SigmaPlot® 5.0

User's Guide

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Introduction

Welcome to SigmaPlot® 5.0 This chapter introduces you to some of the basics of SigmaPlot, including:

- An overview of SigmaPlot features (see below)
- Using SigmaPlot in Windows (see page 5)
- Using the toolbars (see page 6)
- Examples of SigmaPlot graphs (see page 9)
- Setting basic program options (see page 17)
- Getting help on using SigmaPlot (see page 19)

SigmaPlot 5.0 is a state-of-the-art technical graphing program designed for Windows 95. It is both Windows 95 certified, and compatible with Office 95 and Office 97. SigmaPlot 5.0 is specifically designed to aid in documenting and publishing research, specializing in the graphical presentation of results.

Creating and editing graphs is easy. Simply click a Graph toolbar button, pick your data with the Graph Wizard, and you have your graph. You can also use templates to apply favorite graphs again and again.

SigmaPlot also includes a powerful nonlinear curve fitter, a huge scientific data worksheet that accommodates large data sets, summary statistics, a mathematical transform language and much more.

OLE2 technology is fully supported. You can annotate graphs with the MS Word Equation Editor, edit your graphs directly inside Word or PowerPoint, or plot your data with an Excel spreadsheet right inside SigmaPlot.

You can add more numeric power with SigmaStat, a complete basic statistical program. SigmaStat contains a set of easily applied statistical tests that can be integrated directly in SigmaPlot. The Visual Display Graph Library add-on, designed by Edward Tufte, author of *The Visual Display of Quantitative Information*, can be used to create complex graphs using pre-defined templates.

New Features in SigmaPlot Version 5.0

SigmaPlot 5.0 provides many new state-of-the-art graphing features, including:

- Automation: Automate repetitive and complex tasks with macros that execute a series of steps.
- New Data Worksheet: Work with data sets that have more than one billion data points. You can format text, cell, column, row and grid lines. Drag and drop columns, move items around more easily, and change grid colors.
- Rulers and Snap-to Grids: Lay out graphs more easily with graph page rulers and adjustable snap-to grids.
- Improved Notebook: Batch print selected items and in-place text edit.

Graph Types and Styles

SigmaPlot's selectable *Graph Type* determines the structure of your graph. SigmaPlot provides many different types of two- and three-dimensional Cartesian (XY and XYZ) graphs, as well as pie charts and polar plots.

Graph Style determines how data is plotted on a graph. Available styles depend on the Graph Type you have selected; the *Graph Wizard* lists available graph styles once you have selected a graph type.

Templates

SigmaPlot includes a template notebook containing several page layouts you can use to apply specific attributes to new or to previously saved pages and graphs.

You can use a graph that you create as a template for other graphs by copying it into a different section of the notebook. You can store your templates in a SigmaPlot Notebook Template file (.JNT). You may want to create your own template notebook.

Graph Defaults

Graph attributes, such as size and position, font, and settings for symbols, lines, and bars can be preset using default settings.

Axis Scales

SigmaPlot lets you create multiple axes for 2D graphs. Each plot can have separate X and Y axes. Axis ranges can be automatically calculated by SigmaPlot, or you can specify them manually.

Tick Marks Use both major and minor axis tick marks and grid lines. Tick intervals, length, direction, thickness, and color are all adjustable; grid line types are also adjustable. Tick labels can be numeric, time series, or customized, using labels in a worksheet column.

Axis Breaks You can specify an axis break with a different post-break tick interval.

Automatic Legends

You can turn on or off automatically generated legends, or ungroup a legend into individually customized text labels.

3D Mesh Interpolation

Generate mesh data points for a 3D mesh plot from XYZ triplet data using inverse distance interpolation. 3D mesh points can be calculated using different distance weighting values.

SigmaPlot Worksheet

SigmaPlot is now column and row oriented. The *SigmaPlot Worksheet* lets you enter data as X, Y, and other variable data. The worksheet is over 32,000,000 rows by 32,000 columns in size.

Column widths are adjustable by changing the number of digits displayed, or the column size. Each cell can display up to fifteen figures of significance, but can calculate up to 21 significant numbers. Worksheet cells can contain data, labels, date/time values, or special sequences of symbols, line and fill patterns, colors, and error bar direction codes. You can apply these customized sequences to a graph and copy and use the same sequences over and over again.

Microsoft Excel

If Excel for Office 95 or Office 97 is installed on your system, you can create and open Excel workbooks from within SigmaPlot, and graph and run transforms and statistics using Excel worksheets just as you would SigmaPlot worksheets. Almost all Excel functionality is available from within SigmaPlot.

Statistics

Descriptive statistics are available for all your worksheet columns. The *Statistics Worksheet* lists basic statistics for all worksheet columns.

You can also display linear regression lines with confidence and prediction intervals, chart error bars for graphs of column means, and run paired and unpaired *t*-tests between worksheet columns. The Histogram feature can be used to compute and plot distributions for datasets up to 64,000 points in size.

Regression Wizard

The *Regression Wizard* guides you through each step in running a curve fit, plotting the results, and generating a report.

For more information on the Regression Wizard, see the *Programming Guide*.

Data Transform Functions

SigmaPlot comes with a comprehensive mathematical transform language. This can be used to modify and compute data in a very complex manner. Transforms are described in the *Programming Guide*.

Drawing Features

Drawing tools are provided for multi-line text labels, lines, rectangles, ellipses, and arrows. Change the font, size, and style of any text, and change the color, line type, thickness, and fill pattern of graphs and drawn objects.

Graphs and axes can be sized and scaled using the drawing tools, or moved and sized precisely using formatting commands.

Reports

The SigmaPlot Report Editor helps you keep descriptions of SigmaPlot notebooks and graphs. It features a complete text editor, OLE2 (Object Linking and

Embedding, version 2), insertion and editing, and automatic report generation for regression results.

OLE2 You can paste and drag and drop between SigmaPlot and other Windows applications (such as word processors, drawing programs, or desktop publishers) using *OLE2* (Object Linking and Embedding, version 2).

Pasting or dragging and dropping between SigmaPlot and other applications lets you edit a SigmaPlot graph that has been pasted into another OLE2 application, and display and print text and art embedded into SigmaPlot pages and reports.

Installing SigmaPlot

SigmaPlot is installed on your computer from diskettes or CD. The dialog boxes that guide you through the installation process are simple and self-explanatory.

Σ In order to accomplish your installation, you will need to have your product registration number available.

To install SigmaPlot from diskette, insert diskette 1 into the appropriate floppy drive, and run Setup from your floppy drive.

To install SigmaPlot from CD, the installation program automatically starts up when the CD is placed in the CD-ROM drive under Windows 95.

System Requirements

SigmaPlot 5.0 can run under the following systems:

- Windows 95
- Windows NT version 4.0

Excel Workbooks: In order to use Excel workbooks in SigmaPlot, you must have either Excel for Office 95 or Office 97 installed on your local drive or network. To take full advantage of Excel's functionality within SigmaPlot, use Excel for Office 97.

Hardware: Your computer should be at least a 486, with at least 32 megabytes of RAM.

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Registration Card

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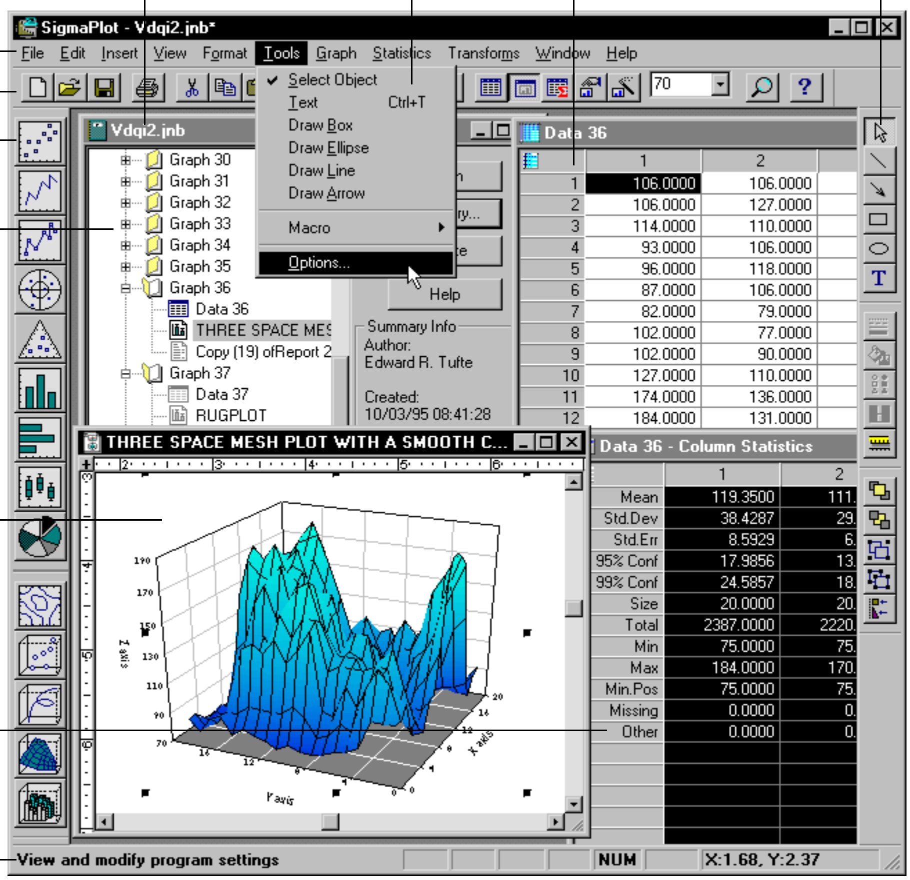
➤ Technical support services
➤ New product announcements and upgrade announcements

Using SigmaPlot in Windows

SigmaPlot runs under the Windows operating system, using the standard Windows 95 interface. For information on how Windows works, please refer to your Windows 95 *documentation.* A brief explanation of standard Windows 95 terminology as it applies to SigmaPlot is provided here.

Figure 1–1
The SigmaPlot Application Window as it appears in Windows 95



Using Toolbars

You can set SigmaPlot to display a selection of toolbars at the top, or along the sides of the SigmaPlot window. The toolbars contain buttons for the most commonly used commands.

Figure 1–2
The Standard Toolbar

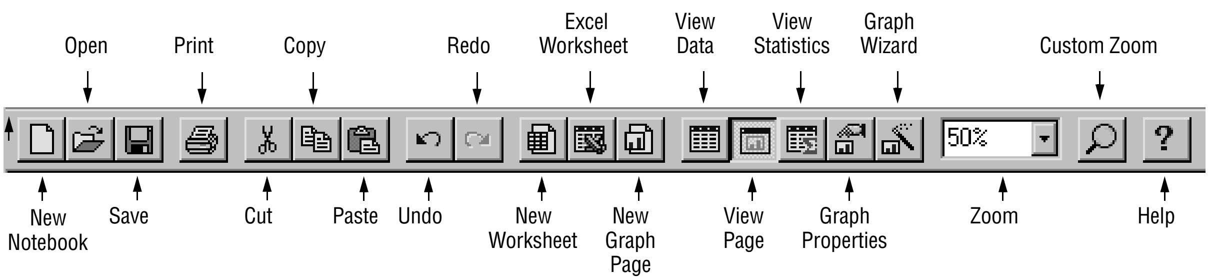


Figure 1–3
The 2D Graph Toolbar

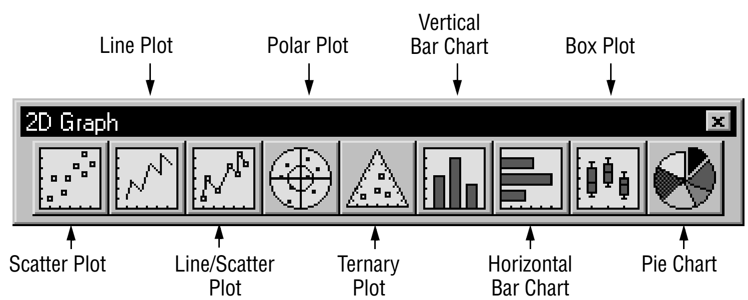


Figure 1–4
The 3D Graph Toolbar

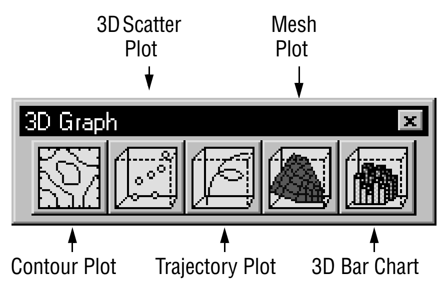
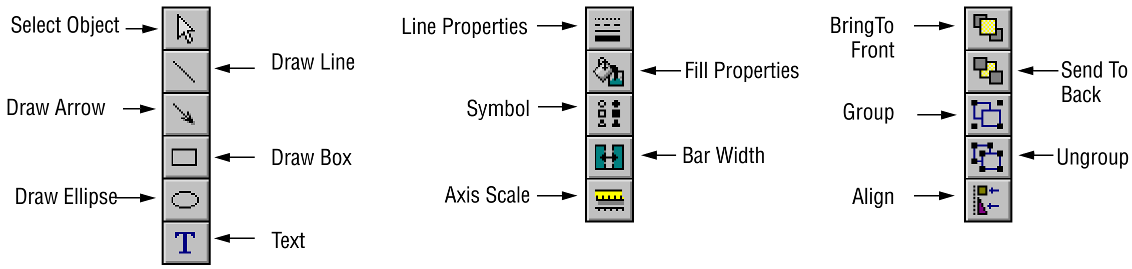


Figure 1–5
From left to right: the Drawing Toolbar, Properties Toolbar, and Arranging Toolbar

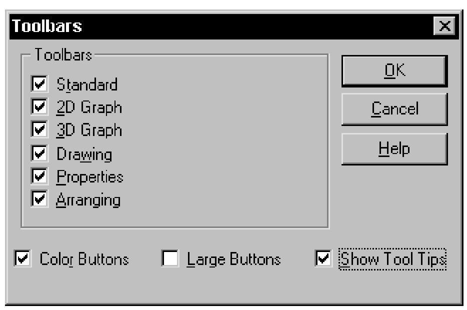


The Report Editor toolbar and ruler are described in “Using the Report Editor Ruler” on page 315.

Viewing and Hiding Toolbars

Choose Toolbars from the View menu to open the Toolbars dialog box. Select or clear a toolbar by clicking the option.

Figure 1–6
The Toolbars Dialog Box



The Large Buttons check box increases the size of Standard, Drawing, Properties, and Arranging toolbar buttons. The Color Buttons check box displays color toolbar buttons on your screen, rather than monochrome. The Show Tool Tips check box hides the toolbar help tags that appear as you drag the mouse over the toolbar.

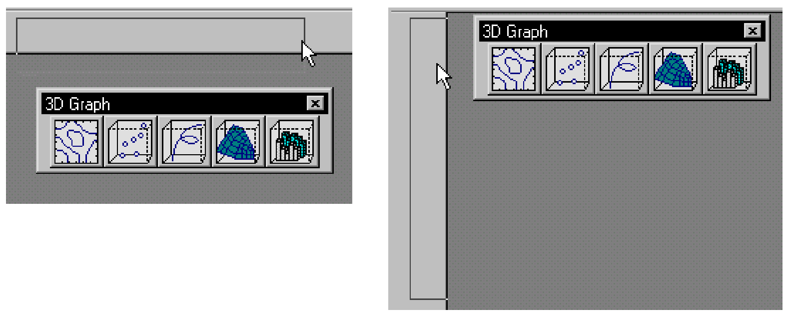
Positioning Toolbars

A toolbar can be moved from its default position to anywhere in the screen, and its positions can be changed from horizontal to vertical.

To move a toolbar, click anywhere in the toolbar that is not a button, and drag it to the desired place. The toolbar appears as a floating palette when it is not attached to the SigmaPlot window. You can also join two floating Toolbars together by dragging a toolbar by the palette border (not the title bar) onto another toolbar.

To reattach the toolbar, either double-click the titlebar, or drag it by the palette border onto any edge of the SigmaPlot window until it docks, then release the mouse button. To change between horizontal and vertical positions, drag the toolbar to the edge of the window and release the mouse button after the toolbar flips to the new position.

Figure 1–7
Toolbars are docked by dragging a toolbar by its edge onto any SigmaPlot window border



Anatomy of SigmaPlot Graphs

This section introduces terminology used in describing SigmaPlot graphs.

Basic Terminology: Graphs, Plots, and Axes

A SigmaPlot graph consists of one or more plots of data, and one or more sets of axes. A graph uses a specific coordinate system (e.g., 2D Cartesian, 3D Cartesian, pie, or polar) and has a specific size and location on a page.

Plots are graphical representations of your worksheet data. You can change the way your graph is plotted, even after the graph has been created. For example, you can view your data as a vertical bar chart, then as a horizontal bar chart. You can also show more than one plot on most graphs.

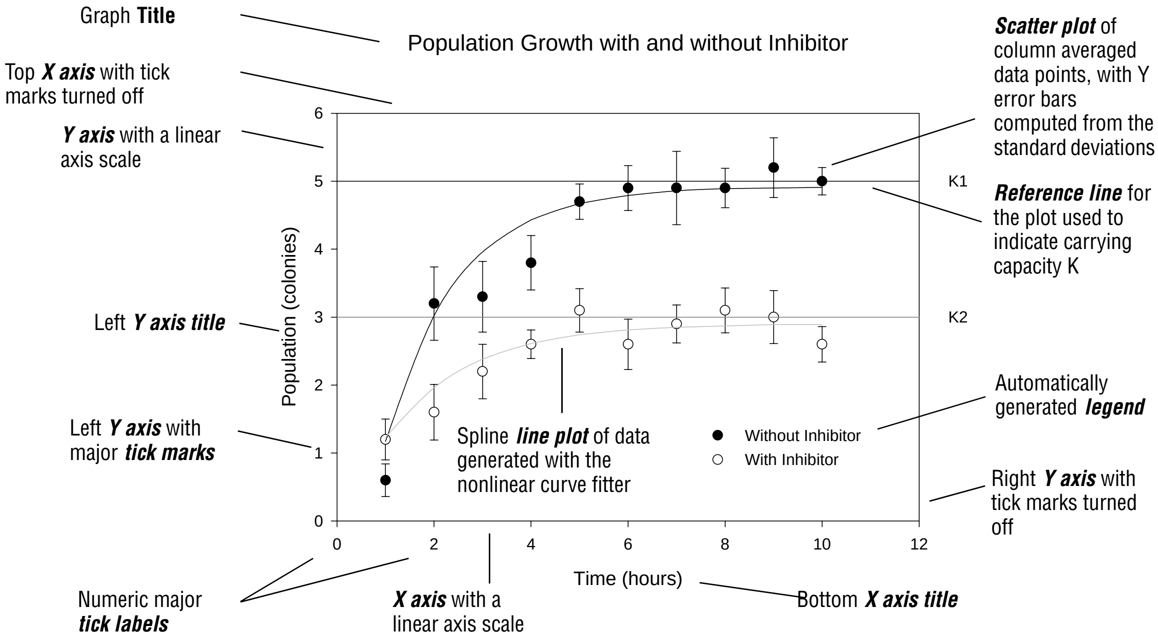
Axes are the scales that determine position of the graph's data points, usually with Cartesian coordinates. The X, Y, and for 3D graphs, Z coordinates, are indicated on each axis by tick marks. An axis can use a linear numeric scale, nonlinear scales such as log, natural log, and probability, or a date/time scale. 2D graphs can have multiple sets of X and Y axes. The axes' *tick marks* and *tick labels*, can be numeric, time series, or customized with worksheet column labels.

2D Cartesian Graph Examples

2D Cartesian graphs are the most commonly used scientific graphs. SigmaPlot provides an extensive range of 2D graph features, including:

- Scatter plots, line plots, dot plots, grouped bar charts, error bars, linear regressions with confidence and prediction intervals, an equation library for nonlinear regressions, reference lines with labels, box plots, ternary plots, bubble plots.
- Contour plots.
- X and Y axes, log axis scales, major and minor tick marks, tick labels from a worksheet column, axis titles, axis breaks, grid lines and backplanes.
- Multi-line text labels and automatic legends.

The following figures exemplify some SigmaPlot 2D Graphs with the terminology defined in this section.



Graph Title
Population Growth with and without Inhibitor
Top X axis with tick marks turned off
Y axis with a linear axis scale
Left Y axis title
Left Y axis with major tick marks
Population (colonies)
0
1
2
3
4
5
6
0
2
4
6
8
10
12
K1
K2
Spline line plot of data generated with the nonlinear curve fitter
Without Inhibitor
With Inhibitor
Time (hours)
Numeric major tick labels
X axis with a linear axis scale
Bottom X axis title
Scatter plot of column averaged data points, with Y error bars computed from the standard deviations
Reference line for the plot used to indicate carrying capacity K
Automatically generated legend
Right Y axis with tick marks turned off

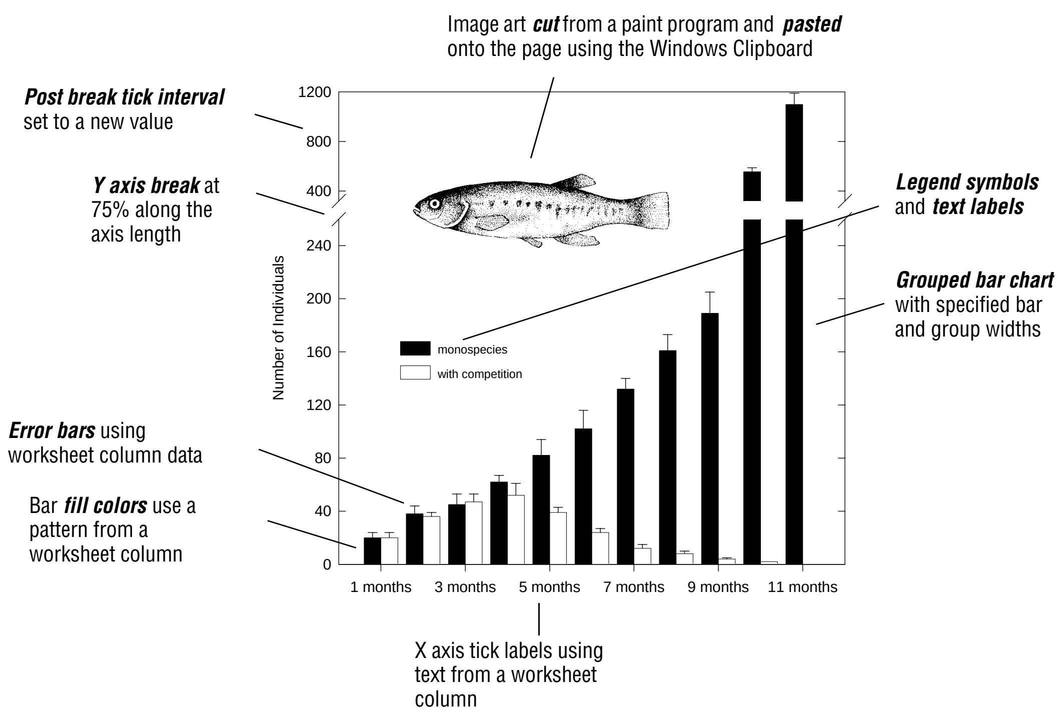
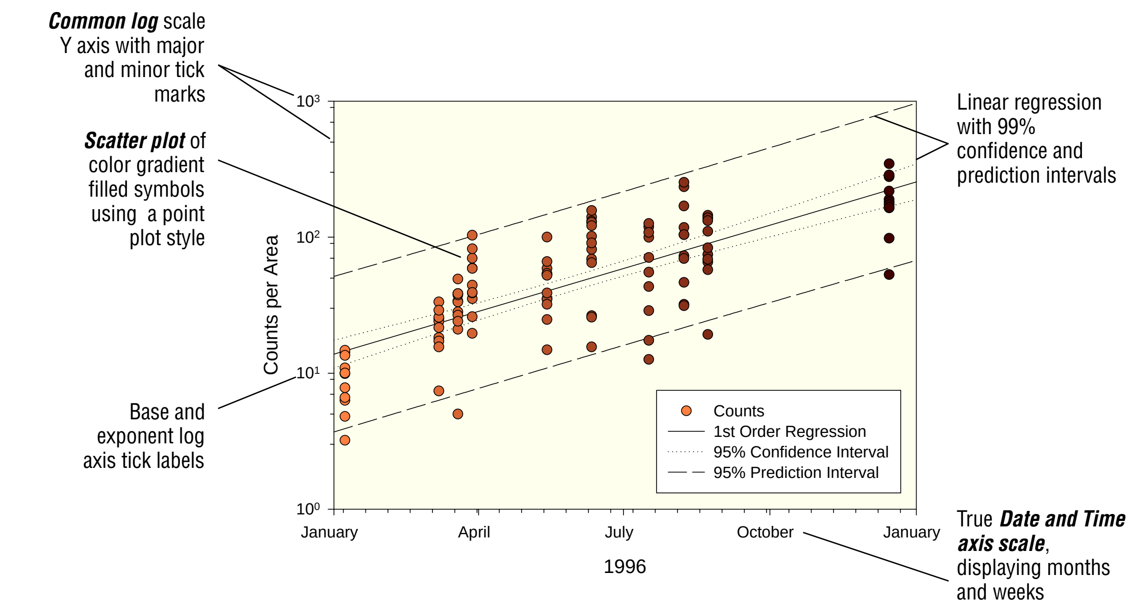
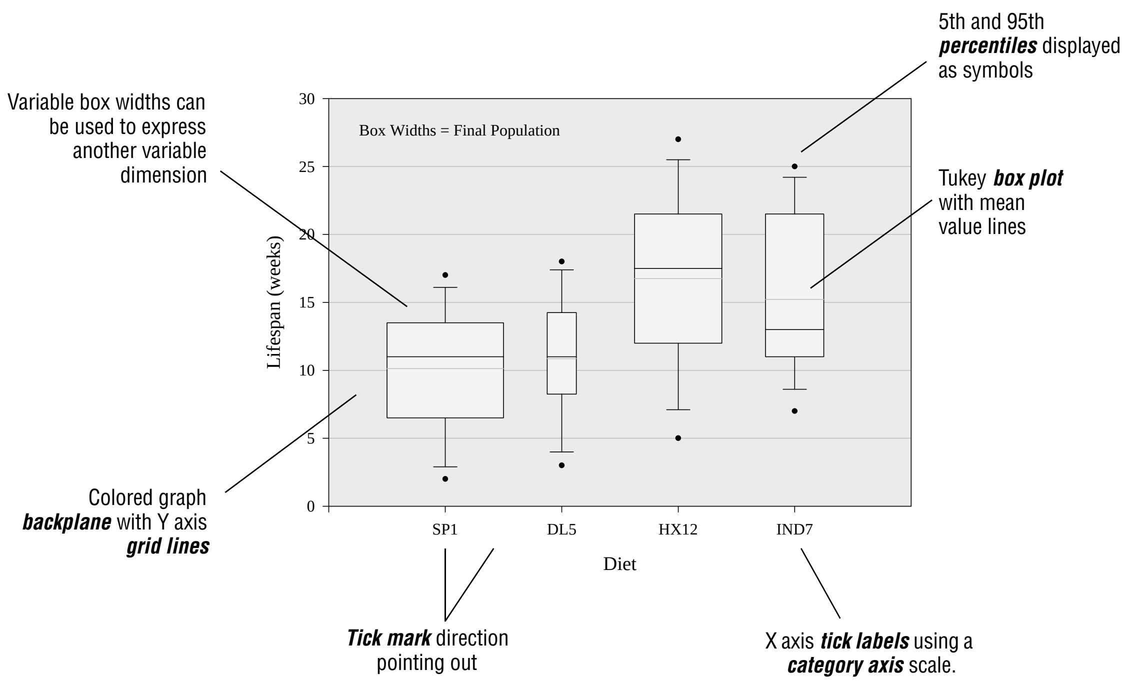


Image art cut from a paint program and pasted onto the page using the Windows Clipboard
Post break tick interval set to a new value
Y axis break at 75% along the axis length
Error bars using worksheet column data
Bar fill colors use a pattern from a worksheet column
Number of Individuals
1200
800
400
240
200
160
120
80
40
0
monospecies
with competition
1 months
3 months
5 months
7 months
9 months
11 months
Legend symbols and text labels
Grouped bar chart with specified bar and group widths
X axis tick labels using text from a worksheet column



Common log scale Y axis with major and minor tick marks
Scatter plot of color gradient filled symbols using a point plot style
Base and exponent log axis tick labels
Linear regression with 99% confidence and prediction intervals
True **Date and Time axis scale**, displaying months and weeks
Counts per Area
10^3
10^2
10^1
10^0
January
April
July
October
January
1996
Counts
1st Order Regression
95% Confidence Interval
95% Prediction Interval

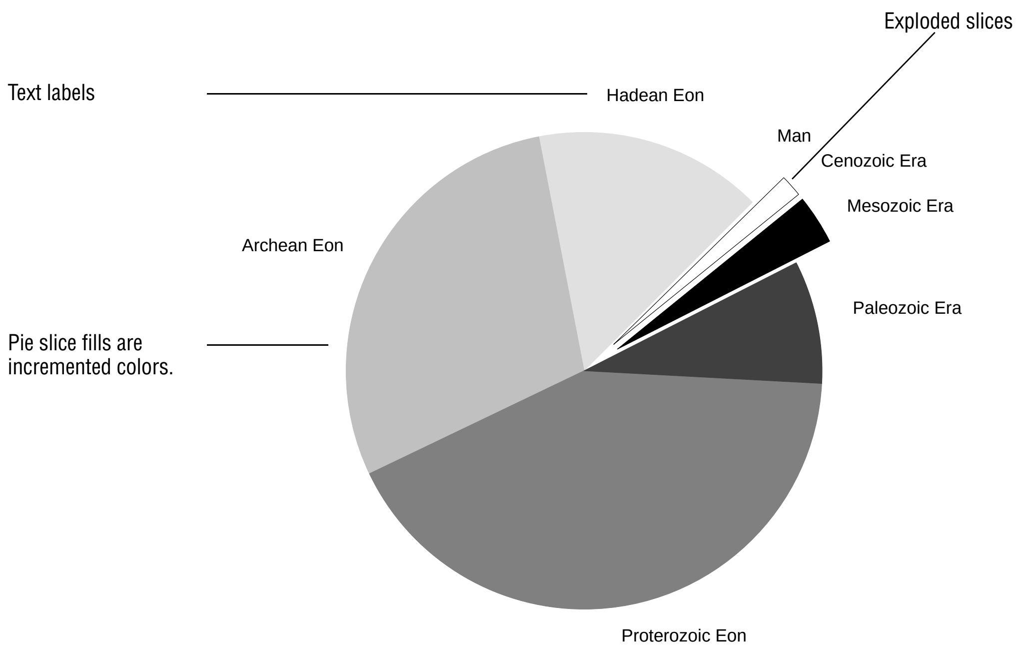


Variable box widths can be used to express another variable dimension
Colored graph **backplane** with Y axis **grid lines**
5th and 95th **percentiles** displayed as symbols
Tukey **box plot** with mean value lines
Tick mark direction pointing out
X axis **tick labels** using a **category axis** scale.
Box Widths = Final Population
Lifespan (weeks)
30
25
20
15
10
5
0
SP1
DL5
HX12
IND7
Diet

Pie Chart Example

Pie charts are useful for displaying a quick comparison of ratios in a data set. The example figure displays:

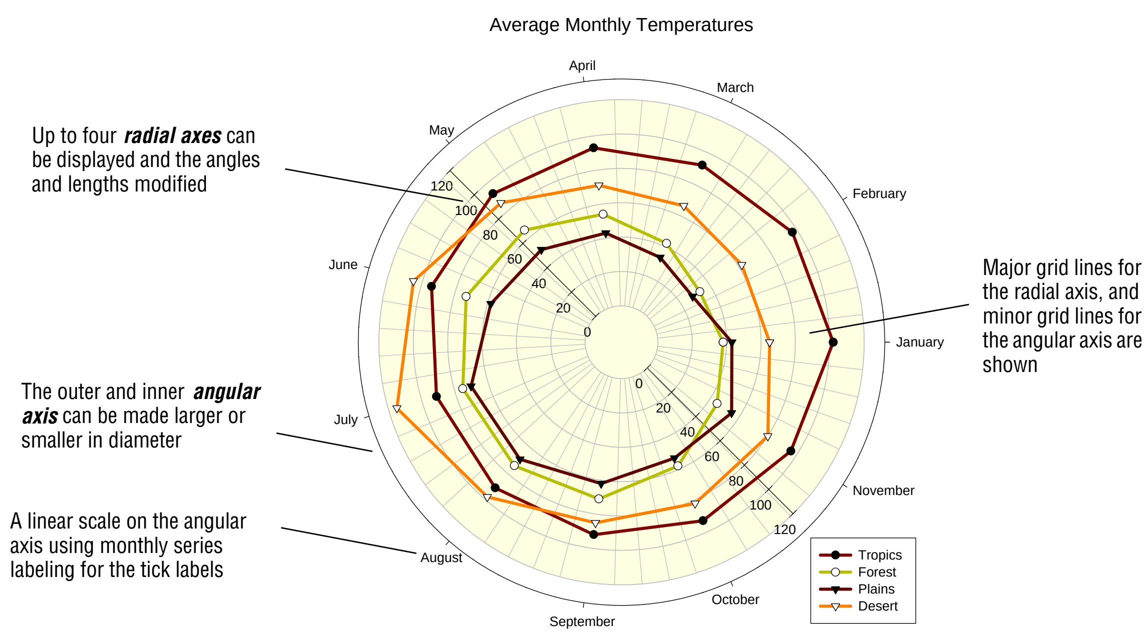
- ➤ Slice fills
- ➤ Text labels
- ➤ Exploded slices



Polar Plot Example

Polar plots are useful for displaying data which is modular in nature. The example figure displays:

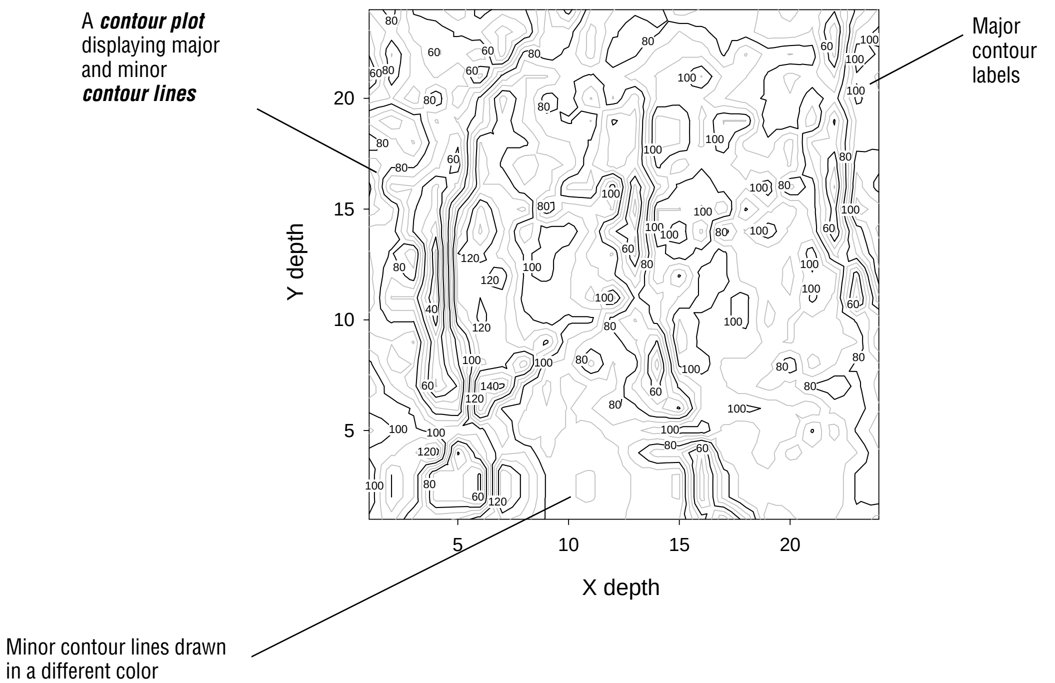
- Angular axis size and location
- Major grid lines for the angular axis
- Radial axes range angle and length



Contour Plot Example

Use *2D Contour Plots* to graph three dimensional data in two dimensions. The following example includes:

- ➤ Major and minor contour lines
- ➤ Contour labels

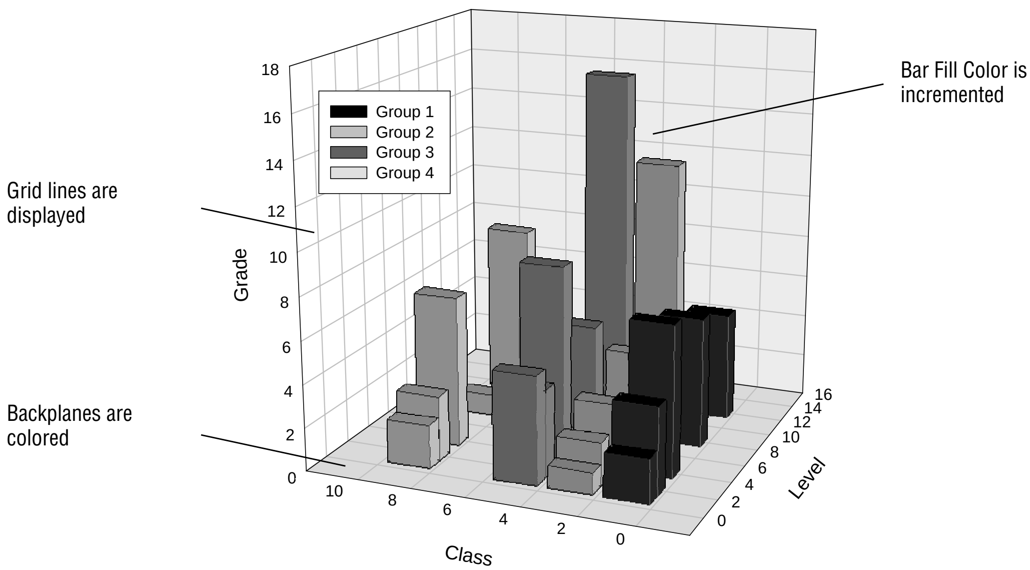


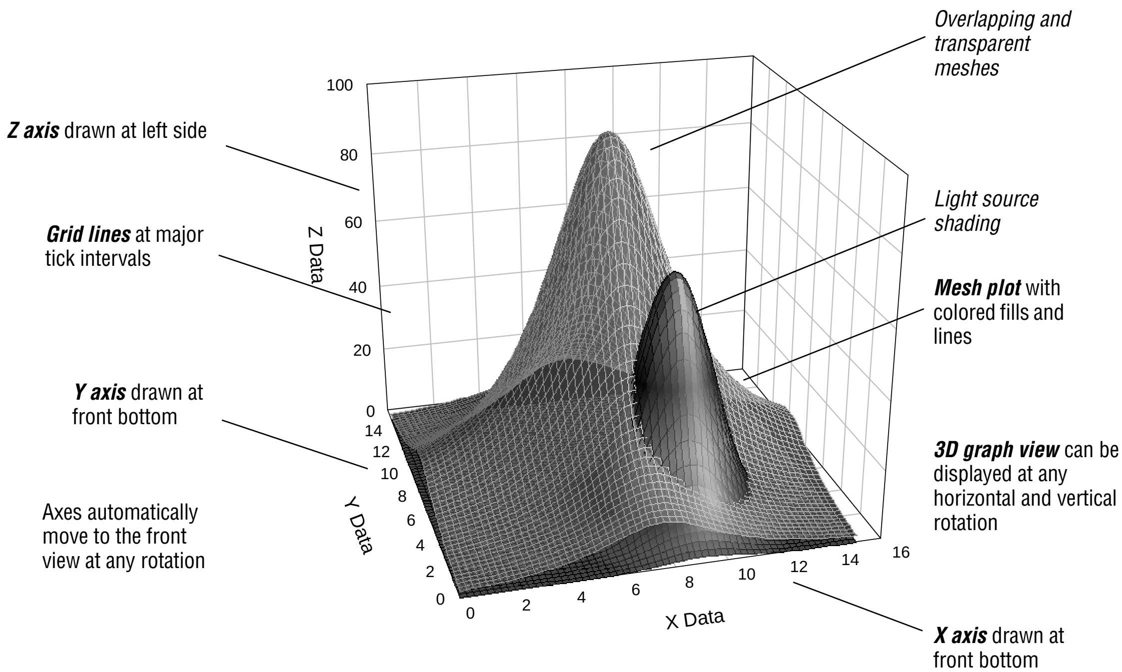
3D Cartesian Graph Examples

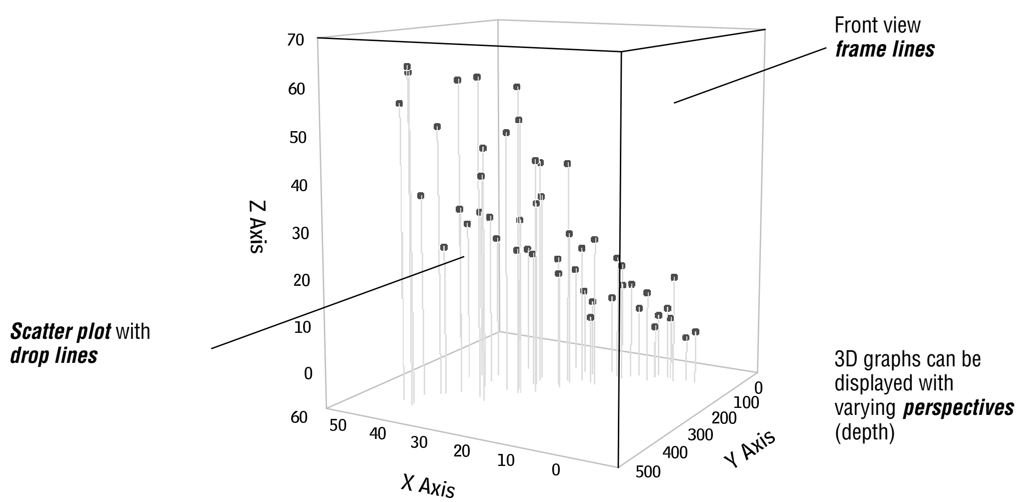
3D Cartesian Graphs are scatter, trajectory, mesh plots, and bar charts. SigmaPlot provides an extensive range of 3D graph features, including:

- ➤ Bar charts, scatter plots, mesh plots, frame lines
- ➤ Incrementing fill color, transparent mesh, drop lines
- ➤ X, Y, and Z axis titles, rotated axis labels, grid lines, backplanes

The following figures contain examples of these plots, as well as some additional 3D features.



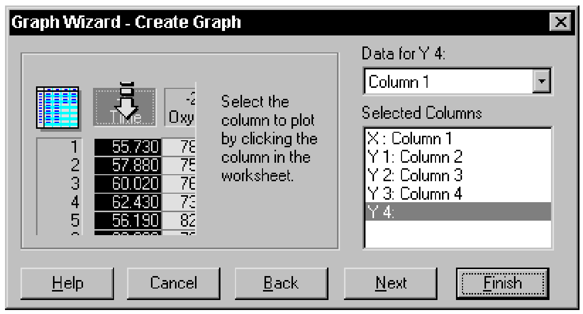

Overlapping and transparent meshes
Z axis drawn at left side
Grid lines at major tick intervals
Light source shading
Mesh plot with colored fills and lines
Y axis drawn at front bottom
3D graph view can be displayed at any horizontal and vertical rotation
Axes automatically move to the front view at any rotation
X axis drawn at front bottom
Z Data
Y Data
X Data
100
80
60
40
20
0
14
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
16


Front view frame lines
Scatter plot with drop lines
3D graphs can be displayed with varying perspectives (depth)
Z Axis
X Axis
Y Axis
70
60
50
40
30
20
10
0
60
50
40
30
20
10
0
0
100
200
300
400
500

Setting Program Options

Use SigmaPlot's program options to control application settings, as well as how worksheets and new pages and graphs will appear. To view the Options dialog box, choose Options from the Tools menu.

Figure 1–8
The Options Dialog Box



Worksheet Options

Worksheet options include settings for numbers, statistics, date and time, worksheet display, default column width, number of decimal places, and use of engineering notation. Using this panel is described in "Worksheet Basics" on page 55.

Page Options

Page options control graph page properties. Working with graph pages is explained in "Graph Page Basics" on page 93.

System Options

The system panel of the Options dialog box controls application settings.

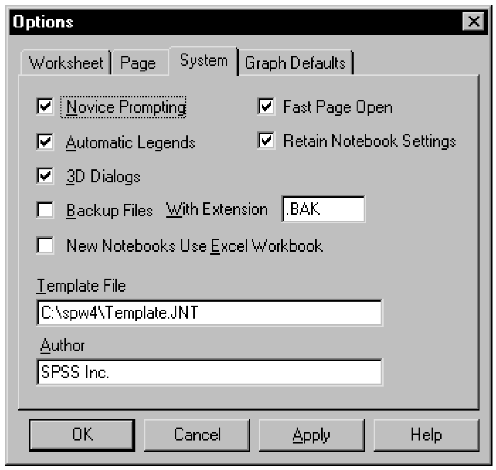
Novice Prompting Novice prompts are warning, information, and confirmation messages that may display before certain operations occur. When novice prompting is disabled, some of these messages no longer appear. To disable novice prompting, clear the check box.

Automatic Legends SigmaPlot creates a legend each time a graph is created, based upon the specifications of the graph. When this check box is selected, the legend appears by default.

If this check box is not selected, legends are not automatically displayed, but can be displayed by selecting Show Legend in the Title and Legend panel of the Graph

Properties dialog box. To learn more about automatic legends, see “Graph Page Basics” on page 93.

Figure 1–9
The System Panel



3D Dialog boxes Use this option to alter the appearance of the SigmaPlot dialogs. 3D dialog boxes have a gray background and a “chiseled” appearance. If you clear this option, dialogs will replace the shades of gray with a black and white 2D appearance.

Backup Files Check this option to automatically create a backup file when saving any notebook. You can also select the extension SigmaPlot assigns to these files by selecting the With Extension edit box and typing three letters. These files appear in the directory where your original data files are stored, and can also be accessed from SigmaPlot by choosing Option from the File menu.

New Notebooks Use Excel Workbooks Check this option to open an Excel workbook each time you create a new notebook. See “Notebook Basics” on page 39.

Fast Page Open Improves saving and opening times for graph pages by not saving the attributes for hidden objects.

Retain Notebook Settings This option retains the windows and items open when the notebook was saved last, and reopens them the next time the notebook is open. When unchecked, time is saved when opening a notebook that had many open items.

Template File Type the path and file name of the template file for SigmaPlot to use when creating new graph pages. Available templates are displayed in the Templates dialog box. For more information on applying and using templates, “Graph Page Basics” on page 93.

Author Select and type your name, or any other name you want to appear in the Summary Information as Author for a selected notebook item. The name in this box is used by SigmaPlot as the default, but can be changed for individual documents by choosing Summary Info from the File menu.

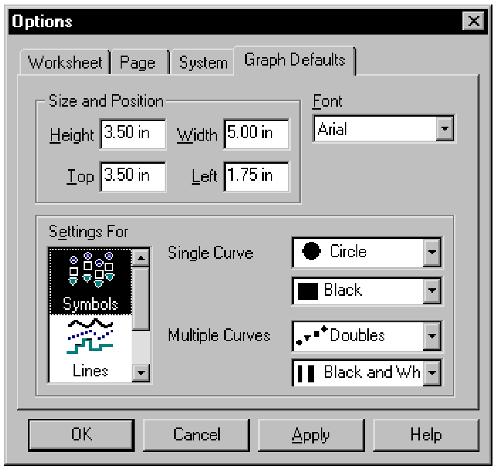
The Graph Defaults Panel

Graph defaults control attributes that are applied to all new graphs, including:

- Size and Position
- Font
- Settings for Symbols, Lines and Bars

To learn about graph defaults, see "Graph Page Basics" on page 93.

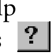
Figure 1–10
The Graph Defaults Panel



SigmaPlot Help

SigmaPlot's online help uses the standard Windows help system. View the Windows Help on Help or refer to your Windows documentation for more information on using Windows help.

To get help, from the Help menu, choose either SigmaPlot Help to open the help search dialog box and search for a specific topic within help, or choose Contents to open SigmaPlot Help Contents.



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Exiting SigmaPlot

When you exit SigmaPlot, all current toolbar and text settings are saved as defaults for the next session.

Choose Exit from the File menu, or press Alt+F, then X to leave SigmaPlot. You can press Alt+F, or Alt+F4 from any location in the program to quit.

Getting Technical Support

The services of SPSS Technical Support are available to registered customers. Customers may call Technical Support for assistance in using SPSS products or for installation help for one of the supported hardware environments. To reach Technical Support, see the SPSS home page on the World Wide Web at *http://www.spss.com*, or contact us:

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Mail:	P.O. Box 7005 San Rafael, CA 94912-7005

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If you are experiencing any kind of problem, please try consulting this manual. If you still cannot solve your problem, feel free to contact our Technical Support department. Please be at your computer and be prepared to identify yourself, your organization, and the serial number of your system.

Using This Manual

The *SigmaPlot User's Guide* is designed to provide you with complete instructions on how to use SigmaPlot's advanced graphing features. Referencing this manual along with SigmaPlot, you can create a wide variety of publication-quality scientific graphs on your IBM or compatible PC.

Conventions

The following conventions are used in this manual:

- New terms, such as *Graph Wizard* are shown in bold italic the first time they are introduced.
- Important notes or information in this manual are flagged with a Σ symbol.

The *User's Guide* includes chapters on Notebook, Worksheet, and Graph Page basics. It begins with the QuickStart, which gives you the basics of graph creation. The latter part of the book is reference material that covers more complex graph creation and details of using SigmaPlot.

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Tel: +49.2104.9540
Fax: 49.2104.95410

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http://www.spss.com/international/asc.html

Additional Publications

Additional copies of SigmaPlot product manuals may be purchased from Prentice Hall, the distributor of SPSS Inc. publications. To order, fill out and mail the Publications order form included with your system or call toll-free. If you represent a bookstore or have an account with Prentice Hall, call 1-800-223-1360. If you are not an account customer, call 1-800-374-1200. In Canada, call 1-800-567-3800. Outside of North America, contact your local Prentice Hall office.

Except for academic course adoptions, manuals can also be purchased from SPSS Inc.

References

We have found the following references very useful for graph design and layout.

M. Brent Charland, Ph.D. 1995. *SigmaPlot for Scientists.* Wm. C. Brown Communications, Inc., 2460 Kerper Boulevard, Dubuque, Iowa, 52001.

Cleveland, William S. 1985. *The Elements of Graphing Data.* Monterey, Calif.: Wadsworth, Inc. (408) 373-0728.

