C H A P T E R

6

Customizing an Image

Introduction

In conjunction with visualization techniques, you can customize data exploration and analysis with the following options:

□ annotating an image with axis labels, text, a response legend, and so on

□ transforming an image by rotating and zooming it

□ probing an image, which displays the response value for a specific data point in an image.

Saving an Image

SAS/SPECTRAVIEW allows you to save a displayed image to either a TIFF (Tagged Image File Format) file or a PostScript file, for example, to use in presentations. You can also save current data values to a new SAS data set, for example, to use the new data set with other SAS products. For information, see "Saving a Displayed Image" on page 85.

Annotating an Image

SAS/SPECTRAVIEW provides the following types of annotations that you can include for an image in the Volume window and the surface windows.

Setting Axis Labels and Tick Marks in the Volume Window

In the Volume window, you can display axis labels, which are the variable names associated with the X, Y, and Z axes, and major and minor tick marks. To display or hide these labels in the Volume window:

1 Select the ⬚Axis⬚ global button, then ⬚Vol⬚ .

2 Select ⬚Major⬚ to set major tick marks or ⬚Minor⬚ to set minor tick marks. By default, major tick marks are set to 1, which displays variable names but no tick marks. *To display minor tick marks, major tick marks must be displayed.*

3 Set the tick marks by dragging the three sliders to specify the number of tick marks for the X, Y, and Z axes. (The value you specify appears to the left of the slider, and the tick marks appear on the appropriate axis in the Volume window.) *To hide variable names, set the slider to 0. To include variable names plus major tick marks, move the slider to a number greater than 1; for example, 2 displays variable names with two tick marks along the axis.*

The maximum value for each major tick slider equals the number of unique data values for the respective axis. If you categorized the data, the maximum value equals the number of categories specified for that axis. The maximum value for the minor tick sliders is 10.

4 To specify where the variable name and tick marks for an axis are to appear, position the hand cursor in the Volume window so that it points to the axis line you want, and click the left mouse button. For example, if you have rotated an image and the variable name and tick marks for the X axis are at the back of the image, you can click the top front or bottom front X axis lines of the bounding box; the labels appear along the line you clicked.

5 The default color for both variable names and tick marks is black. To specify a different color, select ⬚Palette⬚ , then either ⬚Minor tick⬚ or ⬚Major tick⬚ to assign a color to the tick marks or ⬚Label⬚ to assign a color to the variable names.

Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.*

Display 6.1   Volume Window with Axis Labels
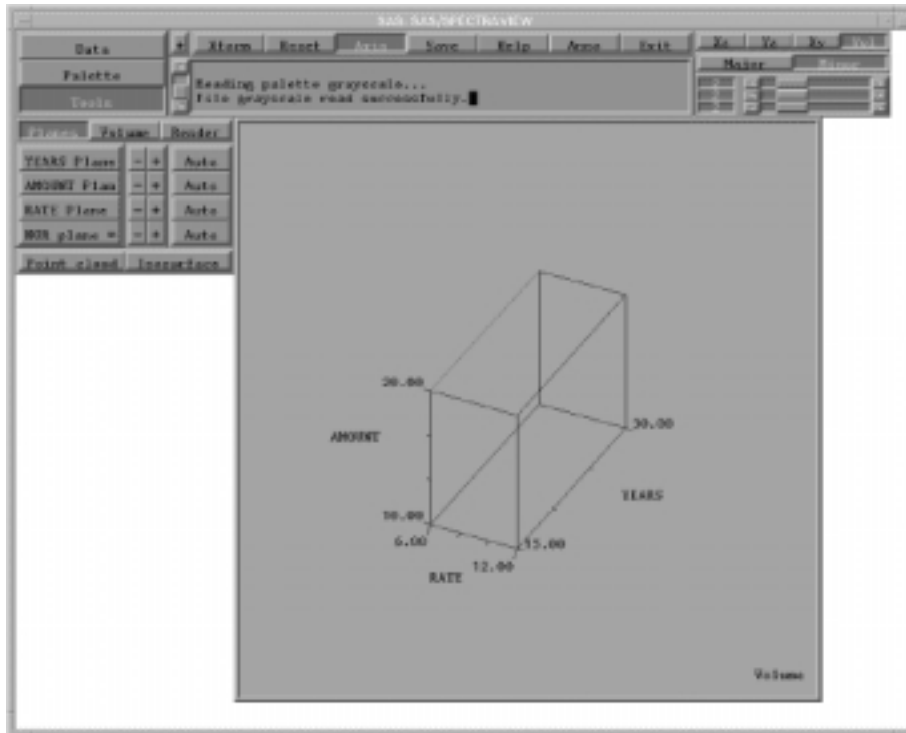
   Note that you can define axis labels and tick marks regardless of whether the bounding box is on or off.
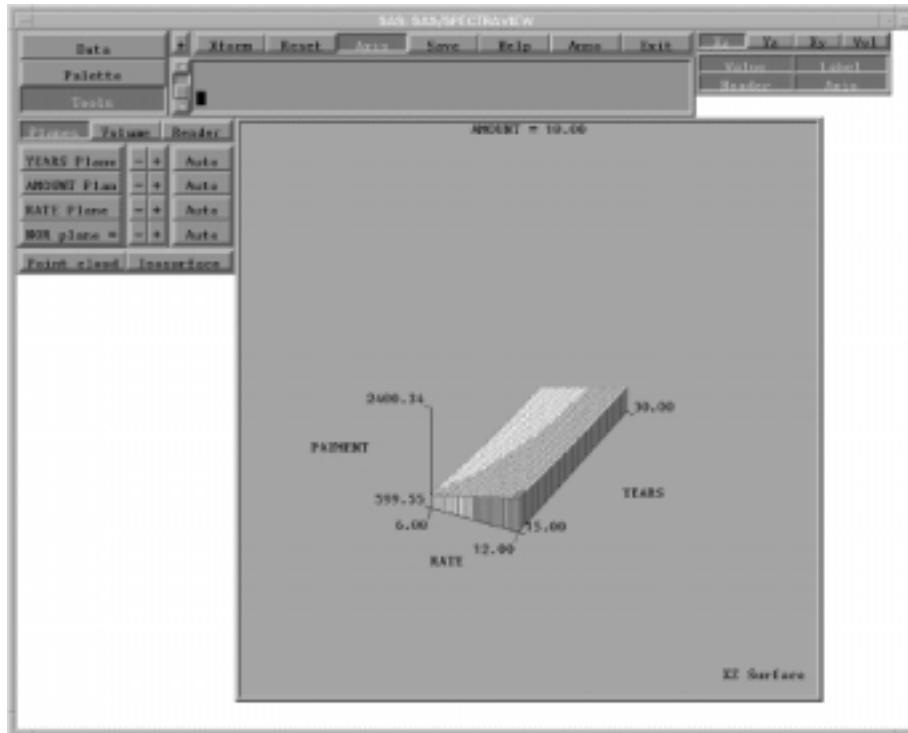
Setting Axis Labels in the Surface Windows

   In the surface windows, you can display axis labels, which are the variable names associated with the X, Y, and Z axes, and the minimum and maximum values. To display or hide labels in the surface windows:

   1 Select the Axis global button, then either Xz , Yz , or Xy to specify the surface window.

   2 By default variable names and values are displayed. To hide variable names, deselect Label . To hide values, deselect Value .

   3 The default color for both variable names and values is black. To specify a different color, select Palette , then Label .

   Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.*

**Display 6.2** Surface Window with Axis Labels

Note that you can define axis labels and values for surface window images regardless of whether the axes lines are on or off.

Setting the Bounding Box in the Volume Window

By default in the Volume window, the software displays a *bounding box*, which is a set of lines that outline the volume grid representing the loaded data. To include or hide the bounding box:

1 Select the ⃞Anno global button, then ⃞Box.

2 To turn off the bounding box, select ⃞Off . (To display the bounding box, select ⃞On .)

3 By default, the bounding box is multicolored. To specify one color, select ⃞Palette , then ⃞Bounding box .

4 Select ⃞User-defined to specify a color for the bounding box. Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.* (To return to the default multiple colors, select ⃞Default .)

