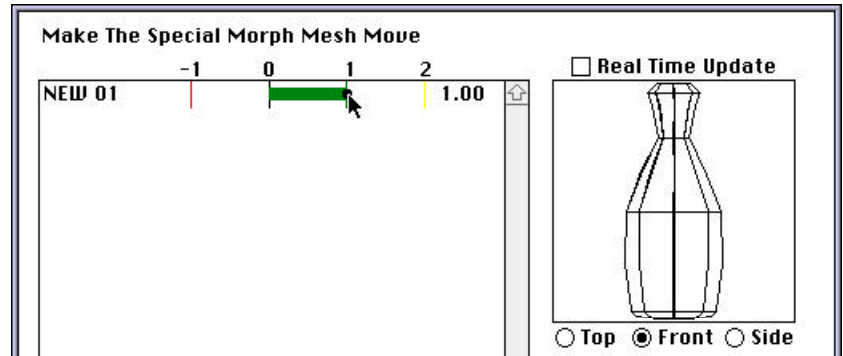


All targets set to zero—Master is the shape of the MSM

The morph target preview box displays the MSM in black wireframe. To see the target preview from various sides (Top, Front, Right view), click on the desired radio button below the box. When you drag the slider for a target away from zero and then release it, the preview updates to show the effect of the new target percentage. Turn on the "Real Time Update" check box to see "morphing" as you move the slider. The "Real Time Update" works best with fewer targets.



Setting the target to 52%. Note Front view for preview display



Setting the target to 100%

Now, double-click on the sphere's key frame marker at time 00:00:02.00, then double-click on the expanded Morph icon in the Attributes bin. This will open the Morph Control window. The single target (NEW 01) that we created in ModelPro is listed. Drag the black slider dot to the right until the percentage readout is about 0.50 (this means 50% of the target NEW 01 shape will be used as a pseudo-target). Click on the "OK" button to accept the settings; click on the "Cancel" button to leave the settings as they were when you entered the Morph Control window.



Next, access the Morph Control window for the sphere at time 00:00:04.00. Drag the black slider dot to the right until the percentage readout is 1.00 (this means that the pseudo-target is entirely defined by the NEW 01 target shape). Click on the "OK" button.

Bring the Active Camera window to the front. Move the Right Bumper on the Slider Bar to the left and drop it at time 00:00:04.00. Position the Camera so that you can preview the morph animation. Click on the Play button in the Active Camera window to watch the preview. The sphere will morph smoothly to a bottle shape over 4 seconds.

Now, we want the morph to change quickly to half-bottle, then slowly morph to the full-bottle shape. Move the sphere key frame from 00:00:02.00 to 00:00:01.00. This makes the sphere morph to a half-bottle in the first second, then morph to the full-bottle shape over the remaining 3 seconds.

The possibilities are endless. You may want to create more key frames with different target percentages that make the sphere grow, then shrink back some, then grow past the full-bottle shape. Experiment with this simple example, then move on to the more challenging SpringMorph tutorial.