Kosslyn, Stephen M. 1994. *Elements of Graph Design*. New York: W.H. Freeman and Company,

Tufte, Edward R. 1983. *The Visual Display of Quantitative Information.* Cheshire, Conn.: Graphics Press. Available from Science News Books, 1719 N. St. NW, Washington, D.C. 20036.

Scientific Illustration Committee of the Council of Biology Editors. 1988. *Illustrating Science: Standards for Publication.* Bethesda, Maryland: Council of Biology Editors, Inc.

2

QuickStart

This chapter provides you with a step-by-step introduction to many of SigmaPlot's most common features.

Creating a graph involves the following:

- ➤ Organizing data in a worksheet.
- ➤ Selecting the data columns to graph.
- ➤ Selecting a graph type and graph style.
- ➤ Selecting a data format.
- ➤ Modifying the graph properties.

Entering Data

When you start SigmaPlot, the SigmaPlot window appears with an empty worksheet and a notebook window. Click anywhere on the notebook window or the worksheet to bring them into view. The notebook window looks similar to the Windows Explorer. The worksheet looks like a spreadsheet and contains rows and columns.

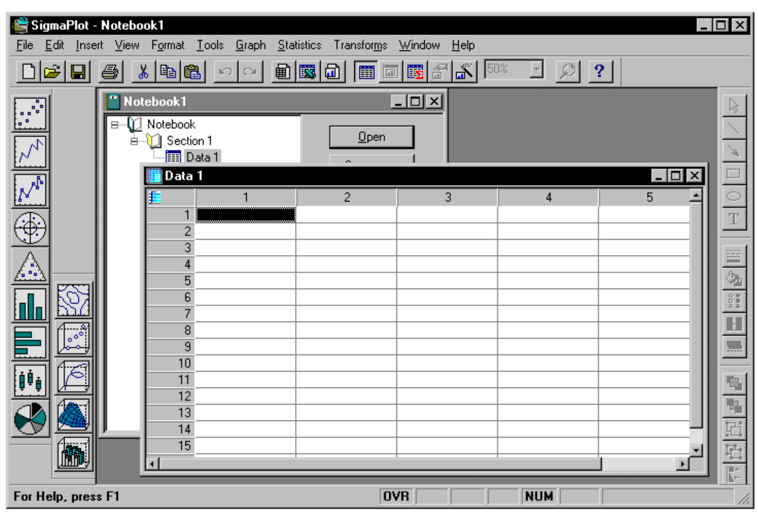


Figure 2–1
A new notebook file contains an empty worksheet and a notebook window

To make a graph, you must first enter or import data into a worksheet.

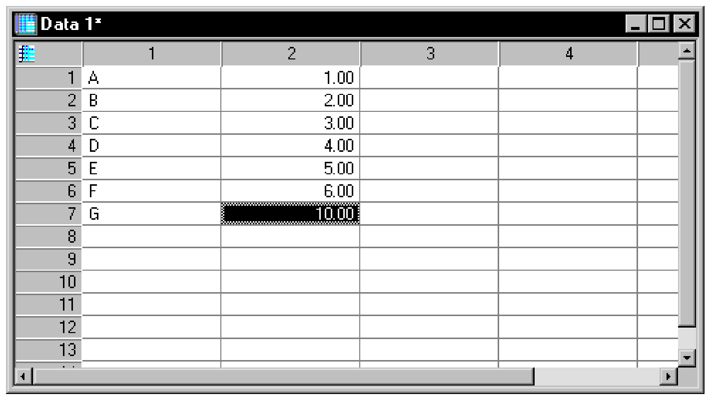
To enter the data:

Click in the cell at row 1, column 1 of the worksheet.

Press the Caps Lock key to capitalize the text and type the first data point shown in Figure 2–2, then press Enter. The worksheet cursor moves down one row.

Continue entering the rest of the data shown in Figure 2–2. When you are finished with one column, press the Home key and then use the Right Arrow key to move the worksheet cursor to move to the second column.

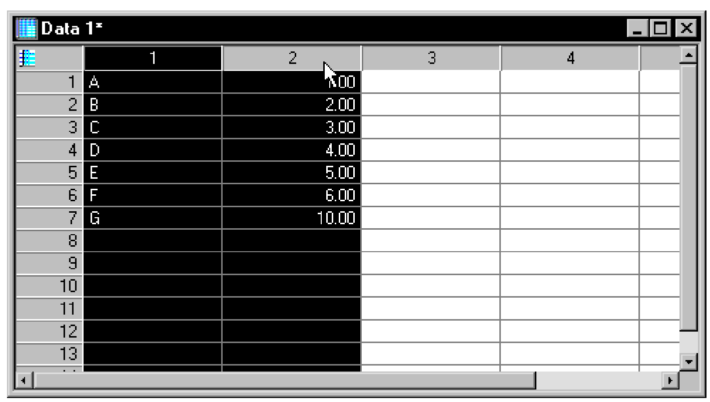
Figure 2–2
Example of Data Entered into the Worksheet



Plotting Graph Data

When you are finished entering all the data, drag the mouse over the two column titles to select both columns of data.

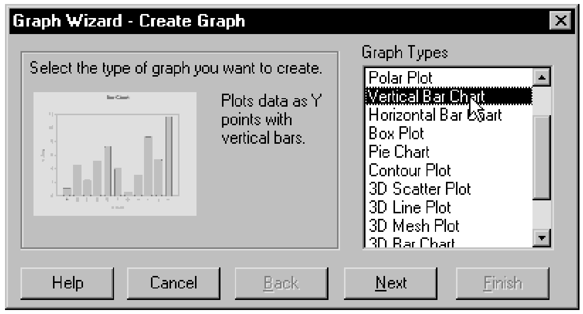
Figure 2–3
Data Entered and Selected in the Worksheet



With two columns of data in the worksheet, now you can create a bar chart using the Graph Wizard. To open the Graph Wizard, press the F3 button.

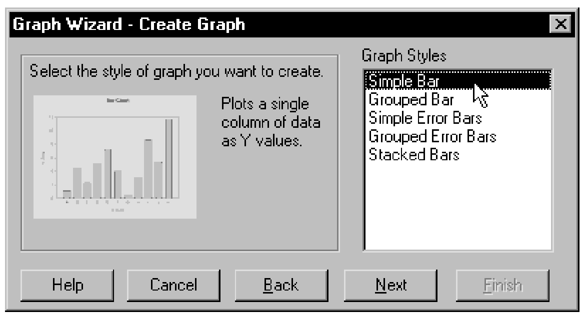
First, the Graph Wizard prompts you to specify a graph type. Select the Vertical Bar Chart graph type from the scroll down list, then click Next.

Figure 2–4 Selecting a Graph Type from the Graph Wizard



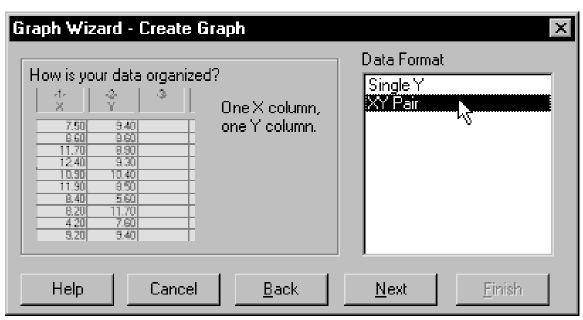
Some graph types in SigmaPlot have different styles. You can choose your preferred style from the Graph Style scroll down list. Select Simple Bar, and click Next.

Figure 2–5 Selecting a Graph Style from the Graph Wizard



Now the Graph Wizard prompts you to select a data format. Select XY Pair from the Data Format list, and click Next.

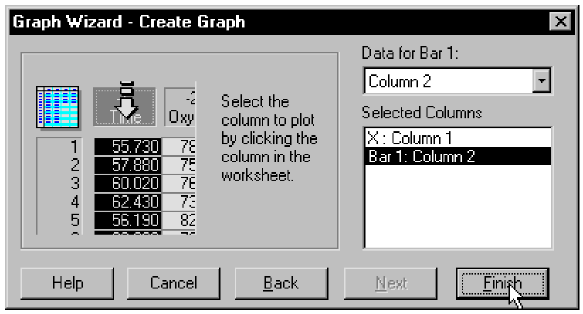
Figure 2–6 Selecting a Data Format from the Graph Wizard



The Graph Wizard prompts you to specify the columns of worksheet data you want to graph. Because you selected the columns before you started to create the graph, the X and Bar 1 columns are already assigned as your X and Y data in the Selected Columns list. If the worksheet columns do not already appear in the Selected

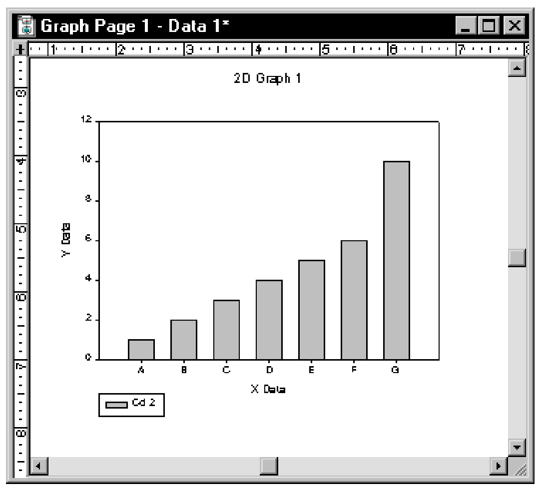
Columns list, click the anywhere in the worksheet columns to assign them to the highlighted option in the Selected Columns list.

Figure 2–7
Selecting Columns from the Graph Wizard



Click Finish to make the graph.

Figure 2–8
A Vertical Bar Chart



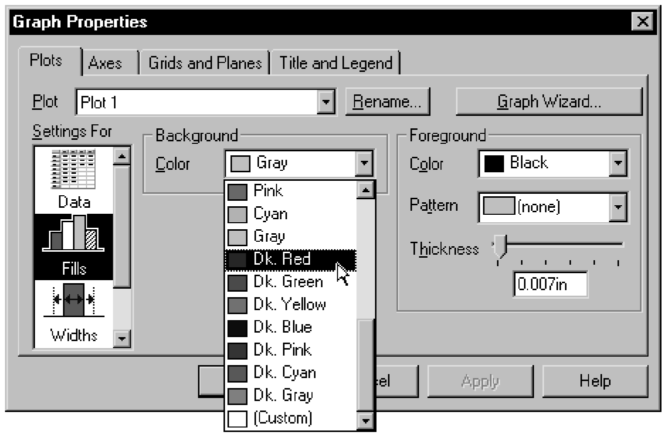
Modifying the Graph

You can change the appearance of the graph using the Graph Properties dialog box.

First, we'll change the bar fill color. To change the characteristics of the bar chart, click the graph bars. A hand appears next to the pointer indicating that the bar chart is selected.

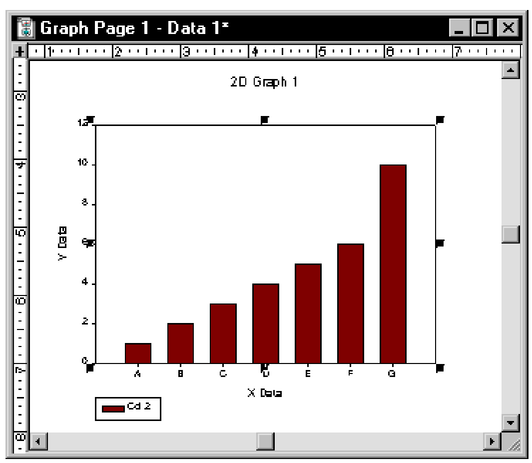
Now double-click the bars to open the Graph Properties dialog box. Make sure Fills in the Settings For list is selected.

Figure 2–9
Graph Properties Dialog
Plots Panel



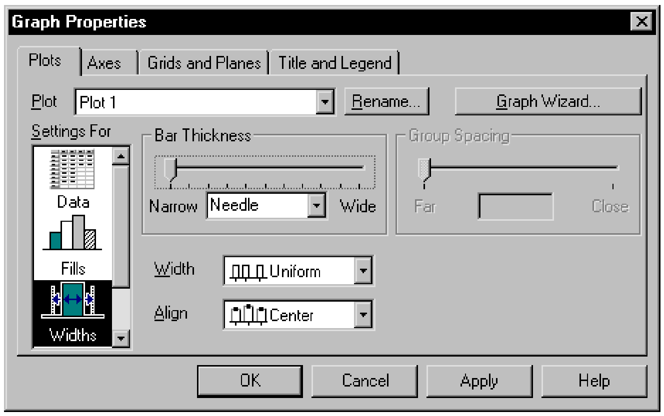
Select the Dark Red fill color option from the Background Color drop down list, then click Apply to modify the graph while keeping the Graph Properties dialog box open. The graph appears with the dark red bars.

Figure 2–10
Result of Changing Bar
Width and Fill Color



Now let’s change the bar widths. First, make sure that the Graph Properties dialog box is open to the Plots panel. Select Widths from the Settings For list.

Figure 2–11
Selecting Bar Width from the Settings For List



Using the pointer, move the Bar Thickness slider to the left so that Needle appears in the drop-down list, then click the Apply button. Notice that the bar thickness is thin.

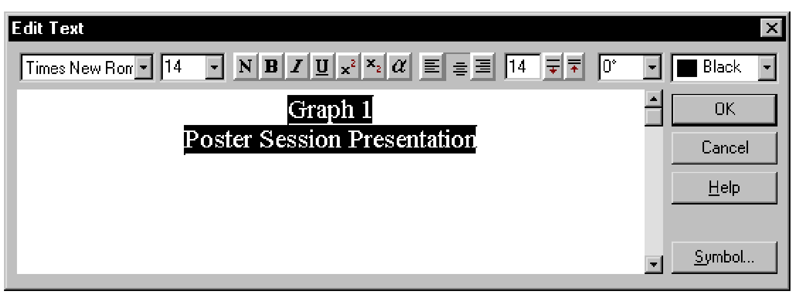
Now, move the Bar Thickness slider to 100% and click OK to close the Graph Properties dialog box. The bar widths change to the largest non-overlapping widths possible.

Changing the Graph Title

To replace the graph title with more meaningful information, double-click the title. The Edit Text dialog box appears with the selected label displayed and highlighted.

Type *Graph 1* in place of the highlighted text, then press Enter and type *Poster Session Presentation*. Center the title by selecting the text and then clicking the Center  button.

Figure 2–12
Edit Text Dialog Box: Drag the pointer to select the text you want to format.



To change the font of the text, select Times New Roman from the font drop-down list, then click OK to close the Edit Text dialog box. The new title appears on your graph.

Modifying Data Interactively

You can change the data in the worksheet at any time. All graphs that use the same data will update to reflect the modification. To make revisions to your data, first activate the worksheet by clicking the View Data button on the toolbar. Then select a cell or group of cells with the pointer, and enter new data. For this example, type the value 10 in the first cell of the second column and press Enter. View the graph by clicking on the View Page button on the toolbar. Your graph now reflects the new data value.

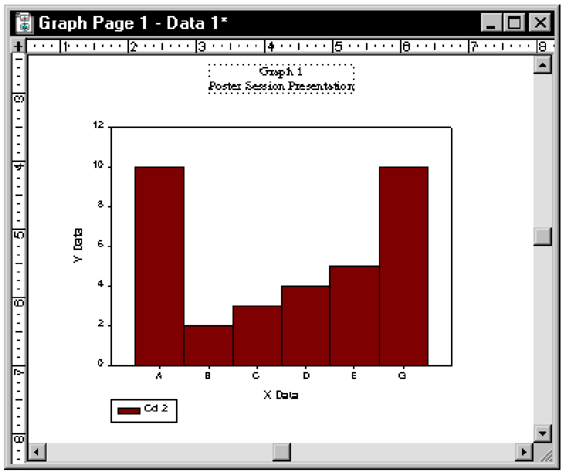


Figure 2–13 Dynamically modifying the bar chart data.

Saving the Notebook File

To save your notebook, first click the File Save button in the toolbar to open the Save As dialog box. Using the list of folders in the Save In drop-down list, select the Samples folder located under the default SigmaPlot folder. Now, press the Tab key to place the cursor in the File Name drop-down list box and type QuickStart1 as the file name. Click Save.

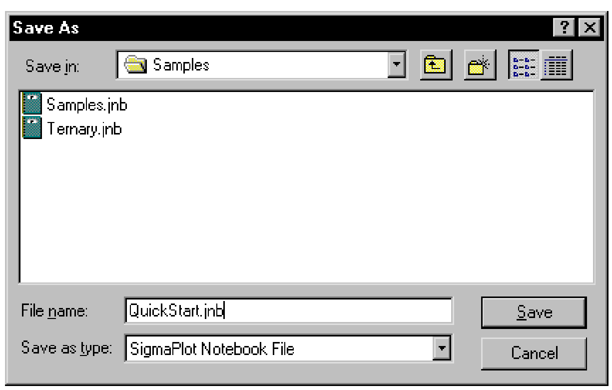


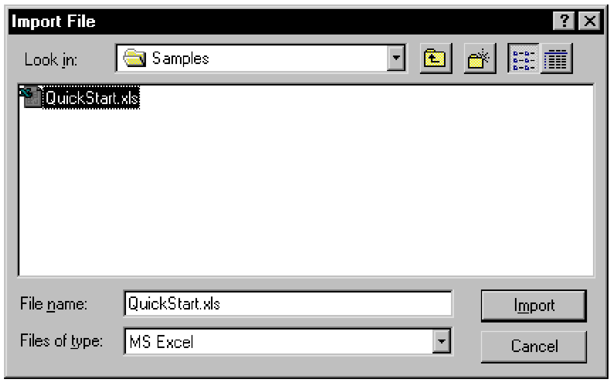
Figure 2–14 Using the Save As dialog box.

Notebook files are saved with .JNB extensions. Later, when you return to your notebook file, you will see the extension appended to the notebook name in the title bar.

Importing New Data

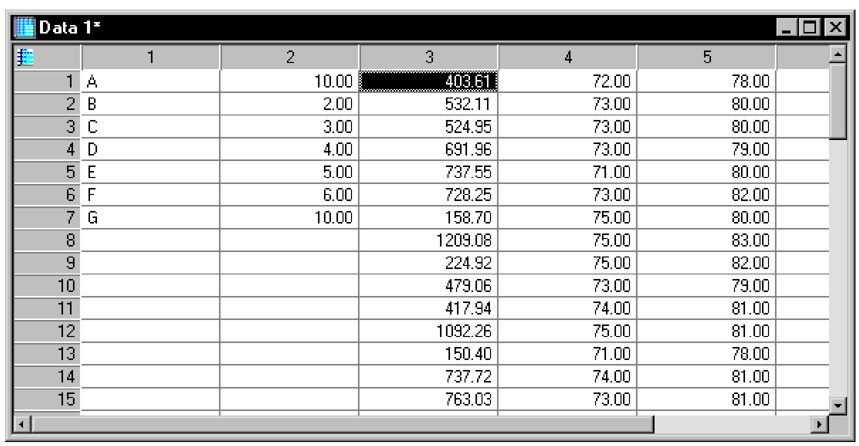
You can import some more data, then plot it with the second graph. Click the View Data toolbar button to view the worksheet. Imported data appears at the last worksheet cursor location, so move the worksheet cursor to row 1 of column 3, then press Ctrl+I to open the Import File dialog box. Select MS Excel from the Files of Type drop down list, then select QuickStart.xls from the list of files and click Import.

Figure 2–15
Import File Dialog Box



When the Import Spreadsheet dialog box appears, click Import. The data appears in the worksheet beginning in column 3.

Figure 2–16
Worksheet with Imported Data Columns: The imported data is located in columns 3, 4, and 5.

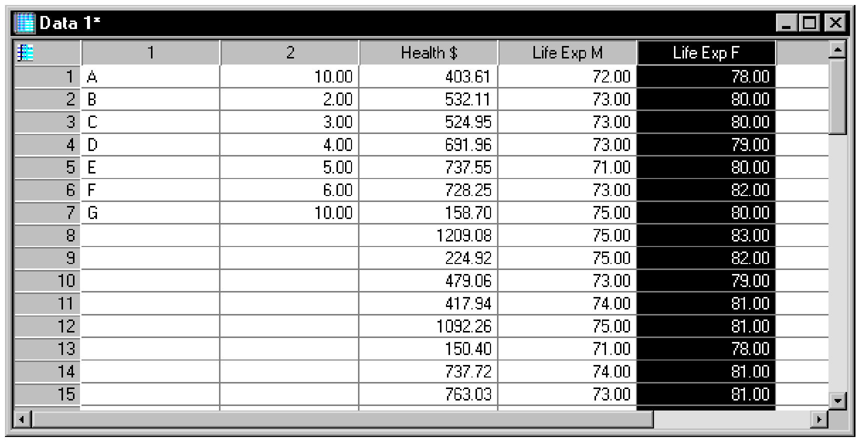


	1	2	3	4	5
1	A	10.00	403.61	72.00	78.00
2	B	2.00	532.11	73.00	80.00
3	C	3.00	524.95	73.00	80.00
4	D	4.00	691.96	73.00	79.00
5	E	5.00	737.55	71.00	80.00
6	F	6.00	728.25	73.00	82.00
7	G	10.00	158.70	75.00	80.00
8			1209.08	75.00	83.00
9			224.92	75.00	82.00
10			479.06	73.00	79.00
11			417.94	74.00	81.00
12			1092.26	75.00	81.00
13			150.40	71.00	78.00
14			737.72	74.00	81.00
15			763.03	73.00	81.00

Labeling Data Columns

Labeling worksheet columns helps keep track of your variables. Double-click the column heading for column 3 and type *Health $*, then press Enter. Although this selects the entire column, pressing the Right Arrow key moves the cursor to the column 4 heading. For column 4 type *Life Exp M*, press Enter, and again press the Right Arrow key to move to column 5. In column 5 type *Life Exp F*, then press Enter.

Figure 2–17 Entering Worksheet Column Titles



Data 1*

	1	2	Health $	Life Exp M	Life Exp F
1	A	10.00	403.61	72.00	78.00
2	B	2.00	532.11	73.00	80.00
3	C	3.00	524.95	73.00	80.00
4	D	4.00	691.96	73.00	79.00
5	E	5.00	737.55	71.00	80.00
6	F	6.00	728.25	73.00	82.00
7	G	10.00	158.70	75.00	80.00
8			1209.08	75.00	83.00
9			224.92	75.00	82.00
10			479.06	73.00	79.00
11			417.94	74.00	81.00
12			1092.26	75.00	81.00
13			150.40	71.00	78.00
14			737.72	74.00	81.00
15			763.03	73.00	81.00

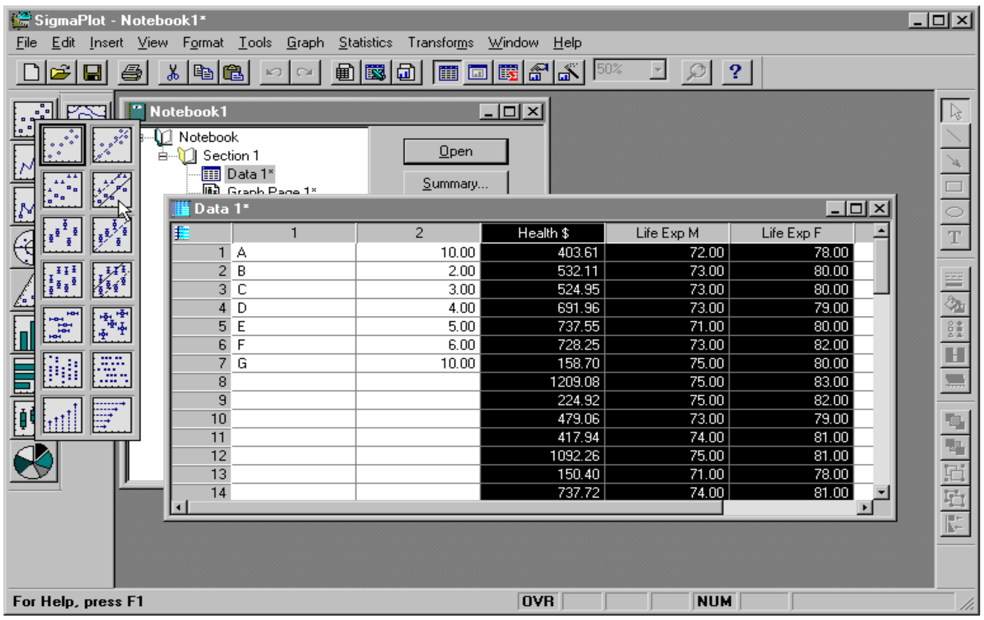
Making a Graph Using the Toolbar

Now let's make a graph using the imported data. This time, instead of choosing a graph type and style with the Graph Wizard, we'll use the Graph toolbar.

First, click and drag across the three new columns to select them.

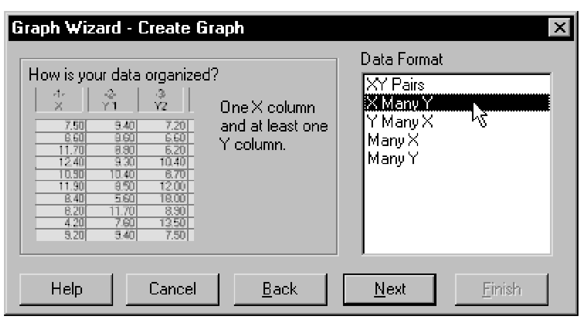
To select a graph type and style, click the scatter plot button from the 2D graph toolbar, and then click the multiple regression lines button from the style toolbar which appears.

Figure 2–18 Selecting a Graph Type and Style Using the Graph Toolbar



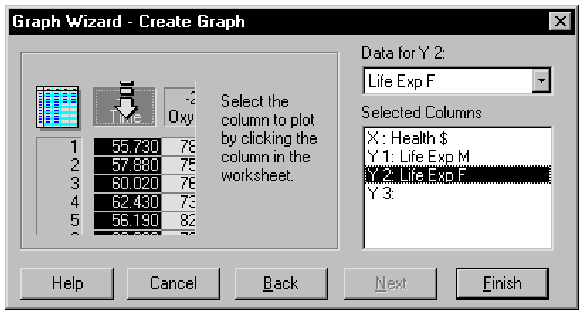
The Graph Wizard appears prompting you to specify a data format for your graph. Select X Many Y, and click Next.

Figure 2–19 Selecting a Data format from the Graph Wizard



Now you need to pick the worksheet data to assign to the graph. Because you selected the columns before you started to create the graph, the Health $, Life Exp M, and Life Exp F columns are already assigned as your X, Y1, and Y2 data in the Selected Columns list. If the worksheet columns do not already appear in the Selected Columns list, click the worksheet columns to assign them to the highlighted option in the Selected Columns list.

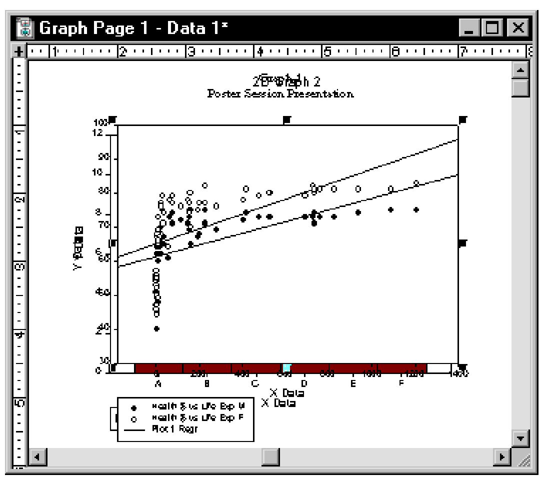
Figure 2–20
Using the Graph Wizard to Pick Columns to Plot to your Graph



If you make a mistake when assigning columns, either highlight the column assignment in the Selected Columns list and select the correct column from the worksheet, or clear the column assignment by double-clicking it in the Selected Columns list, then select the correct worksheet column.

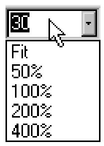
Click Finish. The new graph appears on the page with regression lines for each data series.

Figure 2–21
A Scatter Plot with Multiple Regression Lines



Moving the Graphs

Because you want to show both graphs on the page, you need to adjust their positions.

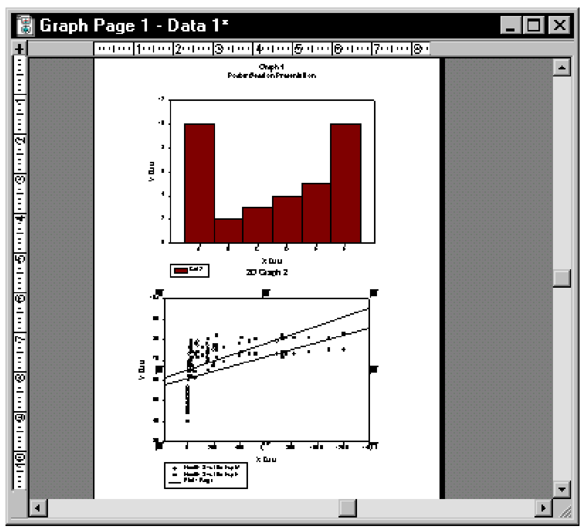


First, adjust the Zoom so that you can see the entire graph page. To adjust the Zoom, click on the Zoom drop-down list which is in the toolbar, type 30 as a value, and click Enter.

To move the scatter plot to the bottom of the page, click on the scatter plot and drag its dotted outline to a new position at the bottom of the page.

Now, select the bar chart and drag it to the top of the page. Both the Scatter Plot and the Bar chart are visible.

Figure 2–22
Moving the Graphs



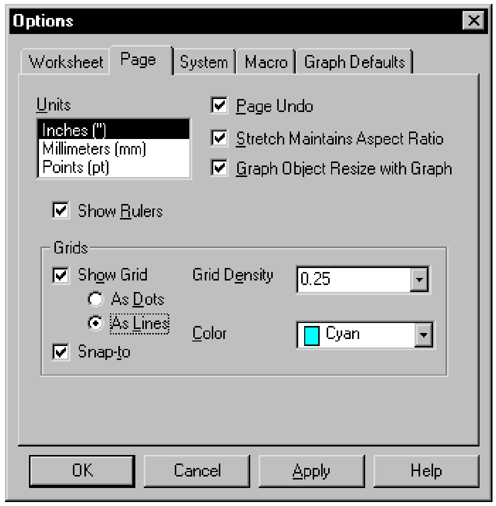
Sizing Graphs on the Page

To resize the scatter plot, select the graph, then use the small square handles that appear on the perimeter. Click the bottom middle handle and drag the dashed outline up, so that it shrinks to form a smaller rectangle. When you release the mouse button, the graph changes size.

Aligning the Graphs

The easiest way to align graphs and objects is with SigmaPlot's new snap-to grids, rulers, and crosshairs. From the Tools menu Options dialog box, select the Show Rulers, Snap-to, and Show Grid check boxes. Select Inches from the Units menu, and from the Field Density drop-down list, select 0.25 inches. Select As Lines from the Show Grid option.

Figure 2–23 Selecting Rulers, Grids, and Snap-to from the Tools menu Options dialog box.

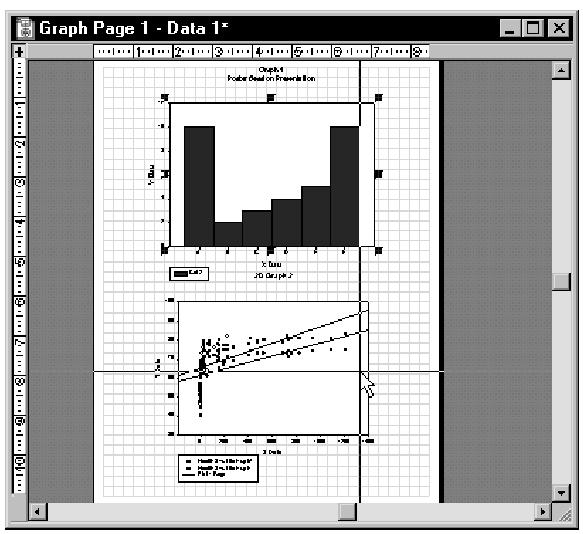


Click OK. Grids and rulers appear on the graph page.

Now click the Crosshairs button on the top left corner of the graph page. Crosshair lines extend from the pointer tip to the rulers and to the right and bottom of the window, and follow the pointer.

With the Snap-to option turned on, the graph snaps to the nearest grid point. Use the crosshairs and rulers to further help you align the graphs.

Figure 2–24 Moving graphs using crosshairs, rulers, and grids.



Turn off the grids Show Grid option from the Tools menu Options dialog box. To turn crosshairs off, click the crosshairs button again.

Changing the X Axis Scale

The linear scale of the X axis bunches the smaller data values. A log scale would better suit the data.

To get a closer look at the scatter plot, click on the Zoom button and use the pointer to define a rectangle around the scatter plot. Release the mouse button when you have a view that you like.

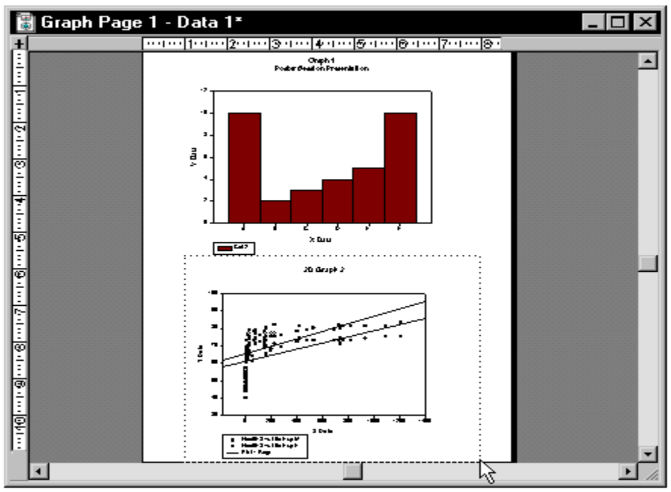


Figure 2–25 Changing the Zoom: The Zoom pointer selects a rectangular region for a close-up.

Click the X axis select it. Now it is enclosed by a rectangular dotted-line.

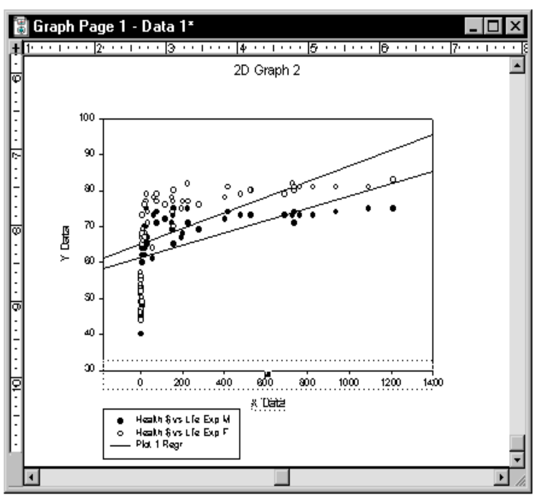
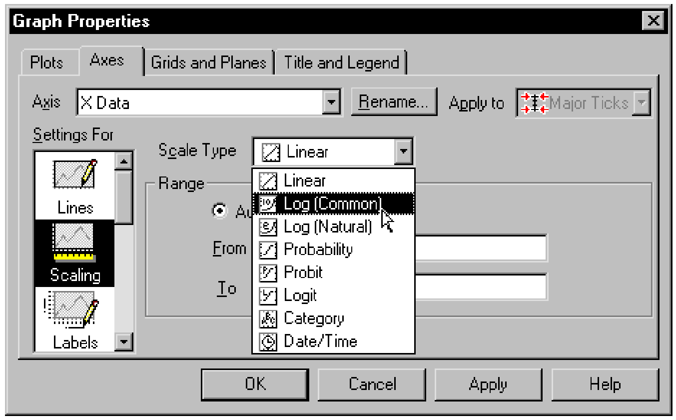


Figure 2–26 Selecting the X Axis to Change the Scale: A rectangular dotted-line indicates that the axis is selected.

Next, click the Scale button on the formatting toolbar.

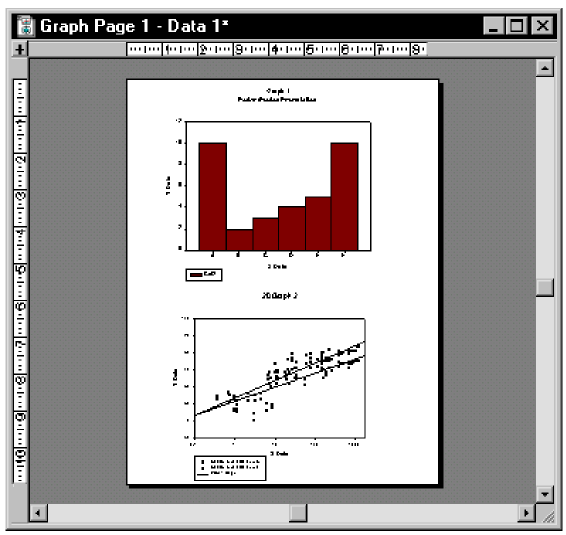
The Graph Properties dialog box opens directly to the Axes Scaling panel. Select Log (Common) from the Scale Type drop down list, then click OK to change the scale.

Figure 2–27
Graph Properties Axes Panel



Return the graph to full-page by selecting Fit from the Zoom drop-down list.

Figure 2–28
Quick Start Graphs: A full-page view is obtained by selecting Fit from the Zoom drop-down list.



Printing the Graph

To print the page using the default settings, click the Print button.

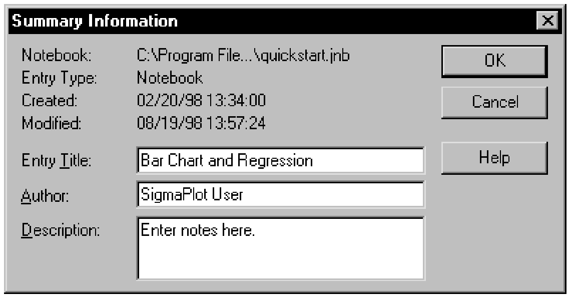
Renaming Notebook Sections

You can customize the default names that SigmaPlot assigns to the sections of your notebook. For example, to rename the title of the notebook, bring the notebook window forward by clicking anywhere in it.

Select the Notebook section (it is labeled Notebook 1*) and use the Summary button to open the Summary Information dialog box. Type Bar and Regression in the Entry Title edit box. Press the Tab key twice to locate the cursor in the

Description box of the Summary Information dialog box. Type a short note to describe your graph and click OK. The new section name appears in the notebook window.

Figure 2–29
Edit Notebook information in the Summary dialog box.



Saving the Notebook File

To save your work, press Ctrl+S. The additions that you made to the graph are saved.

Summary

Congratulations! You have performed many of the procedures that you will use in creating your own graphs. Here are the features and procedures that were covered as you created two graphs and placed them on the same page:

- Importing data files and direct data entry.
- Changing size, position, and relative alignment of graphs.
- Re-scaling of axes.
- Changing graph properties and editing titles.
- Printing.
- Labeling and annotating notebook files.

3

Notebook Basics

The SigmaPlot *notebook file* contains all of your SigmaPlot data and graphs. The notebook file can be exported to other applications, and accept data from other applications. This chapter covers:

- ➤ SigmaPlot notebook organization (see page 39)
- ➤ Managing a notebook file (see page 42)
- ➤ Creating notebooks and adding notebook items (see page 43)
- ➤ Renaming notebooks and notebook items (see page 46)
- ➤ Opening notebooks and notebook items (see page 47)
- ➤ Copying, pasting, and deleting notebook items (see page 49)
- ➤ Saving your work (see page 50)
- ➤ Exporting data, graphs and text reports (see page 51)
- ➤ Printing worksheets, pages and reports (see page 52)

SigmaPlot Notebook Structure

Each SigmaPlot notebook file contains many different documents arranged as a tree structure. Every time you start SigmaPlot, a worksheet opens in the notebook window. To make a notebook window active or current, click it. From the notebook window, you can open, store, move, and delete notebook sections and items.

For more information, “Opening Notebook Files and Items” on page 47, and “Copying, Pasting and Removing Notebook Items” on page 49.

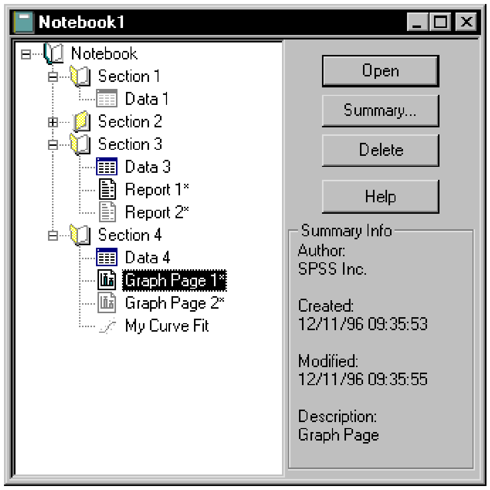


Figure 3–1
A Notebook Window with Multiple Sections
Each section can contain only one worksheet, but multiple pages, reports, and equations.

Modified Notebook Items

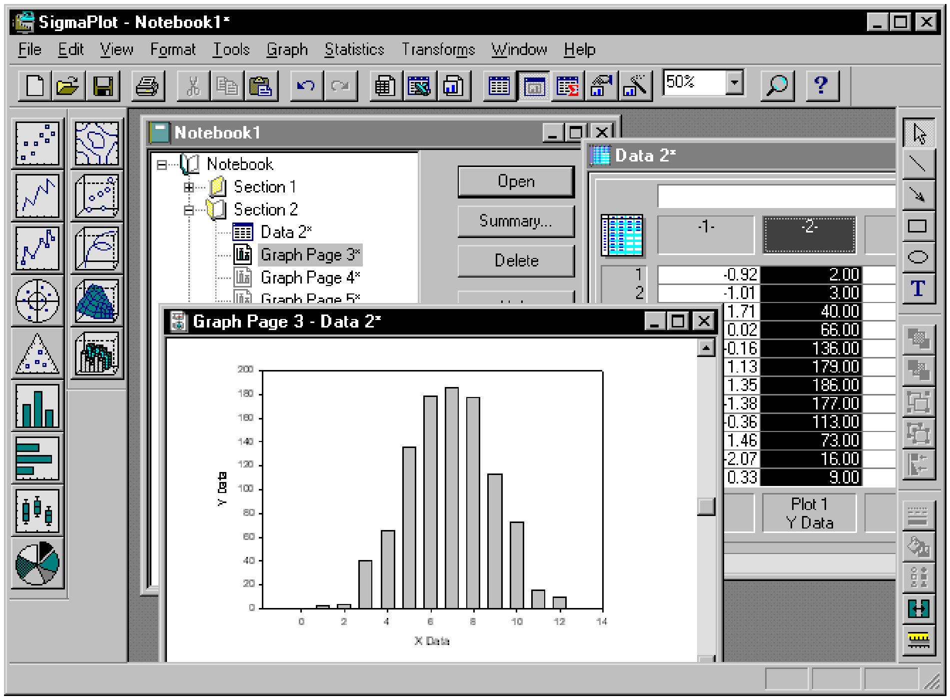
An asterisk (*) next to a notebook item indicates that the item has been modified since the last time the notebook file was saved.

Opening Multiple Notebook Items

You can open multiple notebook items. Using the notebook to open and close multiple items will help you manage viewing multiple documents.

Figure 3–2 Example of Multiple Notebook Items Opened

Note that open items are shown in the notebook as undimmed, active items.



Notebook Item Names

The default startup notebook is named *Notebook 1*. It contains one notebook section, *Section 1*, and one worksheet, *Data 1*. When you save your notebook file, the name of the file appears at the top of the notebook window. Notebook files use a (.JNB) extension.

The default names given to notebook sections and items are, *Section (number)*, *Data (number)* or *Excel (number)*, and *Report (number)*. Regression equations are named when they are created. New items are numbered sequentially.

Worksheets

Worksheets contain data you analyze and graph. You can enter data, paste it, or import it from other sources. You can also automatically generate data and place it in worksheet columns. A worksheet automatically appears each time you start SigmaPlot. You can also open or create additional worksheets any time from within SigmaPlot.

You can modify and manipulate worksheet data and appearance by using the functions described in “Using Transforms on Data in Excel Workbooks” on page 87.

SigmaPlot automatically calculates some basic statistical values for all worksheet columns. You can see these values by choosing Statistics from the View menu, or by pressing F6. Column Statistics are described in “Descriptive Statistics for Worksheets” on page 64.

Graph Pages

Graph pages are true graphical representations of a printed page that contain graphs, text, and other drawn and pasted objects. You can select and modify objects on graph pages using the Graph and Object properties dialog boxes, and with the graph and drawing toolbars. You can also manipulate objects graphically using your mouse.

A page can contain an unlimited number of graphs and other objects, and you can create an unlimited number of pages for each worksheet. You can also paste graphics, OLE objects, and other objects onto a page.

Excel Workbooks

You can open *Excel workbooks* in SigmaPlot. If you open an Excel workbook, many Microsoft Excel menus and commands appear in SigmaPlot.

Σ You can store and save data in the top sheets of an in-place active Excel workbook; however, you can only plot data on one sheet of the Excel workbook. To learn more about using Excel in SigmaPlot, see “Using Excel Workbooks in SigmaPlot” on page 84.

Reports

Reports are text–based pages w here you enter, save and print formatted text. You can also paste graphics, OLE objects, and other objects into reports.

Regression Equations

Use equations to preform nonlinear curve fitting using the Regression Wizard. See the *Programming Guide* for more information.

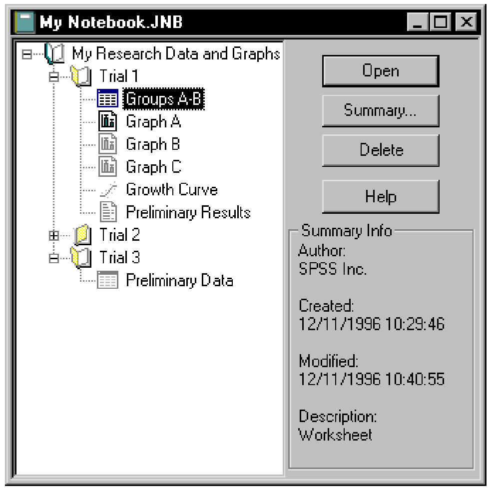
Managing Notebook Sections

Notebook *sections* are place-holders in the notebook window. They contain notebook items, but no data. However, they can be named, opened, and closed. You cannot have sections within sections.

You can create as many new sections as you want in a notebook. You may also create reports within each section to document the items in each section. Figure 3–3 shows several notebook sections containing notebook items.

Figure 3–3
A SigmaPlot Notebook Window showing the tree structure of the Notebook, with open and closed sections

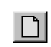
Note that each item and section can have its own name, and all items can have separate author and description information.



To expand or collapse a section, double-click the section icon or click the (+) or (-) symbol.

Creating New Notebook Files and Items

Creating a New Notebook File

To create a new SigmaPlot notebook file, click the New Notebook toolbar  button. A notebook with a single worksheet appears.

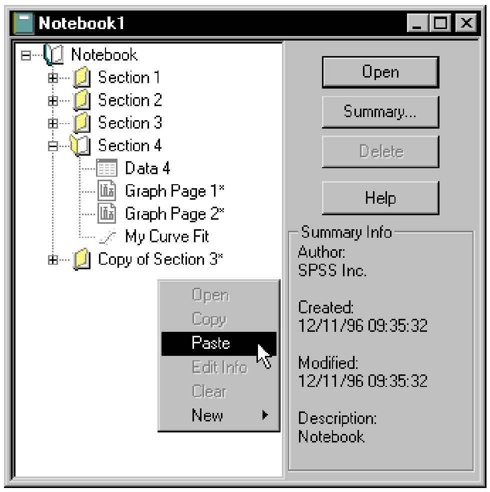
Creating a New Section

To create a new notebook section in the notebook:

1. Right-click in the notebook, point to choose New and choose Section. New sections are appended after the last notebook section.

Another way to create a new notebook section is to *copy* and *paste* a section in the notebook window. Whenever you copy a section, its contents are pasted at the bottom of the notebook window. SigmaPlot names and numbers the section automatically. For example, if you copy notebook *Section 3*, the new section is named *Copy of Section 3*.

Figure 3–4
Copying a Notebook Section



Copied sections create copies of all items within that section as well.

Creating New Worksheets

Creating a new worksheet creates it in a new section that is appended to the end of the notebook. There can only be one worksheet per section. New Excel worksheets are limited to one worksheet only in the workbook.

To create a new SigmaPlot worksheet, click the New Worksheet toolbar button . If you have Excel installed, you can click the New Excel Worksheet toolbar button to create a new Excel worksheet that is modified and saved within the SigmaPlot notebook.

You can also copy and paste existing worksheets; see “Copying, Pasting and Removing Notebook Items” on page 49.

Creating New Graph Pages

To create a new graph page:

1. Select the section in which you want the page to appear.
2. Click the New Page toolbar button .

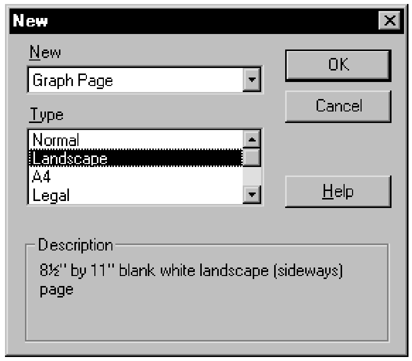
If no page exists for a worksheet, you can automatically create a new page by creating a new graph; see “Creating Graphs” on page 160. Any subsequently created graph will appear on the current page

To use page templates:

1. From the File menu, point to New, and then choose Graph Page.
2. Select the template you want to use the Type list. Descriptions of the templates may appear in the Description box.

3. Click OK to create the new page using the selected template.

Figure 3–5 Using the New Dialog Box to Open a New SigmaPlot Graph Page



Templates consist of preformatted pages along with optional pre-created graphs. You can use any page as a template. For more information about using templates, “Using Graph Pages as Templates” on page 103.

Σ You can also create a new page by copying an existing page. Copied pages also act as templates. For more information on copying notebook items, see “Copying, Pasting and Removing Notebook Items” on page 49.

Creating New Reports

To create a new report:

1. Right-click the section where you want the report to be created.
2. Choose New from the shortcut menu.
3. In the notebook window, click the section or item.
4. Choose Report.

   The Regression Wizard can automatically generate reports. See the *Programming Guide* for more information.

Creating New Regression Equations

To create a new regression equation:

1. Right-click the section where you want the equation to appear, point to New, and then choose Equation.

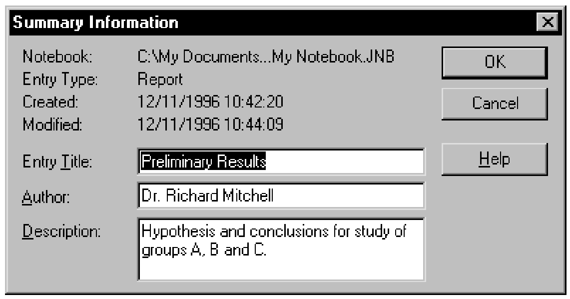
   Creating a new regression equation opens the Regression dialog box which requires entry of the proper programming code. See the *Programming Guide* for more information.