**Display 6.3**   Volume Window without Bounding Box
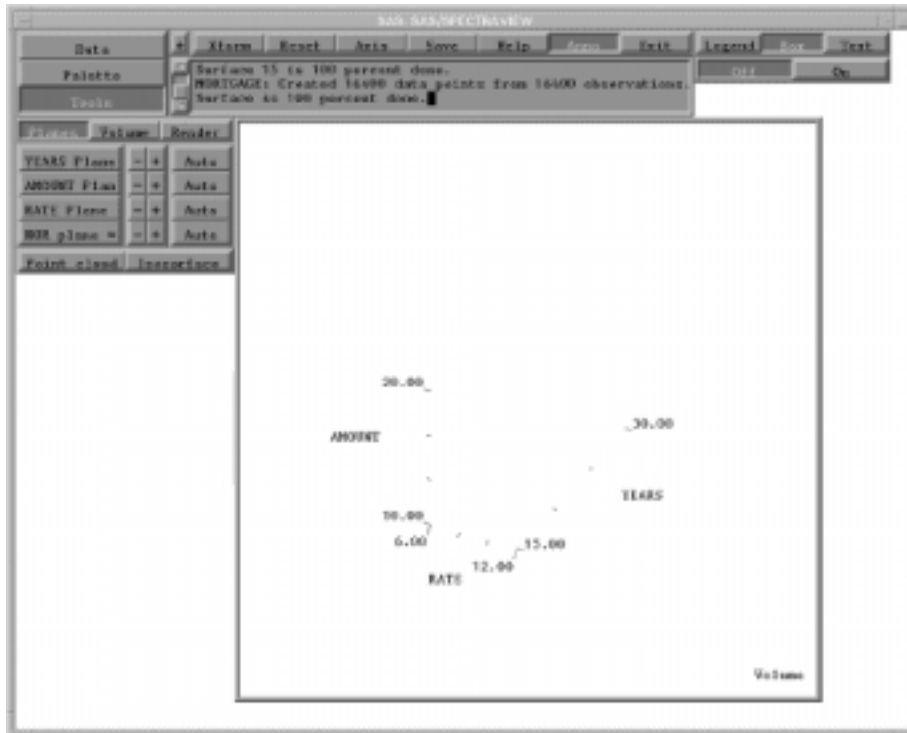
Setting Axes Lines in the Surface Windows

When you display a two- or three-dimensional image in a surface window, the software by default provides axes lines. To set axes lines in the surface windows:

1 Select the Axis global button, then either Xz , Yz , or Xy to specify the surface window.

2 By default axes lines are displayed. To hide them, deselect Axis from the menu of buttons, which displayed when you selected the Axis global button.

3 The default color for axes lines is black. To specify a different color, select Palette , then Bounding box .

4 Select User-defined to specify a color for the lines. Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.* (To return to the default, select Default .)

**Display 6.4** Surface Window without Axes Lines
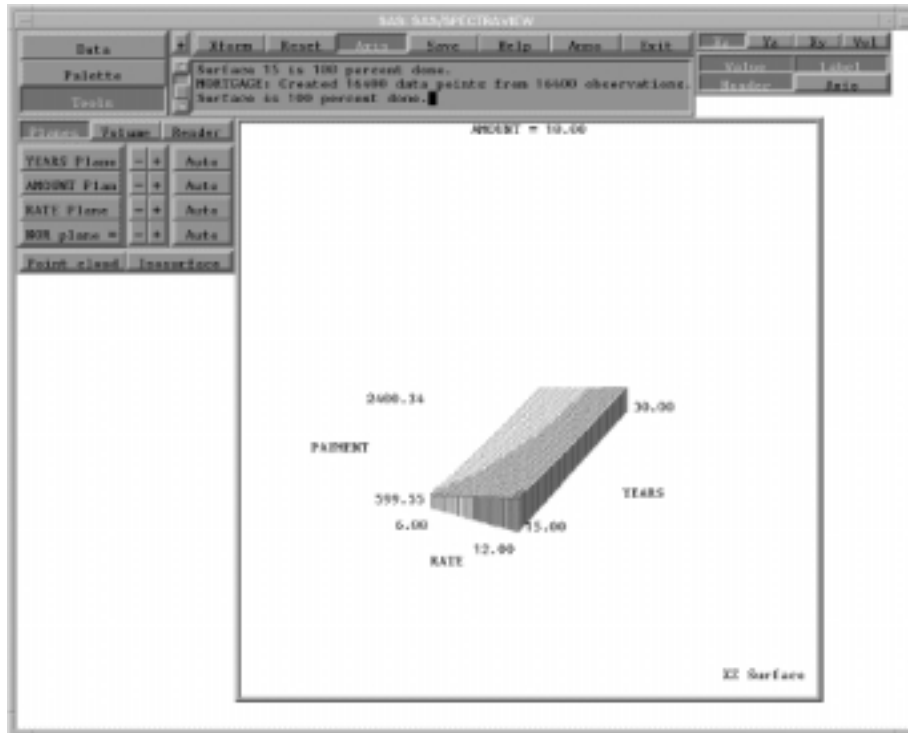
Setting Headers in the Surface Windows