   The Regression Wizard can also create regression equations.

Renaming Notebook Files and Items

Use the Summary Information dialog box to change information that is stored with your notebook files, sections, and items.

Figure 3–6 Using the Summary Information Dialog Box to Change Name, Author, or Comment of a Notebook Item



To change summary information:

1. Click the Summary button on the right side of the notebook window.
2. Select the Entry Title, Author, or Description box, then type the new name.
3. Click OK to close the dialog box. The new section, or item name appears in the notebook window.

In-place Editing Section and Item Names

You can also change the name of a notebook section or item without opening the Summary Information dialog box.

1. In the notebook window, click the section or item you want to rename.
2. Click the file or item a second time.
3. Type the new name, and then press Enter. The new section or item name appears in the notebook window.

Opening Notebook Files and Items

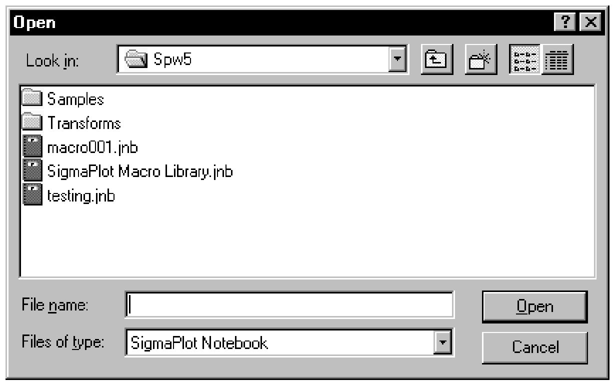
Opening Notebook Files

You can open SigmaPlot files and other types of files as SigmaPlot notebooks.

To open a notebook file that is stored on a disk:

1. Click the Open button. The Open dialog box appears.

Figure 3–7
The Open Dialog Box Showing Previously Saved.JNB Files



2. Choose the appropriate drive and directory of the notebook file to open.
3. Double-click the desired notebook file.
4. If you want to open another type of file , choose the type of file from the Files of type list.
5. Click Open.

Σ SigmaPlot 1.0 or 2.0 or SigmaStat files 1.0 are opened as notebook files.

Opening Worksheets, Reports, and Pages

You can open a worksheet, report, or page by double-clicking its icon in the notebook window. You can also select the item and click the Open button. Open worksheets, pages and report are shown in their own window, and appear in the notebook as a colored icons.

Double-clicking an item that is already open brings the item's window to the front.

Opening Multiple Items You can open as many items as your system's memory allows. However, you can only simultaneously open items associated with the current notebook. If you open an item from a different notebook, the current items close, and the item in the other notebook opens.

Opening Excel Workbooks

You can open Excel workbooks directly into SigmaPlot. You can also instruct SigmaPlot to use Excel worksheets by default for all new notebook. See "Using Excel as Default Workbooks" on page 85.

If you have set SigmaPlot to always use Excel workbooks as the default worksheet, additional file types are available in the Open dialog box. For a list of files that are available, “Opening Other File Types With Excel” on page 85.

When opened by SigmaPlot, Excel workbooks open into a SigmaPlot notebook, and are saved as notebook files. Excel worksheets appear in the notebook as any other notebook. You can create graphs and run transforms and statistics from them as any other worksheet. If you want to save the Excel workbook back out to an Excel file, use the Export command; see “Exporting Notebook Items” on page 51.

Σ Excel worksheets created within SigmaPlot are limited to a single worksheet. You can open Excel workbooks with multiple sheets with SigmaPlot, but you can only use the top sheet for graphing and statistics. You cannot add or delete additional sheets.

Opening Regression Equations

Regression equations opened from the notebook appear in the Regression Wizard. You can use the Regression Wizard to apply the equation model to your data and generate a fitted curve for your graph. For more information on using the Regression Wizard, see the *Programming Guide*.

Opening .FIT Files

SigmaPlot Version 1, 2 and 3 equation files use the .FIT filename extension. You can open a .FIT file as a notebook, then open the .FIT file as a regression equation by double-clicking it.

You can convert .FIT files to regression equations and then copy and paste them like any other notebook item. Copy and paste to convert your old .FIT files into a single notebook of regression equations that you can use as an equation library. For more information on regression equations and .FIT files, see the *Programming Guide*.

Opening Worksheets in SigmaStat

You can gain access to and work with worksheets in and from SigmaStat 2.0 using SigmaPlot’s Run SigmaStat command.

To open a SigmaStat worksheet in SigmaPlot, you must already be running SigmaStat.

To open a SigmaPlot worksheet in SigmaStat:

1. Select the worksheet you want to view in SigmaStat.
2. Choose Run SigmaStat from the Statistics menu.

   SigmaStat appears displaying the selected worksheet. The worksheet is appended to the end of the current SigmaStat notebook.

Copying, Pasting and Removing Notebook Items

Copying and pasting items in your notebook helps you to organize your SigmaPlot notebook and easily create copies of important data and graphs. You can copy and paste items within a notebook and from one notebook to another.

Σ You cannot copy a worksheet into a notebook section that already contains a worksheet. SigmaPlot always creates a new section for pasted worksheets that is appended to the end of the current notebook.

Σ Copying and pasting pages and worksheets between sections results in using graph pages as *templates*. To learn about creating and using templates, “Using Graph Pages as Templates” on page 103.

To copy and paste a notebook item:

1. Open both the source and destination notebook file windows. The source notebook for a copied item must be open for a copy to take place.
2. Right-click the item that you want to copy, and choose Copy from the shortcut menu.
3. Right-click the section and/or where you want to paste the item and choose Paste. The selected item is pasted to the current notebook and section.

Removing Items From a Notebook File

To remove an item from a notebook:

1. Select the item and press Delete.

   Items removed from a notebook file using the Delete button are removed permanently.

Copying a Page to a Section with No Worksheet

If you copy a graph page into an empty section or a section that has no worksheet, you create an *independent page*. The independent page retains all its plotted data without the worksheet. You can store the pages from several different sections that have different data together this way. However, if you ever create or paste a worksheet into a section, all independent pages will revert to plotting the data from the new worksheet.

Use independent pages as templates, or to draw or store objects. You cannot create graphs for an independent page until it is associated with a worksheet (and no longer independent).

Saving Your Work

Be sure to save your work at regular intervals.

To save a notebook file for the first time:

1. Click the Save button . The Save As dialog box appears.
2. Navigate to the directory where you want to save your notebook.
3. Type a name for the notebook in the File Name text box.
4. Click Save to save the notebook file and close the Save As dialog box.

To save changes:

1. To save with the same name and path, click the Save button .

   Your file is saved.
2. To save to a new name and path, choose Save As from the File menu.
3. Enter a new file name.
4. Choose the new drive, directory, and file type.
5. Click Save.

   Your file is saved.

Exporting Notebook Items

Use SigmaPlot's Export command to export worksheet, page and report contents as files of different formats.

You can export a notebook by clicking the notebook icon in the notebook window, then choosing Export from the File menu. Use Export to save SigmaPlot 5.0 notebooks as SigmaPlot version 4.0 or SigmaStat 2.0 files. Note that any features exclusively supported by version 5.0 will be lost upon conversion.

Exporting worksheets does not export associated graphs. To export the worksheet *and* the graph, you need to export the *graph page* to a SigmaPlot Graph (.SPW) file.

Σ You can only export the entire Sigma Worksheet. If you want to export a portion of the worksheet, delete the portion you don't want to export, then export the remainder of the worksheet.

To export a SigmaPlot worksheet:

1. Select the worksheet you want to export by opening and viewing it, or selecting it in the notebook window.
2. Choose the File menu Export command. The Export File dialog box appears
3. Use the Files of type drop-down list to select a file format. Enter the file name, directory, and/or drive for the exported file, then click Export to create the file.

When you export a SigmaPlot worksheet as a text file, tabs or commas are used to separate data columns and data is saved at full precision.

Σ If you want to save a text file with data as it appears in the worksheet rather than at full precision, copy the selected data to the Clipboard, paste it into a text editor, and save it as a text file.

Exporting Graphs and Pages

SigmaPlot graphs and graph pages can be exported to other files formats. To export a graph or graph page:

1. Select and view the graph page. If you want to export specific graph(s), select the graphs you want to export to a file.
2. Choose the File menu Export command. The Export File dialog box appears.
3. Enter the file name, directory and/or drive for the export file destination, then click Export.
4. If you chose one of the graphic file formats, a secondary dialog box appears, asking you to enter some graphic format information.
5. Enter the desired DPI and Color Resolutions; for EPS files, these setting only affect the resolutions of the TIFF header, not the actual PostScript resolution.

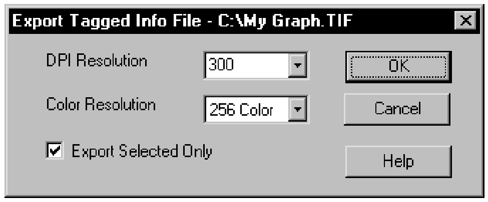


Figure 3–8
Using Export File (Save As Dialog Box) to Export a Report

For metafiles, this setting affects only 3D graphs.

The higher the DPI and Color resolutions, the better quality the image, but also the larger the file. Limit the DPI and Color resolutions to the capability of the intended output device. For example, if you are going to create 600 dpi slide output, set the DPI resolution no larger than 600.

6. If you want to export only the selected graph(s) or objects, check the Export Selected Only option.
7. Click OK to create the exported file using the specified file name and graphic resolutions, if applicable.

Exporting Reports

You can only export the entire report. If you want to export a portion of the report, delete the portion you don't want to export, then export the remainder as the file.

To export a SigmaPlot report:

1. Select and view the report window you want to export.
2. Choose Export from the File menu.
3. Use the Save as type drop-down list to select a file format.
4. Enter the file name, directory, or drive for the export file destination.
5. Click Export to save the file.

Printing SigmaPlot Items

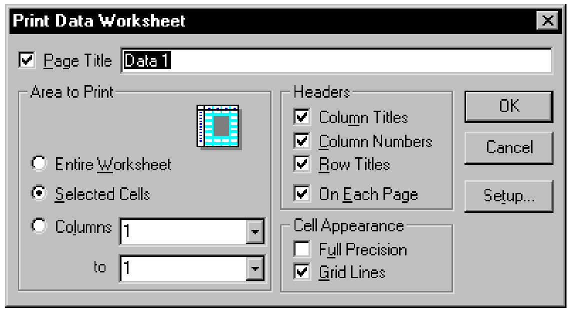
Printing Worksheets

To print the current worksheet:

1. Select and view the worksheet. If you want to print only a portion of the columns in the active worksheet, select a block from the worksheet.
2. Click the Print button to print the worksheet using all the default settings.
3. To print column statistics, select the column statistics worksheet (press F6 or click the toolbar button), then click the Print toolbar button.
4. If you want to set printing options before your print, press Ctrl+P or choose the

File menu Print command. The Print Data Worksheet dialog box appears.

Figure 3–9 The Print Data Worksheet Dialog Box



5. Specify whether you want to print the entire worksheet, only the selected cells in the worksheet, or a specified range of columns by selecting one of the options under the Area to Print heading.
6. To print the worksheet, click OK after setting your worksheet printing options.
7. If you want to configure your printer settings, click the Setup button. The Print dialog box appears.
8. Click OK when you are satisfied with the Printer settings, or click Properties to edit the printer properties. Note that the Properties dialog box options vary from printer to printer.

Σ Note that in order to print the names of the statistics that appear in the row region of the worksheet, you must select to print row titles.

Printing Graph Pages

To print a graph page:

1. Select and view the page window.
2. Click the Print button  to print the page using all the default settings.
3. If you want to set printing options before your print, choose the File menu Print command. The Print dialog box appears.
4. Click OK when you are satisfied with the Printer settings, or click Properties to edit the printer properties. Note that the Properties dialog box options vary from printer to printer.

For more information on printer settings and use of high resolution output devices, “Printing Tips” on page 329.

For more information on using Page Setup, “Changing Graph Page Format” on page 143.

Printing Reports

You can print any report in your SigmaPlot notebook.

To print reports:

1. Select and view the report window.
2. Click the Print button to print the report using all the default settings.
3. If you want to set printing options before your print, choose the File menu Print command. The Print dialog box appears.
4. Click OK when you are satisfied with the Printer settings, or click Properties to edit the printer properties. Note that the Properties dialog box options vary from printer to printer.

Printing Selected Notebook Items

You can print individual or multiple items from the notebook, including entire sections.

To print one or more items or sections from the notebook:

1. Select one or more items or sections from the notebook.
2. Click the Print button to print the worksheet using all the default settings.

Σ If you want to set printing options before printing a report, graph page, or worksheet, each item must first be opened. Then press Ctrl+P to open the Print dialog box.

For information on printing worksheets, “Printing Worksheets” on page 52. For information on printing graph pages, “Printing Graph Pages” on page 53. For information on printing reports, “Printing Reports” on page 53.

4 Worksheet Basics

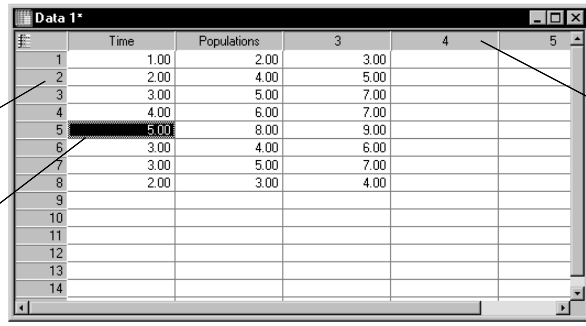
Worksheets are the containers for the data you analyze and graph. They are spreadsheet-like in appearance but are much more limited in function, and are column rather than cell oriented.

Data can be typed in, pasted, or imported from other sources. Data can also be automatically generated and placed in worksheet columns by data transforms and statistical procedures.

This chapter covers:

The following figure provides some worksheet definitions:

Figure 4–1
Example of a SigmaPlot Worksheet



Row numbers and titles are listed along the left side of the worksheet.

Select a cell by clicking it or using the arrow keys to scroll to it. Selected cells are highlighted.

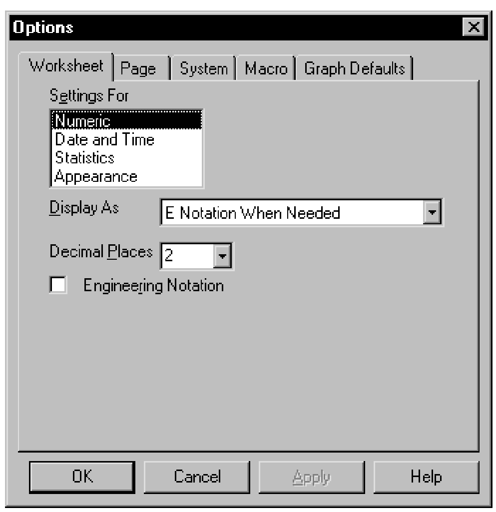
Column numbers and titles appear here.

Setting Worksheet Display Options

The Options dialog box Worksheet panel sets the display for:

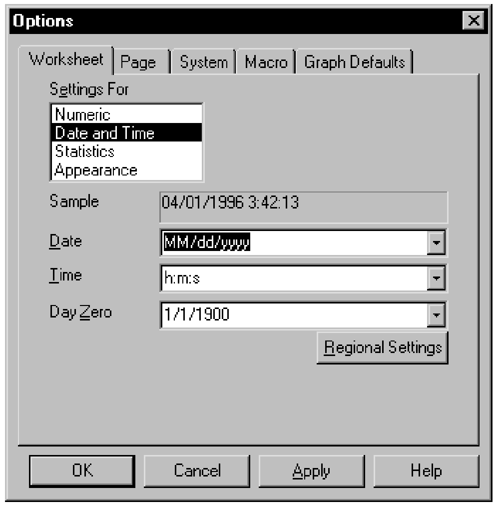
- Numeric
- Date and Time
- Statistics
- Appearance

Figure 4–2
The Options Dialog Box Worksheet Panel Show Settings For Display Choices



This panel also enables you to select a numeric display type, change column width and decimal places, and turn on and off engineering notation.

Figure 4–3 The Options Dialog Box Worksheet Panel Data and Time Options



For information on Column Statistics, see "Descriptive Statistics for Worksheets" on page 64.

Date and Time Displays

The Date and Time displays shown in the Options Worksheet panel show the default formats for all Date and Time displays in the worksheet. The Format Cells Date and Time dialog box also shows the currently selected format. See "Changing Date and Time Display" on page 71.

Moving Around the Worksheet

You can move around the worksheet using *scroll bars* or, move the highlighted worksheet *cursor* with the keyboard.

Function	**Keystroke**
Move one column right/left	→ or ←
Move one row up/down	↑ or ↓
Move one window view up/down	Page Up, Page Down
Move to end of column	End

Function	Keystroke
Move to end of worksheet	End+End
Move to top of column	Home
Move to column one, row one	Home+Home

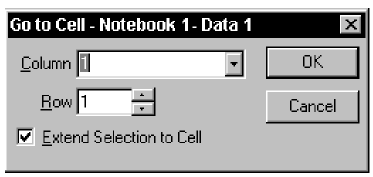
Going to a Cell

You can move the worksheet cursor to any cell in the worksheet by specifying the column and row number in the Go to Cell dialog box.

To go to a cell:

1. Choose the View Menu Go To command.
2. Enter the desired column and row number. To select the block of cells between the current highlight location and the new cell, click the Extend Selection to Cell check box. Click OK to move to the new cell.

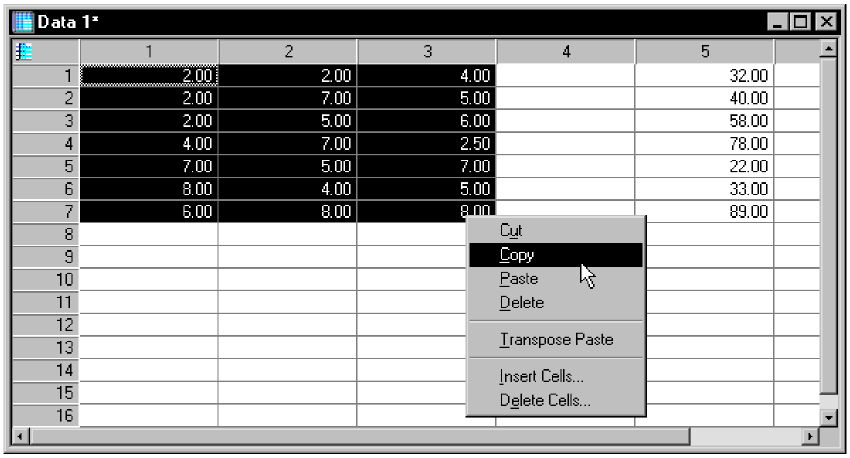
Figure 4–4 Moving to a Specific Cell in the Worksheet



Using the Worksheet Shortcut Menu

In addition to the menu commands and toolbar buttons referred to in the body of this manual, right-clicking the worksheet displays a shortcut menu. The commands on the right-click shortcut menu are the same as the Edit menu: Cut, Copy, Paste, Delete, Transpose Paste, Insert Cells, and Delete Cells commands.

Figure 4–5
The Right-Click Shortcut Menu



Entering Data into a SigmaPlot Worksheet

This section describes entering data into SigmaPlot worksheet columns, and formatting the columns for numeric, label, or date and time display.

Editing Cells

To edit a cell, click it. Make your changes, and press Enter. Note that the edited contents replace the current contents unless Insert mode is active.

To enter data in a SigmaPlot worksheet:

1. Click the cell you want to edit.
2. Type a number, label, or date and time value.
3. Press Enter to move down one row, or use the arrow keys to move around the worksheet. You must press Enter before moving to another column.

Entering Dates and Times

Dates and times are entered using delimiters. The delimiters used are determined by the Windows regional settings. For more information, see “Regional Settings” on page 74.

Date Delimiters: The default date delimiter for most systems is the forward slash (/). An entry that displays only two fields of a date value is assumed to be day and month. If the second field’s value is greater than 31, months and years are assumed. Entries with two delimiters assume month/day/year. If you enter only two digits for the year, the current century is implied. Examples are given in the following table (the twentieth century is assumed to be the current computer clock setting).

Value Entered:	Resulting Date:
2/2	February 2
2/32	February, 1932
2/2/02	February 2, 1902

Time Delimiters: The default time delimiter is usually a colon (:). Entries displaying two fields of a time value are assumed to be hours and minutes. If PM is not specified, hours less than 12 are assumed to be morning hours. An entry with two colons assumes hours:minutes:seconds.

Insertion and Overwrite Modes

Press the Insert key or use the Edit menu Insertion Mode command to switch between overwrite and insert data entry modes.

If in Insertion mode, "Ins" appears in the status bar. A check mark next to the Insertion Mode command in the Edit menu also indicates that the worksheet is in insertion mode.

If in Insertion Mode, new data entered in a cell does not erase the previous contents. Any existing data in the column is moved down one row. If you paste a block of cells, existing data is pushed down and/or to the right to make room for the pasted cells. If you cut or clear data, data below the deleted block moves up and/or to the left.

If not in Insertion Mode, the worksheet is in overwrite mode. Data entered into a cell replaces any existing data. If you paste a block of data, the block overwrites existing data.

Importing Files from Other Applications

You can import data from other applications into an existing worksheet for graphing, worksheet display, or running regressions. When you import data, it appears at the position of the worksheet cursor.

The following file types can be imported into SigmaPlot worksheets:

- SigmaPlot 1.0 and 2.0 files (.SPW)
- SigmaPlot Macintosh 4 Worksheet
- SigmaPlot Macintosh 5 Worksheet
- SigmaStat 1.0 files (.SNB)
- SigmaPlot and SigmaStat DOS files (.SPG, .SP5)
- TableCurve 2D and 3D files

- Microsoft Excel files (.XLS)
- Lotus 1-2-3 files (.WKS, .WK*)
- Quattro/DOS files (.WK*)
- dBase files (.DBF)
- Plain Text files (.TXT, .PRN, .DAT, .ASC)
- Comma Delimited files (.CSV)
- SigmaScan
- SigmaScanPro Worksheets
- SigmaScan Image
- Mocha Worksheets
- DIF
- Axon Text and Binary formats

Σ When you import data from another application that is left-justified, SigmaPlot assumes it is text.

To import data:

1. Move the worksheet cursor to the worksheet cell where you want the imported data to start.
2. Choose the File menu Import command. The Import File dialog box appears.
3. Use the Files of Type drop-down list to select the type of file you want to import.
4. Change the drive and directory as desired, select the file you want to read, then click Import, or double-click the file name. Depending on the type of file, the data is either imported immediately, or another dialog box appears.

SigmaPlot, SigmaStat, SigmaScan, Mocha Worksheets and DIF

If you are importing a SigmaPlot, SigmaStat, SigmaScan, Mocha, or DIF file, a dialog box appears prompting you to select a range of data to import.

Select the range of data by specifying the start and end of the range; the default is the entire range.

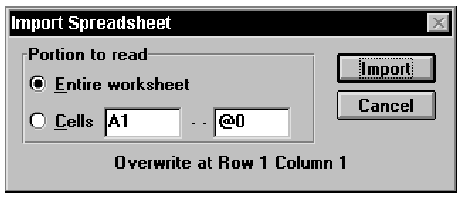
Click Import to place the data in the SigmaPlot worksheet.

MS Excel, Lotus 1-2-3, Quattro, and dBase Files

If you want to use an Excel workbook as an actual Excel workbook within SigmaPlot, you must open the workbook instead of importing it. Importing places the Excel data into a SigmaPlot worksheet, and does not open the workbook as an actual Excel workbook. For more information on using Excel workbooks in SigmaPlot, see "Using Excel Workbooks in SigmaPlot" on page 84.

When importing a spreadsheet or dBase file, the Import Spreadsheet dialog box is used.

Figure 4–6
Import Spreadsheet Dialog Box



Select either the entire spreadsheet or a specified range of cells. Cells are specified using the standard 1-2-3 notation (e.g. A1:C50 for a range from cell a1 to cell c50). For dBase files, cell letters correspond to fields. When you have finished specifying the range to import, click Import. The selected data is imported.

Note that the dialog box indicates whether or not the worksheet is in overwrite or insert mode, and where the imported data will begin.

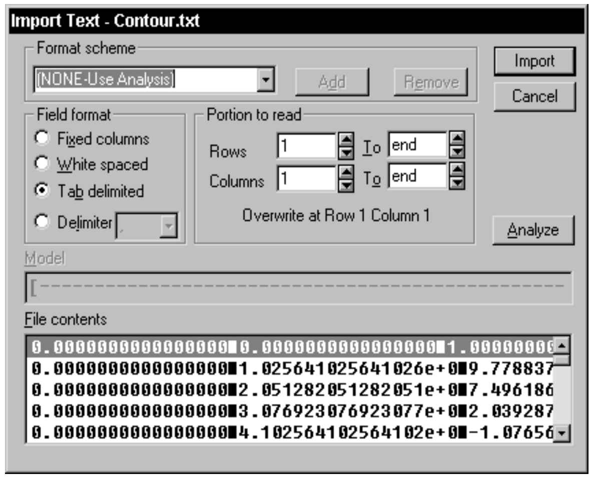
Σ To import spreadsheet data from non-compatible programs, save the spreadsheet as either a Lotus or text file, then import that file.

Σ Only the top sheet of an Excel workbook can be imported. If you attempt to import another worksheet, you will receive a warning message. If you want to move data from other sheets, use Copy and Paste.

Importing Text Files

If you are importing a text file, the Import Text dialog box appears. Use this dialog box to view the text file and to specify other delimiter types, or to build a model of the data file according to custom column widths.

Figure 4–7 The Import Text Dialog Box



Σ A quicker method of importing text is copying the data in your source application, then opening SigmaPlot and pasting the data.

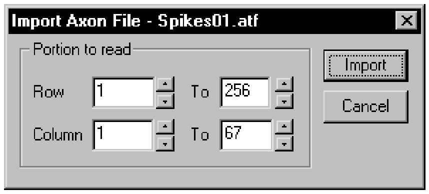
1. **To specify a different column separator,** select Delimiter to activate the delimiter options; then select the appropriate type. You can select commas, hyphens, or any other characters. For example, many databases use semicolons (;) as delimiters.
2. **To specify a model of the data,** use dashes (-) to specify column widths, and bracket characters [and] to define the column edges. Use a vertical bar **|** character to indicate a single-character width column. Click Analyze to re-display the appearance of the file using the new model.
3. **To save text import formats** , enter a name into the Format scheme box, then click Add. Delete unwanted import formats using the Remove button.
4. **To specify a different range,** enter the rows and columns to read, then click Analyze. You can use this feature to eliminate file headers and other undesired text.
5. When you are finished specifying the file parameters, click Import. The specified data from the file is imported.

Axon Files

SigmaPlot can import data files produced by Axon Instruments, Inc. laboratory equipment and data acquisition programs. SigmaPlot imports both text and binary data files; if you select one of these options, the Import Axon dialog box appears prompting you to select a range of data to import. The File selected is indicated in the dialog box title.

Select the range of data by specifying the Row and Column ranges; the default is the entire range. Click Import to place the data in the SigmaPlot worksheet.

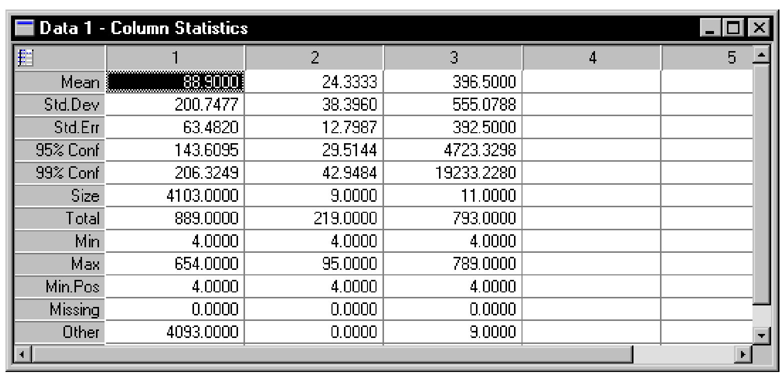
Figure 4–8
Import Axon File Dialog Box



Descriptive Statistics for Worksheets

SigmaPlot automatically calculates a number of basic statistical values for all the data in your worksheet columns. To view the statistics for the currently selected worksheet, choose the View menu Statistics command. A check mark appears next to the Statistics command. The running calculations performed for each column appear in a Column Statistics window for that worksheet.

Figure 4–9
The Column Statistics Worksheet


Data 1 - Column Statistics

	1	2	3	4	5
Mean	88.9000	24.3333	396.5000		
Std.Dev	200.7477	38.3960	555.0788		
Std.Err	63.4820	12.7987	392.5000		
95% Conf	143.6095	29.5144	4723.3298		
99% Conf	206.3249	42.9484	19233.2280		
Size	4103.0000	9.0000	11.0000		
Total	889.0000	219.0000	793.0000		
Min	4.0000	4.0000	4.0000		
Max	654.0000	95.0000	789.0000		
Min.Pos	4.0000	4.0000	4.0000		
Missing	0.0000	0.0000	0.0000		
Other	4093.0000	0.0000	9.0000		

To close the Column Statistics window choose the View menu Statistics command again, choose the File menu Close command, or click the ☒ button in the upper right corner of the worksheet window.

Available Statistics

The statistics shown in the Statistics windows are determined by your settings in the Statistics Options dialog box (see “Statistics Options” on page 66). Empty cells, missing values, and text are ignored in most calculations. The following statistics can be displayed in the Column Statistics window.

Mean: The arithmetic mean, or average, of all the cells in the column, excluding the missing values. This is defined by:

$$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$$

Std Dev: The sample standard deviation is defined as the square root of the mean of the square of the differences from their mean of the data samples x_i in the column. Missing values are ignored.

$$s = \sqrt{\frac{i}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

Std Err: The standard error is the standard deviation of the mean. It is the sample standard deviation divided by the square root of the number of samples. For sample standard deviation s:

$$StdErr = \frac{s}{\sqrt{n}}$$

95% Conf: The value for a 95% confidence interval. The end points of the interval are given by:

$$\bar{x} \pm t(v, z)\frac{s}{\sqrt{n}}$$

where $\bar{x}$ is the mean, s is the sample standard deviation, and $t(v,z)$ the t statistic for $v = n-1$ degrees of freedom and $z = 1.96$ standard normal percentile equivalent.

99% Conf: The value for a 99% confidence interval. The end points for this interval are computed from the equation for the 95% confidence interval using $z = 2.576$.

Size: The number of occupied cells in the column, whether they are occupied by data, text, or missing values.

Sum: The arithmetic sum of the data values in the column.

Min: The value of the numerically smallest data value in the column, ignoring missing values.

Max: The value of the numerically largest data value in the column.

Min Pos: The smallest positive value.

Missing: The number of cells in the column occupied by missing values, denoted with a double dash symbol (--).

Other: Either text or an empty cell.

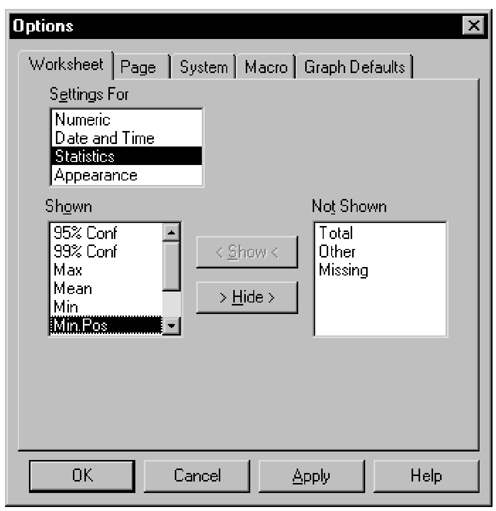
Statistics Options

To display only a portion of the available statistics use the Worksheet Options dialog box, then select column statistics to show or hide.

To specify which statistics are shown or hidden:

1. Choose the View menu Statistics command to open the column statistics worksheet. Choose the Tools menu Options command, then click the Worksheet tab. The Options dialog box appears.

Figure 4–10
The Statistics Options Dialog Box



2. Select the statistic(s) you want shown or hidden, then use the Show and Hide buttons to move the statistics between the Shown and Not Shown lists.

3. To change the column widths and data display, select the appropriate options. For more information on changing data display and column width options, see “Sizing Columns and Rows” on page 68.

Printing Statistics

To print or export statistics:

1. Choose the File menu Print command. The Print dialog box appears.
2. Click OK. The options are set in the Print Data Worksheet dialog box that appears after clicking OK in the Print dialog box.

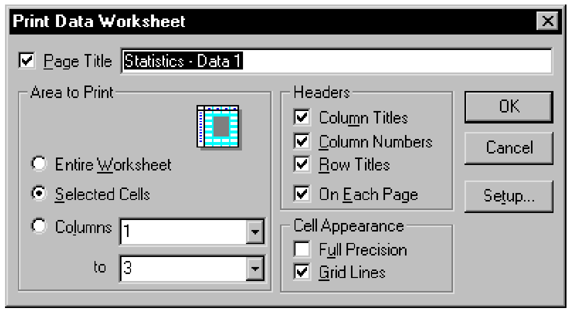


Figure 4–11 The Print Data Worksheet Dialog Box for Columns Statistics

In order to print the name of the statistic, you must select to print the row titles by clicking Options, then checking Row Titles by selecting it from the Headers options.

For more information on printing worksheets, “Printing Worksheets” on page 52 .

Displaying Worksheet Data

Data can be displayed in your worksheet columns as:

- Text
- Numbers
- Date and Time values
- Graphic information

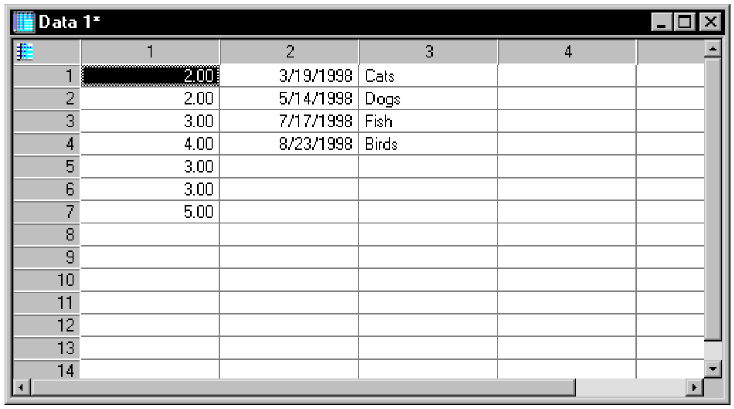


Figure 4–12 Numbers are displayed in Column 1, dates are displayed in Column 2, and text is shown in Column 3

You can enter numbers, labels, and dates and times directly into the worksheet. You can also convert numbers to dates and times and vice versa with the Format menu Cells command. To change column widths, number decimal places, or date and time format, choose the Tools Options menu command. These operations are described below.

Sizing Columns and Rows

If the contents of your column exceed the column width, cell contents display as pound symbols (####). Label entries are truncated.

To change a column width, drag the boundary on the right side of the column heading until the column is the size you want.

To change a row height, drag the boundary below the row heading until the row is the size you want.

To adjust column width and row height from the Tools menu Options dialog box:

1. Select the Worksheet tab.
2. From the Settings For list, select Appearance.
3. Set column width and row height in the Column Width and Row Height drop-down lists.

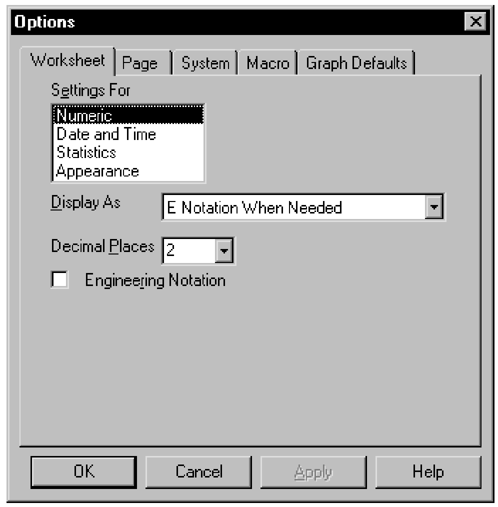
Σ SigmaPlot is only accurate to twenty-one significant digits regardless of how many decimal places you specify.

Setting Decimal Places

To set the number of decimal places used for worksheet values:

1. On the Worksheet panel of the Tools menu Options dialog box, enter the value in the Decimal Places edit box. The number of decimal places allowed is limited by the column width—the maximum number of decimal places cannot exceed the column width.

Figure 4–14 Changing Worksheet Column Width



2. Click Apply to apply the changes without closing the dialog box, or OK to accept the changes and close the dialog box.

Uses of Text

Text entered into worksheet columns can be used as:

- Data categories for a plot
- Column titles (entered above a column)
- Symbols
- Tick labels

For information on categories, see “Using a Category Scale” on page 206. Using labels in worksheet columns is described in “Using a Worksheet Row for Column Titles” on page 82. For information on using text as symbols, see “Using Characters and Text as Symbols” on page 180. For information on using customized tick labels from a worksheet column, see “Using Custom Tick Labels” on page 223.

Changing Numbers Display

Display numbers in four ways in your worksheet. Set the display with the Tools menu Options command.

Numeric Display	Description	Example
E Notation When Needed	Displays worksheet data as scientific notation only when the length of the value exceeds the width of the cell. The default column width is twelve.	12.00
E Notation Always	Always displays data as scientific notation. The number of decimal places is set in the Decimal Places edit box.	12.00e+0
Fixed Decimal	Displays data with a fixed number of decimal places. Set the number of decimal places in the Decimal Places edit box. The number of decimal places allowed is limited by the column width—the maximum number of decimal places cannot exceed the column width. The default setting for decimal places is two.	12.00
General	Displays data exactly as you enter it in the worksheet.	12

To set the numeric display for your worksheet:

1. Select and view the worksheet, then choose the Tools menu Options dialog box.

   The Options dialog box opens. The worksheet panel shows the Numeric setting by default.

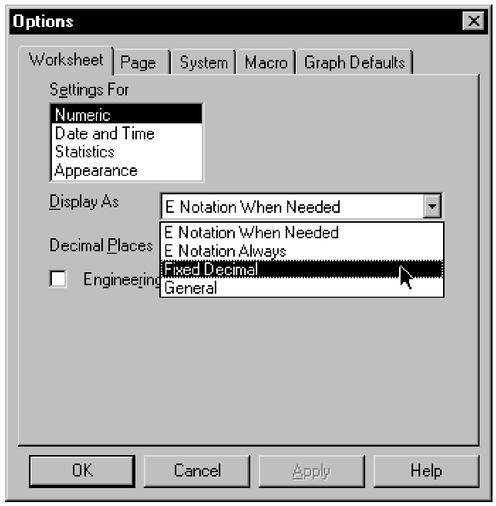


Figure 4–15 Selecting Numbers Display Format

2. To set the numeric display, select a Numeric format setting from the second drop-down list.

3. To use engineering scientific notation for worksheet values, select the Engineering Notation check box. This option only applies if you have a scientific notation format selected.

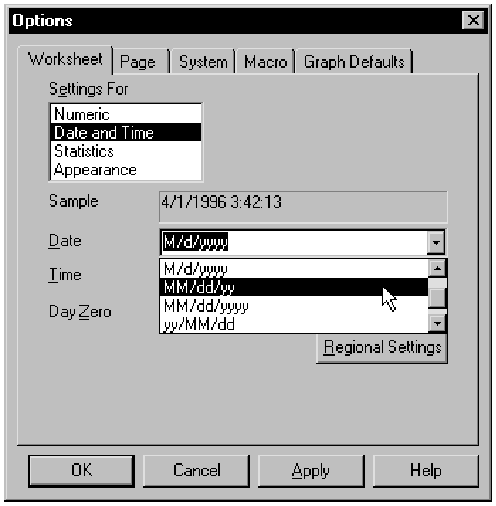
4. Click Apply to set the options without closing the dialog box, or OK to accept the settings and close the dialog box.

Changing Date and Time Display

SigmaPlot offers you a variety of date/time displays. When you enter a value into a date/time formatted cell, SigmaPlot assumes internal date/time information about that value from the year to the millisecond.

For example, if you enter a day and month, you can display the month and year. Open the Tools menu Options dialog box and select the Worksheet tab. Select Date and Time from the Show Settings For drop-down list to view and modify the current settings.

Figure 4–16
Selecting a Date Display Format



To change the display Date format, type one of the following examples into the Date edit box, or choose a format from the drop-down list:

Typing:	**Displays:**
M/d/yy	No leading 0 for single digit month, day or year
MM/dd/yy	Leading 0 for single digit month, day or year
MMMM	Complete month
dddd	Complete day
yyy or yyyy	Complete year
MMM	Three-letter month
ddd	Three-letter day
gg	Era (AD or BC)

To change the display Time format, type one of the following examples into the Time edit box, or choose a format from the drop-down list:

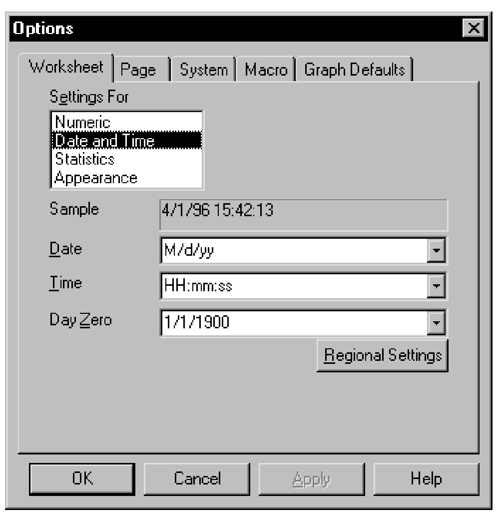
Typing:	Displays:
hh or h	12 hour clock
HH or H	Military hours
mm or m	Minutes
ss or s	Seconds
uu or u	Milliseconds
H: h: m: s: or u	No leading zeroes for single digits
HH: hh: mm: ss: uu	Leading zero for single digits
tt	Double letter AM or PM
t	Single letter AM or PM

Day Zero

Setting a Start Date is only necessary if you are importing numbers to be converted to dates, or converting dates to numbers for export. The starting data must match the date used by the other application.

Select a date from the Day Zero drop-down list, or type your own start date. The default start date is 1/1/1900.

Figure 4–17 The Day Zero Drop-down List



Day Zero becomes the number 1.00 when you change from Date and Time to Numbers format. The basic unit of conversion is the day; that is, whole integers correspond to days. Fractions of numbers convert to times. Zero and negative numbers entered into the worksheet convert to days previous to the Day Zero start date.

Conversion between date/time values and numbers can occur for the calendar range of 4713 BC to beyond the year 4,000 AD. The internal calendar calculates dates using the Julian calendar until September, 1752. After that, dates are calculated using the Gregorian calendar.

Σ If you convert numbers to dates, a start date is applied. If you convert the dates back to numbers, be sure you use the same start date as when you converted them, or they will have a different value.

Regional Settings

Drop-down lists in the Options dialog box worksheet panel use the current date/time settings in your operating system. The Windows Regional Settings control date/time delimiters, 12 or 24 hour clock, and AM/PM display.

Date and time display formats may be affected by your operating system's Regional Settings. For example, if your Time Zones are specified as British (English), your date values appear as dd/mm/yy. If the setting is US (English), your date values appear as mm/dd/yy. If you want to view or modify the current settings, or view alternative settings available on your system, click the Regional Settings button, or modify them directly from the Windows Control Panel.

Σ Date and time values are entered into the worksheet using the date and time delimiters, generally a forward slash (/) or colon (:). For more information on entering dates and times, see "Entering Dates and Times" on page 59.

Switching Between Date and Time and Numeric Display

You can convert between date/time and numeric display when:

- Importing data
- Switching numbers to dates
- Modifying the display between date, time and date/time

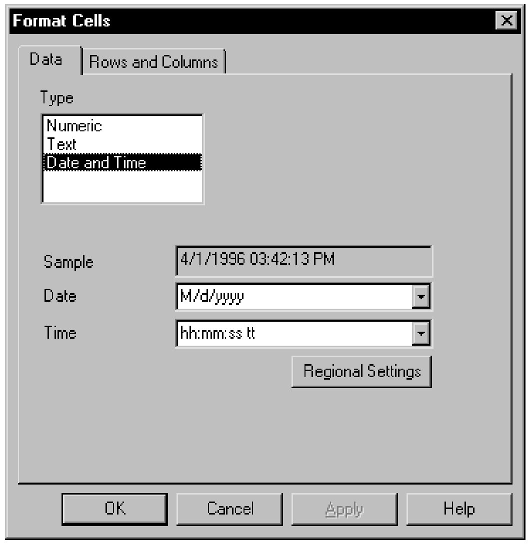
To display worksheet cells in Date and Time format:

1. Open and view the worksheet, and select the data you wish to display in date/time format.
2. Choose the Format Cells command and choose Date and Time from the drop-down list.
3. Select date and time formats from the Date and Time drop-down lists.
4. The sample box changes according to your choice. Click OK.

   The data is displayed showing the date, time, or date and time as specified.

   The dates and times that are entered as dates and times are automatically displayed as such.

Figure 4–18
The Format Menu Cells Dialog Box



Using Date/Time Format with Other Programs

You can copy date/time values from a SigmaPlot worksheet and paste them into other programs, such as an Excel workbook, or, you can copy date/time values from another program and paste them into a SigmaPlot worksheet. If the date/time format you are pasting is larger than the worksheet column width, you may need to change the column width.

Σ If you are copying date/time values from another program to SigmaPlot, make sure that the program is displaying dates/times in a format that SigmaPlot accepts as valid data entry. For example, if you are pasting dates from Excel, make sure the dates are displayed as numbers separated by slashes (/), or whatever date delimiter Windows is set to.

To change Excel formats, see your Excel reference, or, with an Excel worksheet active in SigmaPlot, choose Microsoft Excel Help from the Help menu to view the topic about Date and Time formats.

Keep the following in mind when copying or importing date and time formatted data:

- Pasted or imported numeric data is not automatically converted to Date and Time format. It must be converted using the same start date (Day Zero) that is used by the other program.
- When copying worksheet values, values are copied as numeric strings, not date/time.
- SigmaPlot recognizes Date and Time formats imported from Excel, but most other non-text dates and times will need to be converted from numbers to dates and time.

Setting Row and Column Size

To set row and column size for a selected block of data:

1. Open and view the worksheet, and select a block of data.

   For more information on selecting blocks of data, “Selecting a Block of Data” on page 77.

2. From the Format menu, choose the Cells dialog box. The Format Cells dialog box appears.

   The Selected box reflects the selected rows and columns.

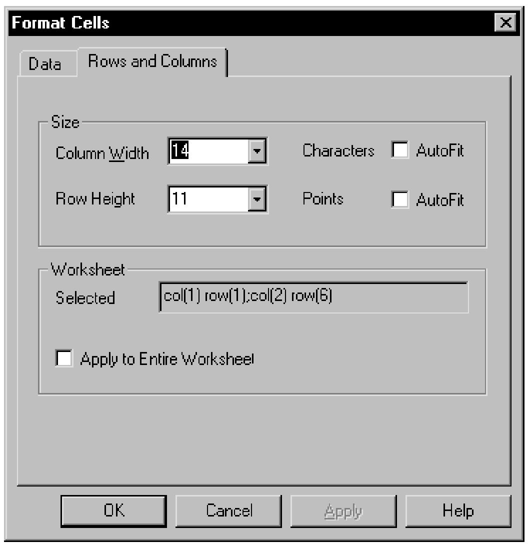


Figure 4–19 The Format Menu Cells dialog box Rows and Columns tab

3. Set column width and row height from the Column Width and Row Height drop-down lists.

4. Click Apply or OK.

   The worksheet appears with new column and row sizes for the selected cells.

5. To apply the row and column formats to the whole worksheet, select Apply to Enter Worksheet, and click Apply or OK.

Changing Graph Appearance

Setting row height and column width from the Format Cells dialog box only changes the selected block of data. Set row and column defaults using Appearance tab in the Tools menu Options dialog box. For more information, see “Sizing Columns and Rows” on page 68.

Selecting a Block of Data

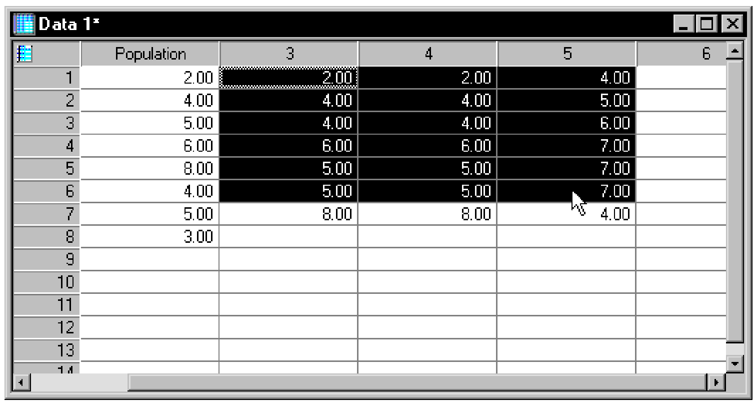
There are several ways to select a block of worksheet cells. You can:

➤ Drag the mouse over the desired worksheet cells while pressing and holding down the left mouse button.

➤ Hold down the Shift key and press the arrow, PgUp, PgDn, Home, or End keys.

➤ Use the Go To command (see page 58).

Figure 4–20 Selecting a Block of Data in the Worksheet



Selecting Columns and Rows

To select an entire column, move the pointer above or below the column and click or drag to highlight the desired column(s).

To select entire rows, move to the left of the rows, then click or drag to select the desired row(s).

Selecting the Entire Worksheet

To select all data in the worksheet, click the worksheet icon in the upper left corner of the window. **To select the entire worksheet,** double-click the worksheet icon.

Sorting Data

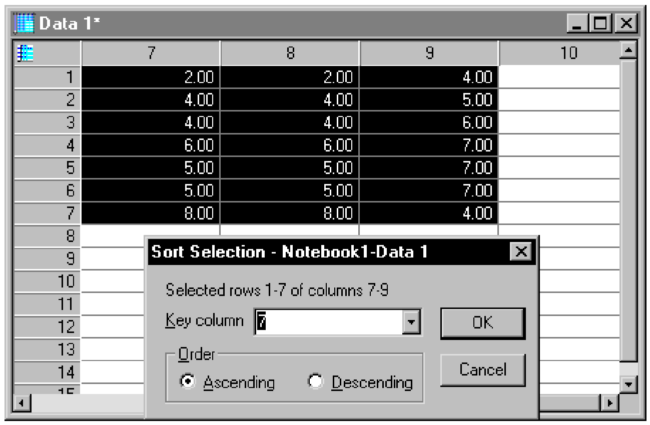
You can sort selected blocks of data in ascending or descending order according to the order in a key column.

Σ Because the sort command sorts data in place, if you want the original data to remain intact, copy the data to a new location and sort the copied data.

To sort selected data:

1. Use the mouse or keyboard to select the data you want to sort. Only the selected columns and rows are sorted; unselected values within a column are ignored.
2. Choose the Transforms menu Sort Selection command. The Sort Selection dialog box appears.

Figure 4–21
The Sort Selection Dialog Box

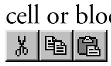


3. Select the key column by choosing the appropriate column title or column number from the Key Column drop-down list, or by selecting the Key Column edit box and typing the column title or column number.

Σ If you sort more than one column of data, the key column is used as the sorting index for all other selected data. The selected rows in any other columns are sorted according to the rows in the key column.

4. Select either Ascending or Descending to sort your data in order of increasing or decreasing values.
5. Click OK to sort the data in place, and close the Sort Selection dialog box.

Cutting, Copying, Pasting, Moving, and Deleting Data

Use the appropriate Edit menu commands to Cut, Copy, Paste, and Delete a selected cell or block. You can also use the Ctrl+X, Ctrl+C, and Ctrl+V shortcut keys or the  toolbar buttons.

The Windows Clipboard

The Clipboard retains the last cut or copied objects. Subsequent cuts or copies overwrite the current Clipboard contents. For information about the Clipboard, see “Cutting, Copying and Pasting Graphs and other Page Objects” on page 108.

Cutting and Copying Data

Cut removes a selected cell or block from the worksheet and copies it to the Clipboard. Copy copies data to the Clipboard without deleting it from the worksheet.

Pasting Data

To paste data, click or move the worksheet cursor to the cell where you want to paste the data, or to the upper-left corner of the block. Choose the Paste command, the  toolbar button, or press Ctrl+V. Any data in the Clipboard is placed in the worksheet.

Moving Data

Move a block of data by cutting it, selecting the upper-left cell of the new location, then pasting the block. To learn more about inserting and deleting entire blocks of data, see the following section, "Inserting and Deleting Blocks, Columns, and Rows" on page 79.

Deleting Data

Use the Clear command to permanently erase selected data. This operation does not copy data to the Clipboard, and is faster than cutting.

Inserting and Deleting Blocks, Columns, and Rows

To insert and delete columns, blocks of cells, and rows:

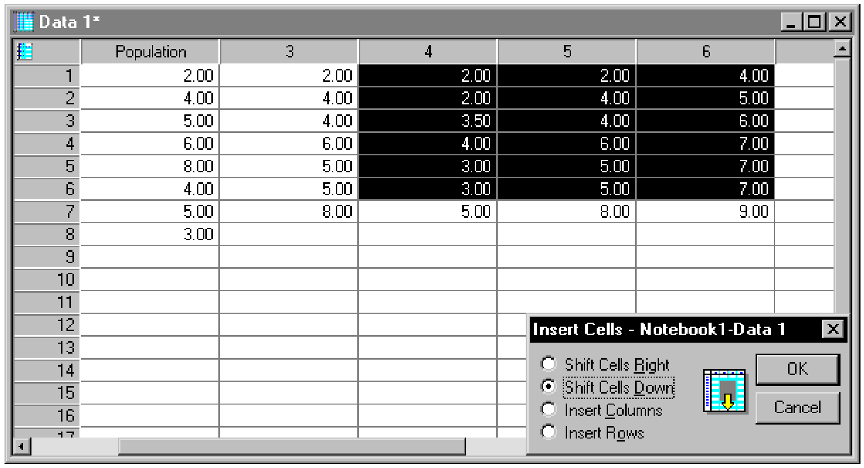
1. Select a block, columns, or rows to insert or delete by dragging the mouse over the region where you want the empty block to appear, or over the block to delete.

   The selected region of cells indicates exactly which cells will be inserted or deleted.

2. If you want to insert cells in the selected region, choose the Insert menu Cells command.
3. To delete the selected block, columns, or rows, choose the Insert Menu Delete Cells command.
4. Select the direction you want the existing data to shift when the empty block is

inserted or deleted, or select Columns or Rows.

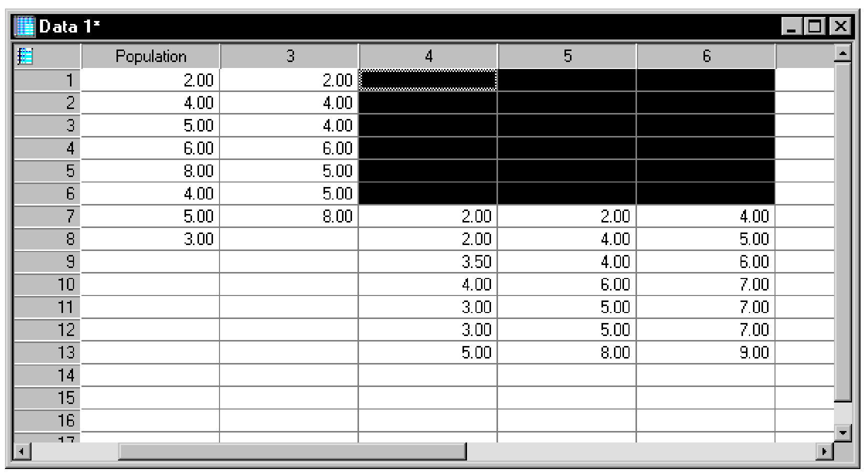
Figure 4–22
Inserting an Empty Block of Data in the Worksheet



	Population	3	4	5	6
1	2.00	2.00	2.00	2.00	4.00
2	4.00	4.00	2.00	4.00	5.00
3	5.00	4.00	3.50	4.00	6.00
4	6.00	6.00	4.00	6.00	7.00
5	8.00	5.00	3.00	5.00	7.00
6	4.00	5.00	3.00	5.00	7.00
7	5.00	8.00	5.00	8.00	9.00
8	3.00				
9					
10					
11					
12					
13					
14					
15					
16					

5. Click OK to insert or delete the block, columns, or rows. The existing data shifts in the specified direction.

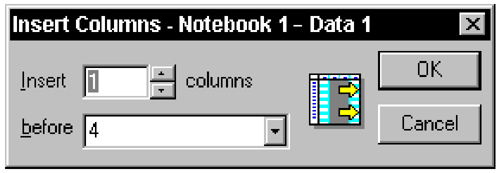
Figure 4–23
The Result of Inserting an Empty Block with Cells Shifted Down



	Population	3	4	5	6
1	2.00	2.00			
2	4.00	4.00			
3	5.00	4.00			
4	6.00	6.00			
5	8.00	5.00			
6	4.00	5.00			
7	5.00	8.00	2.00	2.00	4.00
8	3.00		2.00	4.00	5.00
9			3.50	4.00	6.00
10			4.00	6.00	7.00
11			3.00	5.00	7.00
12			3.00	5.00	7.00
13			5.00	8.00	9.00
14					
15					
16					

You can also insert or delete columns by right-clicking the column number and/or title, then selecting either the Insert Columns or Delete Columns commands. Specify the number of columns you want to insert or delete. If you are inserting columns, use the Before drop-down list to indicate which column to place the new columns in front of. Inserting columns shifts existing columns to the right.

Figure 4–24
Insert Columns Dialog Box



If you are deleting columns, specify the column or starting column of the block you want to delete. Click OK. Deleting columns shifts existing columns to the left.

Switching Rows to Columns

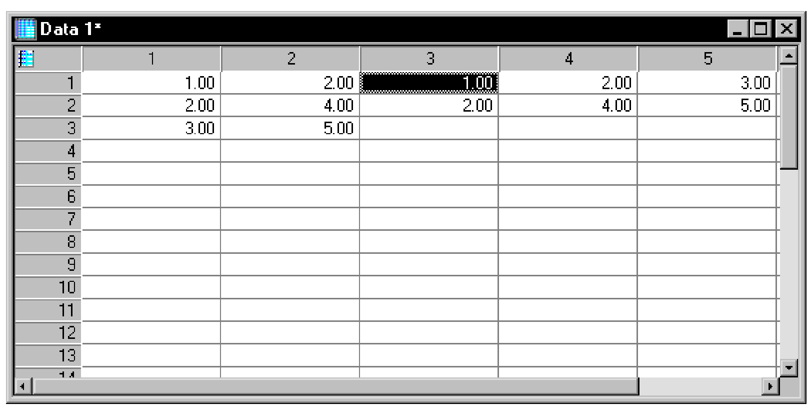
Occasionally, you may need to rearrange data from a row-oriented format to a column orientation, or vice versa. The Edit menu Transpose Paste command pastes contents with the row and column coordinates transposed.

To swap data column and row positions:

1. Select the block of data to transpose.
2. Cut or copy the selected data.
3. Select the cell where you want to begin pasting the data, then choose the Edit menu Transpose Paste command. The data is pasted to the worksheet with the column and row coordinates reversed.

Figure 4–25
Results of Switching Rows to Columns Using the Transpose Paste Command

The data in rows 1 and 2 was transpose pasted starting in column 3. Note that the row and column positions are reversed.



Entering and Promoting Column Titles

Column titles label and identify columns of data. They appear in the Graph and Regression Wizards when you pick columns, identify columns for legends, and can be used instead of column numbers in transforms.

To enter worksheet column titles, either select the column by clicking the column title and number box (at the top of each column), or move to the first row of the column and press the ↑ arrow key.

Type a column title of up to 15 characters. Press Enter to accept the new column title.

Σ You must use at least one text character in every column title. If you need to use a number as column title, type a space character (by pressing the space bar) before the number.

Using the Column Titles Dialog Box

To enter or edit a column title:

1. Either move to the column and press F9, or choose the Format menu Column Titles command. The Column Titles dialog box appears.
2. Enter the column title. To edit an existing title, move to that column by clicking the Next or Prev buttons, then edit the title.
3. When you are finished editing column titles, click OK to close the Column Titles dialog box.

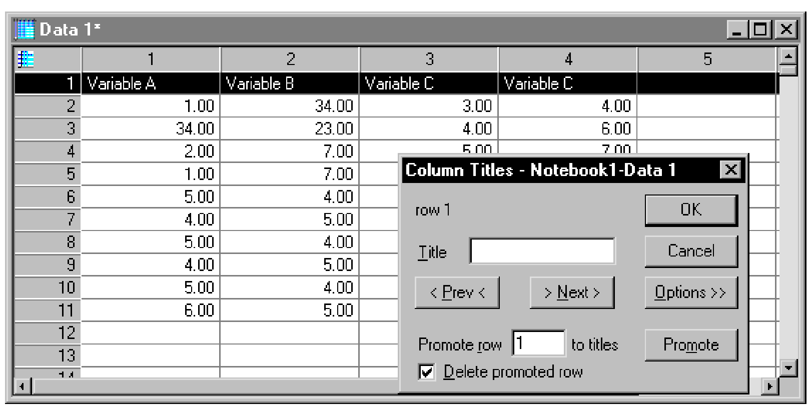
Using a Worksheet Row for Column Titles

Enter labels into a row, then use that row for worksheet column titles. This is particularly useful for data imported or copied from spreadsheets.

To use a row for column titles:

1. If necessary, enter the column titles you want to use in a single worksheet row.

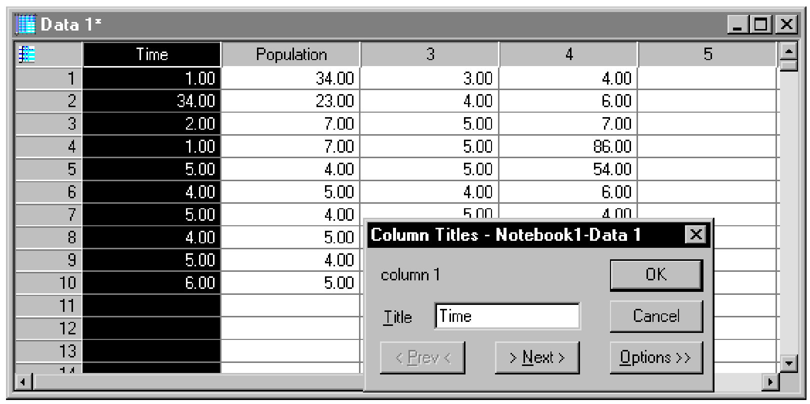
Figure 4–26 Using Row Contents as Column Titles



2. Select the row you want to use as column titles by clicking the row number to the left of the worksheet, then press F9 or choose the Format menu Column Title command. The Column Titles dialog box appears. Note that the selected row is already entered as the row to promote.
3. To delete the original row once it has been promoted, select Delete Promoted Row.
4. Click Promote to use the selected row contents as column titles. The Column Titles dialog box closes.

Σ All the cells of the selected row are promoted, not just those cells which contain column titles. This may affect other data sets in the worksheet.

Figure 4–27 Entering Column Titles Using the Columns Titles Dialog Box



Using a Cell as the Column Title

Use the Column Titles dialog box to promote individual cells to column titles.

To promote individual cells:

1. Press F9 or choose the Format menu Column Title command, and click the Options button in the Column Titles dialog box.
2. Click Next or Prev to move to the desired column, then enter the row number of the cell to use as the column title.
3. Make the Delete Promoted Row option inactive by selecting the checked option, then select Promote to use the selected cell contents as the title for the current column.

Editing Column Titles

To edit a column title, double-click the column title to select it. Use the keyboard to make your changes, then press Enter. The new title appears at the top of the column.

Using Excel Workbooks in SigmaPlot

SigmaPlot supports Microsoft Excel workbooks which you can use to create graphs, run transforms, and perform regressions and other statistics on your data.

To open a new Excel worksheet, you can click the button, or choose the File menu New command. For more information on creating Excel workbooks, see “Creating New Worksheets” on page 44.

Most Excel commands are available when Excel workbooks are viewed, as are the Excel toolbars. The SigmaPlot Graph, Statistics, and Transforms menus are also available. Note that when an Excel worksheet is in focus, all keyboard shortcuts are assigned to Excel’s hotkeys, not SigmaPlot’s.

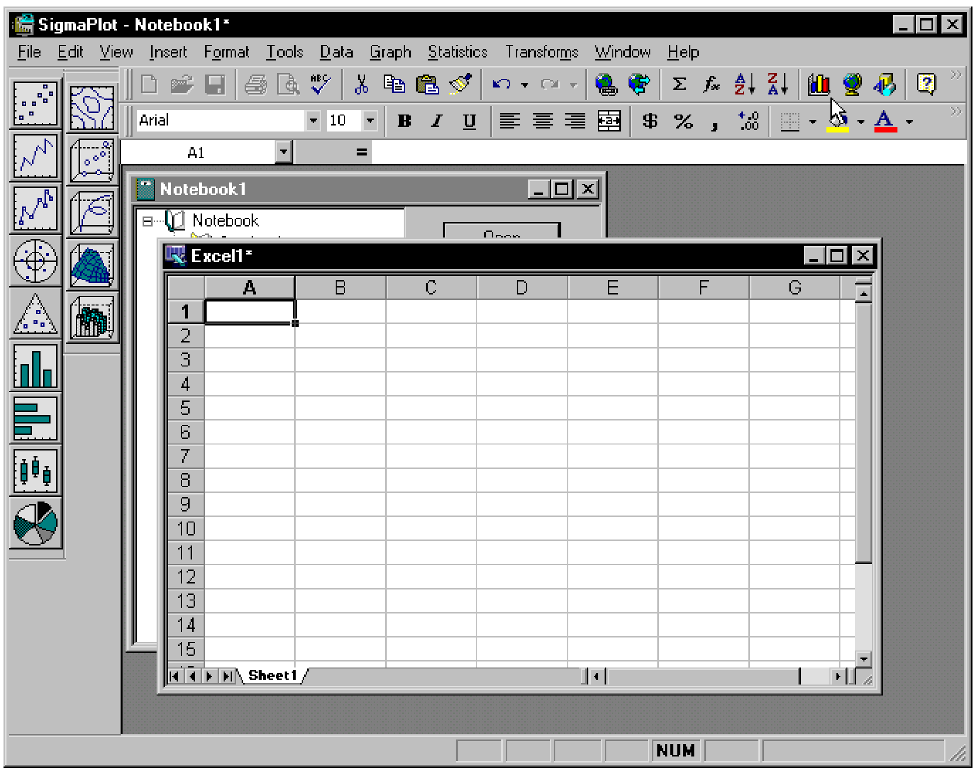


Figure 4–28 A New Excel Worksheet in SigmaPlot

Σ Excel workbooks created by SigmaPlot are initially limited to a single worksheet. Excel workbooks with multiple worksheets that are opened by SigmaPlot as notebooks retain all sheets, but only the first sheet can be used for graphs and statistics.

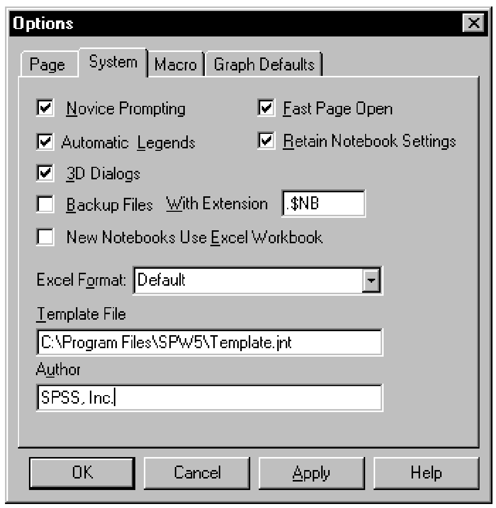
You can unprotect a workbook by choosing the Excel Tools menu Protection command, and choose Unprotect Workbook. However, if you do so, you must take care not to delete the worksheet that is used by SigmaPlot.

You cannot add, delete or move Excel worksheets or macros within workbooks within SigmaPlot until you unprotect the workbook.

Using Excel as Default Workbooks

You can use Excel workbooks as the default SigmaPlot worksheet. To set Excel as the default, choose the Tools menu Options command, then select the System tab. Select the New Notebooks use Excel Workbook option. All new notebooks will use Excel workbooks as the default worksheet.

Figure 4–29 Selecting Excel Workbooks as the Default Worksheet for New Notebook



Opening Other File Types With Excel

Using an Excel workbook as the default SigmaPlot worksheet enables you to use Excel's Open options, and to open file types available to Excel. The following file types use the Excel Import filters if Excel workbooks are the default worksheet:

- MS Excel
- Lotus 1-2-3
- dBase
- Plain Text
- SYLK

Opened data files automatically appear in a new Excel workbook in a new notebook file.

Σ Note that some text may be opened all into a single column. Use the Excel Data menu Text to Columns command to format this data.

Limitations of SigmaPlot Functions in Excel Workbooks

To understand how Excel works with other applications, please see your Excel documentation. The following functions are unavailable when working with data in an in-place active Excel workbook:

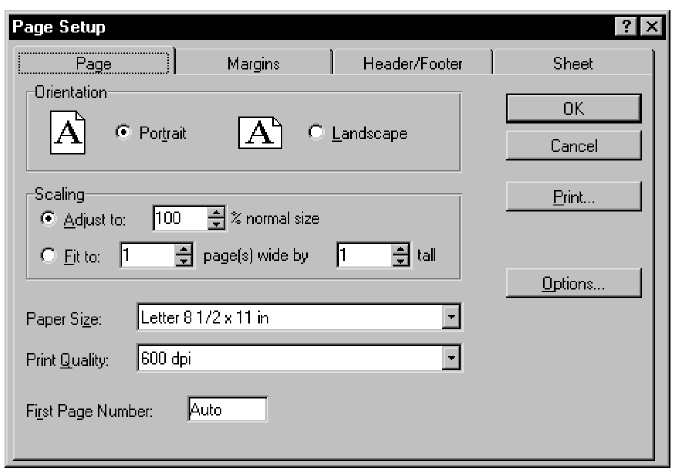
- ➤ Graphic cells cannot be inserted into an Excel workbook for customized sequences of colors, lines, symbols, and patterns. When an Excel workbook is the active window, there is no Edit menu Insert Graphic Cells command.
- ➤ An Excel workbook does not have an associated Statistics worksheet. To view statistics for data in an Excel workbook, use Excel's own statistics, or copy and paste the data into a SigmaPlot worksheet. Choose the View menu Statistics command to display the statistics worksheet for the active SigmaPlot worksheet.

Additional Features With Excel 97

If you are working in Windows 95, Office 97, or Windows NT 4.0, and have a copy of Excel, you can use Excel's advanced Print functions. You can also export Excel workbooks to the Excel *.XLS file format with the File menu Export command.

Printing Excel Workbooks: To specify page setup functions for the active Excel workbook, choose the File menu Page Setup command to open the Page Setup dialog box. You can modify page, margins, headers and footers, and sheet settings.

Figure 4–30 Setting Printing Options Using Excel's Page Setup Dialog Box



Exporting Excel Workbooks: You can export in-place active Excel workbooks to Excel's native *.XLS file format, as well as any other format supported by Excel.

To export Excel Workbooks:

1. Select and view the Excel worksheet, then choose the File menu Export command.
2. Excel's Save As dialog box is opened. Select the desired format from the Save as type drop-down list.

3. Specify the drive and directory to save the file in, enter a file name, then click Save to save the file.

Σ Under Excel 5.0, export and page setup are not available.

Excel Toolbars

An Excel workbook in SigmaPlot always uses Excel toolbar default settings of your last Excel session

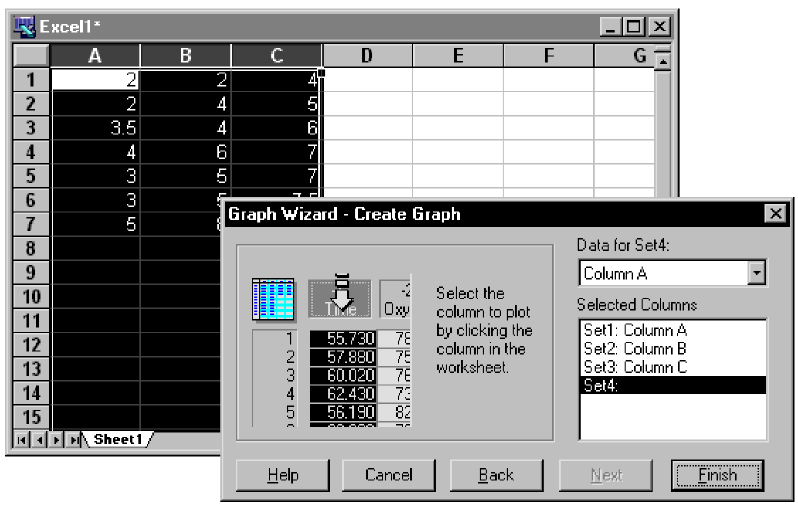
You can view any of Excel's toolbars by choosing the View menu Toolbars command. Select a toolbar to use from the Excel Toolbars dialog box; the toolbars appear near the workbook window.

Σ Switching from or closing an Excel workbook hides any Excel toolbars you may have displayed.

Creating SigmaPlot Graphs With Excel Workbooks

An Excel worksheet works the same as a SigmaPlot worksheet when creating graphs. You can pre-select data before beginning a graph, or click or highlight columns from the Graph Wizard.

Figure 4–31
PIcking Data to Plot From an Excel Worksheet



Using Transforms on Data in Excel Workbooks

Transform menu commands and user-defined transforms can be performed on data in Excel worksheets. The transform language uses syntax which refers to columns numerically, or by the column titles currently assigned. When prompted to pick columns, you can select columns as you would on a SigmaPlot worksheet.

To perform user-defined transforms on an Excel worksheet, use the corresponding column number in place of the column letter that appears in the gray heading area at the top of the column. For example, the transform function:

col(1)=data(1,100)

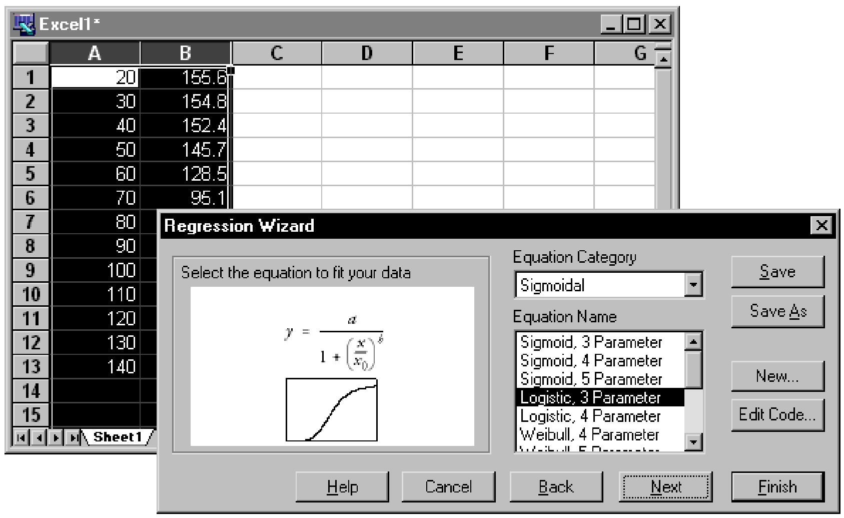
corresponds to inserting data values from 1 to 100 into *column A* of an Excel workbook. For more information, see the *Programming Guide*.

Using Statistics

You can use the statistics menu commands, including the Regression Wizard, with Excel worksheets.

When prompted to pick columns, select the columns from the Excel worksheet just as you would from a SigmaPlot worksheet. Results for statistics can be placed in Excel worksheets as well.

Figure 4–32 Using the Regression Wizard with an Excel Worksheet



5

SigmaPlot Statistics

This chapter covers:

➤ Running *t*-tests (see page 89)
➤ Generating data using transforms and regressions (see page 91)

Running Paired and Independent *t*-Tests

A *t*-test determines if the mean values of two data columns are significantly different by testing the hypothesis that the means of the two columns are equal. SigmaPlot can perform both paired and unpaired *t*-tests.

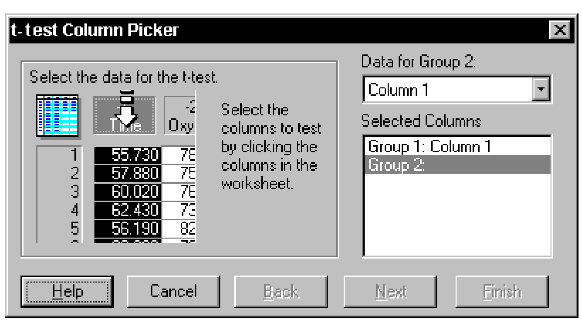
A paired *t*-test requires columns of equal length, since the data is assumed to be before and after data on the same subjects. An independent *t*-test can be performed on differently sized columns, since no relationship is assumed between the groups.

To perform a *t*-test:

1. Choose *t*-test or Paired *t*-test from the Statistics menu. The *t*-test Column Picker dialog box appears.

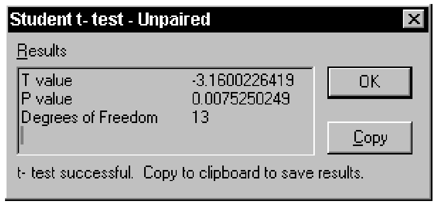
2. To pick the columns you want to compare, select the columns from the list or click the columns in the worksheet. Selected columns are assigned to the highlighted group or treatment in the Selected Columns list.

Figure 5–1
The *t*-test Column Picker Dialog Box



3. Click Finish. SigmaPlot displays results for the *t*-test.

Figure 5–2
***t*-test Results Dialog Box**



4. To save the *t*-test results, copy and paste the data to the worksheet, page, or another application.

For each test these values are displayed:

- ➤ *T*, the student's *t* statistic
- ➤ *P*, the probability that you are incorrect in stating that the two means are different
- ➤ A statement of whether the two means are significantly different at the $P = .05$ level
- ➤ The Degrees of Freedom, a measure of the sample size

Calculation of *t*

When performing *t*-tests, *t* is defined differently for paired *t*-tests than for unpaired tests.

Paired Test: For a paired *t*-test on data sets $\{x_1, x_2, x_n\}$ and $\{y_1, y_2, , y_n\}$

$$t = \frac{\overline{D}}{S_{\overline{D}}} \quad \text{where} \quad \overline{D} = \bar{x} - \bar{y} \quad \text{and}$$

$$S_{\overline{D}} = \sqrt{\frac{\Sigma D_i^2 - \frac{(\Sigma D_i)^2}{n}}{n(n-1)}} \quad \text{where} \quad D_i = x_i - y_i$$

Unpaired Test: For an independent *t*-test on data sets $\{x_1, x_2, , x_{n1}\}$ and $\{y_1, y_2, , y_{n2}\}$

$$t = \frac{D}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}\sqrt{\frac{\Sigma x_i^2 - n_1\bar{x}^2 + \Sigma y_i^2 - n_2\bar{y}^2}{n_1 + n_2 - 2}}} \quad \text{where}$$

$$\bar{x} = \frac{\sum_{1}^{n_1} x_i}{n_i} \qquad \bar{y} = \frac{\sum_{1}^{n_2} y_i}{n_2}$$

Using Transforms and Regressions to Generate Data

For an in-depth discussion of transforms and regression, refer to the *Programming Guide*. It contains descriptions and examples of all transform functions and the regression wizard, as well as many complete transform and curve fitting examples and results.

Using SigmaPlot Transform Language

One of SigmaPlot's most powerful and flexible features is its extensive mathematical transformation language which lets you manipulate and modify worksheet data. You can use transforms to create new data by performing functions on existing data, or generate calculated or random data, which can then be placed in worksheet columns.

To use transforms:

1. Choose User-Defined from the Transforms menu. The User-Defined Transform dialog box opens.
2. Type transform instructions into the edit box. You can enter up to 32 K worth of text.
3. Click Execute to perform the transform.

The contents of the transform window can be saved to a file. Since this is a text file, you can view or print these files using any word processor. Previously saved transforms can be opened in the transform window for execution or modification.

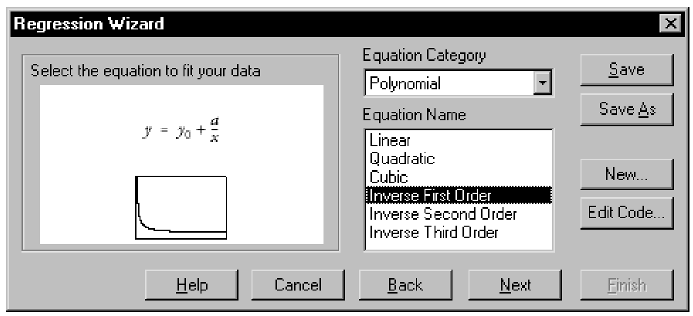
A library of sample transforms has been provided with SigmaPlot; these can be found in the XFMS subdirectory of the SPW5 directory. To view these files, click the Open button in the User-Defined Transforms dialog box and open a transform file. Most transform examples also include a sample SigmaPlot graph file displaying the results of the transform.

The Regression Wizard

The *Regression Wizard* is a graphical user interface that provides access to the over 100 built-in curve-fitting equations and to your own regression models, and steps you through the regression process. The Regression Wizard produces plots of your fitted curves as well as statistical reports.

Use of the Regression Wizard and SigmaPlot equation library are discussed in detail in the *Programming Guide*.

Figure 5–3
Selecting a Built-in Equation from the Regression Wizard



6

Graph Page Basics

Graph Pages are used to display and modify graphs that plot data from your worksheets. You can create as many graph pages as you wish per worksheet. New graph pages are associated with the current worksheet, and are placed in the current notebook section. This chapter describes how to work with graph pages, including:

- Selecting page settings and options (see page 94)
- Selecting and modifying basic page objects (see page 95)
- Adding graphs to a page (see page 100)
- Zooming your view in and out of the page (see page 101)
- Using page templates to speed up page and graph creation (see page 103)
- Cutting, copying, and pasting graphs and other objects (see page 108)
- Using OLE2 to paste, link, and embed objects (see page 109)
- Dragging and dropping graphs (see page 118)
- Hiding and deleting objects from pages (see page 119)
- Drawing shapes and lines (see page 121)
- Modifying drawn shape colors and lines (see page 123)
- Changing graph and object size, shape and position (see page 126)
- Drawing graphs and other objects in front of or behind other objects (see page 128)
- Grouping multiple objects as one (see page 129)
- Aligning objects with each other and with the page (see page 130)
- Entering and formatting text labels (see page 133)
- Editing and modifying automatic graph legends (see page 138)
- Changing graph page size, color, and margins (see page 143)
- Selecting and changing custom colors (see page 146)

About Graph Pages

Graph pages are true graphical representations of a printed page that contain graphs, text, and other drawn and pasted objects. Objects on graph pages are selectable and are modified using the Graph and Object properties dialog boxes, and with the graph and drawing toolbars. All objects can also be manipulated graphically using your mouse.

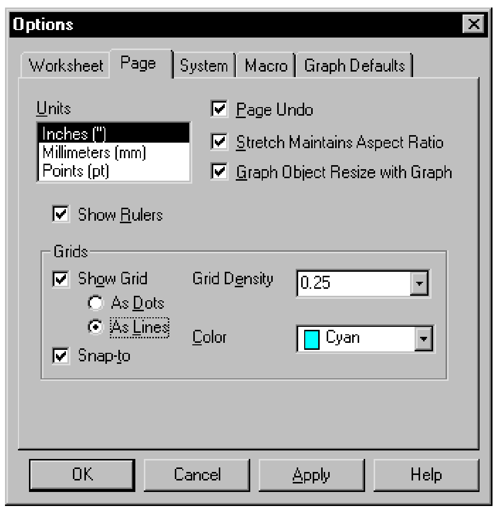
A page can contain an unlimited number of graphs and other objects, and you can create an unlimited number of pages for each worksheet. You can also paste graphics, OLE (Object Linking and Embedding) objects, and other objects onto a page.

Graph pages are created in several ways. "Notebook Basics" on page 39, describes a new graph page as a notebook item; see "Creating New Graph Pages" on page 44. This chapter describes how to create a new graph page using templates; see "Using Graph Pages as Templates" on page 103.

Setting Page Options

Graph page properties are controlled with the Options dialog box Page panel.

Figure 6–1 The Options Dialog Box Page Tab



Units: Sets the unit of measurement on the graph page (inches, millimeters, points). These units are displayed in the Graph Properties and Object Properties dialog boxes. See "Working with Page Objects" on page 95.

Page Undo: When this box is checked, the Undo and Redo commands are available for changes you make to the graph page. Disabling Undo and Redo can speed graph page operations significantly; however, page editing cannot be undone.

Stretch Maintains Aspect Ratio: When this box is checked, resized objects maintain their vertical-to-horizontal ratio when dragging a selected graph with corner handles. If this option is not checked, objects can be resized disproportionately.

Graph Object Resize with Graph: When this box is checked, resizing a graph automatically resizes objects associated with the graph, (axis labels, tick labels, the graph title, and the automatic legend). If this option is unchecked, objects must be sized individually.

Show Rulers: When this box is checked, horizontal and vertical rulers are displayed at the page window borders on the top and left-hand side of the page. If this option is unchecked, the rulers are hidden.

Show Grid: When this box is checked, grids are displayed on the graph page as either dots or lines in units as specified in the Units scroll-down list. If this option is unchecked, the grids remain hidden.

Grid Density: Sets the interval and spacing for both x and y grid directions. You can choose a density value from the drop-down list, or enter any legitimate value.

Color: Sets the color of the grid. You can change the grid from its default color of Cyan to another color available from the drop-down list.

Snap-to: When this box is checked, all drawn, resized, or moved objects “snap” to the nearest grid point. When drawing or resizing, the current corner or edge being dragged is snapped. When moving an object, the upper left corner is snapped.

Working with Page Objects

SigmaPlot menu commands, dialog boxes, and wizards let you to create and modify graphs and other page objects.

The *Graph Wizard* guides you in selecting the type and style of graph, and in adding plots and axes.

The *Graph Properties* dialog box customizes the plots, axes, grids planes, titles and legends of your graph. It is used for more advanced modifications to your graph.

The *Object Properties* dialog boxes modify many graph attributes.

The *Text Properties* dialog box modifies font and paragraph text attributes.

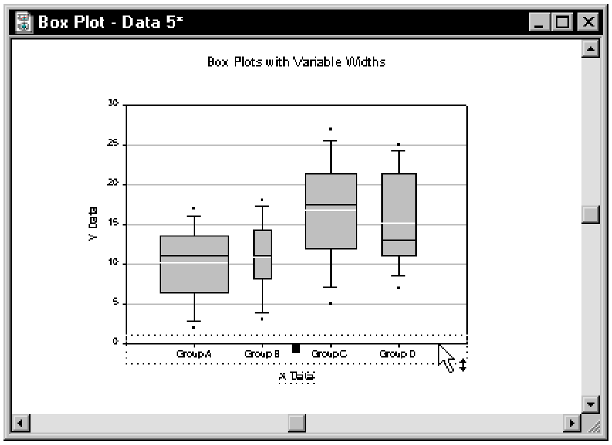
The *Edit Text* dialog box is used to enter and modify text.

Selecting Page Objects

SigmaPlot dialog boxes and menu commands are automatically accessed when you select the text, drawn objects, or individual elements on the graph page. To select a graph element, make sure you are in *selection mode* by clicking the drawing toolbar Select Object button, or choosing the Tools menu Select Object command. A check mark next to this command indicates that you are in selection mode.

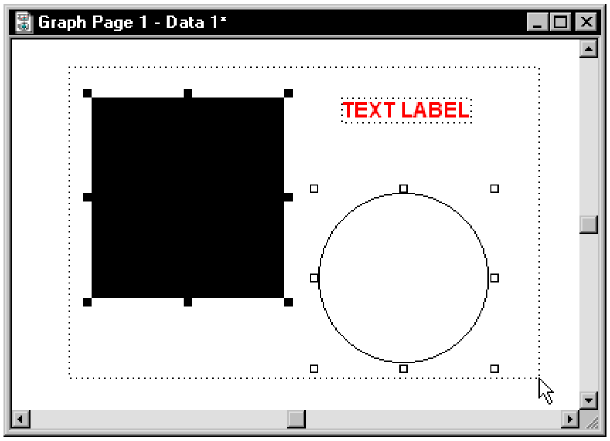
Selected objects are surrounded with square handles; selected axes and text are surrounded by dotted lines.

Figure 6–2
Selecting an Axis



Selecting Multiple Objects: To select multiple objects, hold down the Shift key while clicking objects, or drag a window completely around the objects you want to select. When multiple objects are selected, only the last selected object has solid black handles; the other objects have hollow handles.

Figure 6–3
Selecting Multiple Objects



Selected page objects, including graphs, text, drawn objects, and pasted objects, can all be edited, copied, pasted, moved, sized and scaled, and deleted or hidden.

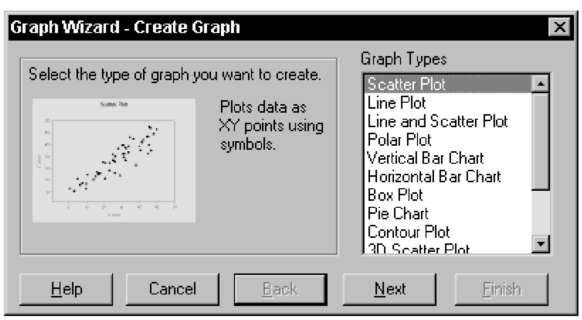
The following table summarizes the results of selecting various objects on the graph page.

Select:	**By:**	**Opens:**
Graphs	Double-click	Graph Properties Dialog Box/Plots Panel
Plots	Double-click	Graph Properties Dialog Box/Plots Panel
Axes	Double-click	Graph Properties Dialog Box/Axes Panel
Tick marks	Double-click	Graph Properties Dialog Box/Axes Panel
Tick labels	Double-click	Graph Properties Dialog Box/Axes Panel
Axis titles	Double-click	Edit Text Dialog Box
Legends	Double-click	Edit Text Dialog Box
Fills or Lines	Right-click	Object Properties Dialog Box

The Graph Wizard

The *Graph Wizard* guides you through a series of dialog boxes to select the type and style of graph, and to select worksheet data for plotting. After the graph is created, the wizard can be accessed to add or modify plots and axes.

Figure 6–4
The Graph Wizard Displaying a List of Graph Types

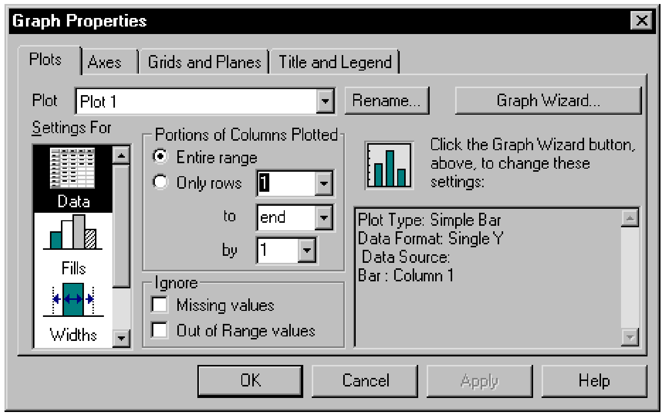


"Creating and Modifying Graphs" on page 151, discusses using the Graph Wizard at length. Step by step instructions for using the Graph Wizard also appears on page 23.

The Graph Properties Dialog Box

To access the Graph Properties dialog box, double-click anywhere on the graph, or choose Graph Properties from the Graph menu. Plots, Axes, Grids and Planes, and Titles and Legends panels offer many customizing features.

Figure 6–5 When You Double-click a Graph, the Graph Properties Dialog Box opens to the Data Panel

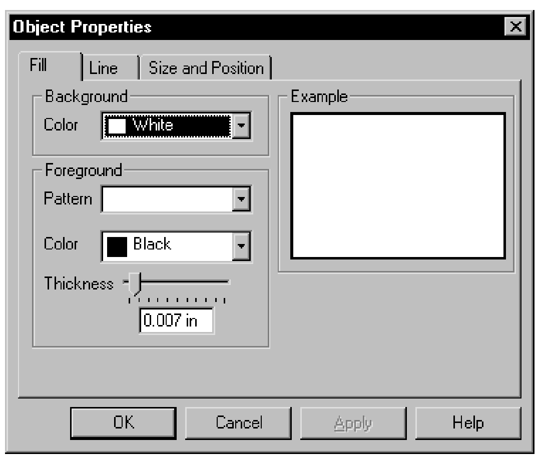


For in-depth information, see “Using the Graph Properties Dialog Box to Modify Graphs” on page 163.

The Object Properties Dialog Boxes

The *Object Properties* dialog box makes simple modifications to the graph page. The Line and Fill panels change fill patterns, lines of your plots and objects. The Size and Position panel changes position, scaling and size for all objects.

Figure 6–6 The Object Properties Dialog Box



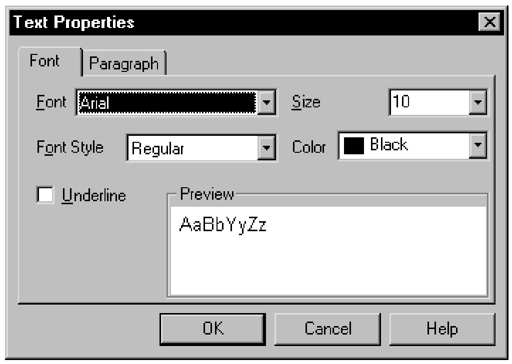
For more information see “Drawing Objects on the Page” on page 121.

The Text Properties Dialog Box

The Text Properties dialog box is used to change attributes of non-editable text, as well as attributes for multiple text labels, and making global text changes.

Selecting text properties with no selected text sets the default attributes for new text labels.

Figure 6–7
The Text Properties Dialog Box Has Both Font and Paragraph Tabs



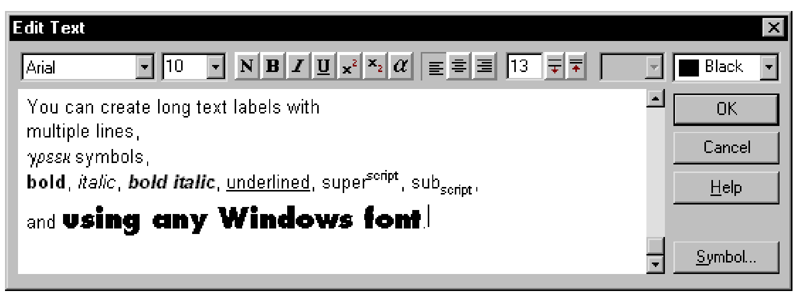
For more information on the Text Properties dialog box, see “Formatting Text” on page 137.

The Edit Text Dialog Box

The Edit Text dialog box is used to create new text labels and edit existing labels. The Edit Text dialog box is opened using the text tool, or by double-clicking a title or label.

You can format individual characters within a text string by selecting the text, and using the text toolbar buttons in the dialog box.

Figure 6–8
The Text Properties Dialog Box Has Both Font and Paragraph Tabs



Use the Edit Text dialog box to:

➤ Create and edit text labels.
➤ Edit graph and axis titles on the page.
➤ Modify automatic legend labels on the page.

For more information on entering and editing text, see “Working with Text on the Page” on page 133.

Adding Another Page to a Graph

You can add additional graphs to the current graph page by:

- Creating a new graph.
- Copying a graph to the same page.
- Copying and pasting a graph from another page.

Σ In the next section you will learn about applying templates. Never use templates to add a graph to a page.

Σ To learn about adding additional plots to the same graph, see "Multiple Plots on a Graph: Adding New Plots" on page 170.

Creating a New Graph for the Current Page

If you want to add a graph to a page by creating a new graph, first add the data for the new graph in the worksheet associated with the current graph page. View the active graph page, then either select a graph from the graph toolbars, choose the Graph menu Create Graph command, or click the Graph Wizard button

To learn more about graphs, see "Creating and Modifying Graphs" on page 151.

Copying a Graph on the Same Page

One of the quickest and the easiest ways to add a second graph is to copy the one you have already created, then modify it; see "Cutting, Copying and Pasting Graphs and other Page Objects" on page 108.

Copying and Pasting a Graph from One Page to Another

You may copy a graph from a graph page within the current notebook section, or from a different notebook section.

To copy a graph from one page to another:

1. Make the current page active by selecting it or by choosing the graph page name from the Window menu.
2. Select the graph you want to copy.
3. Copy the selected graph by clicking the Copy button, or by pressing Ctrl+C, Ctrl+Insert, or choosing the Edit menu Copy command.
4. Make the destination page the current page either by opening it, or if it is already open, select the graph page name from the Window menu. A check mark next to the page name indicates that it is the active window.

Σ If the destination page is in a different notebook than the source page, you must close the source page, and any other open work in the source notebook.

5. Paste the graph to the page by clicking the Paste button, or by choosing the Edit menu Paste command. The graph appears on the current page, and the

graph data appears in the worksheet associated with the current page. Another method is dragging and dropping, as described in "Dragging and Dropping Graphs" on page 118.

To learn about moving and sizing graphs, see "Using Your Mouse to Change Graph and Object Size" on page 126.

Zooming In and Out

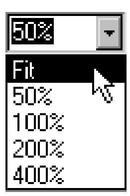
Use SigmaPlot View menu commands to control display of the worksheet window. You can view the page at several different levels of magnification, magnify the page centering on a specified page location, or choose a completely unobstructed view of the page.

Viewing the Full Page

To view the full page without toolbars, title bars, scroll bars, or the status bar, choose the View menu Full Screen command. The page is displayed without any obstructions.

To return to normal view of the page, press any key on the keyboard. The screen returns to its normal appearance.

Magnifying the Page.



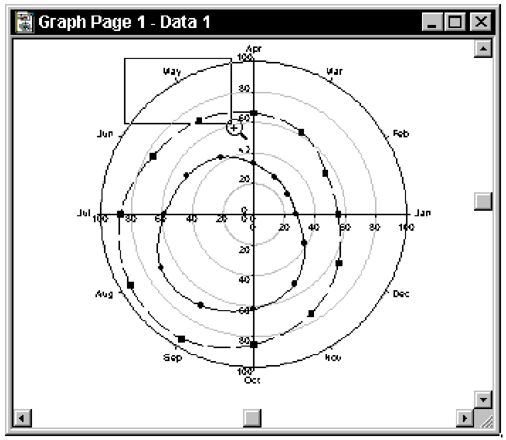
To change the magnification of the entire page:

1. Change the view using the toolbar drop-down list. You can select a zoom level, or enter a custom zoom anywhere between 10 to 2500.

2. You can also click the toolbar custom zoom button  to zoom in on a specific region of the page. The pointer changes to a magnifying glass; select a region on the page by dragging the mouse, then release the mouse button. The region is

zoomed to the selected area.

Figure 6–9
Using the Zoom Pointer to Select a Region on the Page



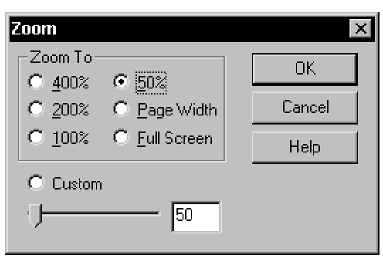
3. Another way to zoom in on the page is using keyboard shortcuts while viewing the page window. The zoom keyboard shortcuts to view the page:
   - ➤ At 50% actual size, press Ctrl+5
   - ➤ At 100% actual size, press Ctrl+1
   - ➤ At 200% actual size, press Ctrl+2
   - ➤ At 400% actual size, press Ctrl+4
   - ➤ Entire page, press Ctrl+F
   - ➤ Magnified for a specific region, press Ctrl+U

Using the Zoom Dialog Box

You can use the Zoom dialog box to change the zoom level to fixed or custom levels.

1. Choose the Zoom command from the View menu. The Zoom dialog box appears.

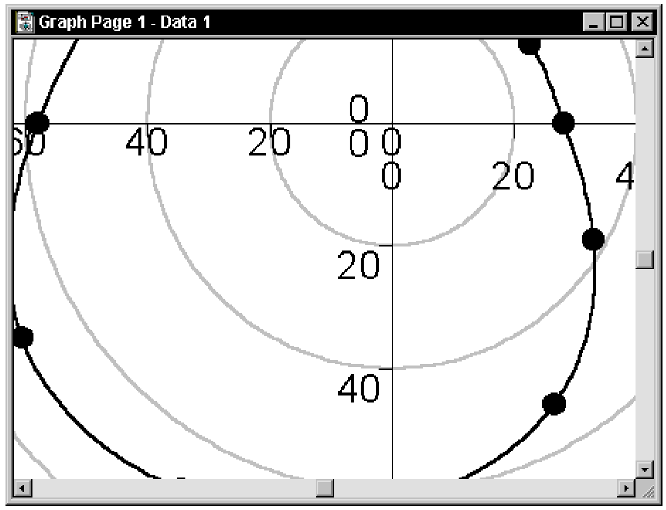
Figure 6–10
The Zoom Dialog Box



2. Choose the desired zoom level, to fit the page to the window, or to zoom to a full screen view. Use the Percent edit box and slider controls to set a specified percentage of magnification

.