When you display an axis cutting plane view in a surface window, the software by default provides a window header that specifies the variable name for the axis and the value for the cutting plane's location. To display or hide headers in the surface windows:

1 Select the $\boxed{\text{Axis}}$ global button, then either $\boxed{\text{Xz}}$, $\boxed{\text{Yz}}$, or $\boxed{\text{Xy}}$ to specify the surface window.

2 By default headers are displayed. To turn off headers, deselect $\boxed{\text{Header}}$.

3 The default color for headers is black. To specify a different color, select $\boxed{\text{Palette}}$, then $\boxed{\text{Label}}$.

Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.*

Display 6.5 YZ Surface Window with Header Turned Off
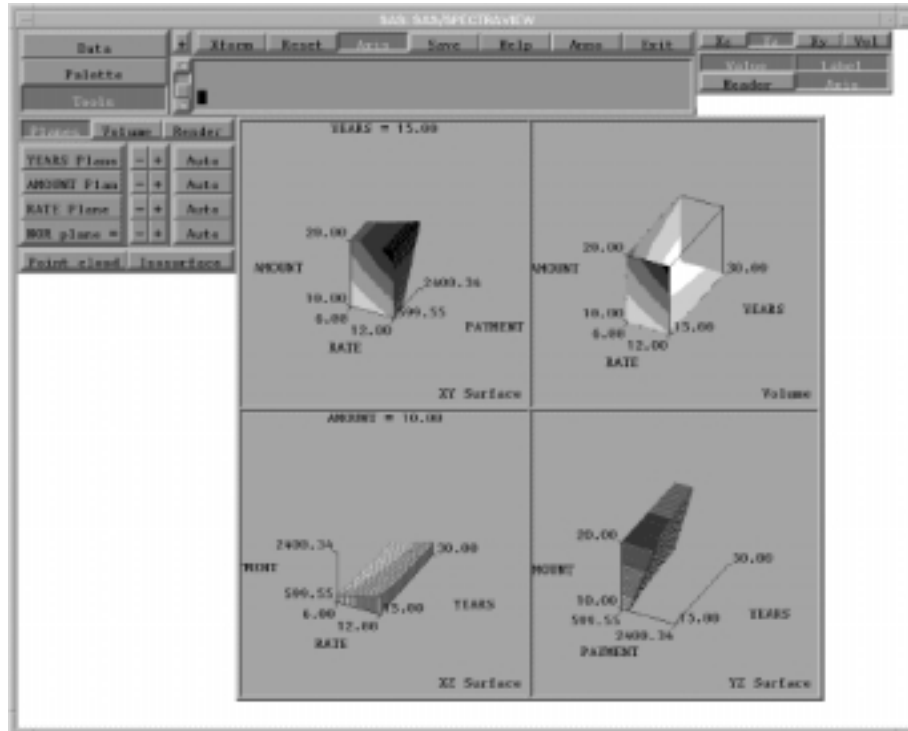
Including Text

You can add lines of text to a selected window, for example, to annotate it with a title or the current value of a variable. Each text line can contain one or more words or special characters, and you can include as many lines as you need. You can add simple text or a substitution string.