Figure 6–11
Example of a Graph
Page Zomed in to 200%



Using Graph Pages as Templates

Graph page templates are used to simplify graph and graph page creation and modification. You can use templates to create pages and graphs with preset properties. For example, if you need to create a set of slides, you can open pages that are already set to attributes for slides.

How to Apply Templates

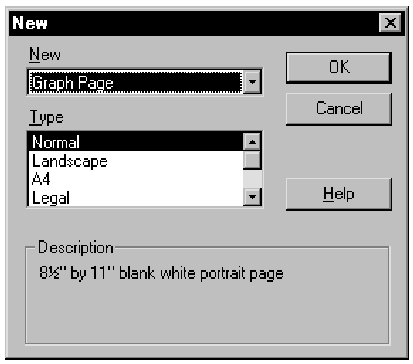
There are three methods of using pages as templates:

Method	**Result**
Using a template from the New Page command	Creates a new page with attributes from the template applied
Copying a graph page from one notebook section to another	Creates a new page in a section, using the data in the existing worksheet for graphs
Overwriting an existing page	Replaces the existing page

To create a new page with attributes from a template:

1. Either open a new notebook with the New command, or open a previously existing notebook.
2. Select to create a Graph Page, then select the type of graph page you want to open.
3. Click OK. A new graph page is created using the selected page as a template source.

Figure 6–12
The New Dialog Box with Graph Page Selected. Available Templates Are Listed the Type List.



Copying a Page: The best method of applying a page template to a worksheet is to use an existing graph page as a template. The copied page acts as a template using the worksheet in the new section. For information on copying pages and other notebook items, see “Copying, Pasting and Removing Notebook Items” on page 49.

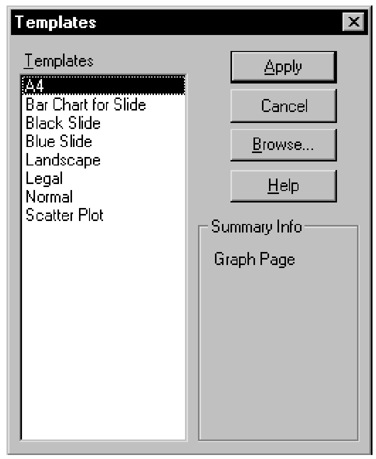
Σ If you plan to copy a page, set up your worksheet so that the data is in the appropriate columns before applying the template. You can also change the columns to plot after applying a template by selecting the plot, opening the Graph Properties dialog box, and using the Graph Wizard button. For more information on picking different columns to plot, see “Picking Different Data for the Current Plot” on page 168.

Overwriting an Existing Page: When you apply a template to an existing graph page, all features of the existing page are lost.

To apply a template to an existing page:

1. Make the graph page the active window, then choose the File menu Templates command.

Figure 6–13
The Templates Dialog Box



2. To apply a template from the Templates list, select the template name, then click Apply.

To apply a template from a different notebook template file:

1. Click Browse From the Open dialog box.
2. Select the path and file name of the desired SigmaPlot Notebook or template file.
3. Click Open to use the selected notebook template file.
4. Select the template to use from the Templates list of the Templates dialog box.
5. Click Apply.

Template Pages

Template pages are ordinary graph pages. Any graph page can act as a template page if it is copied to a section or used from the File menu New command to create a new page. All attributes from the page—size, color, margins, and orientation—are retained. Any graphs and other objects on the page are also duplicated.

Template Graphs: Template graphs automatically plot the worksheet column data that was selected when the graph was created.

When applying a page to a worksheet, make sure your data is already arranged as required, or repick the data for the graph after applying the template.

You can determine which columns are plotted by either looking at the worksheet footers, or by opening Graph Properties dialog box for the template graph, and viewing the information shown under the Data panel.

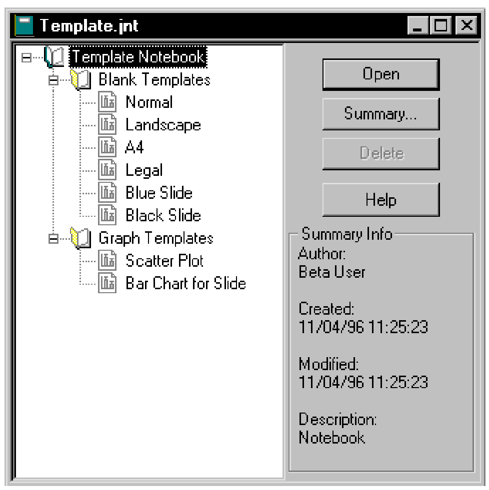
Graphs created by templates can be modified like any other graph. See "Creating and Modifying Graphs" on page 151.

Templates/Notebooks

Templates can be stored as pages in notebook files that have the extension .JNT. Template notebooks can be opened and edited like any other notebook file; the different extension is only provided for organizational purposes.

A sample template notebook, TEMPLATE.JNT, is provided with SigmaPlot, and is set as the initial template source notebook. The template pages found in this file are described in "SigmaPlot Templates" on page 328.

Figure 6–14
The TEMPLATE.JNT Notebook



TEMPLATE.JNT is used as the source for new pages by default. It contains both pages with no graphs and pages with graphs.

You can modify existing pages or add your own graphs or graph pages to TEMPLATE.JNT. Simply open the file, open the page you want to modify, then save your changes. You can add files by creating new pages or by copying pages from your notebooks to TEMPLATE.JNT; see "Adding New Pages to TEMPLATE.JNT" on page 107.

You can also create your own template notebook containing your own customized graph pages. Save template notebooks as SigmaPlot Template (.JNT) files, then specify that file to be your Template File; see "Changing the Template File Used for New Pages" below.

Changing Page Created by the New Page Button

The New Page toolbar button automatically uses whichever page is titled Normal as the source for new pages. If you want to modify the attributes of your new page, open and modify the Normal page, or replace it with the desired page.

If there is no page named Normal in your template file, the page is formatted according to settings found in the SPW5.INI file. See "Troubleshooting" on page 387 for more information on modifying these settings.

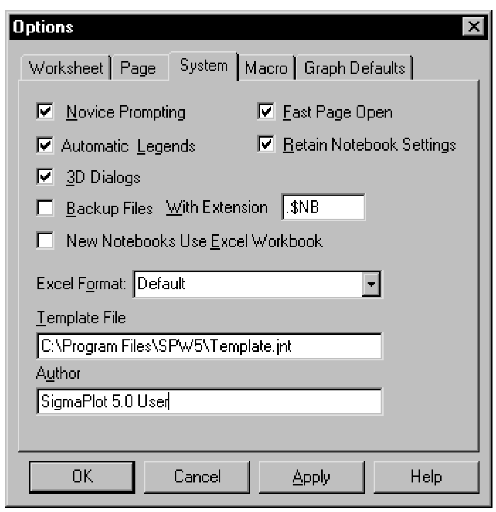
Changing the Template File Used for New Pages

The template notebook is automatically used when SigmaPlot opens a graph or graph page. The file name is set in the System panel of the Options dialog box.

To change the source file template:

1. Close any open dialog boxes, then choose the Tools menu Options command.
2. Select the System panel.
3. Type the path and file name of the desired template file in the Template File edit box.
4. Click OK. The notebook becomes the default template source.

Figure 6–15
The Default Template File Edit Box



Note that if a valid default template source file is not specified, a default page is created instead. This page is a letter-sized, white portrait page by default.

Adding New Pages to TEMPLATE.JNT

You can add a previously created page to the TEMPLATE.JNT notebook.

To add a page:

1. Choose the File menu Open command.
2. Specify Template Notebook as the file type.
3. Select TEMPLATE.JNT.

4. Click Open.
5. Open or view the notebook file containing the page you want to add to TEMPLATE.JNT.
6. Highlight the page you want to copy, and press Ctrl+C.
7. Highlight the section of TEMPLATE.JNT where you want to add the new page.
8. Press Ctrl+V. The page is added to TEMPLATE.JNT.
9. Save and close TEMPLATE.JNT.
10. Choose File New and select Graph page. The page you copied should appear on the list.

Cutting, Copying and Pasting Graphs and other Page Objects

Cut and copy selected page objects to the Clipboard using the toolbar, or by using Edit menu commands.

Cutting and Copying Graphs

To cut or copy a graph or other page object select the graph or object to cut or copy by clicking it. To cut the item, click the toolbar button, choose the Edit menu Cut command, or press Ctrl+X.

To copy the item, click the toolbar button, choose the Edit menu Copy command, or press Ctrl+C. A copy of the selected graph or object or is placed in the Clipboard. Since copied items remain in the Clipboard until replaced, you can paste as many copies as you want without having to cut or copy the object each time.

Pasting Objects

Clipboard contents can be pasted to any open page, report, or into any other Windows application that supports Windows Metafiles or OLE2 (Object Linking and Embedding).

To paste an object to a page, click where you want the object to appear, then press Ctrl+V. You can also press Shift+Insert, click the toolbar Paste button, or choose the Edit menu Paste command.

For more information on OLE, see “SigmaPlot and OLE” on page 110. To learn about pasting objects and graphs between applications in general, see “Using OLE2 to Paste, Link, and Embed Objects” on page 109.

The Clipboard is a Microsoft Windows feature. To learn more about how the Clipboard works, refer to your Windows *User’s Guide*.

Using OLE2 to Paste, Link, and Embed Objects

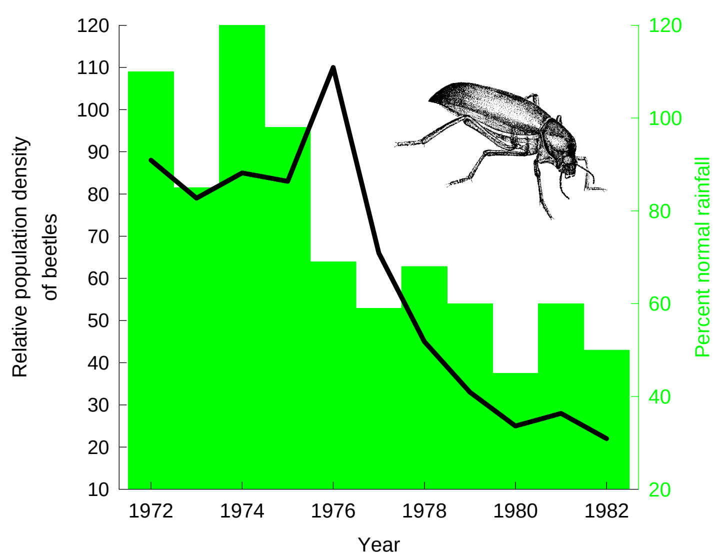
There are various ways to paste SigmaPlot objects into other applications, and vice versa. One method is using *OLE2* (Object Linking and Embedding), which is fully supported by the SigmaPlot page. OLE provides the ability to move or copy information among supporting applications, and to use the applications interchangeably to modify the data.

Methods Of Placing Objects

Data can also be copied or cut and pasted among applications without using OLE2. The method of placing objects depends on each application's implementation. The following table shows how objects can be placed:

Type of Object	Destination Application
OLE object	Can be placed if application supports OLE.
Windows Metafile	Can be placed if application doesn't support OLE, but supports pictures.
Enhanced Metafile	Can be placed in Windows 95 applications only.
Bitmap	Can be pasted in applications that support bitmaps only (for example, Microsoft Paint).

Figure 6–16
A SigmaPlot Graph with Pasted Artwork



Σ SigmaPlot always pastes an OLE object if it is available. The SigmaPlot graph and report pages support OLE. Graphs (not graph pages) pasted into SigmaPlot reports are always pasted as Windows metafiles.

Commands to Place Objects

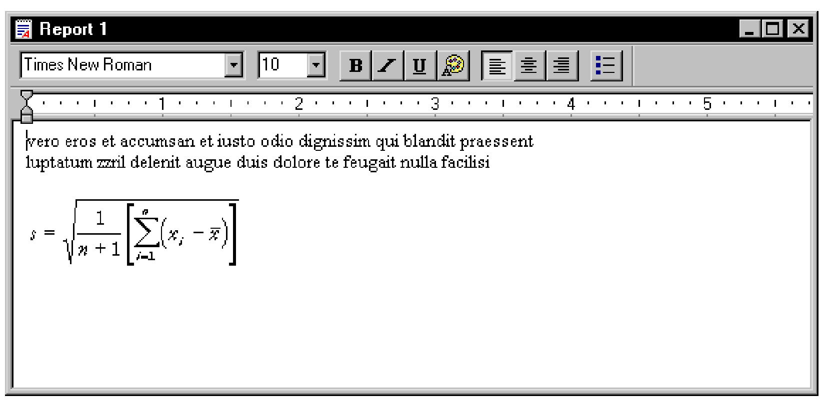
SigmaPlot provides the following commands and functions to place, link, and embed objects on a graph or report page:

Command or Function	Definition and Use
Paste Command	Embeds an OLE object, if there is one in the Clipboard. Connects to data in the originating application but not directly to a file. If there is no OLE object in the Clipboard, a non-editable picture or text is placed.
Paste Special Command	Allows you to choose Clipboard file types and to also embed objects and links.
Insert New Object Command	Directly creates and places an OLE object without using the Clipboard. Allows embedding the object or linking to a file.
Drag and Drop	Moves, or copies any Clipboard object (usually OLE).

SigmaPlot and OLE

SigmaPlot can place and receive OLE and other types of objects, such as scanned images, clip art, or text from a word processor. For example, you can place an equation created with the Microsoft Word Equation Editor into a SigmaPlot report, and edit it with the Word Equation Editor when it changes.

Figure 6–17 Example of an Microsoft Excel Equation Embedded into a SigmaPlot Report



Linking or Embedding Objects

Paste Special, Insert Object, and Ctrl+Drag enable you to either *link* or *embed* the object in the page or report.

Linking appears to place a copy of the object in the destination application, but actually only places a reference to it. Therefore, the object is modified every time the original file is modified.

Linking to a file is only available if you create an object using the Paste Special or Insert New Object commands, or if you drag and drop an object with the Ctrl key held down.

Linking is useful when an embedded object needs to be updated when the file is updated. The disadvantage of linking objects is that a referenced file cannot be accessed if the locations of either the SigmaPlot file and/or the source file change.

Embedding places a copy of the object in the destination application, and enables you to edit it by activating it's source application when you double-click it. Embedding does not use a reference file; the "file" is actually embedded completely in the SigmaPlot file. For example, if a Microsoft Word embedded object has been placed in a SigmaPlot report, and you double-click it, Microsoft Word opens. Word temporarily runs "under" SigmaPlot. When you are finished editing the item and close Word, SigmaPlot remains open.

Embedding an object has the advantage of keeping all the associated data in one place, but can create large files.

Placing SigmaPlot Objects into Other Applications

SigmaPlot graphs and reports can be pasted into other applications, and linked or embedded for future editing with SigmaPlot. For example, you can paste a SigmaPlot graph into a Microsoft Word document (as an OLE object), and use the SigmaPlot Graph Properties dialog box to edit it by double-clicking the graph.

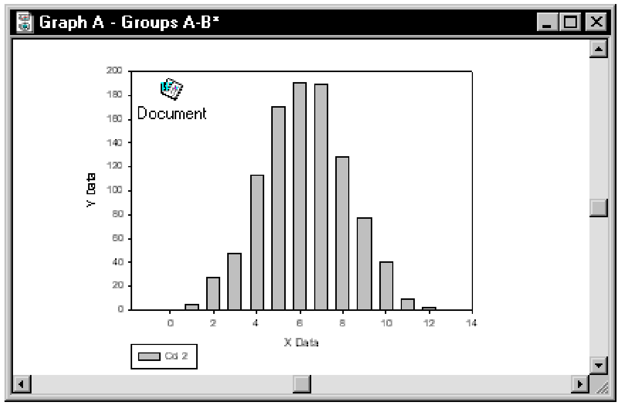
When you link to SigmaPlot and double-click the graph or report, the notebook file containing the graph/report opens. See "Placing SigmaPlot Graphs into Other Applications" on page 112.

You can change the source of any linked object, with the Change Source command. See "Viewing and Modifying Object Links" on page 117 .

View as Icon

With OLE, the View as Icon feature allows you to place an icon representing the application that created the file in your data. For example, if you have a description of a graph written in a Microsoft Word document, you can embed it, and display it as an icon that shows on the graph page. If you want the object displayed as an icon, check the Display As Icon option. Click the icon to view and edit the object in its source application.

Figure 6–18 Displaying a Microsoft Word Document as an Icon on a Graph Page



Identifying Objects on the Graph Page

You can determine the type of object on the graph or report page with the Edit menu Object command. Select the object, then choose the Edit menu Object command. The Object command changes to reflect the file type of the selected object. For example, if a bitmap object is selected, the Object command displays *Bitmap Image Object*.

Placing SigmaPlot Graphs into Other Applications

You can copy or cut SigmaPlot graphs to the Windows Clipboard, then paste the graph directly into another document, like a word processing or desktop publishing page, without having to do any file exporting or importing.

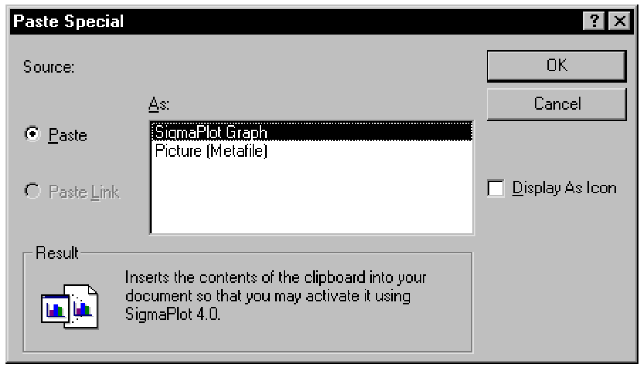
You can also drag and drop graphs directly from SigmaPlot into any other Windows 95 program that supports OLE2. See “Dragging and Dropping Graphs” on page 118 for more information.

To paste a graph to another application:

1. Select the graph to cut or copy.
2. Press Ctrl+X or Ctrl+C. The graph is cut or copied.
3. Open or switch to the other application, and click where you want the graph to appear.
4. Paste the graph, typically using the Edit menu Paste command. If the graph isn’t an OLE object, try the Paste Special command, and select SigmaPlot Graph or SigmaPlot Graph Object.

To create a link between SigmaPlot and the other application, click the Paste Link button. To insure you are pasting an OLE object, use the Paste Special command. If a Paste Special command doesn't exist, the application probably doesn't support OLE.

Figure 6–19
Using the Paste Special Dialog Box to Paste a Graph from SigmaPlot to another program

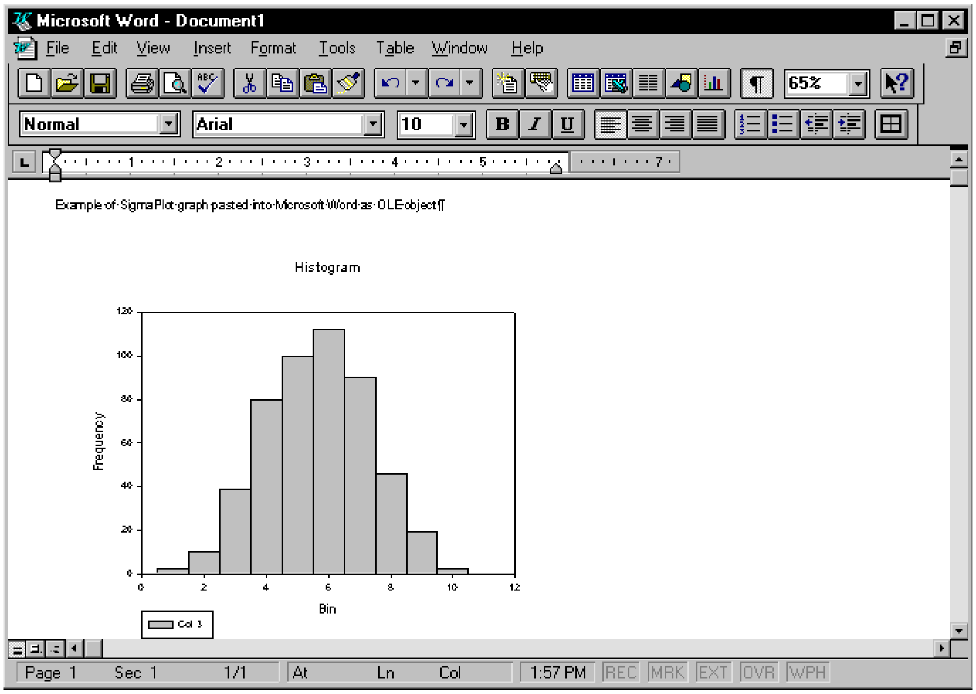


5. The SigmaPlot graph appears in the other application. You can now in-place activate the graph by double-clicking it, or open it in SigmaPlot, typically by choosing the Edit menu Object command.

   If the application does not support OLE or OLE2, the SigmaPlot graph is typically pasted as a metafile graphic.

SigmaPlot graphs pasted with the Edit menu Paste command take their plotted data with them in the form of the plotted graph (the worksheet is not shown). If you want to view or edit the data, you must open the graph rather than simply editing it.

Figure 6–20 Example of a SigmaPlot Graph Pasted into Microsoft Word for Office 97 as an OLE Object



Pasting Objects onto a Graph Page or Report

You can paste contents, including OLE and OLE2 objects, into both page and report documents.

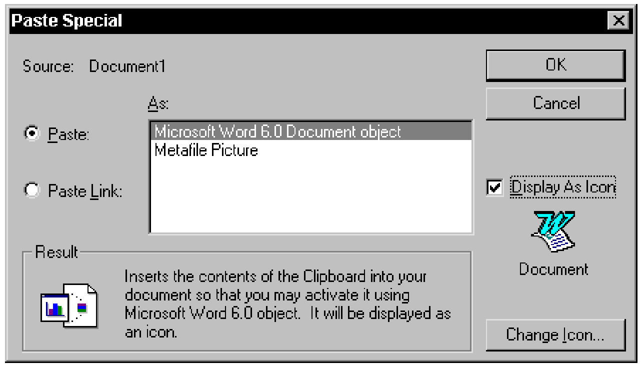
To paste artwork, text from a word processing application, or other objects onto a graph or report page:

1. Open the application and file containing the desired artwork or text, and cut or copy the object.
2. Switch to SigmaPlot and view the graph or report page.
3. Click the location where you want the object to appear, then press Ctrl+V.

   The graphic is pasted to the page. If the object can be an OLE object, SigmaPlot always defaults to the OLE object.
4. To paste the object as a specified file type, choose the Edit menu Paste Special

command. The Paste Special dialog box appears.

Figure 6–21 Using the Paste Special Dialog Box to Paste an Object from Microsoft Word to SigmaPlot



Σ Note that the options available in the Paste Special dialog box depend on the type of file being pasted.

5. If you want the object displayed as an icon, click the Display As Icon option. Click the icon to view and edit the object in its source application.

   You can also specify a different icon to display the pasted object. Click Change Icon and select a different icon.

6. Click Paste to paste the object as a specified file type. Select Paste Link to paste the object as a linked file that can be updated in another application.

Σ The options in the As list change depending on your selection of either Paste or Paste Link, and the explanation in the Result box changes depending on your selection in the As list.

7. Select the type of object to paste from the As box, then click OK. The object appears at the selected location.

If the object is an OLE2 object, you can double-click the object to edit it with its original application directly within SigmaPlot. OLE1 objects are opened and edited by the source application when they are double-clicked.

Placing Objects Without the Clipboard

You can select objects from applications that are installed on your system and to place them into a SigmaPlot graph or report with the Insert New Object command. The object types available on your system depend on the applications installed, and appear in the Object Type drop-down list of the Insert New Object dialog box.

To insert an object using the Insert Object command:

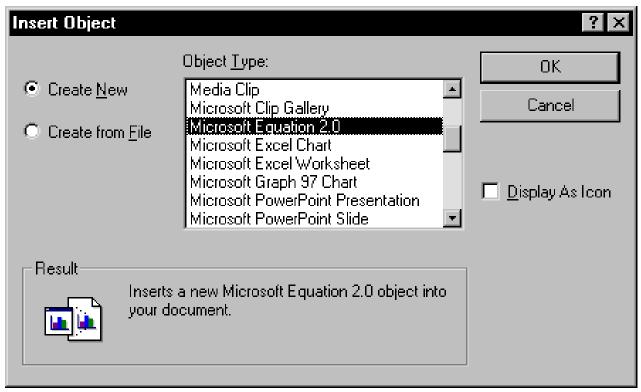
1. View the report or graph page, and click where you want the insertion point.
2. Choose the Edit menu Insert New Object command. The Insert Object dialog box appears.

3. If you want to display the new object as an icon, check the Display As Icon check box.

   You can also specify a different icon to display the inserted object. Click the Icon button to open the Change Icon dialog box. Choose a different icon from the available options, or click the Browse button to search for alternative icons on your system.

4. To create a new object to place on the report or graph page, select the Create New option, then choose the type of object from the Object Type list. Click OK to open the application associated with the selected object. Create the desired object, then use the application's appropriate Exit command to close the application and return to SigmaPlot. The created object is displayed on the graph or report page as an embedded object.

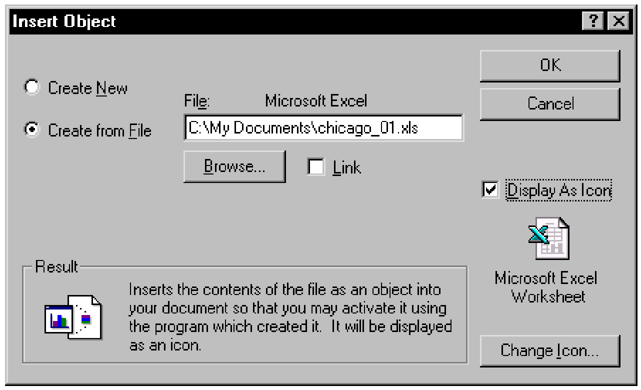
Figure 6–22
The Insert Object Dialog Box



5. To insert an object from an existing file on the report or graph page, selec t the Create from File option, then type the path and file name of the desired file in the File edit box, or click the Browse button to open the Browse dialog box, from which you can select the appropriate path and file name of the object you want to place.

6. Select the Link option to place the object on the page as a linked object. When a file is linked, it is modified in your graph or report page when it is modified in the original application. If the Link option is not selected, the object is pasted as an embedded object.

Figure 6–23
The Insert Object Dialog Box After Selecting Create From File, with the Display as Icon Option Checked



7. Click OK to place the object on the report or page.

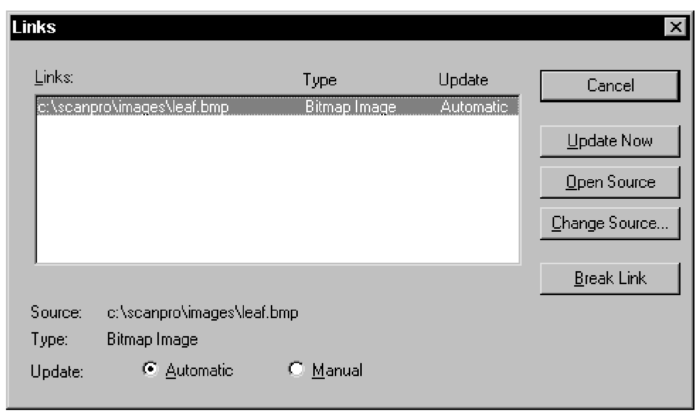
Viewing and Modifying Object Links

You can view and modify links with the Links dialog box. The Links dialog box displays all links associated with the current graph or report page.

To view and modify links:

1. View the graph or report page by selecting it.
2. Choose the Edit menu Links command. The Links dialog box appears displaying the path, file name, type of file, and if it is a manually updated or automatically updated link, of all links on the page.

Figure 6–24
The Links Dialog Box



If you do not have any linked objects on the page, the Links box is empty.

3. To change the updating to either Automatic or Manual, select the unselected option. If Automatic updating is selected, the object changes automatically when the source file is changed. If Manual updating is selected, you must use the

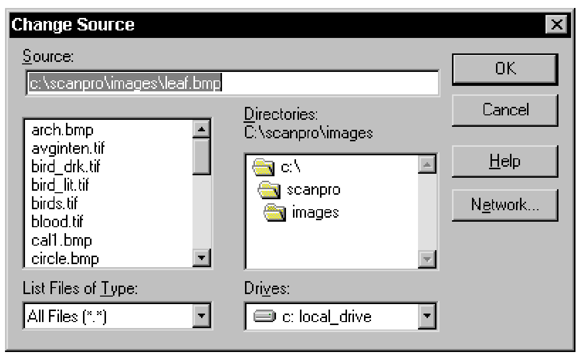
Update Now button to update the linked object with any changes made to the source file.

4. To edit a linked object, select the object name in the Links dialog box, then click Open Source. The source file opens in the appropriate application where you can make changes, then exit the application and return to SigmaPlot.

   If Automatic updating is selected, the object reflects the changes; if Manual updating is selected, you must click the Update Now button to apply changes to the linked object.

5. To change the source file for a linked object, click the Change Source button. Choose the new path and file name, then click OK. The link appears in the Links dialog box with the new path and file name. You may need to click the Update Now button to view this change in your document.

Figure 6–25
The Change Source Dialog Box



6. To end the link between an object and its source file, click the Break Link button. The object is no longer treated as a linked object.

7. Click OK to close the Links dialog box.

Dragging and Dropping Graphs

OLE2 allows you to drag objects between compatible applications within Windows 95. Additionally, you can drag and drop graphs from one graph page to another.

To drag a graph into another application, you must be operating within Windows 95 or NT 4, and the other application must support OLE2.

1. Make sure the other application is open and visible from the desktop, with the location where you want to drop the graph also visible.

2. Select the SigmaPlot graph you want placed in the other program, then drag the graph from the SigmaPlot page. If you want to drop a copy of the graph, press

the Ctrl key while dragging.

3. Move the mouse to the location you want the SigmaPlot graph to appear.
4. Release the mouse; the graph appears at the drop location. You can now edit the graph with SigmaPlot in the future by double-clicking.

Note that you can also drag and drop graphs onto the Windows 95 desktop. Dropping a graph onto the desktop creates a scrap file that can be dragged into another document at a later date.

Dragging and Dropping Graphs Between Pages

You can drag a graph from one graph page to another. If the graph is dragged from a different notebook section, it will insert its data into the destination section worksheet.

To copy or move a graph from one graph page to another:

1. Open the source and destination pages. The pages must still be within the same notebook, but can be in different sections.
2. Select the graph and drag it from the original page to the new page. If you want to copy rather than move the graph, press the Ctrl key while dragging.
3. Release the mouse where you want the graph to appear. The graph is placed on the new page. If the page is in a different section, the data plotted by the graph is copied to the current worksheet.

Hiding and Deleting Objects from the Page

Drawn and pasted page objects can be deleted from the page, and graphs, automatic legends, automatically created graph titles, plots, and axes can be deleted and/or hidden from view. To learn about removing and hiding axes, see “Hiding, Displaying, and Deleting Axes” on page 225.

Hiding and Viewing Graphs on a Page

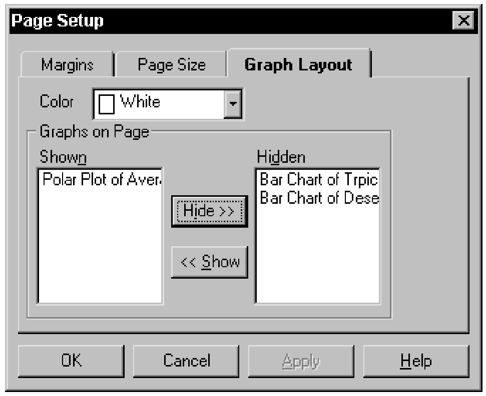
To control which graphs are displayed on the page:

1. Make the graph page the active window by selecting it, then right-click the graph you want to hide and choose Hide.
2. You can also choose the File menu Page Setup command, then select the Graph Layout tab to view the Graph Layout panel of the Page Setup dialog box.
3. The graphs on the current page are listed in the Shown box. To hide a graph, select it from the list and click the Hide button. The selected graph is moved to the Hidden list. (To select multiple graphs, hold down the Shift or Ctrl key while making selections.)

4. To view a hidden graph, select it from the Hidden list and click the Show button.

5. Click OK to apply your selections and close the Page Setup dialog box.

Figure 6–26 The Graph Layout Panel of the Page Setup Dialog Box



Σ Note that hidden graphs do not print.

To learn about showing and hiding plots, see “Showing, Hiding, and Deleting Plots” on page 172.

Hiding Graph Titles and Legends

Automatically generated graph and axis titles and legends can be hidden from view without being permanently removed from the graph page.

To hide an automatic legend or automatically created graph title:

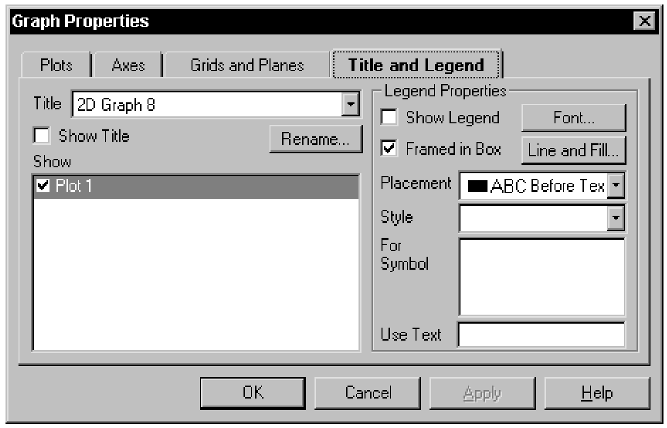
1. Open and view the page and select the title or legend, then press Delete. You can also right-click and choose Hide, or choose the Edit menu Clear command. The title or legend is not deleted, only hidden.

2. You can also hide graph titles, axis title, and legends using the Graph Properties dialog box. Open the Graph Properties dialog box by double-clicking the graph.

   You can also open the Graph Properties dialog box directly to the Title and Legend panel by right-clicking the legend and choosing Graph Properties.

3. To hide the graph title, clear the Show Title check box.

Figure 6–27 Hiding Graph Tiltes and Automatic Legends Using the Graph Properties Dialog Box



4. To hide the automatic legend, clear the Show Legend check box.
5. To hide axis titles, select the Axes tab, open the Labels panel, and clear the Show Axis Title option(s).
6. Click OK to apply the changes and to close the Graph Properties dialog box.

The titles and automatic legend no longer appear on the graph page. Restore the title and legend by returning to the Graph Properties dialog box and checking the Show Title and Show Legend options.

Removing Graphs, Plots, Titles, Legends, and Other Page Objects

Anything on the graph page can be removed from the page by selecting the object, then pressing the Delete key, or choosing the Edit menu Clear command.

Deleting removes curves, plots and graphs entirely. You can use undo (Ctrl+Z) to retrieve these items. When a graph or plot is removed, worksheet data remains intact. Delete also completely removes drawn and pasted objects. Note that delete only hides titles and legends, and does not remove them permanently.

Drawing Objects on the Page

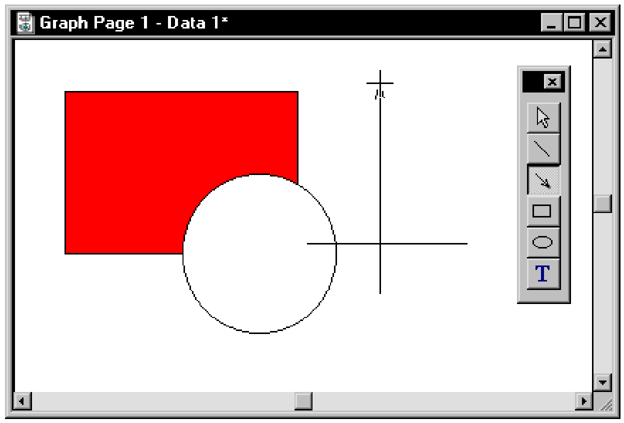
Use the Tools menu Draw Box, Draw Ellipse, Draw Line, and Draw Arrow commands to draw rectangles, ellipses, lines, and arrows, or use the drawing toolbar.

Σ Any drawn object or text is not attached to the graph until they are *grouped* with the graph, see “Grouping and Ungrouping Objects” on page 129 for more information.

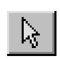
The Drawing Toolbar

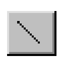
Use the drawing toolbar to quickly and easily access Tools menu commands. To learn about viewing, hiding, and positioning toolbars, see “Viewing and Hiding Toolbars” on page 7.

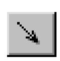
Figure 6–28
Drawing Objects on a Page

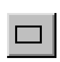


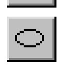
The drawing toolbar buttons are:

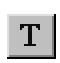

Select Object: Use the Select Object button to select objects on the graph page.


Draw Line: Click this button to draw a line on the graph page.


Draw Arrow: Click this button to draw an arrow on the graph page.


Draw Box: Use the Draw Box button to draw a box on the graph page.


Draw Ellipse: Click this button to draw an ellipse on the graph page.



Text: Click this button to add text, labels, or manually created legends to the graph page.

Drawing Objects

To draw an object:

1. Click a drawing tool on the drawing toolbar, or choose a drawing command from the Tools menu.
2. The pointer has a crosshair appearance when over the graph page. Place the pointer over the page where you want the object to begin, press and hold down the left mouse button, then drag the pointer to draw the object.
3. Release the mouse button to finish drawing the object.

Modifying Object Colors and Lines

Use Format menu commands or double-click selected objects to modify line type, thickness, color, line end appearance (arrow heads, etc.), object fill color, pattern, and pattern color. These modifications are made through the Object Properties dialog box.

Changing Object Fills

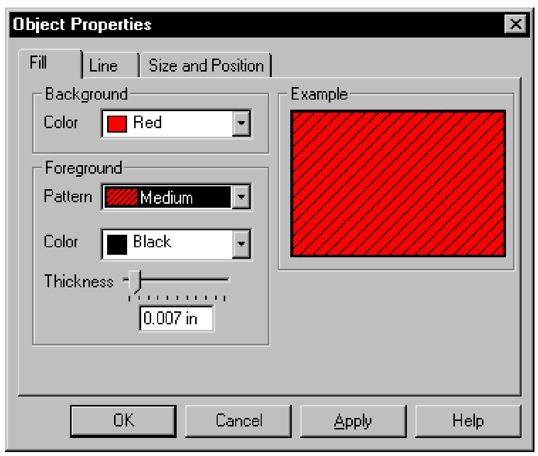
You may change fill patterns and colors of drawn rectangles and ellipses, and of graph symbols, bars, and boxes using the Object Properties dialog box.

Σ When multiple objects are selected, fill options apply to all selected objects that can be filled, including lines.

To change an object's fill attributes:

1. Select the object(s) to modify, then open the Fill panel of the Object Properties dialog box by choosing the Format menu Fill command, by double-clicking the selected object, or by right-clicking and choosing Properties.

Figure 6–29
The Fill Panel of the Object Properties Dialog Box



2. To change the fill color, choose a color from the Background Color drop-down list. (To learn how to customize the color, see "Using Custom Colors" on page 146.) Choosing None creates a transparent (hollow) object.

   ➤ To change the fill pattern of the selected object, choose a pattern and pattern density from the Foreground Pattern drop-down list.

   ➤ To change the color of the fill pattern lines and edge lines, choose a color from the Foreground Color drop-down list. Choosing None creates a transparent pattern and edge line.

   ➤ To set pattern and edge line thickness, use the Thickness slider control.

3. Click Apply to apply the changes you've made to the selected objects without

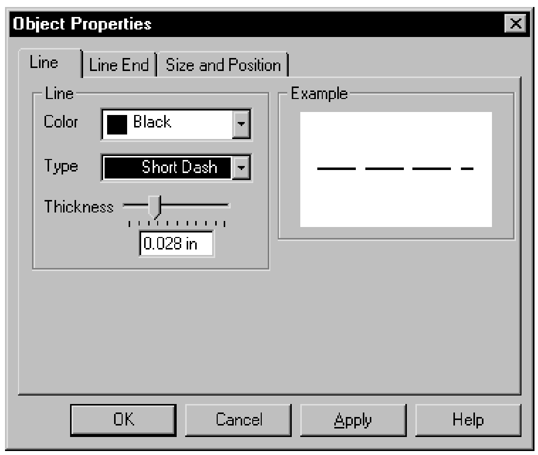
closing the dialog box, or click OK to apply your changes and to close the dialog box.

Changing Lines

For drawn lines and graph lines, you can change line type, color, and thickness.

1. Select the object(s) to modify, then open the Line panel of the Object Properties dialog box by choosing the Format menu Line command, by double-clicking the selected object, or by right-clicking and choosing Properties.

Figure 6–30 The Line Panel of the Object Properties Dialog Box



2. To change line color, select a color from the Color drop-down list. (To learn about using custom colors, see on “Using Custom Colors” on page 146.) Choosing None creates a transparent line.

   To change line type and thickness, use the Type drop-down list and the Thickness slider. Notice that clicking the slider causes the slider to move incrementally, and that dragging it moves it more precisely.

   Σ To change the range of control of the slider, move the slider to one end of the selectable range, select the text in the corresponding edit box, and type a new numeric value.

3. Click Apply to apply the changes you’ve made to the selected objects without closing the dialog box, or click OK to apply your changes and to close the dialog box.

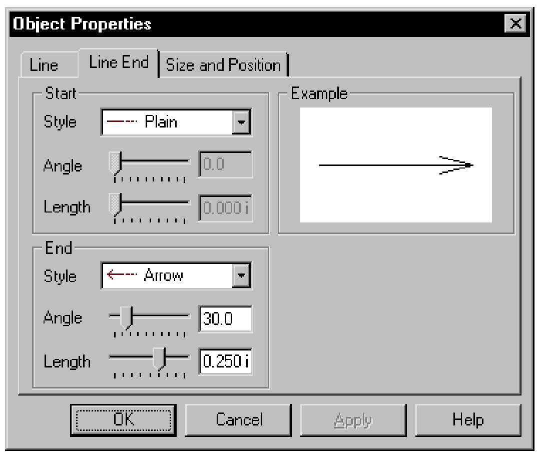
The Object Properties dialog box is also used to add arrowheads and other line endings to lines. For more information, see below.

Changing Line Ending Attributes

Edit line ending attributes for existing lines and arrows, or set the default line endings for drawn arrows. Line ending attributes affect only plain lines and arrows, not graph lines.

1. Select the line(s) to modify, then choose the Format menu Line command, double-click the selected line, or right-click and choose Properties. The Object Properties dialog box appears.
2. Click the Line End tab, if necessary, to view the Line End panel of the Object Properties dialog box.
3. Add or edit line ends at both the start and end of a line. The Start of Line options add or modify the beginning end of the line (where you start drawing the line). The End of Line options add or modify the line end at the end of the drawn line (where you stop drawing the line by releasing the mouse button).
4. Use the Style drop-down list to change the type of line end used.
5. Use the Angle and Length slider controls to change arrowhead length and angle. The angle is the angle between the arrowhead line and the main line. The Angle option is unavailable if the line Style is dotted or plain.

Figure 6–31
The Line End Panel of the Object Properties Dialog Box



Note that clicking the slider causes the slider to move incrementally, and that dragging it moves it more precisely. To change the range of control of the slider, move the slider to one end of the selectable range, select the text in the corresponding edit box, and type a new numeric value.

6. Click Apply to apply the changes you've made to the selected objects without closing the dialog box, or click OK to apply your changes and to close the dialog box.

Changing Multiple Page Objects

When making changes to multiple objects with different properties, the Object Properties dialog box options are blank. Only options that are changed are applied to selected objects. To learn how to select multiple objects, see "Selecting Page Objects" on page 95.

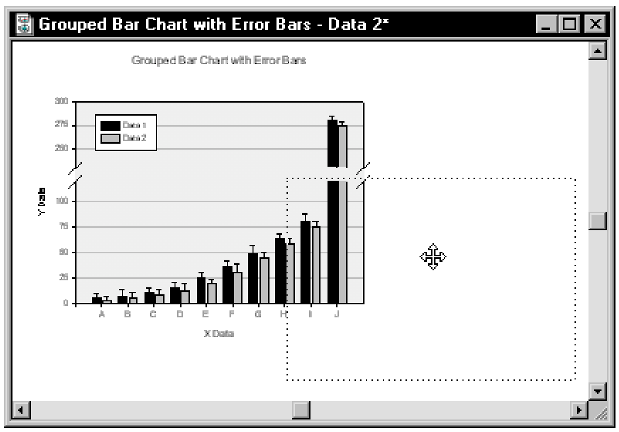
Moving and Sizing Graphs and Objects

You can modify graph or object size and position either by using your mouse on the page, or by setting specific position, size, and scaling options in the Size and Position panel of the Object Properties dialog box.

Using Your Mouse to Move Graphs and Objects

To move a graph or object with your mouse, select the desired graph, and drag it to the desired position. A dotted outline of the graph follows the pointer indicating the location of the moved graph. When you release the mouse button, the graph moves to the new position. Graph titles, axis labels, and automatic legends are automatically grouped with a graph and move with it. You can move graphs and objects to other page windows.

Figure 6–32
Moving a Graph



Using Your Mouse to Change Graph and Object Size

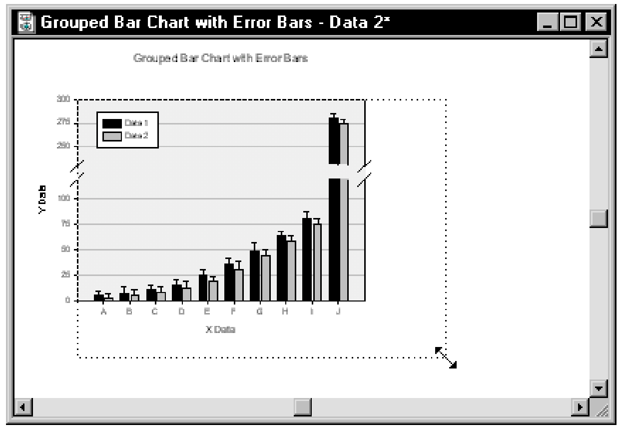
The easiest way to adjust the size and shape of a graph is to resize the graph using the mouse. You can also specify proportional scaling of graphs and objects so that the height and width ratios are maintained, and choose to rescale graph and axis titles and tick marks accordingly.

To adjust graph or object size with the mouse:

1. View the page window and click the graph or desired objects to select them; selected page objects are surrounded with small square handles.
2. Place the pointer over a handle, then press and hold down the left mouse button to drag the handle to a new location. The shape of the pointer changes when you move it over a handle, indicating the direction you can stretch the graph or object.

   Drag a side handle to stretch or shrink an object horizontally, drag a top or bottom handle to stretch or shrink an object vertically, or drag a corner handle to stretch an object two-dimensionally. A dotted outline of the resized graph or object follows the pointer position.

Figure 6–33
Resizing a Graph



Note that dragging a corner handle preserves the aspect ratio (relative height and width) of objects by default. Also, graph text, symbols and tick marks are rescaled along with the graph. To disable these features, use the Tools menu Options command and change these Page option settings; see “Setting Page Options” on page 94.

3. Release the mouse button when finished; the graph or object resizes to the indicated size.

∑ Unlike graphs and drawn objects, text labels cannot be stretched or shrunken manually. To resize text, change the font size. To learn how to resize text, see “Formatting Text” on page 137.

Setting a Specific Size and Location

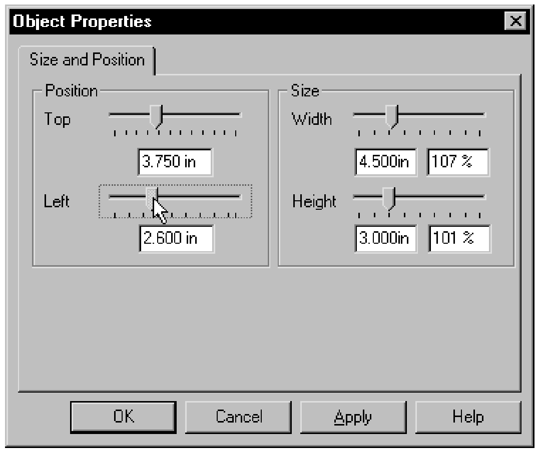
To move a graph or object to a specific location on the page, or to scale the graph or object to a specific size, use the Object Properties dialog box Size and Position Panel.

To set graph size and location with the Object Properties dialog box:

1. Select the graph or object on the page by clicking it.
2. Right-click the selected item and choose Object Properties, then click the Size and Position tab, or choose the Format menu Size and Position command.
3. Use the Position slider controls or type new values in the edit boxes to set the distance of the selected object from the top and the left of the page.
4. To change the size of the selected object, either use the Height and Width slider controls to set the size to specific measurements, or scale the object to a new size

by selecting the edit boxes displaying a percent, and typing a new percentage.

Figure 6–34 The Size and Position Panel of the Object Properties Dialog Box

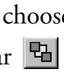


5. Click OK to apply the changes and to close the Object Properties dialog box.

Moving Objects to the Front or Back

You can move selected objects so that they appear in front of or behind other page objects.

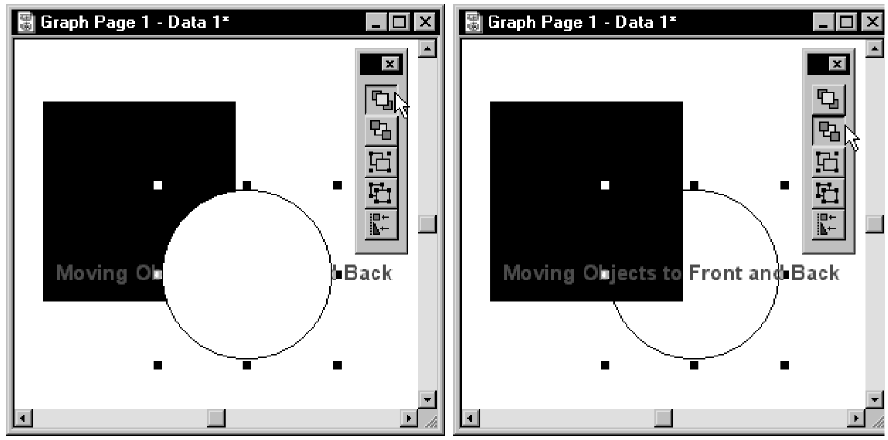
To move an object to the front or back:

1. Select the object to move by clicking it.
2. To move the selected object to the foreground, choose the Format menu Bring to Front command, or click the arranging toolbar  button. The selected object is drawn in front of all other objects.
3. To move the selected object to the background, choose the Format menu Send to Back command, or click the arranging toolbar  button. The selected object is drawn behind all other objects.

Σ If more than one object is selected, the selected objects remain in their relative front to back positions. Grouped objects, including titles and legends with graphs, are moved as a single object.

Figure 6–35
Moving Page Objects to the Front and to the Back

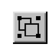
The figure on the left shows a circle in front of a square and a text label. The page on the right is the same page showing the circle moved behind the square and label.



Grouping and Ungrouping Objects

The Group command in the Format menu facilitates moving and modifying selected items on the page by treating multiple objects as one object. Objects which have been grouped must be ungrouped to be modified individually. You can also use the Group and Ungroup commands to group and ungroup page objects. Objects and text must be grouped with the graph for them to stay in place, and move with the graph if you shift the graph's location.

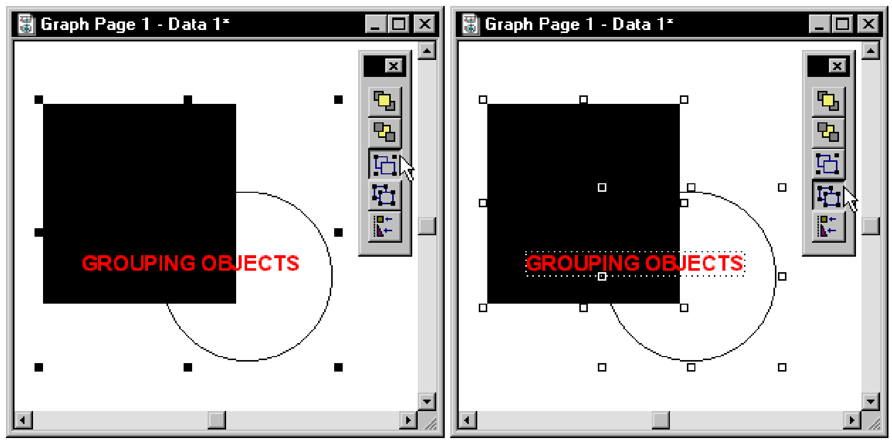
To group and ungroup objects:

1. Check the Select Object option of the Tools menu.
2. Select the graph, by clicking it, if you wish to attach the graph to the objects or text. Next, select the objects and text to group by holding down the Shift key while selecting individual objects. Handles will appear around the graph and each selected object.
3. Choose the Format menu Group command, or click the arranging toolbar  button. The Group command and button are available only when more than one object is selected.

   All selected objects are grouped and can be selected, moved, sized, aligned, and positioned as a single object.
4. To ungroup a group, select the group, then choose the Format menu Ungroup command, or click the arranging toolbar  button. If you have grouped a group, you may need to ungroup the objects as many times as they have been grouped.

Figure 6–36
Grouped Objects

Note that grouped objects have only one set of handles when selected, and ungrouped objects have handles around each selected objects.



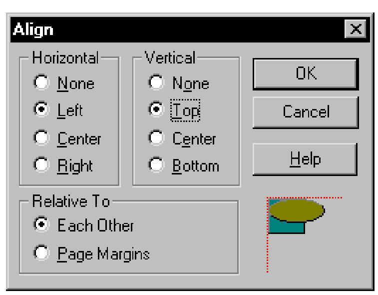
Aligning Page Objects

You can align labels and objects with each other as well as with graphs and axes using the Format menu Align command.

1. Select the labels, graphs or other object(s) you want to align by holding down the Shift key while selecting individual objects. (You must select more than one object to use the Align command.)

2. Click the arranging toolbar  button or choose the Format menu Align command.

Figure 6–37
The Align Dialog Box



3. Choose the appropriate options to align the selected objects vertically, horizontally, or both. Graphical feedback for your selections appears in the lower right corner of the dialog box.

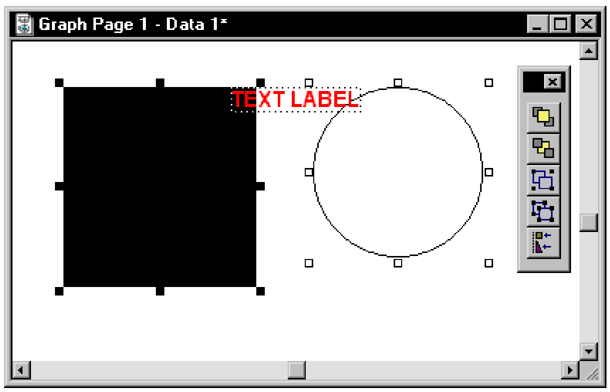
4. From the Relative To options, you can select to align selected objects relative to Each Other, or to the Page.

You must have multiple objects selected if you want to align selected objects relative to each other. This option moves aligned objects with respect to the last selected object, which remains in a fixed position. Note that the last selected object can be distinguished from other selected objects by solid rather than hollow selection handles.

Page alignment aligns objects using the page margins rather than the page edge, and do not move the objects with respect to each other. You can use page alignment to place single objects. Margins for each page are set using the File menu Page Setup command.

5. Click OK to close the Align dialog box. Selected objects are aligned as specified.

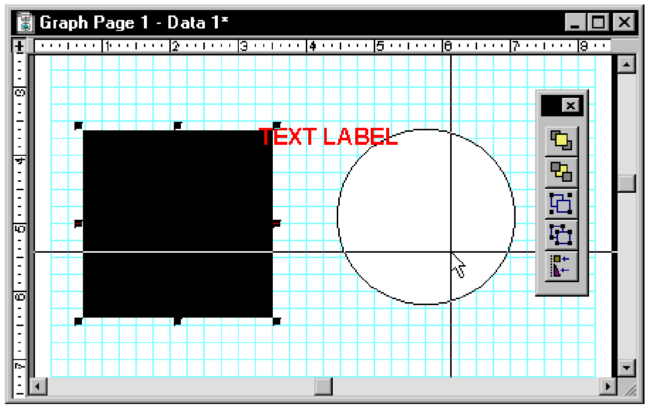
Figure 6–38
Objects Top Aligned with Respect to the Square



Working with Grids and Rulers

Use grids and rulers to quickly and easily align graphs and objects on the page. You can show or hide grids and rulers from the Tools menu Options dialog box, View menu, or you can right-click the graph page to open the shortcut menu. Although visible on the screen, they do not print with the page. Control the grid and ruler attributes with the Tools Menu Options dialog box.

Figure 6–39
Using Crosshairs, Grids, Rulers, and Snap-to to Align Objects



Using Rulers

Rulers are optionally displayed at the top and left hand side of all graph pages. They display the current units set in the Tools menu Options dialog box. You can choose between inches, centimeters, or points.

Using Snap-to

You can use the Snap-to option whether the grids are either displayed or hidden. Select the Snap-to option in the Tools menu Options dialog box, or right-click the graph page to select Snap-to. If the Snap-to option is selected, graphs and objects snap to the nearest grid.

Using Crosshairs

Crosshairs make checking for object alignment easier. To turn on crosshairs, click the Crosshairs button on the upper left hand corner of the graph page window. Crosshair lines extend from the pointer tip to the rulers and to the right and bottom of the window, and follow the pointer.

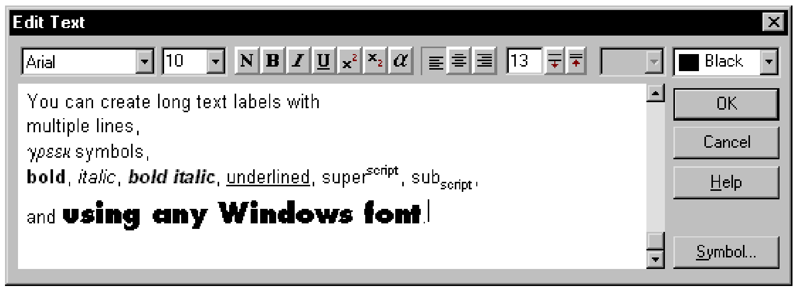
To hide crosshairs, click the Crosshairs button again.

Working with Text on the Page

Editing Text

Use the Edit Text dialog box to add and edit text labels and legends to the graph page, in addition to editing automatically created graph and axis titles. SigmaPlot automatically creates legends for every plot. You can modify the existing automatic legend, or create a new one using the Edit Text dialog box. The Edit Text Toolbar offers a variety of modifications options.

Figure 6–40
The Edit Text Dialog Box



Σ Tick and contour labels can be formatted, but not edited for content. To learn about formatting text, see “Formatting Text” on page 137.

Σ For information on modifying Automatic Legends using the Graph Properties dialog box, see “Working with Automatic Legends” on page 138.

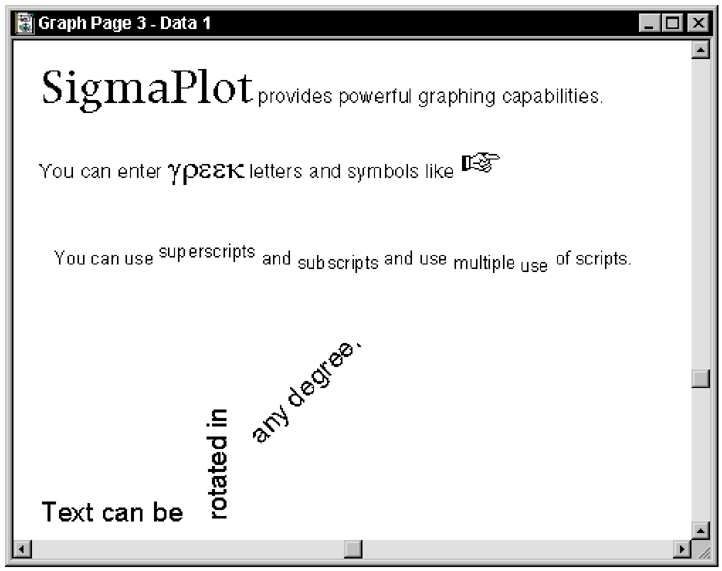
Creating Text Labels

You can add an unlimited number of text labels and legends to any graph page. SigmaPlot for Windows supports:

- All TrueType®, PostScript®, and other fonts installed on your system
- Multiple lines of text aligned left, right, or centered, with adjustable line heights
- Mixed fonts and other attributes within a single label
- Multiple levels of superscripting and subscripting

- ➤ Rotation of text in single degree increments
- ➤ Color using up to 16.7 million different combinations of red, green, and blue

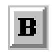
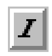
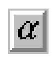
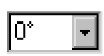
Figure 6–41
Examples of Text Using Different Fonts, Superscripting, Subscripting, and Different Rotations



To create text labels or legends on a page:

1. Select and view the page window it, then click the T tool in the drawing toolbar, or choose the Tools menu Text command. This places you into *text mode* until another mode or tool is selected.
2. Click the page where you want the label to begin. The Edit Text dialog box appears.
3. Select the font, character size, and other starting character attributes.

The following table outlines the functions of each button. These buttons act on selected text, or set the format for following text.

Control	**Function**
	Set Font
	Set Size
	Normal Format
	Bold
	Italic
	Underlined
	Superscript One Level
	Subscript One Level
	Toggle to Greek (Symbol) Font
	Left Align
	Center Align
	Right Align
	Line Spacing (Multiline Paragraph Only)
	Rotation
	Color

Note that the Rotation, Alignment, and Line Spacing options affect the entire label, not just the selected text, and that Line Spacing is a minimum spacing control, not fixed. If you change the height of characters by changing font sizes or by adding superscripts or subscripts, the line height adjusts automatically.

Σ Default Text Properties let: You set default text label attributes by opening the Text Properties dialog box with no labels selected. For more information on using the Text Properties dialog box, see “Formatting Text” on page 137.

Σ In addition to using the Greek text  button to add a Greek symbol to text, you can also select pre-existing text and choose Symbol as the font type in the Text Properties dialog box.

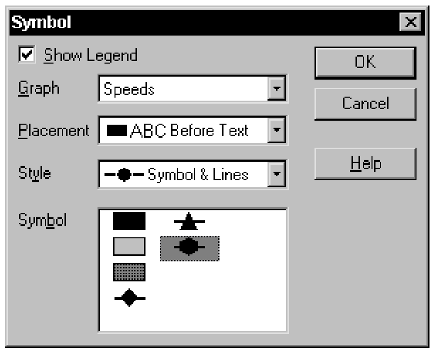
4. Use the keyboard to type your label. To type additional lines, insert a line break by pressing Enter.

To change the attributes of text already typed in the Edit Text dialog box, highlight it, then click the appropriate button, such as normal font, bold, italics, underline, sub or superscript, or symbol.

To switch back to normal text from greek, superscript, or subscript text, click the **N** normal button.

5. To add legend symbols to your text, click the Symbols button. The Symbol dialog box appears.

Figure 6–42
The Symbol Dialog Box



6. Click Show Legend to activate manually created legend options. Select the Graph to apply the legend to from the Graph drop-down list, then choose to place the symbol before text or after text using the Placement drop-down list.

   Use the Style drop-down list to control the appearance of the legend you are creating, then choose the symbol to use for the legend from the Symbol window. Symbols and Style options vary depending on the graphs you have created.

   Legend symbols added to text using the Edit Text dialog box do not appear in the Edit Text dialog box; they appear with the text on the page.

   Click OK to place the symbol in the text and to close the Symbol dialog box.

7. When you are finished entering text, close the Edit Text dialog box by clicking OK.

Editing Text and Individual Characters

To edit existing text, you can simply click the text if you are text mode, or if you are in select mode, double-clicking the text. You can also right-click a label, and choose the Edit command. The Edit Text dialog box appears.

Use your keyboard to type new text, or use the Edit Text dialog box buttons to modify selected text.

Formatting Text

If you want only to change the attributes (the formatting) of selected text, use the Text Properties dialog box. The Text Properties dialog box sets properties for all selected labels, and applies changes to all characters within selected labels.

Σ If you have complex font and character changes within a label, take care not to overwrite these formats with Text Properties dialog box settings.

Global Text Changes: The Text Properties is useful for formatting multiple labels as well as all text on a graph. Select the graph and choose Text Properties, then select the attributes you want applied to all graph labels and titles.

Default Text Properties: The Text Properties dialog box is used to set the default character and paragraph properties for new labels. Open the Text Properties dialog box with nothing selected, and set the options you want applied to new text labels.

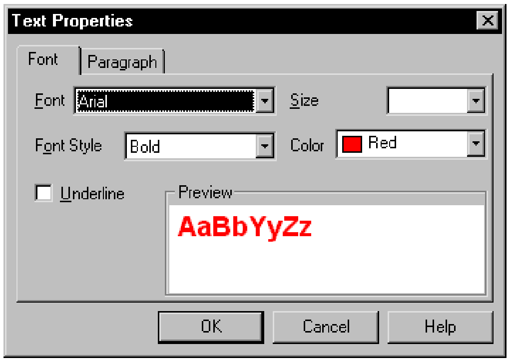
To format text using the Text Properties dialog box:

1. Select the text object you want to modify. If you want to modify several text objects, hold down the Shift key while clicking the objects, or drag a select window around all objects
2. Choose the Format menu Text Properties command to open the Text Properties dialog box.
3. To change the font, style, character size, or color of text, or to underline text, choose the Font tab.

Σ If you have multiple text objects with different text properties selected, the attributes that are not the same appear blank. Do not select an attribute for these options unless you want it to be applied to all selected objects.

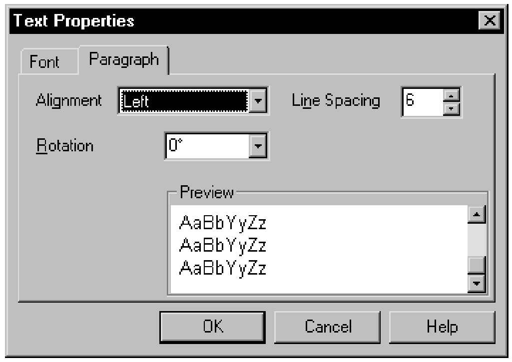
Figure 6–43
The Text Properties Dialog Box Font Panel

Note that the Size option is blank, indicating that there are multiple text objects of different sizes.



4. To change paragraph attributes, including line spacing, alignment, or rotation, choose the Paragraph tab.
5. Click Apply to effect the changes you've made in the Text Properties dialog box without closing the dialog box. To apply your changes and close the dialog box, click OK.

Figure 6–44
The Text Properties Dialog Box Paragraph Panel



Working with Automatic Legends

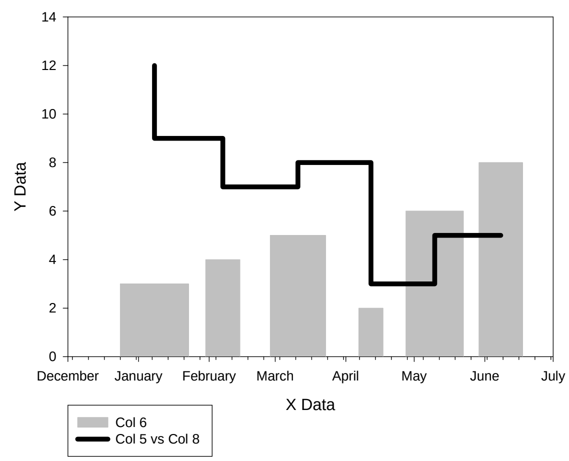
Legends are used as a key for your graph. They label what the different graph symbols, lines, or fills represent. SigmaPlot can automatically create legends for all graphs, always placing them below the graph on the left side. Legend entries are labeled using the titles of the columns plotted; if there are no column titles, column numbers are used instead.

Legends can be moved and modified as any other page object. They also have a special set of controls and features. This section describes how to modify and control these automatic legend features.

You can also add legend symbols to any text label or title. To learn how to add symbols to text, see “Creating Text Labels” on page 133.

Figure 6–45
Example of a Graph Displaying an Automatic Legend

The legend uses the column titles of the data plotted.



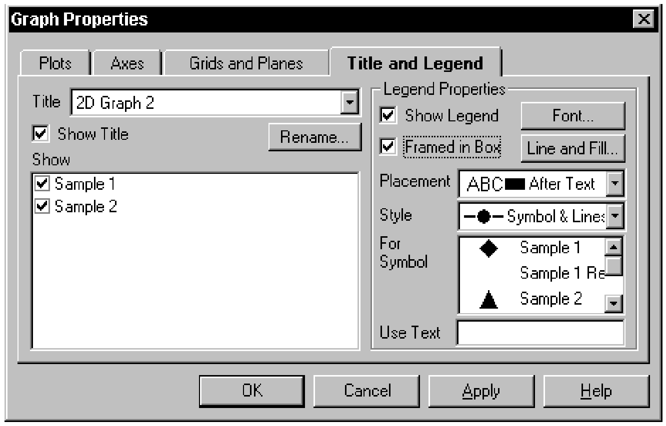
Displaying and Hiding Automatic Legends

You can control the display of automatic legends either for all subsequently created graphs, or for a current graph.

To hide an automatic legend for a graph:

1. View the page and click the legend to select it. Press Delete, or use the right-click pop-up menu, and select Hide to hide the legend.
2. To show the legend again, select the graph on the page and choose the Graph menu Graph Properties command, or click the graph properties toolbar button.
3. Select the Title and Legend tab. Check the Show Legend option to display the legend. If you do not want the automatic legend for this plot displayed, leave this option unchecked.

Figure 6–46
The Title and Legend Panel of the Graph Properties Dialog Box



To hide a legend entry for a specific plot or curve:

1. View the page and double-click the legend entry that you want to hide. The Edit Text dialog box opens.
2. Click the Symbols option, then clear the Show Legend check box. Click OK, then OK again to close the dialog boxes. The legend is now hidden.
3. To redisplay the legend symbol, use the Graph Properties dialog box to redraw the legend. Hide the entire legend, apply the change, then show the legend again and click OK.

To view or hide automatic legends for all subsequently created plots:

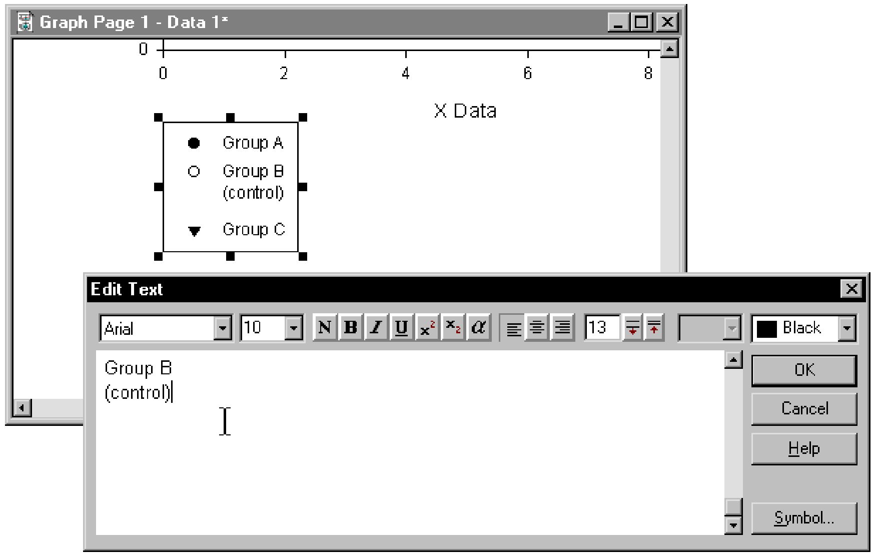
1. Choose the Tools menu Options command, then select the System tab to display the System options panel of the Options dialog box.
2. Check the Automatic Legends option to display the legend, or clear it to hide the legend.

Editing Individual Legend Entries

You can edit and format the text for individual legend entries using the Edit Text dialog box. For more information on using the Edit Text dialog box, see “Editing Text” on page 133.

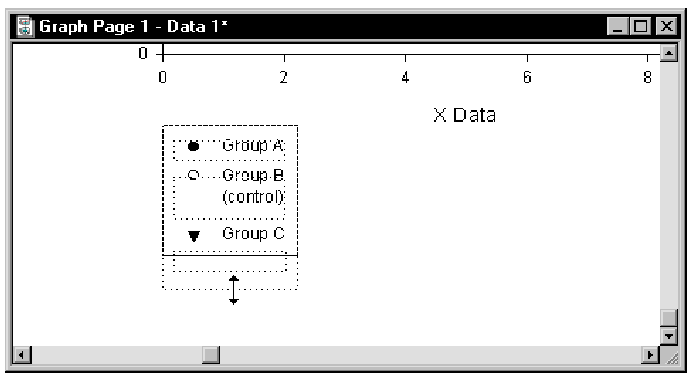
1. View the page and double-click the legend entry that you want to edit. The Edit Text dialog box opens.
2. Edit the text of the legend entry as desired. You can also change the legend symbol properties by clicking the Symbol button.

Figure 6–47
Editing a Legend Entry



Increasing the Line Spacing for a Legend: You can increase the spacing between legend symbols by increasing the height of the legend box. Click the box to select it, then drag the top or bottom handle to increase the height.

Figure 6–48
Increasing Spacing Between Legend Entries



Note that you cannot change the widths of automatic legends—these are determined automatically by the width of the text. You can edit individual labels and add multiple lines. You can also ungroup a legend and format it manually; see "Ungrouping a Legend" on page 143.

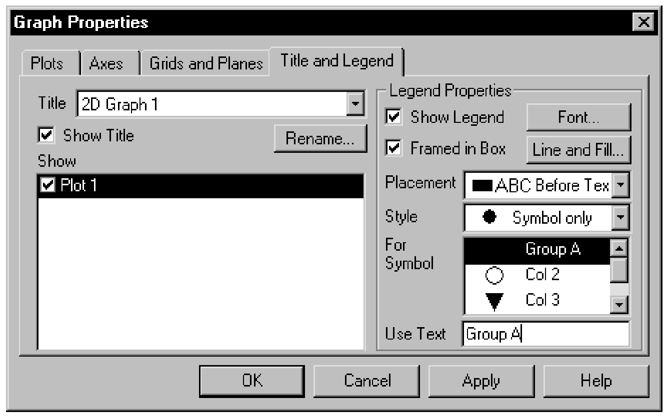
Editing Automatic Legends

You can edit a legend as a single object. To edit an individual legend entry, see "Editing Individual Legend Entries" on page 140.

To edit an automatic legend:

1. Open the Graph Properties dialog box by double-clicking the graph, or by clicking the Graph Properties toolbar button.
2. Select the Title and Legend tab to display the Title and Legend panel of the Graph Properties dialog box. Use the Legend options on the right side of the Graph Properties dialog box to edit automatic legends.

Figure 6–49 Using the Title and Legend Panel of the Graph Properties Dialog Box to Edit an Automatic Legend



3. To enclose the legend in a box, check the Framed in Box option. To hide a legend box, clear this check box. You can modify the line thickness and fill of the legend box by clicking the Line and Fill button.
4. Move the legend symbols either to the right or to the left of text by choosing a position from the Placement drop-down list. If you have no legend symbol selected, this operates on all legends. If you select a specific entry from the For Symbol list, this option affects only that symbol.
5. Use the Style drop-down list to modify the appearance of the symbols for the current legend. This option only affects scatter and line plots. If you have no legend symbol selected, this operates on all symbols. If you select a specific entry from the For Symbol list, this option affects only that symbol.
6. Enter the text for a legend symbol by selecting the symbol to annotate from the For Symbol drop-down list, then selecting the Use Text edit box and typing text. Do this for as many legend symbols as you want.
7. To change the text size or style, click the Font button. The Text Properties dialog box appears. For more information on using the Text Properties dialog box, see "Formatting Text" on page 137.
8. Click OK to apply the changes and close the Graph Properties dialog box. The legend is updated as specified.

Ungrouping a Legend

You can ungroup the legend entries and box by selecting the legend, then choosing the Format menu Ungroup command, or clicking the arranging toolbar Ungroup button (see "Grouping and Ungrouping Objects" on page 129). You can then edit each object like an ordinary graphic object or label.

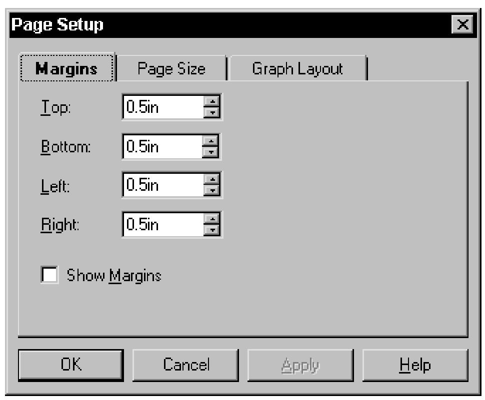
You can also use your mouse to move any of the legend items to a new location, and the Format menu Align command, or arranging toolbar button to align them (see "Aligning Page Objects" on page 130).

Σ Ungrouping a legend removes automatic legend features.

Changing Graph Page Format

You can change graph page margins and size with the Page Setup dialog box. This dialog box also controls which graphs on a page are displayed or hidden from view, and the color of the page. To learn about displaying or hiding graphs on the page, see "Hiding and Deleting Objects from the Page" on page 119. To learn about changing page color, see "Changing Page Color" on page 145.

Figure 6–50 The Margins Panel of the Page Setup Dialog Box



Σ Note that the options in the Page Setup dialog box affect both the view of the page on-screen, and the printer settings for the page you are printing. To learn more about printing pages, see "Printing Graph Pages" on page 53.

Changing and Displaying Graph Page Margins

To change page margins, and to view or hide margins on the current page:

1. Choose the File menu Page Setup command. The Page Setup dialog box appears from which you can select the Margins tab, if necessary, to display the Margins panel of the Page Setup dialog box.
2. Use the Top, Bottom, Left, and Right options to specify the width or height of the corresponding page margin. You can type values in the edit boxes using any

of the available units of measurement; the value is converted to the current measurement units specified in the Options dialog box. Type *in* for inches, *mm* for millimeters, and *pts* for points.

∑ Margins do not affect printing, they are only a guide. The Align dialog box uses margins when aligning the page.

3. Clear or check the Show Margins option by selecting it. If this option is checked, margins are displayed on the page. To hide page margins, make sure the Show Margins option is not checked.
4. Click Apply to apply changes without closing the dialog box, or click OK to apply your changes and close the dialog box.

∑ To learn about changing the unit of measurement used on the graph page, see "Changing Page Units of Measurement" on page 145.

Graph Page Size and Orientation

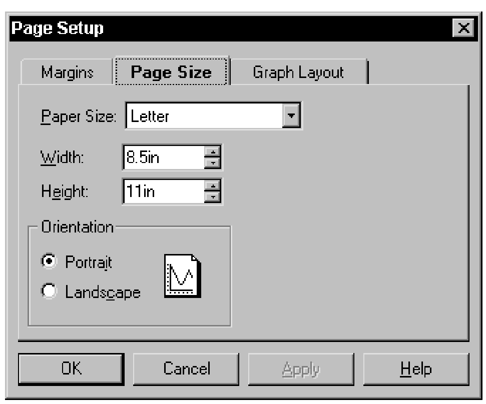
To change the size or orientation of the graph page:

1. Open the Page Setup dialog box by choosing the File menu Page Setup command, then select the Page Size tab, if necessary, to display the Page Size panel of the Page Setup dialog box.
2. From the Paper Size drop-down list choose the appropriate size for the page, or use the Width and Height options to specify a unique page size.

∑ Note that SigmaPlot does not support heights or widths greater than 32 inches.

3. To switch between portrait (normal) and landscape (sideways) orientation, select either the Portrait or Landscape option.
4. Click Apply to apply changes without closing the dialog box, or click OK to accept your changes and close the dialog box.

Figure 6–51
The Page Size Panel of the Page Setup Dialog Box



Σ If you change the page size and/or orientation, the page changes on the screen, but your graphs remain in the same relative position. You may have to move the graphs back into position.

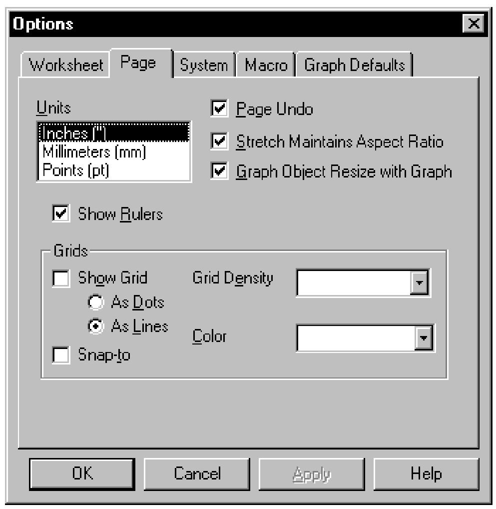
Changing Page Units of Measurement

Use the Page Options dialog box to change the units of measurement used on the page. Page units of measurement are important when specifying margins and object size and position. These settings are applied to all pages and graph and object properties dialog boxes.

To change the unit of measurement used:

1. Choose the Tool menu Options command, then select the Page tab, if necessary, to open the Page panel of the Options dialog box.
2. From the Units box, select the unit of measurement to use on the Page. You can choose to use inches, millimeters, or points.

Figure 6–52
The Page Panel of the Options Dialog Box



3. Click Apply to apply changes, or OK to apply changes and close the dialog box.

Changing Page Color

You can change the color of a page using the Page Setup dialog box. This is especially useful when creating output for slides or for overhead projectors.

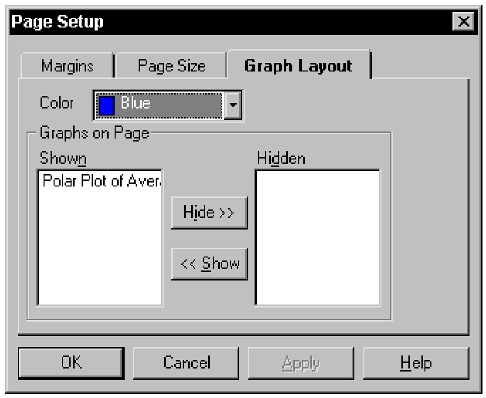
To change the color of a page:

1. Make the page active by selecting it, or by choosing its name from the Window menu. A check mark next to the name of the page indicates that the page is active.
2. Open the Page Setup dialog box by choosing Page Setup from the File menu. Select the Graph Layout tab to open the Graph Layout panel of the Page Setup dialog box.

3. Choose the color to use for the page from the Color drop-down list. Choose (custom) to use or create a custom color. To learn more, see "Using Custom Colors" on page 146.

4. Click OK to apply changes and close the dialog box. The page reappears in the new color.

Figure 6–53
The Graph Layout Panel of the Page Setup Dialog Box



Σ If you want no background color to show up for pasted graphs (e.g., pasting a graph into PowerPoint), set the page color to None.

To learn about changing graph backplane color, see "Modifying Grids and Planes" on page 230.

Page Color Default Setting

You can set the default color for a new page by opening the template file and change the attributes for the Normal page using the Page Setup dialog box for that page.

If there is no template file or Normal page present, page settings are derived from the settings stored in the SPW5.INI file (see "Troubleshooting" on page 387).

Templates

You can overwrite the current page entirely by applying a template to it. This is generally not recommended as a means of reformatting the page unless you intend to discard all changes made to the page up to this point. For more information on the use of page templates, see "Using Graph Pages as Templates" on page 103.

Using Custom Colors

Most color drop-down lists have a (custom) option that opens the Color dialog box, enabling you to select a custom color from over 16.7 million possible combinations of red, green, and blue (24-bit color). These color controls are found in the Graph Properties, Object Properties, Options, and Page Setup dialog boxes.

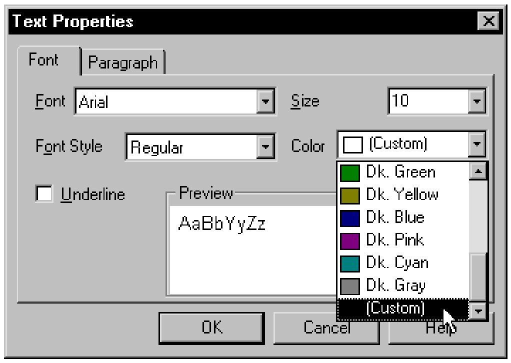
Configuring Your Display for Color

If you want the truest representation of what your colors will appear like when printed, you should always set you display to the highest color level possible. Most Windows 95 systems support Hi Color (16-bit) or True Color (24-bit) modes. Right-click your desktop, choose Properties, select Settings, then set your Color palette to the highest possible level.

To select a custom color:

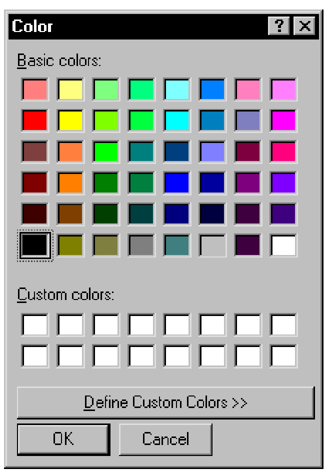
1. Open the dialog box that has the color option in it, and select the Custom option from the Color drop-down list.

Figure 6–54 Selecting the Custom Color option from the Text Properties Dialog Box.



If a custom color has not been selected for this option, the Color dialog box appears.

Figure 6–55 The Color Dialog Box

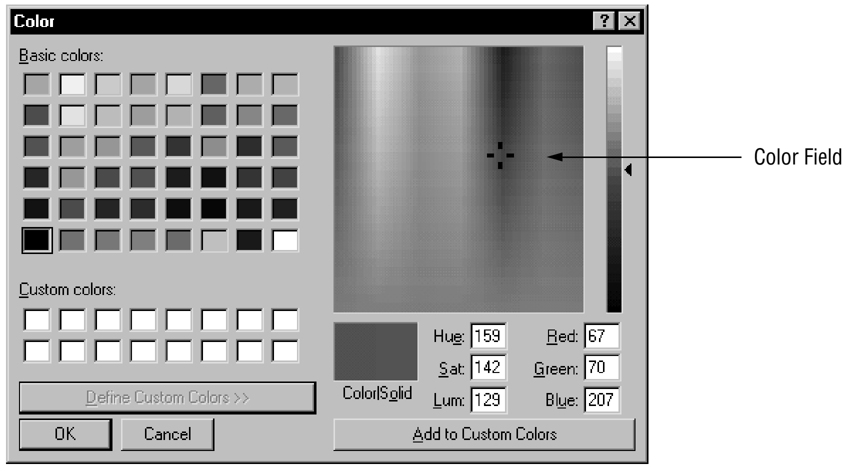


If a custom color has already been defined for this option, the custom color is selected. For directions on how to select a different custom color, see “Re-defining Custom Colors” on page 149.

2. Select a color from the Basic Colors list, or click Define Custom Colors to define

your own color. The dialog box expands to show a color palette.

Figure 6–56
The Color Dialog Box



3. Click the large color field, or drag your mouse across it to indicate the approximate color you want to use. If you know the numeric RGB (red, green, blue) values of the desired color, you can select each of the Red, Green, and Blue edit boxes and type the correct values. The selected color appears box.
4. Use the slider next to the vertical color bar along the right of the dialog box to fine-tune the range of the Hue, Saturation, and Luminosity of the selected color, or type new values in the edit boxes.

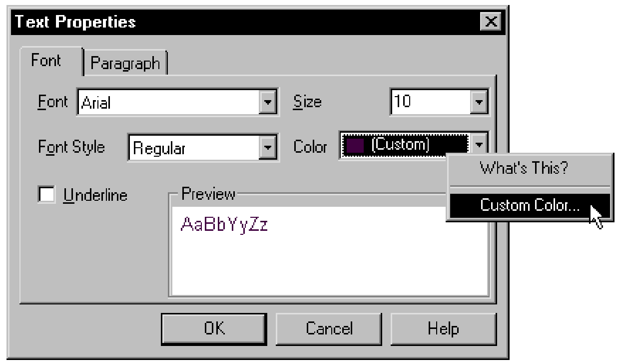
   The current custom color is displayed in the Color|Solid box as a gradational color and a solid. To change the color assigned to a Custom Color box select the box in the list, then specify the new color from the large color field.
5. To select the gradational color, click Add to Custom Colors. The color appears in the first available box of the Custom Colors list.
6. To select the solid version of the color, double-click the solid in the Color|Solid box, then click Add to Custom Colors. The color appears in the first available box of the Custom Colors list.
7. Select the color to use from the Custom Color list, then click OK. The Color dialog box closes, and you are returned to the dialog box from which you opened the Color dialog box.

   The color drop-down list that you are using now has the color you created as an option with the word (custom) next to it. If the custom color you created is a duplicate of a pre-existing system color, the system color is selected instead of the (custom) option in the drop-down list.

Re-defining Custom Colors

If you have already selected a custom color but want to change it, right-click the color control (without opening it). Choose the Custom Color command; the Colors dialog box opens again. Select a new custom color to use as described above.

Figure 6–57
Choosing the Custom Color command from the shortcut menu for Text Color



Notes

7

Creating and Modifying Graphs

This chapter covers the basics of SigmaPlot graph creation and modification. These include:

- ➤ Setting graph defaults (see page 152)
- ➤ SigmaPlot graph types (page 153) and styles (page 155)
- ➤ Creating a new graph (see page 160)
- ➤ Using the Graph Properties dialog box (see page 163)
- ➤ Naming a plot (page 166) and graphs (page 166)
- ➤ Modifying an existing graph's properties (see page 164)
- ➤ Hiding and showing graphs and plots on the page (see page 172)
- ➤ Plotting a restricted data range (see page 174)
- ➤ Handling missing and out-of-range data (see page 175)
- ➤ Changing scatter plot symbols (see page 176)
- ➤ Changing line plot lines (see page 185)
- ➤ Changing bar, box and pie chart fill colors and hatching (see page 188)
- ➤ Creating custom color, symbol, and line schemes (see page 191)
- ➤ Changing bar and box plot widths and spacing (see page 193)
- ➤ Adding and changing drop lines (see page 196)
- ➤ Modifying axes and grids (see page 199)

About SigmaPlot Graphs and Plots

A graph is a representation of selected worksheet columns on a graph page. The representation, or graph type (*i.e.*, 3D scatter plot, vertical bar chart, *etc*.) is selected when a plot or graph is created, but can be changed at any time.

Most plot types can graph many worksheet columns, column pairs, or column triplets. Each column, or set of columns, is represented as a separate curve or set of bars, depending on the plot type. A graph must have at least one plot, but most graphs can hold many more plots, each with a different type and style.

Graphs are created using the *Graph Wizard*. This chapter provides an overview of the graph creation process using the Graph Wizard, including descriptions of the different graph types and styles available, and common modifications.

Setting Graph Defaults

Σ Changing graph defaults affects only new graphs created. To change existing graphs, select the graph and change its properties with the Graph Wizard or other dialog boxes and commands.

Σ The graph default options are intentionally limited and simple. If you want to use more complex graph defaults, use the page templates feature to create complex graphs that can be applied to data as a template, bypassing graph creation entirely. For more information on using page templates, see “Using Graph Pages as Templates” on page 103.

To change your Graph Defaults:

1. Choose the Tools menu Options command, then select the Graph Defaults tab.
2. Change the graph defaults options as desired. The available options are:

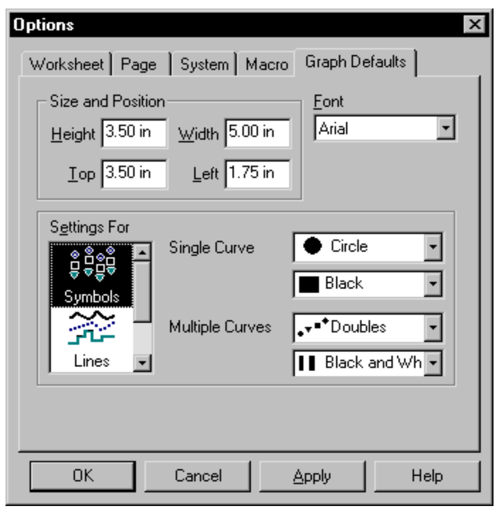


Figure 7–1
The Graph Defaults Panel of Options

Σ The defaults listed for the setting below are simply the settings for the program as shipped, and are provided as a reference if you want to restore the original settings.

Size: The default height and width of all new graphs in height and width in inches, millimeters, or points in the appropriate edit boxes. The default height is 3.5 inches, and the width is 5 inches. Note that unit type is controlled in the Page panel.

Position: The default position of the first new graph created on each graph page. Any subsequent graphs you create on the same graph page are positioned below the first graph, using default offset distances. The default initial location is 3.5 inches from the top and 1.75 inches from the left.

Font: Select a font to be used to display all standard text labels, graph and axis titles, tick labels, and legends.

Settings for Symbols: The default symbol types and colors for single and multiple curves on a graph.

Single curves use Circle as the default symbol shape, and Black as the fill color. Multiple curves use Doubles as the default scheme, and Black and White as the color scheme.

Settings for Lines: Default line styles and color for single and multiple curves on a graph.

Single curves use Solid as the default line style, and multiple curves use Monochrome as the default line style. Both line colors default to black.

Settings for Fills: The default bar color for both simple and grouped bar charts.

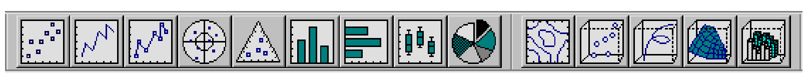
Simple bar charts use light gray, and grouped bar charts use Grayscale as the default background color scheme.

Bar Thickness: You can specify the thickness of each bar with the Bar Thickness option. The default bar thickness is 60%.

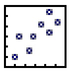
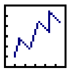
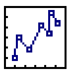
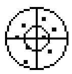
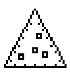
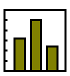
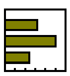
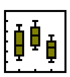
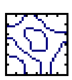
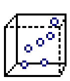
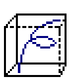
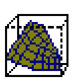
SigmaPlot Graph Types

There are more than a dozen graph types available in SigmaPlot. Choose a graph type using the *Graph Wizard* or the *graph toolbar*. To learn about making graphs, see "Creating Graphs" on page 160.

Figure 7–2
The Graph Toolbars Display the Available Graph Types



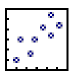
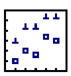
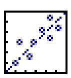
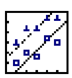
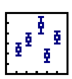
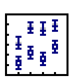
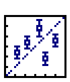
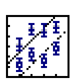
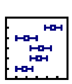
Graph Types

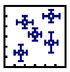
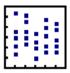
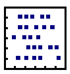
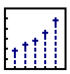
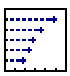
	**Scatter Plot**	Plots data as XY points using symbols.
	**Line Plot**	Plots data as XY points connected with lines.
	**Line and Scatter Plot**	Plots data as XY points using symbols connected with lines.
	**Polar Plot**	Plots data using angles and distance from center.
	**Ternary Plot**	Plots data on a coordinate system based on three different components which always add up to 100%.
	**Vertical Bar Chart**	Plots data as Y points with vertical bars.
	**Horizontal Bar Chart**	Plots data as X points with horizontal bars.
	**Box Plot**	Plots data as the median and percentiles.
	**Pie Chart**	Plots data as a percent of the total. Format data in a single column.
	**Contour Plot**	Plots data as XYZ values in 2D space. Format data columns as: many Z; single XY, many Z; or XYZ triplet. See "Arranging Data for Contour Plots and 3D Graphs" on page 279.
	**3D Scatter Plot**	Plots data as XYZ data points in 3D space. Format data columns as: many Z; single XY, many Z; or XYZ triplet. See page 279.
	**3D Line Plot**	Plots data as XYZ data points connected with lines. Format data columns as: many Z; single XY, many Z; or XYZ triplet. See page 279.
	**3D Mesh Plot**	Plots data as a 3D surface. Format data columns as: many Z; single XY, many Z; or XYZ triplet. See page 279.
	**3D Bar Chart**	Plots data as Z values on an XY grid. Format data columns as: many Z; or single XY, many Z. See page 279.

SigmaPlot Graph Style

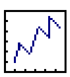
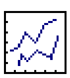
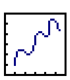
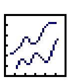
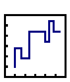
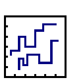
Many graph types have several styles to choose from. When you select a graph type, either from the graph toolbar or from the Graph Wizard, you are prompted to choose a graph style.

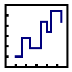
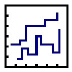
Scatter Plots

	**Simple Scatter**	Plots a single set of XY pairs. Format data columns as: XY pair; single X; or single Y.
	**Multiple Scatter**	Plots multiple sets of XY pairs. Format data columns as: XY pairs; single Y, many X; single X, many Y; many X; or many Y.
	**Simple Regression**	Plots a single set of XY pairs with a regression line. Format data columns as: XY pairs; single X; or single Y.
	**Multiple Regressions**	Plots multiple sets of XY pairs with regression lines. Format data columns as: XY pairs; single Y, many X; single X, many Y; many X; or many Y.
	**Simple Error Bars**	Plots a single set of XY pairs with error bars. If using error bar values from the worksheet, format data columns as: XY pair; or single Y. If using column means as error bar values, format data columns as: single X, many Y; or many Y.
	**Multiple Error Bars**	Plots multiple sets of XY pairs with error bars. Format data columns as: single X, many Y; or many Y.
	**Simple Error Bars & Regression**	Plots a single set of XY pairs with error bars and a regression line. If using error bar values from the worksheet, format data columns as: XY pair; or single Y. If using column means as error bar values, format data columns as: single X, many Y; or many Y.
	**Multiple Error Bars & Regressions**	Plots multiple sets of XY pairs with error bars and regression lines. If using error bar values from the worksheet, format data columns as: single X, many Y; or many Y. If using column means as error bar values, format data columns as: single X, many Y; or many Y.
	**Horizontal Error Bars**	Plots XY pairs with horizontal error bars. If using error bar values from the worksheet, format data columns as: XY pairs; or single X. If using column means as error bar values, format data columns as: single Y, many X; or many X.

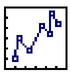
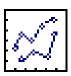
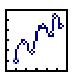
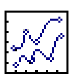
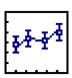
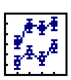
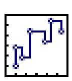
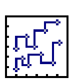
	**Bidirectional Error Bars**	Plots XY pairs with both horizontal and vertical error bars. Format data columns as XY pairs.
	**Vertical Point Plot**	Plots columns of data as Y values. Format data columns as: many Y; or single X, many Y.
	**Horizontal Point Plot**	Plots columns of data as X values. Format data columns as: many X; or single Y, many X.
	**Vertical Dot Plot**	Plots a column of data as Y values. Format data columns as: many Y; or single X, many Y.
	**Horizontal Dot Plot**	Plots a column of data as X values. Format data columns as: many X; or single Y, many X.

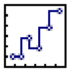
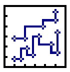
Line Plots

	**Simple Straight Line**	Plots a single set of XY pairs connecting the data points with straight lines. Format data columns as: XY pair; single X; or single Y.
	**Multiple Straight Lines**	Plots multiple sets of XY pairs connecting the data points with straight lines. Format data columns as: XY pairs; many X; many Y; single X, many Y; or single Y, many X.
	**Simple Spline Curve**	Plots a single set of XY pairs connecting the data points with a spline curve. Format data columns as: XY pair; single X; or single Y.
	**Multiple Spline Curves**	Plots multiple sets of XY pairs connecting the data points with spline curves. Format data columns as: XY pairs; many X; many Y; single X, many Y; or single Y, many X.
	**Simple Vertical Step Plot**	Plots a single set of XY pairs connecting the data points with vertical and horizontal lines, starting with vertical. Format data columns as: XY pair; single X; or single Y.
	**Multiple Vertical Step Plot**	Plots multiple sets of XY pairs connecting the data points with vertical and horizontal lines, starting with vertical. Format data columns as: XY pairs; many X; many Y; single X, many Y; or single Y, many X.

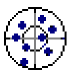
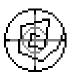
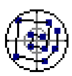
	**Simple Horizontal Step Plot**	Plots a single set of XY pairs connecting the data points with vertical and horizontal lines, starting with horizontal. Format data columns as: XY pair; single X; or single Y.
	**Multiple Horizontal Step Plot**	Plots multiple sets of XY pairs connecting the data points with vertical and horizontal lines, starting with horizontal. Format data columns as: XY pairs; many X; many Y; single X, many Y; or single Y, many X.

Line & Scatter Plots

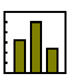
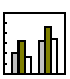
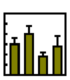
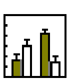
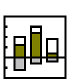
	**Simple Straight Line**	Plots a single set of XY pairs connecting symbols with straight lines. Format data columns as: XY pair; single X; or single Y.
	**Multiple Straight Lines**	Plots multiple sets of XY pairs connecting symbols with straight lines. Format data columns as: XY pairs; many X; many Y; single Y, many X; or single X, many Y.
	**Simple Spline Curve**	Plots a single set of XY pairs connecting symbols with a spline curve. Format data columns as: XY pair; single X; or single Y.
	**Multiple Spline Curves**	Plots multiple sets of XY pairs connecting symbols with spline curves. Format data columns as: XY pairs; many X; many Y; single Y, many X; or single X, many Y.
	**Simple Error Bars**	Plots a single set of XY pairs as symbols with error bars connected with straight lines. If using error bar values from the worksheet, format data columns as: XY pairs; or single Y. If using column means as error bar values, format data columns as: single X, many Y; or many Y
	**Multiple Error Bars**	Plots multiple sets of XY pairs as symbols with error bars connected with straight lines. If using error bar values from the worksheet, format data columns as: XY pairs; or single Y. If using column means as error bar values, format data columns as: single X, many Y; or many Y.
	**Simple Vertical Step Plot**	Plots a single set of XY pairs connecting symbols with vertical and horizontal lines, starting with vertical. Format data columns as: XY pair; single X; or single Y.
	**Multiple Vertical Step Plot**	Plots a multiple sets of XY pairs connecting symbols with vertical and horizontal lines, starting with vertical. Format data columns as: XY pairs; many X; many Y; single Y, many X; or single X, many Y.