A *substitution string* can display the current value for a variable when you specify the variable name preceded by an ampersand (&). For example, for a variable named PAYMENT, entering **Payment Amount=$&payment** as the text line will display the current value for the variable PAYMENT, that is, **Payment Amount=$1500.00**. For the axis variables, the software displays the value for the axis cutting plane's current location. For the response variable, the software displays the response value at the intersection of the three cutting planes.

To add text:

1 Select the ‾Anno‾ global button, then ‾Text‾.

2 Specify the window by selecting ‾Xz‾, ‾Yz‾, ‾Xy‾, or ‾Volume‾. Note that the selected window must be visible.

3 Select ‾Add‾. In the text window, the software displays a message asking you to enter text, and the cursor changes to the input cursor.

4 In the text window, type the text or text string and press Enter. For example, as shown in Display 6.6 on page 80, you might enter the title **Mortgage Data**. By default, the first text line is centered at the top of the selected window. The second text line is centered below the first, and so on.

5 To manipulate added text:

□ To move text, select ‾Move‾, position the cursor on the text that you want to move, press the left mouse button, and drag to the appropriate position.

□ To change the size of text, select $\boxed{\text{Scale}}$, position the cursor on the text that you want to scale, press the left mouse button, and drag left (smaller) or right (larger).

□ To delete text, select $\boxed{\text{Del}}$, position the cursor on the text that you want to delete and click the left mouse button.

6 The default color for text is black. To specify a different color, select $\boxed{\text{Palette}}$, then $\boxed{\text{Text}}$.

Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.*

Display 6.6   Volume Window with Text
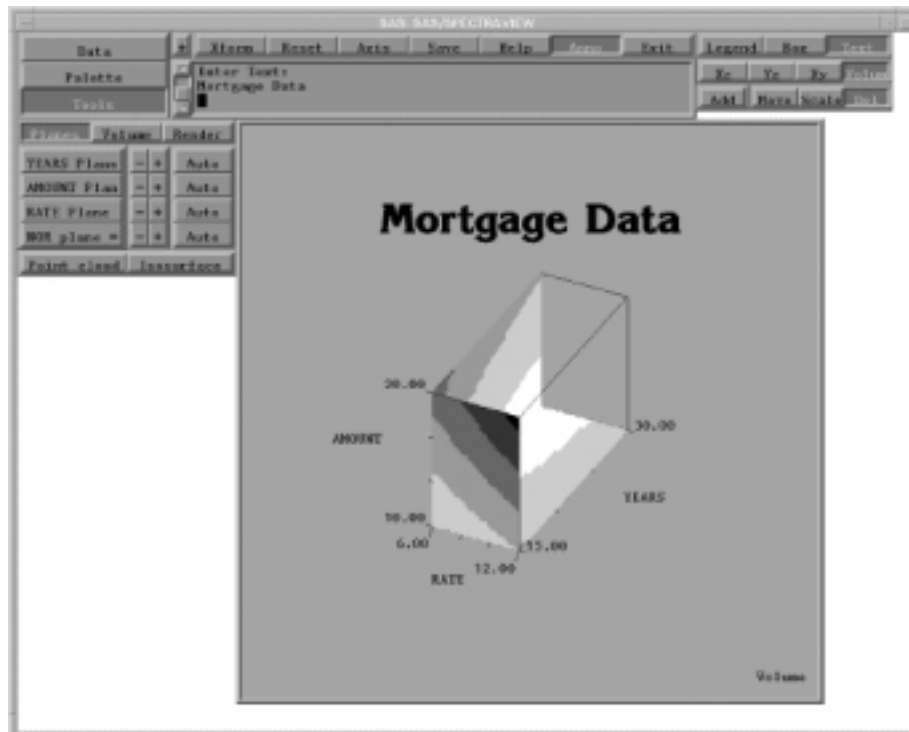

Including a Response Legend

You can add a legend of response values and associated colors to a selected window. To include a response legend:

1 Select the $\boxed{\text{Anno}}$ global button, then $\boxed{\text{Legend}}$.

2 Specify the window by selecting $\boxed{\text{Xz}}$, $\boxed{\text{Yz}}$, $\boxed{\text{Xy}}$, or $\boxed{\text{Volume}}$.

3 Specify whether you want to display the legend horizontally or vertically by selecting $\boxed{\text{Hor}}$ or $\boxed{\text{Ver}}$, as shown in Display 6.7 on page 81.