	**Simple Horizontal Step Plot**	Plots a single set of XY pairs connecting symbols with vertical and horizontal lines, starting with horizontal. Format data columns as: XY pairs; single X; or single Y.
	**Multiple Horizontal Step Plot**	Plots a multiple sets of XY pairs connecting symbols with vertical and horizontal lines, starting with horizontal. Format data columns as: XY pairs; many X; many Y; single Y, many X; or single X, many Y.

Polar Plots

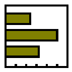
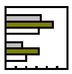
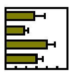
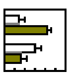
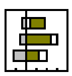
	**Scatter**	Plots angle and distance data as symbols. Format data columns as: Theta, R pairs; XY pairs; many Theta; Many R; single Theta, many R; or R, many Theta.
	**Lines**	Plots angle and distance data points connected with lines. Format data columns as: Theta, R pairs; XY pairs; many Theta; Many R; single Theta, many R; or R, many Theta.
	**Scatter & Lines**	Plots angle and distance data as symbols connected with lines. Format data columns as: Theta, R pairs; XY pairs; many Theta; Many R; single Theta, many R; or R, many Theta.

Vertical Bar Charts

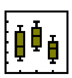
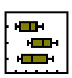
	**Simple Bar**	Plots a single column of data as Y values. Format data columns as: XY pair; or single Y.
	**Grouped Bar**	Plots multiple columns of data in a series of bars. Format data columns as: single X, many Y; or many Y.
	**Simple Error Bars**	Plots data as Y values with error bars. If using error bar values from the worksheet, format data columns as: XY pairs; or single Y. If using column means as error bar values, format data columns as: single X, many Y; or many Y.
	**Grouped Error Bars**	Plots data as multiple sets of Y values in a series of bars with error bars. Format data columns as: single X, many Y; or many Y. Error bar values are from the worksheet.
	**Stacked Bars**	Plots multiple columns of data as a series of stacks in bars. Format data columns as: single X, many Y; many Y.

Horizontal Bar Charts

Histograms plot a single column of frequency data, and can be generated automatically using the Statistics menu Histogram command. For more information, see “Creating Histograms” on page 253.

	**Simple Bar**	Plots a single column of data as X values. Format data columns as: XY pairs; single X.
	**Grouped Bar**	Plots multiple columns of data in a series of bars. Format data columns as: single Y, many X; many X.
	**Simple Error Bars**	Plots data as X values with error bars. If using error bar values from the worksheet, format data columns as: XY pair; or single X. If using column means as error bar values, format data columns as: single Y, many X; or many X.
	**Grouped Error Bars**	Plots data as multiple sets of X values in a series of bars with error bars. Format data columns as: single Y, many X; or many X. Error bar values are from the worksheet.
	**Stacked Bars**	Plots multiple columns of data as a series of stacks in bars. Format data columns as: single Y, many X; or many X.

Box Plots

	**Vertical**	Plots the median, 10th, 25th, 75th, and 90th percentiles as vertical boxes with error bars. Format data columns as: many Y; or single X, many Y. Error bar values are column means.
	**Horizontal**	Plots the median, 10th, 25th, 75th, and 90th percentiles as horizontal boxes with error bars. Format data columns as: many X; or single Y, many X. Error bar values are column means.

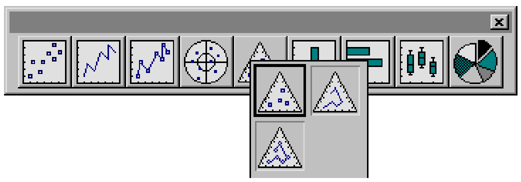
Creating Graphs

Create graphs using either the Graph Wizard or graph toolbar buttons.

Σ If you want to select the worksheet columns to plot before creating your graph, drag the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

To create a graph using the graph toolbar, select the desired graph type from the graph toolbar. If you selected to create a graph type that has more than one style, a graph style toolbar appears from which you can choose a style.

Figure 7–3
Example of Types and Styles for a Selected Graph Type



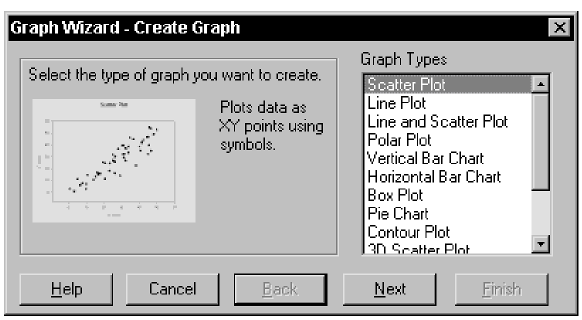
After selecting a graph type and style, the graph wizard is opened to the data format panel of the Graph Wizard.

Using the Graph Wizard to Create Graphs

To create a graph using the Graph Wizard:

1. Choose the Graph menu Create Graph command or click the Graph Wizard  button. The Graph Wizard appears.
2. Select the type of graph you want to make from the scroll box from the Graph Types box, then click the Next button. See “SigmaPlot Graph Types” on page 153 to learn about the different types of graphs available.

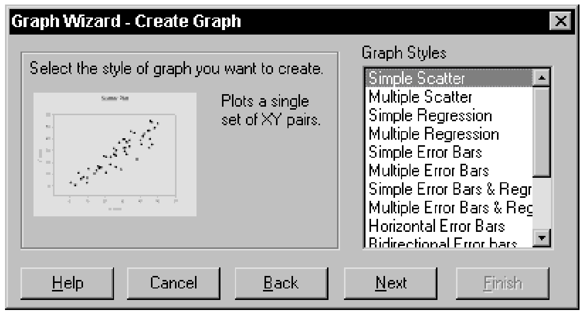
Figure 7–4
The Graph Wizard Displaying a List of Graph Types



Σ If you are making a contour plot, 3D scatter plot, 3D line plot, or 3D mesh plot, you are not prompted to choose a graph style; proceed to step 6. If you are making a pie chart, proceed to step 7. For any other type of graph, continue to step 3.

3. If there is a style available for the graph type you have chosen, the Graph Wizard displays the available graph styles. Select the desired graph style, then click Next. See "SigmaPlot Graph Style" on page 155 to learn about the different graph styles available for different graph types.

Figure 7–5
The Graph Wizard Displaying a List of Available Graph Styles for a Scatter Plot

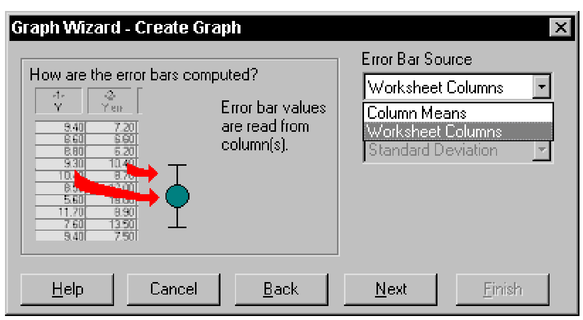


If the graph you are making uses error bars, continue to step 4. If you are making a polar plot, proceed to step 5. For any other style of graph, proceed to step 6.

4. Selecting Data for Error Bars: If the graph style you have chosen uses error bars, you are prompted to choose an error bar source and a value to use for the error bars. If you are making a box plot, or a grouped bar chart with error bars, you are not prompted for error bar source data.

   Error Bar Source: Choose either Column Means to use the column means as the error bar source, or Worksheet Columns to use values you've entered in the worksheet. You are prompted during data picking (step 7) to specify the column to use as error bar source data.

Figure 7–6
Using the Create Graph Dialog Box to Specify Error Bar Information

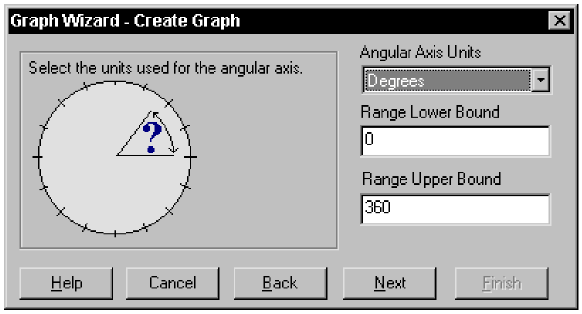


   Error Bar Values: If you choose Column Means as the error bar source, specify the calculation method to use for error bars. Choose either Mean, Standard Deviation, Standard Error, 95% Confidence, or 99% Confidence.

   When you have finished setting error bar options, click Next. Proceed to step 6.

5. Specifying Angular Axis Units for Polar Plots: If you are making a polar plot, you are prompted to specify the angular axis units.

Figure 7–7
Using the Graph Wizard to Specify Angular Axis Information



Choose the unit type to use from the Angular Axis Units list. Note that the Range Lower Bound and Range Upper Bound options change depending on your selection from the Angular Axis Unit list.

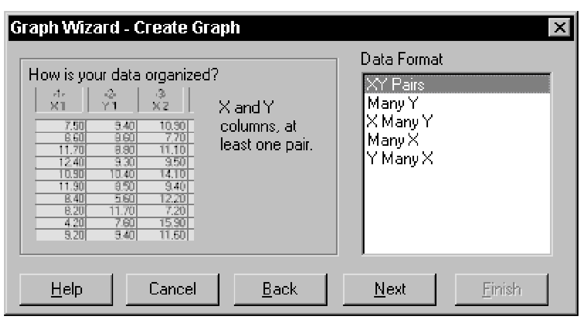
If you don't see the axis units you want to use for your polar plot listed in the list, you can manually edit the Range Lower Bound and Range Upper Bound values by selecting them and typing new values.

Click Next when finished entering axis range values. Proceed to Step 6.

6. Specifying a Data Format: Specify how your data is formatted by choosing the appropriate data format from the Data Format list. To learn about the available data formats for the graph you are making, see the description of the graph style in "SigmaPlot Graph Style" on page 155 , or if the graph you are making has only one style, see "SigmaPlot Graph Types" on page 153 .

Select the appropriate data format from the Data Format list and click Next. Continue to Step 7.

Figure 7–8
Using the Graph Wizard to Specify the Data Format

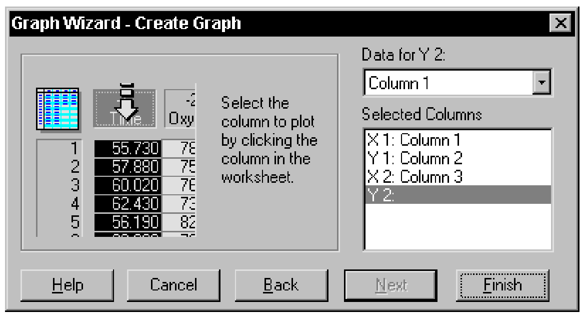


7. Picking Data: Specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box and you can click Finish to create the graph.

If you have not already selected columns, note that a single data type is highlighted in the Selected Columns box. The highlighted data type indicates the data column to select. Begin selecting data either by clicking the corresponding column directly in the worksheet, or selecting the appropriate column from the Data Columns list. You are prompted to pick X, Y, or Z data, R and theta data, and error bar data, if applicable.

Σ If you make a mistake while selecting data, click the wrong entry in the Graph Wizard, then select the correct column from the worksheet. You can also clear a column assignment by double-clicking it in the Selected Columns list.

Figure 7–9
Using the Create Graph Dialog Box to Pick Columns to Plot



8. Repeat the process for every data column. When you have chosen the data appropriate for your style of plot, you can click Back to reselect data columns, or if applicable, click Next to select data for additional plots.
9. Click Finish to create the plot and close the Graph Wizard.

To learn about modifying plots see “SigmaPlot Graph Style” on page 155 and “SigmaPlot Graph Types” on page 153. To learn about repicking data for an existing plot, see “Picking Different Data for the Current Plot” on page 168.

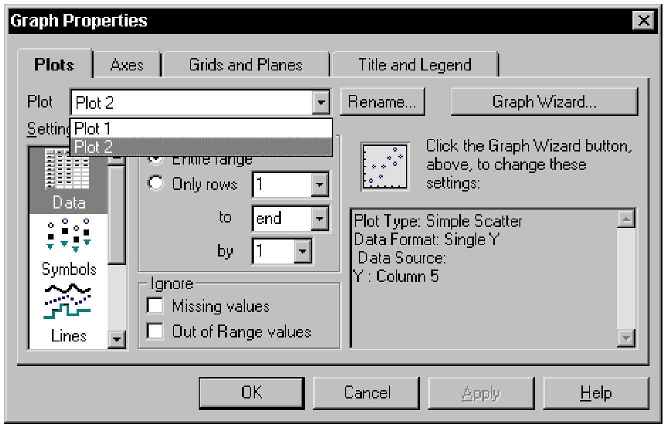
Using the Graph Properties Dialog Box to Modify Graphs

Most graph modifications are made using the Graph Properties dialog box. To display the Graph Properties dialog box, select the graph to modify and click the Graph Properties button, or choose the Graph menu Graph Properties command. You can also double-click a graph to open the Graph Properties dialog box.

Modifying Plots and Axes

To modify a plot or the axes of a selected graph, view the Plots or Axes panel by selecting the Plots or Axes tab, and use the Plot or Axis list to specify which plot or axis in the current graph you are modifying. Use the Settings For lists in the Plots and Axes panels to access many different plot and axis modification options.

Figure 7–10 Using the Plot list on the Plots Panel of the Graph Properties Dialog Box



Modifying Grids and Planes, Titles and Legends

To modify grids or planes, view the Grids and Planes panel by selecting the Grids and Planes tab of the Graph Properties dialog box. Use the Title and Legend panel to hide or show graph titles and automatic legends, to hide or show plots, and to make modifications to automatic legends.

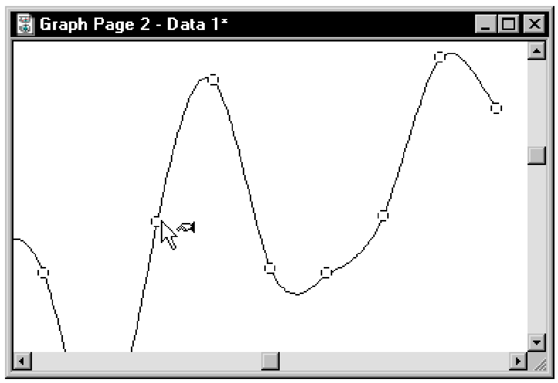
To apply your changes, click Apply, or click OK to apply your changes and close the Graph Properties dialog box.

Selecting a Graph or a Plot

To select a graph or plot, view the page window and make sure you are in selection mode by choosing the Tools menu Select Object command, or by clicking the drawing toolbar button. Place the pointer over the desired graph or plot and click.

Figure 7–11
Selecting a Plot from a Graph on the Page

The data points are covered with square handles.



A selected graph is surrounded by small square handles. A selected plot is indicated with handles at each deadpanning, or in the case of meshes, four handles surrounding the mesh.

Graphs can also be selected by choosing the Graph menu Select Graph command, then choosing the name of the graph.

Using Special Shortcuts

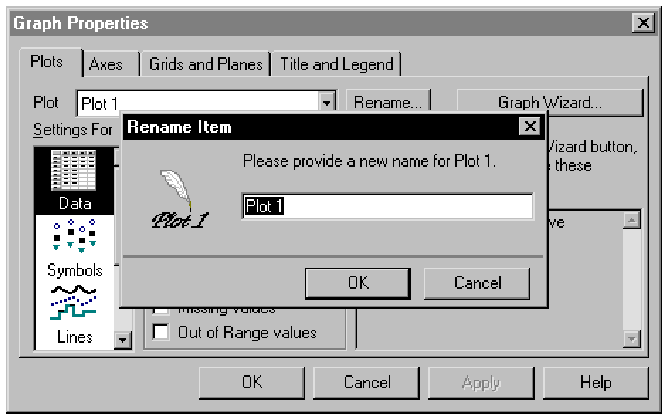
Double-clicking the graph automatically opens the Graph Properties dialog box. For more information on using the Graph Properties dialog box, see “Using the Graph Properties Dialog Box to Modify Graphs” on page 163 .

Your can also right-click a selected graph or plot display to view other available commands on the Shortcut menu.

Naming Plots

The default plot names are numeric; for example, Plot 1, Plot 2, etc. To assign a new name to a plot, open the Graph Properties dialog box by clicking the Graph Properties toolbar  button, then view the Plots panel by selecting the Plots tab. Select the plot to rename from the Plot list, then click Rename to open the Rename Item dialog box.

Figure 7–12 Using The Graph Properties Dialog Box Plots Panel to Rename a Plot



Enter a new name and click OK to apply the new name and close the Rename Item dialog box, then click OK again to close the Graph Properties dialog box.

Naming Graphs

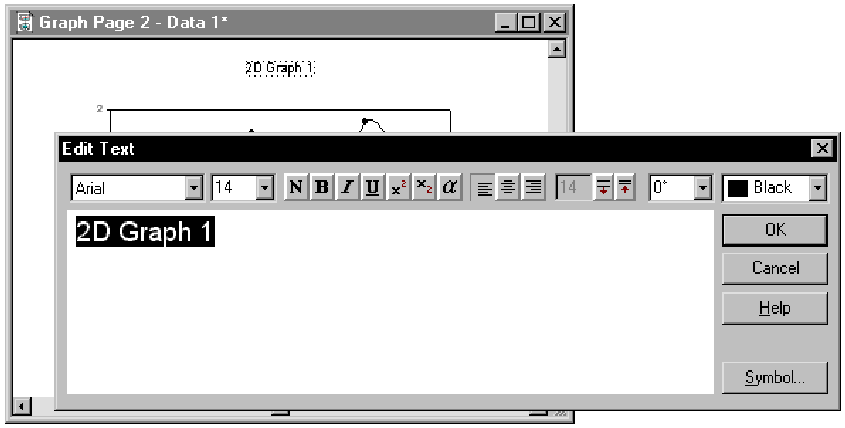
The default graph names are numeric, and include the graph type; for example, 2D Graph 1, 2D Graph 2, and so on.

To assign a new name to a graph:

1. Double-click the graph title that appears above the graph. The Edit Text dialog

box appears.

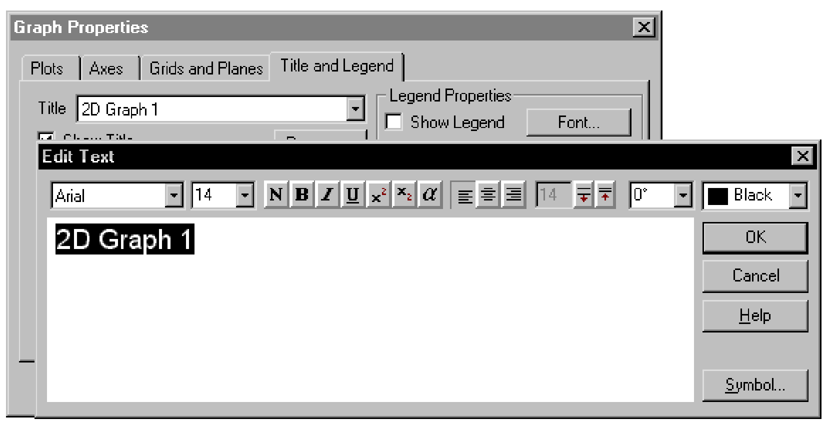
Figure 7–13
Using the Edit Text Dialog Box from the Page to Change the Name of a Graph



2. Type in the new name, making any font changes you desire. Click OK to apply the new name.

You can also open the Graph Properties dialog box by clicking the toolbar button, then view the Title and Legend panel by selecting the Title and Legend tab. Choose the graph to rename from the Title list, then click Rename to open the Edit Text dialog box.

Figure 7–14
Using the Edit Text Dialog Box from Graph Properties to Change the Name of a Graph



Picking Different Data for the Current Plot

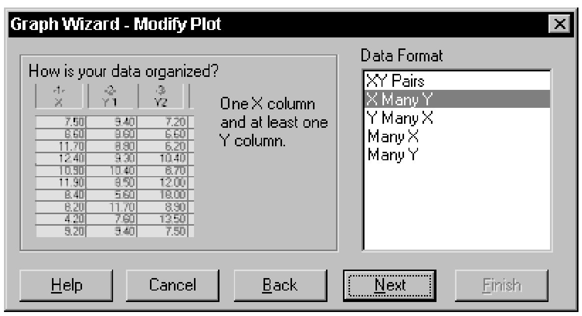
To change data columns for an existing plot:

1. Select the plot to modify by clicking it. Square handles appear over the data points for the clicked curve. Do not click the graph, or you will add a plot to the graph.

2. Open the Graph Wizard by clicking the Graph Wizard  toolbar button. The Graph Wizard - Modify Plot dialog box appears with the Data Format panel displayed. The current data format of the selected plot is highlighted.

   You can also modify a plot by double-clicking a graph to open the Graph Properties dialog box, selecting the plot you want to modify from the Plot list, then clicking the Graph Wizard button.

Figure 7–15
The Graph Wizard Displaying the Data Format for the Current Plot



3. To change the way your data is formatted, use the Data Format list to pick a different data format, then click Next.

4. **If you did not change the data format for your graph,** your previous column choices are listed in the Selected Columns edit box. Change column assignments by clicking the desired assignment in the Selected Columns edit box, then selecting the appropriate column from the worksheet or from the data list.

   You can also clear a column assignment by double-clicking it in the Selected Columns list.

5. **If you did change the data format for your graph,** a single data type is highlighted in the Selected Columns list. The highlighted data type indicates the data column to pick. Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the data list. Use this method to pick X, Y, or Z data, R and theta data, and error bar data, if applicable.

6. **If you make a mistake while picking data** , click the mistaken entry in the Graph Wizard, then choose the correct column from the worksheet.

7. Repeat the process for every data column. When you have chosen the data appropriate for your style of plot, you can click Back to repick data columns, or if applicable, click Next to pick data for additional plots.
8. Click Finish to close the Graph Wizard and view the changed graph.

Changing Graph Type and Style

Plots can be changed using the Graph Wizard; however, once a plot style and type have been defined, the styles and types available for you to apply to the created plot are limited. If the plot you've selected cannot be changed to the plot type or style that you want, use the Graph Wizard to create another plot using the desired style and type.

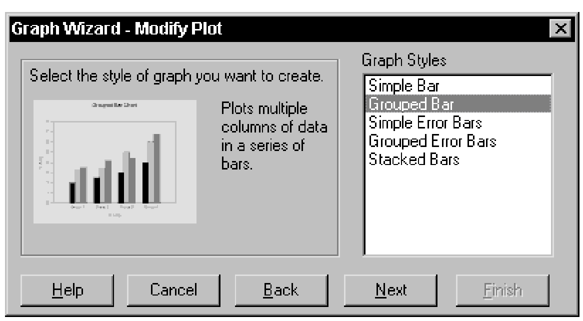
To learn about creating new plots, see "Creating Additional Plots" on page 171.

To change graph type and style:

1. Select the plot to modify by clicking it. Square handles should appear over the data points for the clicked curve. Do not click the graph, or you will add a plot to the graph.
2. Open the Graph Wizard by clicking the Graph Wizard  toolbar button. The Graph Wizard opens displaying the data format of the current plot.

   You can also modify a graph type and style by double-clicking a graph to open the Graph Properties dialog box, selecting the plot you want to modify from the Plot list, then clicking the Graph Wizard button.
3. **To change plot style,** view the Graph Styles list in the Graph Wizard by clicking Back one time. Choose from list of available styles then click Next.

Figure 7–16
The Graph Wizard Displaying the Graph Style for the Current Plot



4. **To change the plot type,** view the Graph Types list in the Graph Wizard by clicking Back twice. Choose from the list of available graph types, then click Next. If you selected a 2D scatter, line, bar chart, box plot, or polar plot, you are

prompted to select a style for the new plot (see step 3). If you selected a 3D graph or contour plot, you are prompted to select a data format (see step 5).

5. Click next until you can select a data format again for the new plot type or style from the Data Format list, then click Next. You are prompted to specify which worksheet columns to plot.

6. If necessary, repick the data columns to plot. Otherwise, simply click Finish to complete you plot type or style change.

Σ Note that if you are changing a 3D plot to a mesh plot, you may need to interpolate your data. For more information on interpolating 3D data, see "Converting Unordered XYZ Triplet Data to Mesh Format" on page 287.

Multiple Plots on a Graph: Adding New Plots

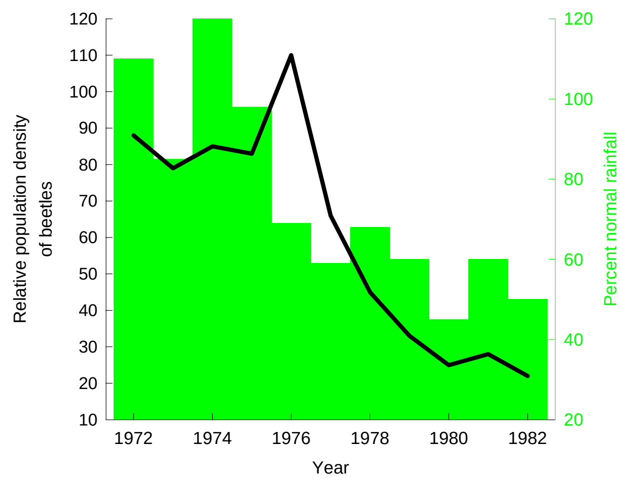
Graphs can have multiple plots and plot types. Although most 2D graphs with multiple curves do not require more than one plot, multiple plots are required if you want to mix plot types on a single graph. If you simply want multiple sets of lines, symbols, or bars, just plot multiple columns of data for the same plot; see "Creating Multiple Curves" on page 257.

Use multiple plots per graph rather than a single plot with many curves only if different plot types or styles are required (i.e., placing a bar chart and a line plot, or a 3D scatter and mesh plot on a graph), if different data formats are required (such as XY and Y only for a scatter plot), or if a curve requires a different axis (scale, range, etc.)

2D graphs with multiple plots can also have multiple axes. For information on adding multiple axes to a 2D graph, see “Creating Multiple 2D Axes” on page 273.

Figure 7–17
Example of a Graph with Two Plots

Each plot has separate Y axes.



Creating Additional Plots

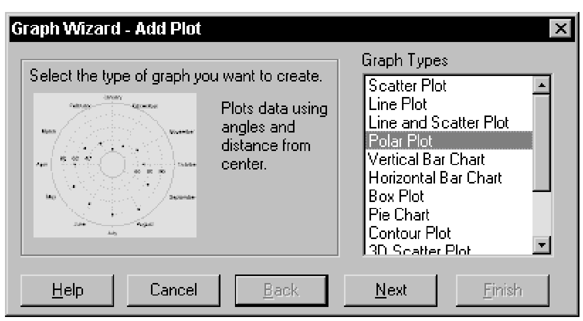
Use the Graph Wizard, the Add Plot command, or Graph Wizard toolbar button to add a plot to a selected graph.

To add another plot to a graph:

1. Select the graph to modify by clicking it. The graph should be surrounded by small square handles. Do not click a curve, or you will modify that curve instead.

2. Open the Graph Wizard by clicking the Graph Wizard toolbar button, or by choosing the Graph menu Add Plot command. The Graph Wizard opens, displaying all the graph types.

Figure 7–18
The Graph Wizard Displaying the Available Graph Types for the New Plot



Note that the styles and types that can be used for a new plot are limited depending on the other plot types and styles in the current graph; for example, you cannot add a Polar plot to a 2D Cartesian plot, or vice versa.

If the graph you've selected cannot accommodate the plot type or style that you want to add, the plot will be created as a new graph. The graph of the new plot can be moved over the original graph so that it appears to be in the same graph.

3. To specify the type of plot to add to the graph, select a plot type from the Graph Types list, then click Next. If you selected a 2D scatter, line, bar chart, box plot, or polar plot, you are prompted to select a style for the new plot (see step 4). If you selected a 3D graph or contour plot, you are prompted to select a data format (see step 5).
4. If applicable, select the desired plot style from the Graph Styles list, then click Next.
5. Select a data format for the new plot from the Data Format list, then click Next. You are prompted to specify which worksheet columns to plot. A single data type is highlighted in the Selected Columns list. The highlighted data type indicates the data column to pick.
6. Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the data list. Use this method to pick X, Y, or Z data, R and theta data, and error bar data, if applicable.
7. If you make a mistake while picking data, click the wrong entry in the Graph Wizard, then choose the correct column from the worksheet. You can also clear a column assignment by double-clicking it in the Selected Columns list.
8. Repeat the process for every data column. When you have chosen the data appropriate for your style of plot, you can click Back to repick data columns, or if applicable, click Next to pick data for additional plots.
9. Click Finish to add the plot to the graph and close the Graph Wizard.

Showing, Hiding, and Deleting Plots

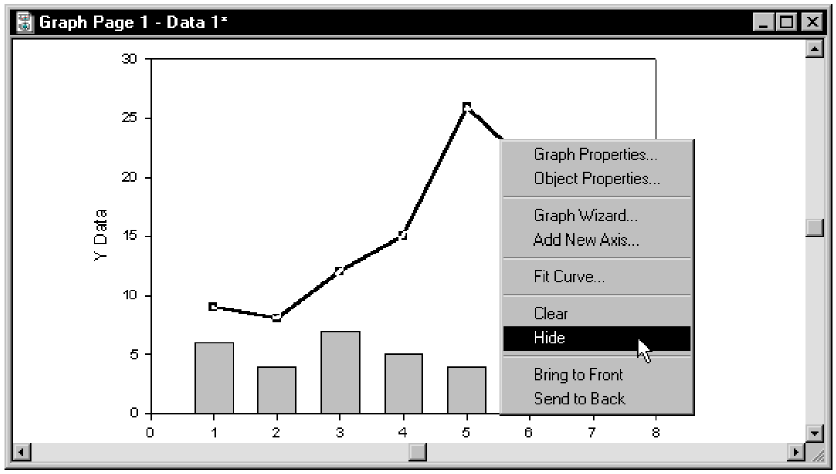
Occasionally, you may want to remove a plot from a graph without deleting it. Plots can be hidden from view without being deleted using the right-click shortcut menu, or the Graph Properties dialog box.

Hiding and Showing Plots

To show or hide a plot:

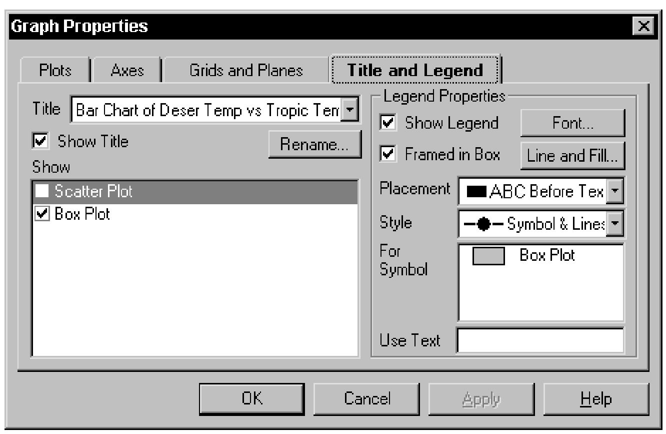
1. Right-click the plot, then choose Hide from the shortcut menu. The plot is hidden, but not removed.
2. To show the plot again, or to hide it using the Graph Properties menu, double-

Figure 7–19
Hiding a Plot



click the graph to open the Graph Properties dialog box, then select the Title and Legend tab to view the Title and Legend panel.

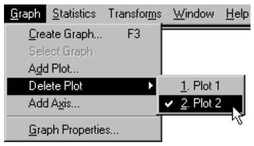
Figure 7–20
The Graph Properties Dialog Box Title and Legend Panel



3. All plots associated with the current graph are listed in the Show box. A check mark in the box next to the name of a plot indicates that the plot is displayed. Clear a check box by selecting it to hide a plot from view, or check it to show the plot.

4. Click OK to apply your changes and to close the Graph Properties dialog box.

Deleting Plots



To erase a plot permanently, select the graph, choose the Graph menu Delete Plot command, then choose the plot you want to delete. The Graph menu Delete Plot command is only available when there are multiple plots in a graph.

You can delete the individual curves of a plot by selecting a curve on a graph, then pressing the Delete key, choosing the Edit menu Clear command, or right-clicking, and choosing Clear.

If you delete a plot by mistake, you can use the Edit menu Undo command to restore the deleted plot. However, Undo is only available once — until the next command is issued.

Sampling Fewer Data Points

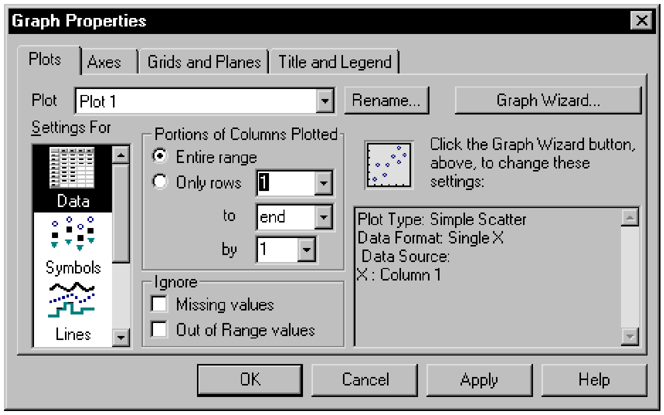
If you have a graph with a large number of data points, you can plot only a portion of the column(s) and/or sample only a portion of the data from the column. This is useful if you are interested only in graphing part of the data, or if you want to increase drawing speed while working on the graph.

To plot only a portion of your data:

1. Double-click the graph to open the graph properties dialog box. If your graph has more than one plot, and it is not the current plot shown, use the Plot drop down list to select the desired plot.
2. To plot only a portion of your data, select the Only Rows option under Portions of Columns Plotted and enter the range to plot.
3. To sample the column rows by a specified increment, select the box labeled by and type a number. Typing a “2” samples every other row and reduces the number of rows plotted by 50%, typing a “3” samples every third row, and so on.

You can also use the By list to select a number of rows plotted.

Figure 7–21 The Data Settings of the Graph Properties Dialog Box Plots Panel



4. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply, then use the Plot list to modify a different plot.

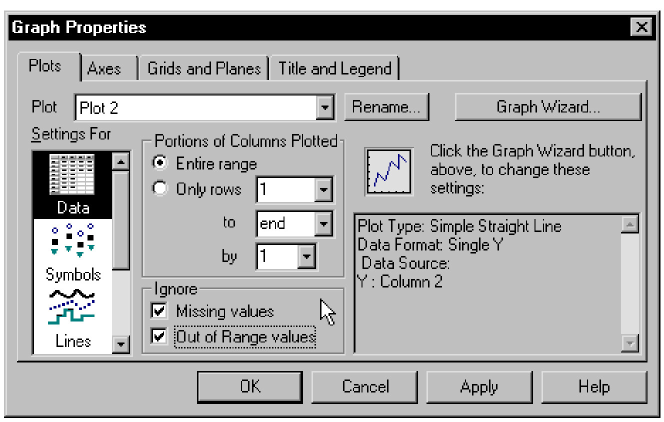
Plotting Missing and Out of Axis Range Data Points

You can choose to either plot or ignore ***bad points***. Bad points are either missing values, or data that lie outside the axis ranges.

To ignore missing and/or out-of-range points:

1. Double-click the graph to open the graph properties dialog box. If your graph has more than one plot, use the Plot list if necessary to select the desired plot.

Figure 7–22 The Data Settings of the Graph Properties Dialog Box Plots Panel



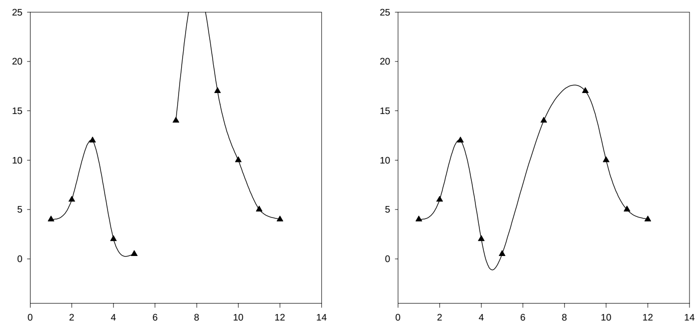
2. Use the Missing Values option under Ignore to plot data without missing values. When this option is checked, missing values are not plotted. To plot missing val-

ues, clear the checked option by selecting it.

3. Use the Out of Range Values option to plot data without out of range values. When this option is checked, out of range values are not plotted. To plot out of range values, clear the checked option.

Figure 7–23
Example of Graphs Plotting Bad Data Points

The graph on the left plots both a missing data point and out-of-range data point. The graph on the right ignores both missing and out of range points.



4. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify a different plot.

Changing Symbol Type and Other Symbol Options

You can specify the symbol type used either for the symbols in a single curve, or for all the curves in a plot. The default is to use the same symbol for a single curve and increment symbols for multiple curves.

Symbols only can be modified (or added to), plots that normally use symbols, *i.e.,* scatter plots, line plots, line/scatter plots, bubble plots, polar plots, box plots, 3D scatter plots, 3D trajectory plots, and ternary plots.

Σ Note that bubble plots use circles as the default symbol shape. If you choose a different symbol shape, you must change the transform function used to translate area to diameter. For more information, see “Bubble Plots” on page 244.

To use different symbol types within a single curve, or for each curve, you can increment types automatically; see “Automatically Incrementing Symbols” on page 178. You can also choose to use your own order of symbols, or to use text as symbols. For more information, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191, and “Using Characters and Text as Symbols” on page 180.

Σ Note that symbols cannot be incremented for single curves, unless there is only one curve within a plot.

Changing Symbol Type, Size, and Color

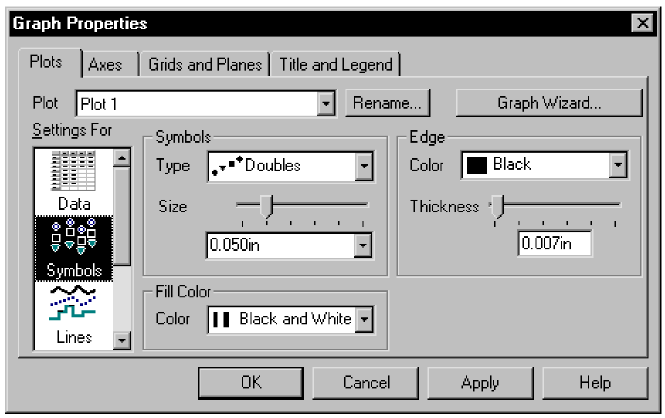
To change symbol attributes for a plot:

1. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the symbols panel. If not, select the Symbols option from the Settings For list.

   You can also select the plot, then click the Properties toolbar  button, or choose the Graph menu Graph Properties command, then select the Symbols option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the symbols to modify from the Plot list.

Figure 7–24
The Symbols Settings of the Graph Properties Dialog Box Plots Panel



2. To change the symbol type for the selected plot, use the Type list, or choose to increment symbols using the one of the symbol schemes. To create a plot that displays lines only, turn off symbols by choosing (none).

   To learn more about automatically incrementing symbols, see “Automatically Incrementing Symbols” on page 178. To learn about using custom symbol schemes, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191. For information on using text as symbols, see “Using Characters and Text as Symbols” on page 180.

3. To change the size of the symbol, use the Size slider control, or select the Size edit box, then typing the new value. By default, all symbols in a plot are the same size. Use symbols of different sizes by entering symbol sizes in a worksheet column, then selecting the column from the Size list.

4. To change the fill color of symbols for the selected plot, choose a color from the Fill Color options Color list, or choose to increment fill colors using the one of the incrementing schemes. Turn off symbol fills by choosing none.

   To learn more about automatically incrementing symbol fills, see “Automatically

Incrementing Symbols” on page 178. To learn about using custom increment schemes, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191.

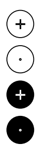
Use the (custom) option to open the Color dialog box from which you can create or choose a custom color. For more information, see “Using Custom Colors” on page 146.

Hollow Symbols are symbols that use (none) as the fill color are hollow, that is, they are composed of the edge lines only. Lines, error bars, and graph background colors all show through unfilled symbols, which is useful if you have many overlapping data points.

5. To change the edge color of symbols, choose a color from the Edge Color list, or choose to increment edge colors using the one of the incrementing schemes. Turn off symbol edge color by choosing none.

   To learn more about automatically incrementing edge color, see “Automatically Incrementing Symbols” on page 178. To learn about using custom increment schemes, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191.

   Use the (custom) option to open the Color dialog box from which you can create or choose a custom color. For more information on using custom colors, see “Using Custom Colors” on page 146.



6. To control the color of symbol dots and crosshairs, or of text used as symbols (see page 180), use the Edge Color option. If a symbol is filled with black and has a black edge, then dots and crosshairs automatically default to white. See step 5 for information on incrementing the color of symbol dots and crosshairs.
7. Change the thickness of the symbol edge using the Thickness slider control, or by selecting the Thickness edit box, then typing the new value.
8. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify symbols on a different plot.

Automatically Incrementing Symbols

When incrementing symbols automatically, symbol types are assigned to curves (or points, if the plot has only one curve) in the same order the column pairs forming the curves are listed in the Graph Wizard. SigmaPlot increments symbols according to the selected scheme.

To learn about using custom increment schemes, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191 .

To use automatically incrementing symbol types:

1. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the symbols panel. If not, select the Symbols option from the Settings For list.

You can also select the plot, then click the Properties toolbar button, or choose the Graph menu Graph Properties command, then select the Symbols option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the symbols to modify from the Plot list.

2. To increment symbol types and fill and edge colors automatically, use the Type, Fill Color, and Color lists to choose a symbol scheme. For examples of these schemes, see "Schemes" on page 335.

   Symbol types and colors appear on the curves of the plot in the same order as the symbol types and colors in the right-click popup menus of the incrementing option (see Step 3). There are seven different incrementing color schemes to choose from for both fill and edge colors.

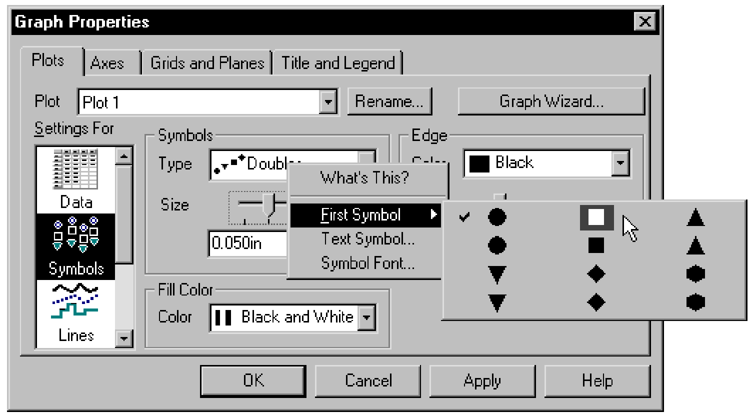
   The incrementing symbol types are:

   - Doubles: Uses two of each symbol, without crosshairs or dots. This scheme is designed for use with the Black and White color scheme.
   - Monochrome: Uses a circle, a crosshair, inverted triangle, square, and triangle.
   - Dotted Doubles: Uses two of each symbol, one symbol with a dot and one symbol without a dot.
   - Incrementing: Uses one of each symbol, without crosshairs or dots.

Σ Increment schemes do not include (none) as a symbol type.

3. To change the first symbol type or color used in the incrementing sequence, select Incrementing from the Symbols Type, Fill Color, and Edge Color lists. By right-clicking the Incrementing option selected, choose First Symbol or First Color from the Shortcut menu, then choose the symbol type or color with which to start the incrementing sequence. The Shortcut menus display the order of the symbol types and colors in the selected incrementing scheme.

Figure 7–25
Changing the Starting Symbol for an Incrementing Sequence

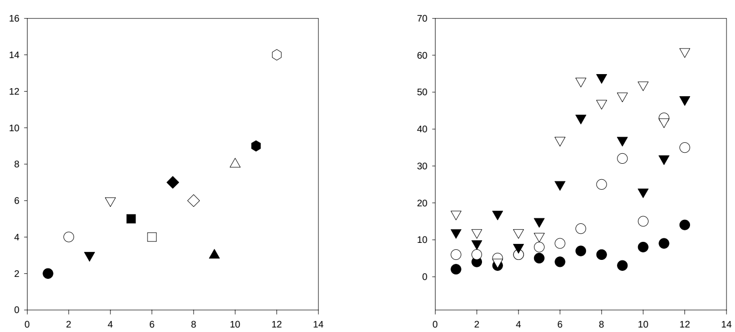


4. Use the Symbol Size, Fill Color, and Edge options to modify the symbols, if necessary. For more information on modifying symbols, see “Changing Symbol Type, Size, and Color” on page 177.

5. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify symbols on a different plot.

Figure 7–26
Example of Symbol Schemes on Scatter Plots

Both graphs use the Doubles symbol scheme and the Black and White color scheme. The first graph has only one curve; the second has four.



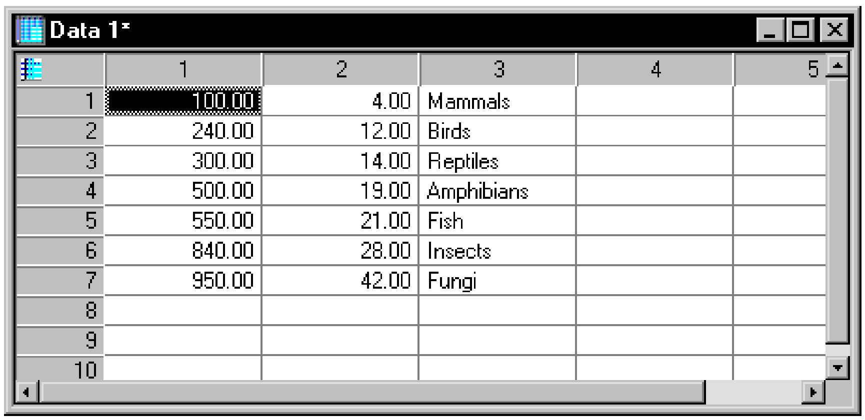
Using Characters and Text as Symbols

You can use numbers, characters, and text as symbols by entering them in a worksheet column and specifying the column in the Graph Properties dialog box. For more information on using symbols from worksheet columns, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191 .

To specify characters as symbols:

1. Enter the text you want to use as symbols in a worksheet column, in the order you want the curve(s) to use them. To use numeric values as symbols, add a space after each value in the worksheet. The numbers appear aligned to the left and can be assigned as symbols.
2. You can use all the non-keyboard characters available for the default font. To view and access these characters, you can use the Windows Character Map utility. The Windows User's Guide also lists these special characters, along with the keystrokes required to enter them.

Figure 7–27 Example of Worksheet with Plot Symbol Text Entered in Column 3



	1	2	3	4	5
1	100.00	4.00	Mammals		
2	240.00	12.00	Birds		
3	300.00	14.00	Reptiles		
4	500.00	19.00	Amphibians		
5	550.00	21.00	Fish		
6	840.00	28.00	Insects		
7	950.00	42.00	Fungi		
8					
9					
10					

3. View the page by clicking the toolbar button, or by choosing the page name from the Window menu.
4. Double-click the plot on which you want to use text symbols. The Graph Properties dialog box opens to the Symbols settings.

   You can also select the plot, then click the Properties toolbar button, or choose the Graph menu Graph Properties command, then select the Symbols option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the symbols to modify from the Plot list.

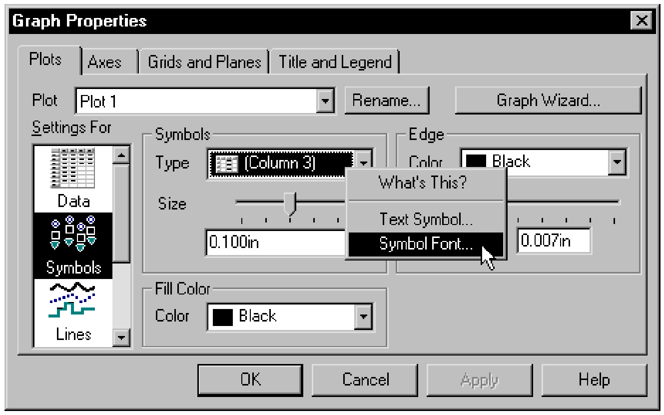
5. From the Type list, choose the name of the column that contains the text or numeric values you want to use as symbols. The column options for symbols can be found at the bottom of the Symbols Type list.

Σ The column option does not appear in the Type list unless text or symbols are entered in a worksheet column.

6. To change the font used for your symbol, right-click the Type option, and choose the Symbol Font command. This feature is especially useful if you wish

Figure 7–28
Using Text from a Worksheet Column as the Symbol Type for the Plot

Change the font for text symbols by right-clicking the Type option and choosing Symbol Font.

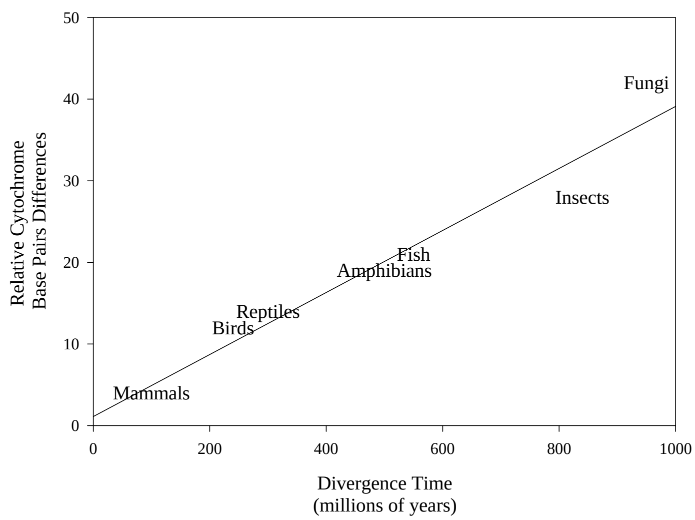


to use Wingdings, Zapf Dingbats, or other iconic or symbolic fonts as a symbol.

Σ The Fill Color and Edge Thickness options do not apply to text and characters.

7. Apply your changes and close the Graph Properties dialog box by clicking OK.

Figure 7–29
Example of a Graph Using Text from a Worksheet Column as Plot Symbols



Using Different Symbol Sizes

By default, all symbols in a plot are the same size. To use symbols of varying sizes, enter symbol size values in a worksheet column, then set symbol size using the Graph Properties dialog box. For more information on using symbol attributes from worksheet columns, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191.