4 To manipulate the legend:

□ To move the legend, select $\boxed{\text{Move}}$, position the cursor on the legend, press the left mouse button, and drag to the appropriate position.

□ To change the size of the legend, select $\boxed{\text{Scale}}$, position the cursor on the legend, press the left mouse button, and drag left (smaller) or right (larger).

□ To remove a displayed legend, select Off .

5 The default color for the legend's labels, which are the response variable name and minimum and maximum values, is black. To specify a different color, select Palette , then Label .

Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.*

Display 6.7   Volume Window with Response Legend
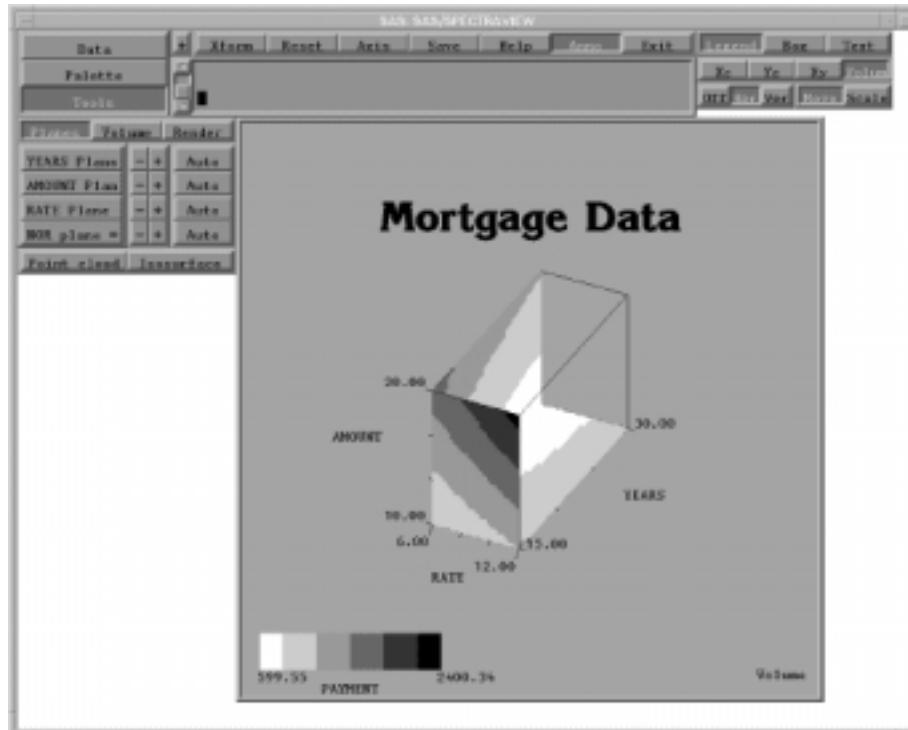
Transforming an Image

Transforming an image lets you view it from any direction and modify its size.

Rotating an Image

Rotating an image lets you view it from any angle, giving you better visualization to analyze the data. You can rotate any Volume window image and three-dimensional images in the surface windows; you cannot rotate two-dimensional images. To rotate an image:

1 Select the Xform global button, then select

 Rotate 1   to rotate the image in the Volume window or a three-dimensional image in a surface window.

 NOR rotate   to rotate the NOR cutting plane.

|Rotate all| to simultaneously rotate the images in all four windows, except for two-dimensional images.

2 Position the cursor within the Volume window or surface window and drag the cursor in any direction. The image becomes wire mesh during the rotation process. It returns to its original format when rotation is complete.

Display 6.8 Rotated Image
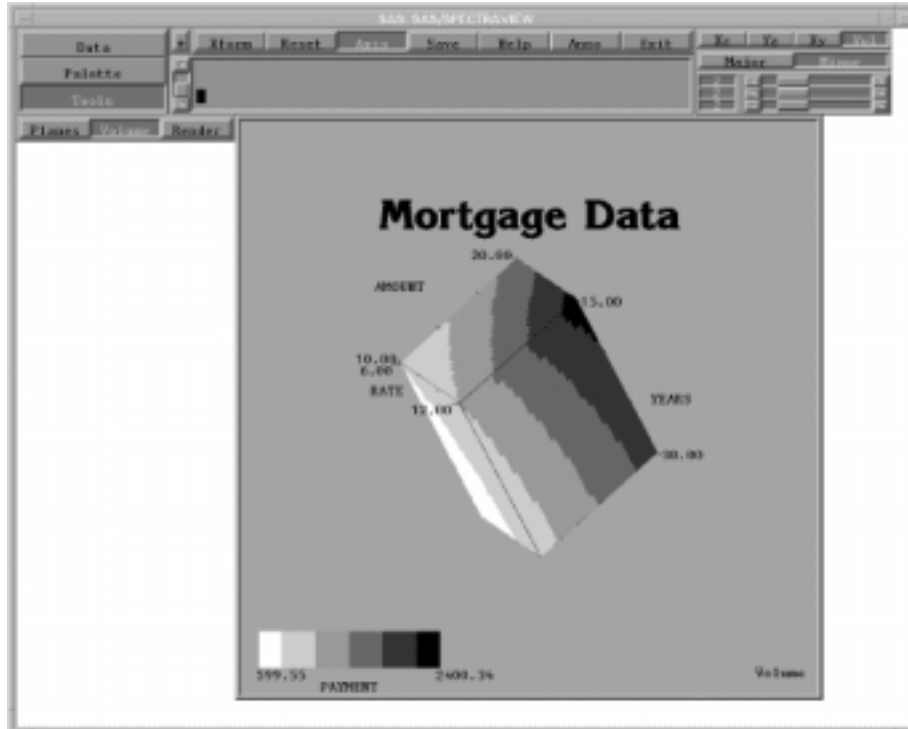
Note that if you have a point cloud with many data points, turning it off before rotating will speed the process. Once you reach the new angle (using the bounding box), turn the point cloud on again. Also, note that rotating an image may cause labels to become obscured. To make them visible again, select the Axis global button, specify which window, and click the axis where you want to relocate the labels.

Zooming an Image

Zooming lets you move an image nearer or farther away, making it smaller or larger proportionally. To zoom an image:

1 Select the |Xform| global button, then select |Zoom|.

2 Position the cursor within the Volume window or surface window and drag the cursor left (to push the image farther away) or right (to bring the image closer to you).

Display 6.9 Zoomed Image
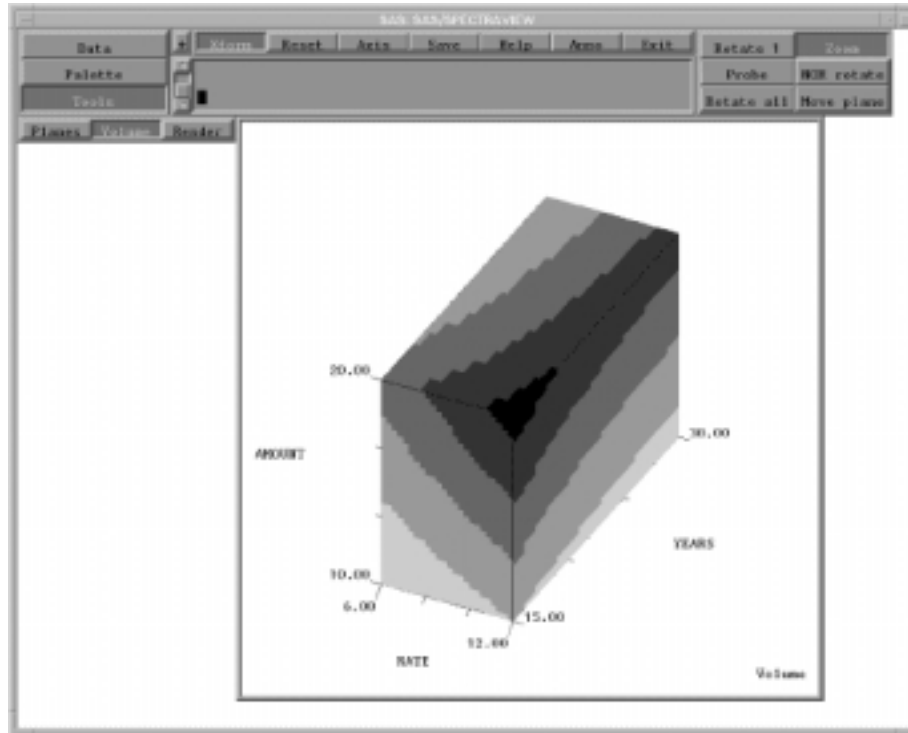
Probing an Image for a Specific Response Value

A useful customization option is to explore an image for specific response values, referred to as *probing*. Probing allows you to pinpoint the actual response value for a specific data point. To probe an image:

1 Select the Xform global button, then Probe .

2 Position the cursor in the appropriate window, press the left mouse button to display the probe lines, and do one of the following:

☐ To probe a Volume window image, place the cursor on an axis and drag the probe line to an appropriate point along the axis. Then drag the other axis probe lines to display the response value at the intersection of all three probe lines.

☐ To probe a three-dimensional image in a surface window, drag the probe lines along the variable axes to display the response value at the intersection of the two probe lines. (The response axis cannot be used to probe for response values.) The value for the horizontal axis is shown below the axis, and the response value is shown above it.

☐ To probe a two-dimensional image in a surface window, drag the cursor along the horizontal axis. The value for the horizontal axis is shown below the axis, and the response value is shown above it.
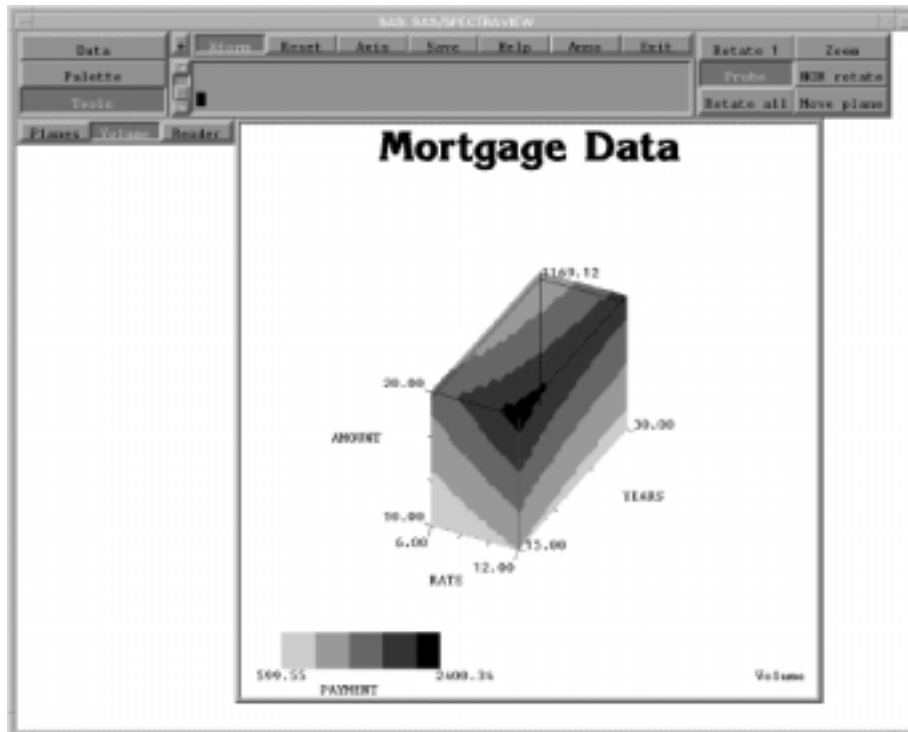
Note that if the data point being probed is a missing value, the software displays a ? for the value.

3 By default the probe lines and displayed response value are black.

☐ To specify a different color for the displayed response value, select Palette , then Label .

  □ To specify a different color for the probe lines, select $\boxed{\text{Palette}}$, $\boxed{\text{Bounding box}}$, then $\boxed{\text{User-defined}}$.

Adjust the RGB sliders. As you move the sliders, the specified color appears in the square at the left, and the item changes color in the Volume window. *You can also select a color chip, located below the RGB sliders.*

Display 6.10   Probed Solid-Volume Image Displaying Response Value