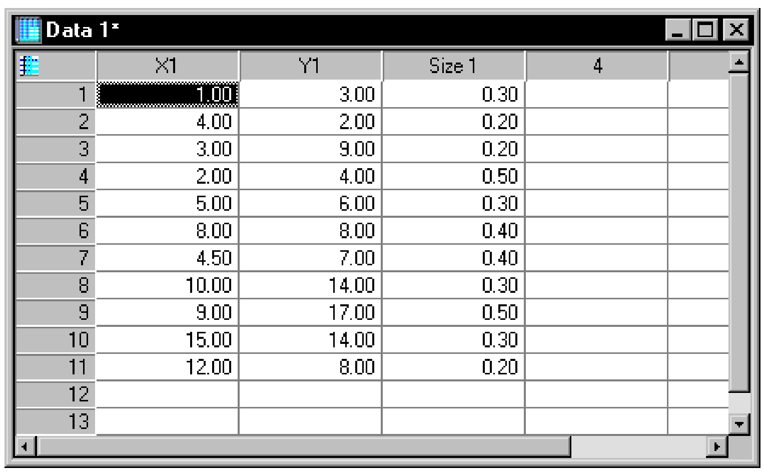
Symbol sizes are assigned to symbols and curves (or points, if the plot has only one curve) in the same order the column pairs forming the curves are listed in Graph Wizard.

To use worksheet values for symbol size:

1. In the worksheet containing data for the current plot, select the first cell of an empty column.
2. Type the size values to use in the order you want to use them. Since the symbol sizes correspond to symbol diameters or widths, make sure that the symbol sizes you enter are of a reasonable size, that is, small fractions of inches or only a few millimeters or points.

   If desired, you can also include the measurement unit for the value. For example, for inches type *in*, for millimeters type *mm*, or for points type *pt*.

Figure 7–30 Example of Worksheet with Symbol Sizes Entered in Column 3



Data 1*

	X1	Y1	Size 1	4
1	1.00	3.00	0.30	
2	4.00	2.00	0.20	
3	3.00	9.00	0.20	
4	2.00	4.00	0.50	
5	5.00	6.00	0.30	
6	8.00	8.00	0.40	
7	4.50	7.00	0.40	
8	10.00	14.00	0.30	
9	9.00	17.00	0.50	
10	15.00	14.00	0.30	
11	12.00	8.00	0.20	
12				
13				

Σ If you omit the measurement unit, the numeric values in the symbol size column are assigned the measurement unit specified in the Page panel of the Options dialog box.

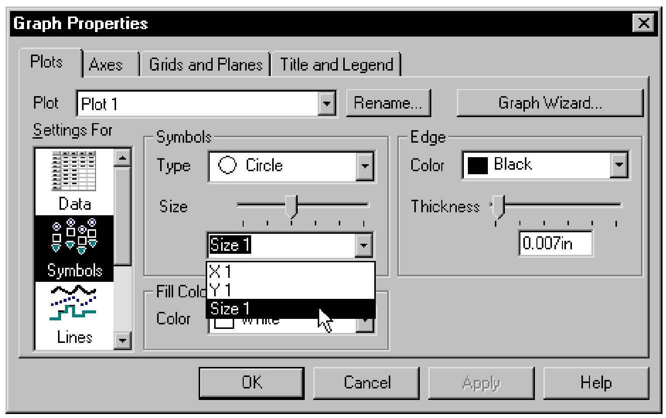
3. View the page by clicking the toolbar button, or by selecting the page name from the Window menu.
4. Double-click the plot on which you want to use text symbols. The Graph Properties dialog box opens to the Symbols settings.

   You can also select the plot, then click the Properties toolbar button, or choose the Graph menu Graph Properties command, then select the Symbols option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the symbols to modify from the Plot list.

5. Use the Size list to choose the worksheet column containing the symbol size values you've entered.

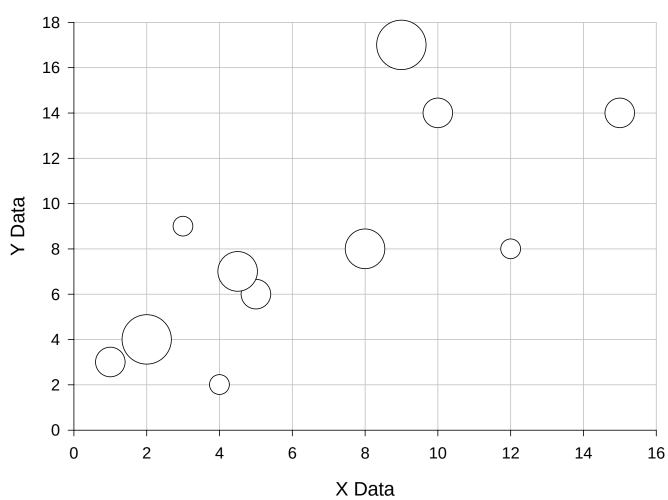
Figure 7–31
Using the Symbols Panel to Select Symbol Size from a Worksheet Column



6. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify symbols on a different plot.

Σ When creating a bubble plot, the Graph Wizard automatically prompts you to pick a column to specify bubble size. For more information, see "Bubble Plots" on page 244.

Figure 7–32
Example of a Graph Using Symbol Sizes from a Worksheet Column for Plot Symbols



Changing Line Type and Other Line Options

You can change the line type, shape, thickness, and color for all lines in a plot. Because plots can also have multiple curves, you can also increment the line types and colors for any plot with multiple curves.

Lines can only be modified in or added to plots that normally use lines, *i.e.,* scatter plots, line plots, line/scatter plots, polar plots, 3D scatter plots, 3D trajectory plots, and ternary scatter, line, and line/scatter plots.

Changing Plot Line Attributes

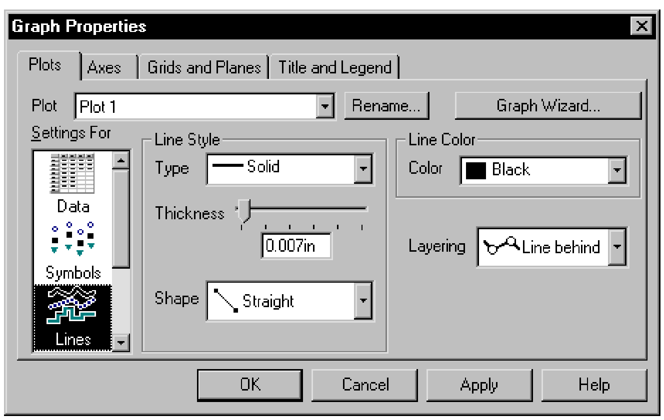
To change the attributes of lines in a selected plot:

1. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the lines panel. If not, select the Lines option from the Settings For list.

   You can also select the plot. Click the Graph Properties toolbar button or choose the Graph menu Graph Properties command, then select the Lines option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot from the Plot list.

Figure 7–33 The Lines Settings of the Graph Properties Dialog Box Plots Panel



2. To change the line type for the lines on the selected plot, choose a line from the Type list, or choose to increment lines using one of the line schemes. Choose (none) to turn off lines for the selected plot.

   To learn more, see "Automatically Incrementing Symbols" on page 178. To learn about using custom increment schemes, see "Using Custom Symbol, Fill, Line, and Color Increments" on page 191.

Σ To create a plot that displays symbols only, turn off lines by choosing (none).

3. Change the thickness of the line using the Thickness slider control, or by selecting the Thickness edit box, then typing the new value.
4. To choose a line shape, use the shape list. Select straight lines, upper or lower step lines, vertical or horizontal midpoint step lines, or smoothed lines (spline curves).
5. To change the color of the lines in the selected plot, select a color from the Color list, or choose to increment line color using the one of the incrementing schemes. Select (none) to create transparent lines.

   Use the (custom) option to open the Color dialog box from which you can create or choose a custom color. For more information on using custom colors, see "Using Custom Colors" on page 146.
6. To control the layering of plot lines, use the Layering list to place lines in front of or behind plot symbols.

Σ Hollow symbols (with fills of None) will always show plot lines.

7. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify lines on a different plot.

Automatically Incrementing Lines

To learn about using custom line schemes, see "Using Custom Symbol, Fill, Line, and Color Increments" on page 191 .

To use automatically incrementing line types:

1. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the lines panel. If not, select the Lines option from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar  button or choose the Graph menu Graph Properties command, then select the Lines option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the lines to modify from the Plot list.

2. To alternate line types and colors automatically, use the Type and Color lists to choose a line scheme.

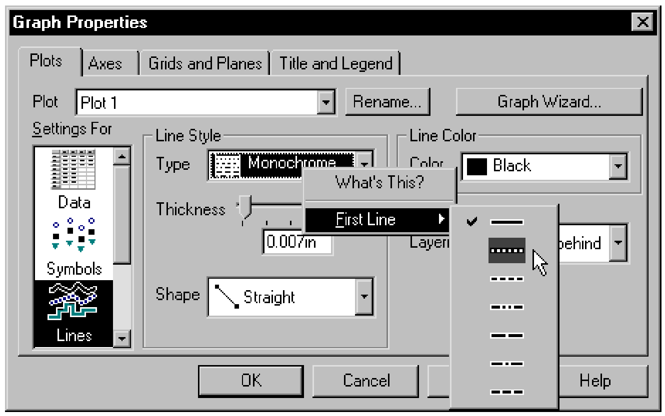
   For examples of these schemes, see "Schemes" on page 335.

   Line types and colors appear on the curves of the plot in the same order as the line types and colors in the right-click popup menus of the incrementing option (see Step 3). There are two line type incrementing schemes: Incrementing and Monochrome. There are seven different incrementing color schemes to choose from for line colors.

Σ Note that Windows is limited in its ability to supply the true colors for lines by the number of system colors available. For the best representation of true line colors, set your display to either HiColor (16-bit) or TrueColor (24-bit).

3. To change the first line type and color used in the incrementing sequence, right-click the incrementing option selected in the Type and Color lists, choose First Line or First Color from the Shortcut menu, then choose the line type or color with which to start the incrementing sequence.

Figure 7–34 Changing the Starting Line Type for an Incrementing Sequence

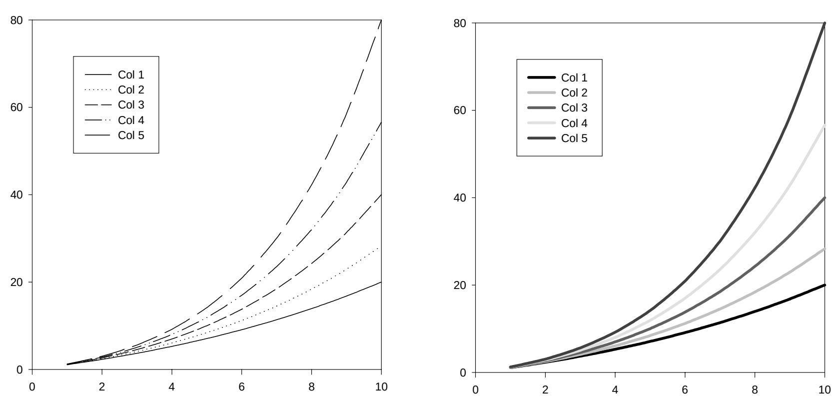


4. Use the Line Thickness, Shape, Line Color, and Layering options to modify the lines, if necessary. For more information on modifying lines, see “Changing Plot Line Attributes” on page 185.

5. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify lines on a different plot.

Figure 7–35 Example of Incremented Line Types for Line Plots with Multiple Curves

Each of these graphs uses the Incrementing option, but are assigned different starting line types.



Changing Patterns and Fill Colors

You can modify and increment the background colors, patterns, and pattern colors used for plots.

Fill colors and patterns can only be modified or added to plots that normally use fills, *i.e.,* bar charts, box plots, pie charts, 3D bar charts, and ternary plots.

Changing Plot Fill Patterns and Colors

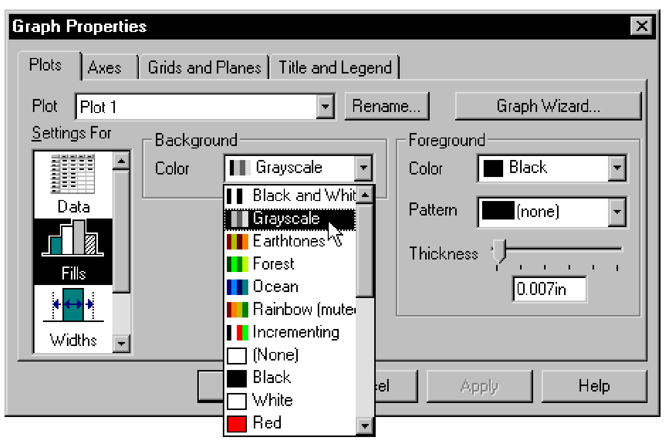
To change the fill attributes in a selected plot:

1. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the Fills panel. If not, select the Fills option from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar button or choose the Graph menu Graph Properties command, then select the Fills option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the fills to modify from the Plot list.

Figure 7–36 The Fills Settings of the Graph Properties Dialog Box Plots Panel



2. To change the background fill color, choose a color from the Background Color list, or choose to increment fill colors using the one of the incrementing schemes. Turn off background fills by choosing (none).

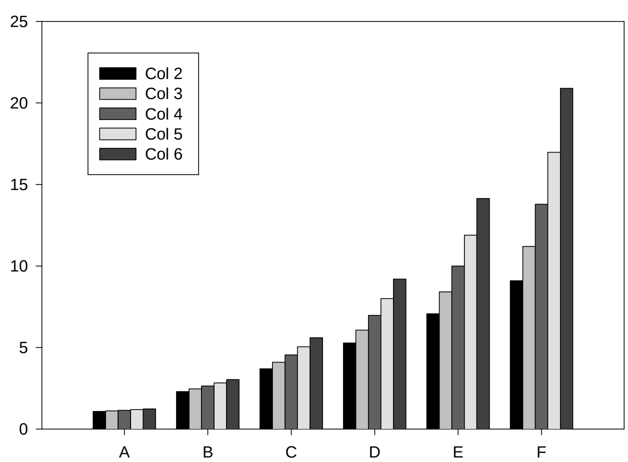
   To learn more about automatically incrementing fills, see page 189. To learn about using custom increment schemes, see page 191.

   Use the (custom) option to open the Color dialog box which you can use to create or choose a custom color. For more information on using custom colors, see “Using Custom Colors” on page 146.

1. To change the foreground fill pattern and edge color, choose a color from the Color list, or choose to increment pattern and edge colors using the one of the color schemes. Turn off pattern and edge colors by choosing (none).
2. Design Tip: Modern laser printing and color slides have removed much of the need for using hatch marks and other line patterns for bar and pie charts. The use of gray shades and colors should be encouraged whenever possible.
3. To learn more about automatically incrementing colors, see page 189. To learn about using custom incrementing schemes, see page 191.

   Use the (custom) option to open the Color dialog box from which you can create or choose a custom color. For more information on using custom colors, see "Using Custom Colors" on page 146.
4. To change the fill pattern and density for the selected plot, choose a fill pattern from the Pattern list, or choose to increment fill patterns using one of the fill schemes. Turn off fill patterns by choosing (none).
5. Change the thickness of the pattern lines and edges using the Thickness slider control, or by selecting the Thickness edit box, then typing the new value.
6. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify fills on a different plot .

Figure 7–37 Example of a Bar Chart with a Gray Scale Fill Color Scheme



Automatically Incrementing Chart Fills

When incrementing fills automatically, different fill colors and patterns are assigned to each bar, box and pie chart slice in the plot. If you are incrementing fills for a grouped bar chart fill colors and patterns are assigned to each group in the plot in the same order the column pairs forming the groups are listed in Graph Wizard.

To learn about using custom increment schemes, see page 191.

To use automatically incrementing fills:

1. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the fills panel. If not, select the Fills option from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar button or choose the Graph menu Graph Properties command, then select the Fills option from the Settings For list.

   Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the fills to modify from the Plot list.

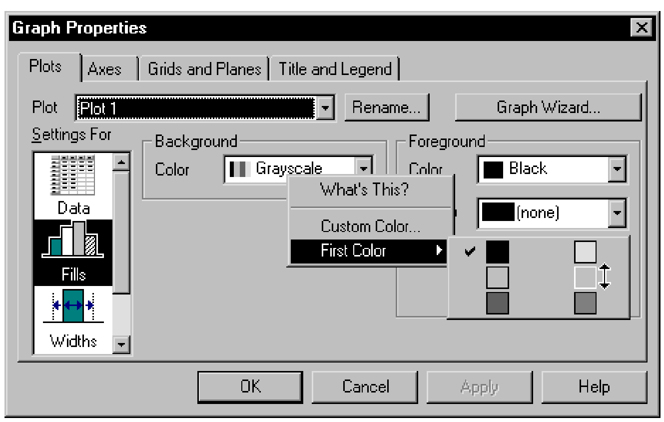
2. To alternate fill colors and patterns automatically, use the Color and Pattern lists to choose a scheme. Colors and patterns appear in the bars, boxes, or pie chart slices of the plot in the same order as the Shortcut menu of the incrementing option (see Step 3).

   For examples of these schemes, see “Color, Symbol, Line, and Fill Schemes and Codes” on page 335.

   There are two line type incrementing schemes: Monochrome and Incrementing. There are seven different incrementing color schemes to choose from for line colors.

3. To change the color or fill pattern used in the incrementing sequence, right-click the incrementing option selected in the Pattern and Color lists, choose First Pattern or First Color from the pop-up menu, then choose the pattern or color to start the incrementing sequence.

Figure 7–38 Changing the Starting Fill Color for an Incrementing Sequence



4. Use the other Fill settings to modify the fills, if necessary. For more information on modifying fills, see “Changing Plot Fill Patterns and Colors” on page 188 .

5. Apply your changes and close the Graph Properties dialog box by clicking OK,

or click Apply then use the Plot list to modify fills on a different plot.

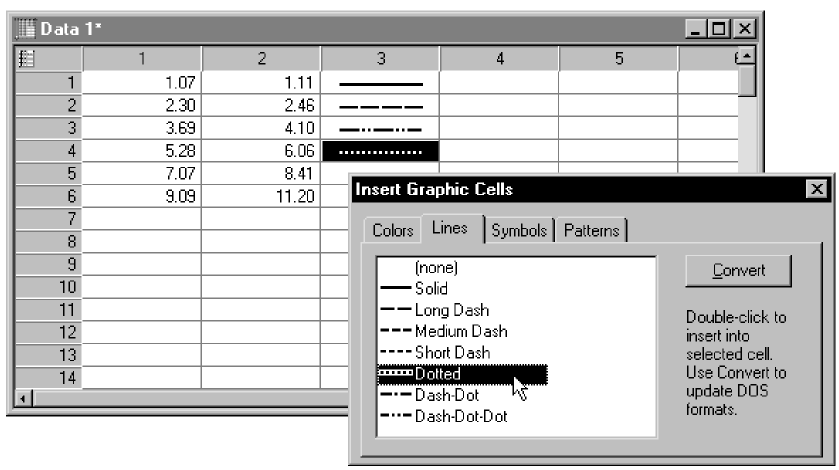
Using Custom Symbol, Fill, Line, and Color Increments

When using a series of incremented symbols, fills, lines, or colors you have defined, the increment scheme is assigned to curves (or points, if applicable) in the same order the columns plotted for the curves are listed in the Graph Wizard.

To use a series of incremented symbols, fills, lines, or colors you have defined:

1. View the worksheet by clicking the Worksheet toolbar button, or by choosing the name of the worksheet from the Insert menu. A check mark next to the name of the worksheet indicates that it is the current window.
2. Open the Insert Graphic Cells dialog box by choosing the Edit menu Insert Graphic Cells command, then select the Colors, Lines, Symbols, or Patterns tab to view the appropriate panel.

Figure 7–39 Using the Insert Graphic Cells Dialog Box to Specify a Custom Line Sequence



Σ Custom Solid and Hollow Symbols Using symbol types from a column specifies the symbol shape only. If you want to change the symbol fills, create another color column and use it as the symbol fill colors. Typically, white is used for "hollow" symbols, and black for solid symbols.

3. Select the first cell in an empty column, then double-click the color, line, symbol, or fill pattern in the Insert Graphic Cells dialog box you want to place in the cell.

Σ Do not mix graphic cell types within the same column; for example, place colors in one column, symbols in a different column, fills in yet another column, and lines in a fourth column. However, you can use multiple columns to define several different increments of the same graphic cell type. For example, you can have several columns containing colors of differently ordered increments.

4. Continue adding to the column, in the order you want the curves to use the colors, lines, symbols, or patterns. The order of the curves is the order in which they appear in the Selected Columns list in the Graph Wizard. Click Close when finished.

5. View the page by clicking the toolbar button, or by choosing the page name from the Window menu. A check mark next to this command indicates that the page is active.

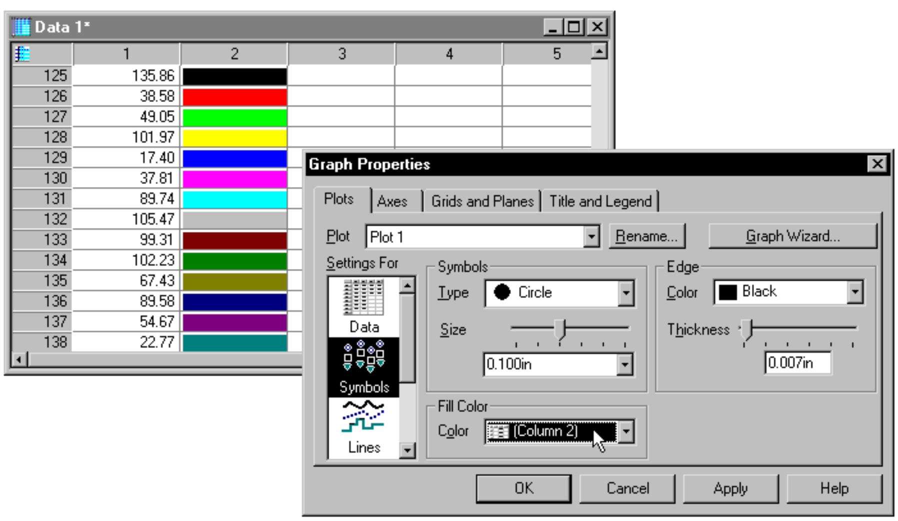
6. Double-click the plot to open the Graph Properties dialog box. If you double-clicked the plot, the dialog box should open directly to the desired panel. If not, select the option from the Settings For list.

   You can also select the plot, choose the Graph menu Graph Properties command, then select the desired option from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot to modify from the Plot list.

7. From the Symbols Type, Fills Foreground Pattern, or Lines Type lists, or any of the Color lists, choose the name of the column which contains the appropriate graphic cells.

Figure 7–40 Assigning Custom Symbol Colors in a Worksheet Column to a Plot



8. If you are applying a large number of colors or other property schemes, you may wish to turn off your automatic legend, which will attempt to display your first 25 different data points. Select the Titles and Legends tab, and clear the

Show Legend option.

9. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply then use the Plot list to modify different plots

Σ To set a custom color select Custom from the Color drop down list. To subsequently change it, right-click the Color control and choose Custom Color

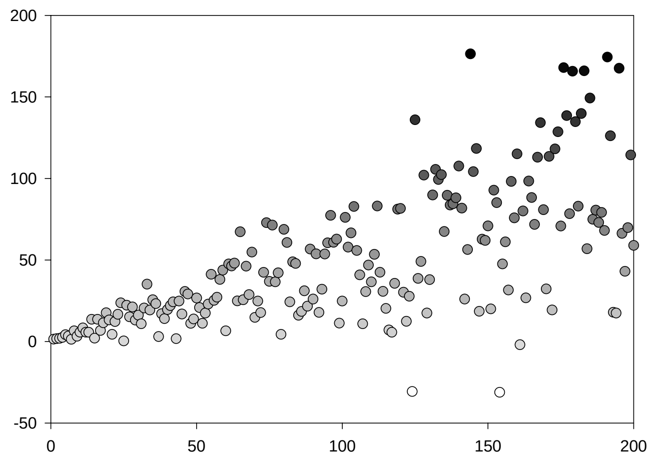


Figure 7–41
Example of Scatter Plot using Colors From a Worksheet Column

The RGBCOLOR.XFM transform was used to generate the smooth color gradient.

Entering Graphic Cells Manually

You can also add graphic cells to the worksheet by entering the code in the cell. If you want to enter symbols using codes, just enter the code for the symbol type in the cell. See "Color, Symbol, Line, and Fill Schemes and Codes" on page 335 for a list of all these codes.

Generating Color Gradients with a Transform

You can also use the RGBCOLOR transform function to add colors to worksheet cells and columns. The RGBCOLOR.XFM sample transform included with SigmaPlot demonstrates how to create a color gradient corresponding to a data points value. You can also use the RGB transform to transform a third or fourth variable to color and add another dimension to your graph. For more information on the use of this transform, see the *Programming Guide*.

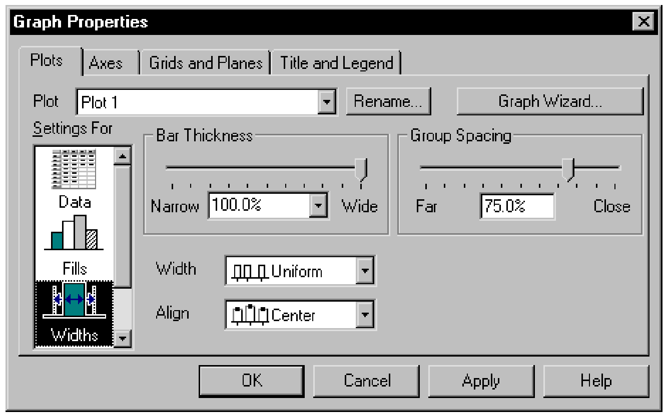
Changing Bar and Box Widths and Spacing

Control the amount of space between bars and boxes, and between grouped 2D bars by adjusting the percent of the maximum possible widths of both the individual bars and the bar groups.

To control bar and box width and spacing for bar charts and box plots:

1. Double-click the plot to modify, then select Widths from the Settings For list, or select the plot, then click the  properties toolbar button.

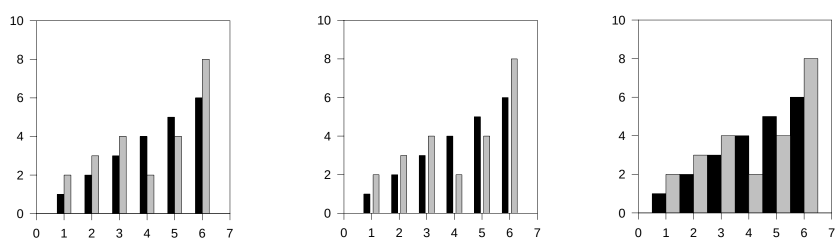
Figure 7–42
The Widths Settings of the Graph Properties Plots Panel



2. To change the width and spacing between bars for all bar charts and box plots, change the Bar Thickness option. The wider the bars or boxes, the less space between them. The narrower the bars or boxes, the more space between them.

3. To change the width and spacing between groups of 2D and 3D bars, change the Group Spacing options. This option is only available for grouped and 3D bar charts. SigmaPlot sets grouped bar widths and spacing to as wide or as narrow and as far or as close as possible given the corresponding spacing or width setting.

Figure 7–43
From left to right: bar charts with a group spacing of 50% and relative thickness of 100%, group spacing and relative thickness both set to 66%, and both settings set to 100%.



4. To set a constant width for all bars or boxes, select Uniform Widths from the Widths list. This is the default setting. If the bars are set to Uniform Width, the Bar Thickness setting has the same effect on all bars. For more information on using the Uniform and Variable width settings, see "Uniform versus Variable Bar Widths" on page 196.

5. To set potentially uneven widths for bars and boxes, select Variable Widths from

the Widths list. If the constant column values are uneven, the bars will vary in width according to the corresponding axis values. For more information on using the Uniform and Variable width settings, see "Uniform versus Variable Bar Widths" on page 196.

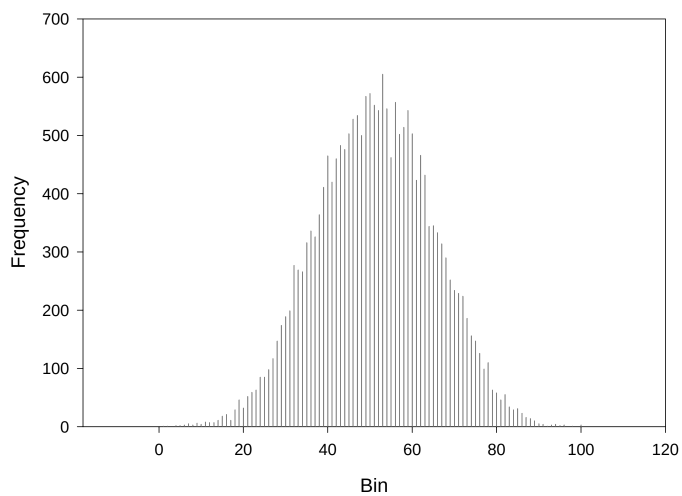
If the bars are set to Variable Width, the Bar Thickness option changes bar widths according to the percent of their total widths, so that wide bars are more affected than thin bars.

Σ Note that bars created with a single plot are never allowed to overlap. However, you can create bars using separate plots and overlap them; see "Spacing Bars from Different Plots" on page 250.

6. To create a needle plot, use the Bar Thickness slider to set bar widths to the narrowest possible widths.

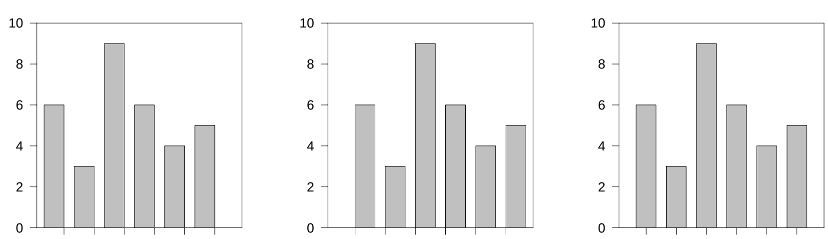
Figure 7–44
An Example of a Histogram Needle Plot

To make a needle plot, create a bar chart and set the Bar Thickness to Needle.



7. To change bar alignment, use the Align list. Choose either Center, Left, or Right. By default, bar chart bars are centered at the data point. Use the Align options to alternately draw the bars right aligned or left aligned with the data points.

Figure 7–45
From Left To Right: Bar Charts with Alignments to the Left of the X Points, to the Right of the X Points, and Centered over the X Data Points



8. Click Apply to apply changes without closing the dialog box, or click OK to apply changes and close the dialog box.

Uniform versus Variable Bar Widths

Uniform bar widths set all individual bars to the same width, using the width of the narrowest bar. If the values which the bars are plotted along are unevenly incremented, the bar widths still remain constant.

Variable bar widths set the widths to be as wide as possible, as determined by the Bar Thickness and Group Spacing settings. If the values which the bars are plotted along are evenly incremented, this option has no effect. However, if the values which the bars are plotted along are unevenly incremented, the bar widths will vary according to their corresponding values.

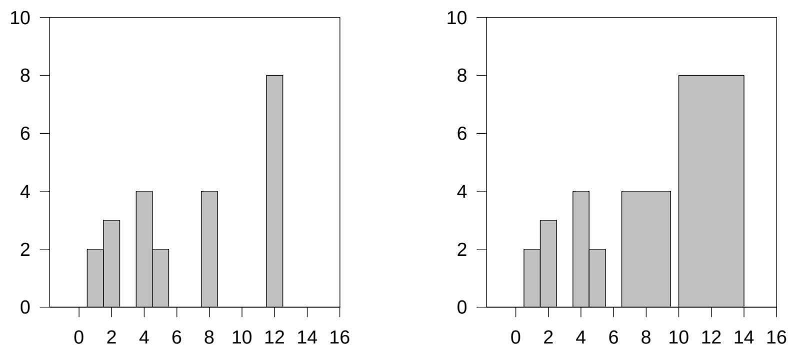


Figure 7–46
The bar chart on the left is set to a uniform width; the bar chart on the right uses a variable width.

Adding and Modifying Drop Lines

Drop lines can be used to produce dot plots and other types of graphs which connect data points to their axis values. You can add drop lines from plotted data points to either or both axes in a 2D scatter, line, or line/scatter plot, or to any or all back planes in a 3D scatter or trajectory plot. Drop lines are drawn for every curve in a plot.

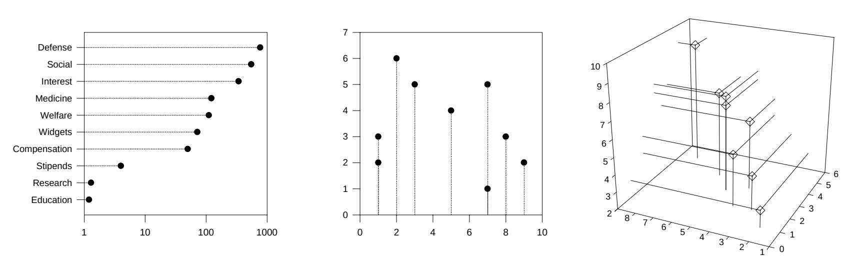


Figure 7–47
Graphs with Drop Lines

The graphs on the left are examples of 2D plots with drop lines to the Y and X axes. The graph on the right is an example of a 3D graph with drop lines to all axes.

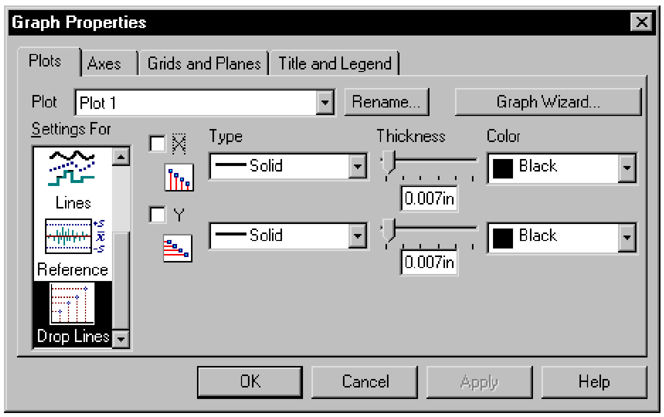
Drop lines always fall toward the minimum of a range; for example, if a Y axis range were reversed, a drop line to the X axis would fall to the top of the graph rather than the bottom.

Use the Drop Lines settings of the Graph Properties Plots panel to create new drop lines, and to modify existing drop line type, thickness, and color.

To add or modify drop lines for a selected plot:

1. Double-click the plot to modify, then select Drop Lines from the Settings For list. You can also select the plot, then click the Graph Properties toolbar button or choose the Graph menu Graph Properties command.

Figure 7–48 The Drop Lines Settings of the Graph Properties Dialog Box Plots Panel for a 2D Scatter Plot



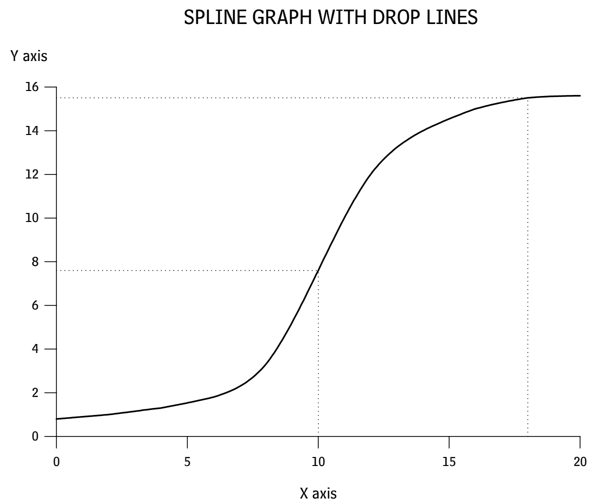
Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the drop lines to modify from the Plot list.

2. Check the plane (for 3D graphs) or axis (for 2D graphs) to add drop lines to by selecting the appropriate check box. Drop lines are added to any and all planes or axes that are selected. To turn off drop lines for a plane or axis, clear a checked box by selecting it.
3. Use each of the Type lists to specify the type of line to use for selected drop lines.
4. To adjust line thickness, use the Thickness slider controls, or select the appropriate Thickness edit box and type the new value.
5. Use the Color lists to set drop line color. Select any of the listed colors, or choose (custom) to select or define a custom color. To learn more, see “Using Custom Colors” on page 146.
6. Apply your changes and close the Graph Properties dialog box by clicking OK, or click Apply, then use the Plot list to modify different plots.

Drop Lines for a Single Point

Drop lines are useful for indicating the position of a single point in a curve. However, since drop lines are always drawn for every point in a plot, to show a single drop line, you need to create a second plot which graphs only the desired data point, then add drop lines to the single-point plot. If you don't want the symbol to show for the point, set the symbol type to (none).

Figure 7–49
Drop Lines Used to Indicate the Values of Points on a Graph



Modifying Axes and Grids

Axes are the scales or rulers along which data is plotted. An axis is always associated with at least one plot on a graph, and determines the scaling of the plot.

- 2D Cartesian graphs have an ***X axis*** (horizontal), and a ***Y axis*** (vertical).
- 3D graphs have X and Y axes forming the base of the graph, and a Z axis as the vertical axis.
- Polar plots use an angular axis drawing the circumference of the plot, and radial axes drawing the radius. For more information, see "Modifying Polar Axes" on page 361.
- Ternary graphs have X, Y, and Z axes arranged in a triangular shape. For more information, see "Modifying Ternary Axes" on page 374.

Each axis consists of pairs of lines that can be moved and modified independently. *Tick marks* are short lines along the axis that represent scale intervals. Tick marks can be displayed and modified for each axis. *Grid lines* are attached to the graph planes, and can be drawn at tick intervals for all axes. Most axis modifications are made using the Axes panel of the Graph Properties dialog box. This dialog box is described in "Working with Page Objects" on page 95.

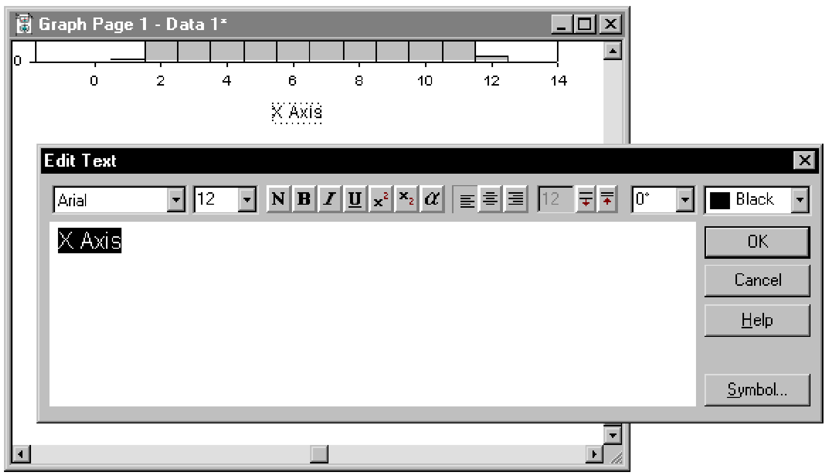
Working with Axis Titles and Tick Labels

SigmaPlot automatically labels graph axes with titles and tick labels. Axis titles can be modified like any other text label. Tick labels are automatically generated; for information on how to edit tick labels, see "Changing Tick Labels" on page 217.

Changing an Axis Title

To edit an axis title, double-click it on the page, and use the Edit Text dialog box to make your changes to the title.

Figure 7–50
Editing an Axis Title



For more information on how to use the Edit Text dialog, see "Working with Text on the Page" on page 133.

You can also rename an axis title from within Axis tab of the Graph Properties dialog box. Double-click the axis, then click Rename. The Edit Text dialog box opens.

Rotating Axis Titles

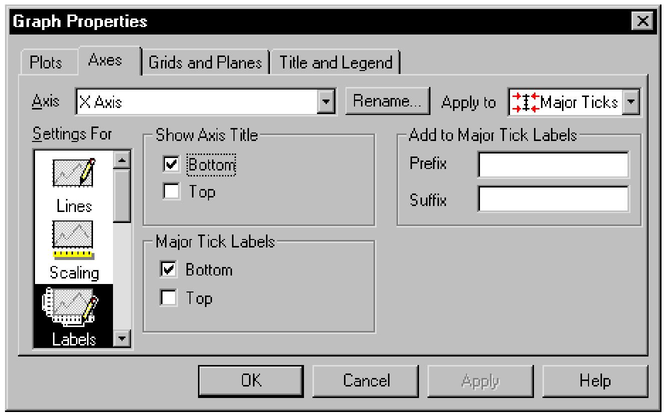
To rotate an axis title, open the Edit Text dialog box by double-clicking the title, then use the Rotation list to select a degree of rotation for the selected label.

Viewing and Hiding Axis Titles and Tick Labels

The easiest way to hide a graph title or label is by clicking on it and pressing delete. You can also use the Graph Properties dialog. To view or hide axis titles:

1. Access the Axes panel of the Graph Properties dialog box by double-clicking the desired axis, and select Labels from the Settings For list.

Figure 7–51 The Labels Settings of the Graph Properties Dialog Box Axis Panel



2. **To view or hide the axis title** , select or clear the appropriate check box in the Show Axis Title options.

   To view or hide Major Tick labels , select Major Ticks from the Apply to list, then check or clear the appropriate options from the Major Tick Labels check boxes.

   To view or hide Minor Tick labels , select Minor Ticks from the Apply to list, then check or clear the appropriate options from the Minor Tick Labels check boxes.

3. Click OK to apply your changes and to close the dialog, or Apply to apply your changes without closing the Graph Properties dialog.

Moving an Axis Title

You can move an axis title by dragging it with the mouse, just like any other text label, or by choosing the Format menu Size and Position command. To learn more about moving labels and other page objects, see “Using Your Mouse to Change Graph and Object Size” on page 126.

Σ Note that axis title position, relative to the axis, remains constant when the axis or graph is moved.

Changing Axis Range

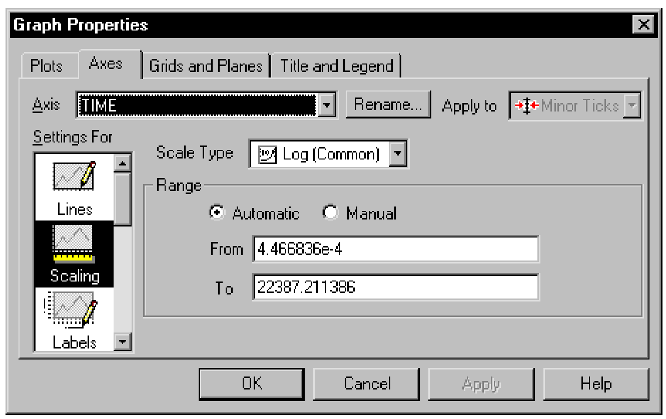
Axis range is the values of the starting and ending points of an axis. Choose to set axis range automatically or manually.

To change the axis range:

1. Select the axis to modify, then click the Axis Scale button on the Properties toolbar.

   You can also double-click the axis, then select Scaling options from the Settings For list.

Figure 7–52
The Scaling Options Available on the Axes Panel of the Graph Properties Dialog Box



2. **To automatically set the axis range,** select Automatic. SigmaPlot automatically determines the axis range based on the data plotted.

3. **To manually set the axis range,** select Manual then type beginning and ending axis range values in the From and To edit boxes.

   Note that Date/Time axes display the ranges in date and time units.

4. Apply axis range settings by clicking Apply, or apply changes and close the dialog box by clicking OK.

Changing Axis Scales

You can control the axis units and increments used in representing your data. Axis scale and range are modified with the Scaling settings of the Graph Properties dialog box Axes panel.

You can also use transforms and tick labels and intervals from worksheet columns to create your own custom axis scales; see “Using a Custom Axis Scale” on page 208.

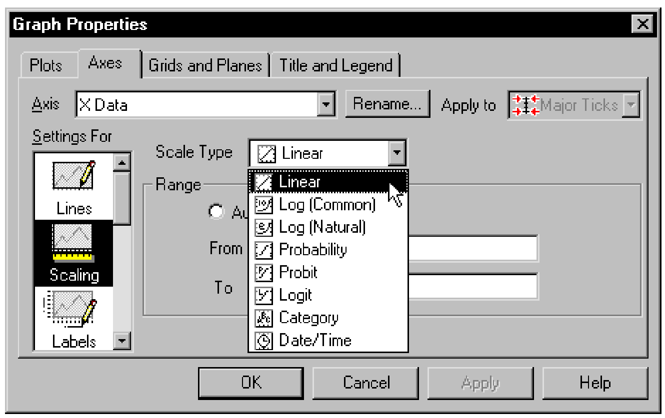
Changing Scale Type

To change an axis scale:

1. Select the axis to modify, then click the Axis Scale button on the Properties toolbar.

   You can also double-click the axis, then select Scaling options from the Settings For list.

Figure 7–53 Using the Scale Type list from the Axes Panel of the Graph Properties Dialog Box



2. From the Scale Type list, select the desired axis scale type. The default axis scale is Linear for all numeric data, Category for text data, and Date/Time for date and time data.
3. Apply the new scale type to the selected axis by highlighting your choice and clicking OK. The selected axis appears using the new scale type.

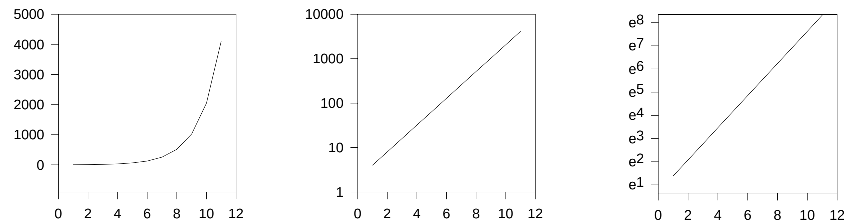
Axis Scale Types

Linear: A standard base 10 numeric scale. (This scale is recommended for a date axis when an exact representation of spacing depicted by dates is not required. Otherwise, use the date/time scale.)

Common Log: A base 10 logarithmic scale.

Natural Log: A base e logarithmic scale.

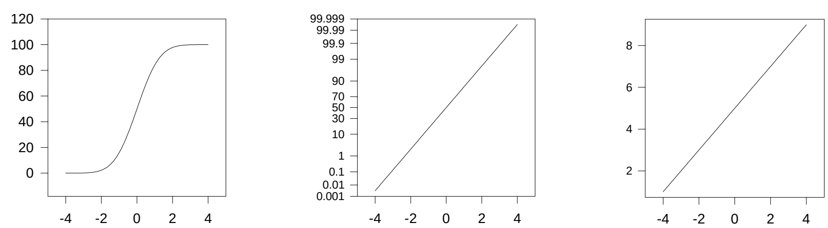
Figure 7–54
Graphs of the Same Data Using Linear, Common Log, and Natural Log Scales



Probability: The inverse of the Gaussian cumulative distribution function. The graph of the sigmoidally shaped Gaussian cumulative distribution function on a probability scale is a straight line. Probabilities are expressed as percentages with the minimum range set at 0.001 and the maximum range value set at 99.999. The default range depends on the range of the actual data.

Probit: A scale similar to the probability scale; the Gaussian cumulative distribution function plots as a straight line on a probit scale. The scale is linear, however, with major tick marks at each Normal Equivalent Deviation (N.E.D. = X $-\mu)/\sigma)$ plus 5.0. At the mean (X = μ) the probit = 5.0; at the mean plus one standard deviation (X = $\mu + \sigma$) the probit = 6.0, etc. The default range is from 3 to 7. The range limit for a probit axis scale is 1 to 9.

Figure 7–55
Graphs of the Same Data Using Linear, Probability, and Probit Scales



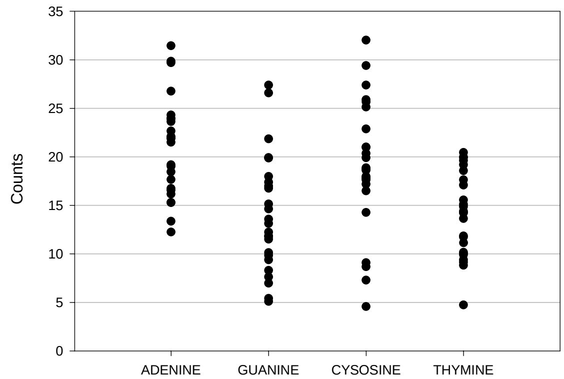
Logit: Uses the transformation

$$\lambda o\gamma it \; = \; \lambda\nu\left(\frac{y}{a-y}\right)$$

where a = 100 and $0 \leq y \leq 100$. The default range is 7 to 97. Like the probability and probit scales, the logit scale “straightens” a sigmoidal curve.

Category: A scale which uses numerical values or text from a worksheet column used to generate a plot. Each distinct entry in the column is a separate *category* against which the corresponding data values are plotted. This scale is commonly used for bar charts or other plots used to graph different categories of data.

Figure 7–56
A Graph Showing the Category Scale



Any plot generated by plotting a column containing any text versus a column containing data will use a category axis automatically. For more information on plotting data versus categories, see “Using a Category Scale” on page 206.

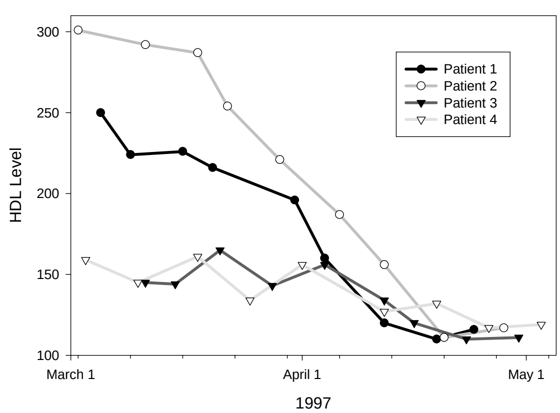
You can select a category scale for numeric data, and each unique value will be treated as its own category.

Σ If a column contains more than one instance of the same category, the category appears only once, and all corresponding data is plotted within that category.

Date/Time: Date and time formatted data are automatically plotted using a Date/Time axis scale. This scale is specifically designed to handle true calendar date and time units, labeling and spacing.

Figure 7–57
A Graph Showing the Date/Time Scale

Minor ticks are set to show every Sunday in the month.



➤ For directions on plotting date and time data, see “Using a Date and Time Scale” on page 207.
➤ For directions on changing date and time labels, see “Changing Date and Time Tick Labels” on page 221.
➤ For directions on changing data and time intervals, see “Tick Intervals for Date/Time Axes” on page 213.

Although you can plot numeric data as date and time, you should first view these numbers as dates and times in the worksheet to make sure they are sensible values.

For more information on displaying numbers as dates or times, see “Switching Between Date and Time and Numeric Display” on page 74.

Note that if a worksheet cell is a label, it won’t be plotted as a date and time value. In this case, you may want to reenter the label as a date and time value; see “Entering Dates and Times” on page 59.

Using a Category Scale

Use the category scale type by plotting a column containing categories against other columns of data values.

To plot a column of text as categories:

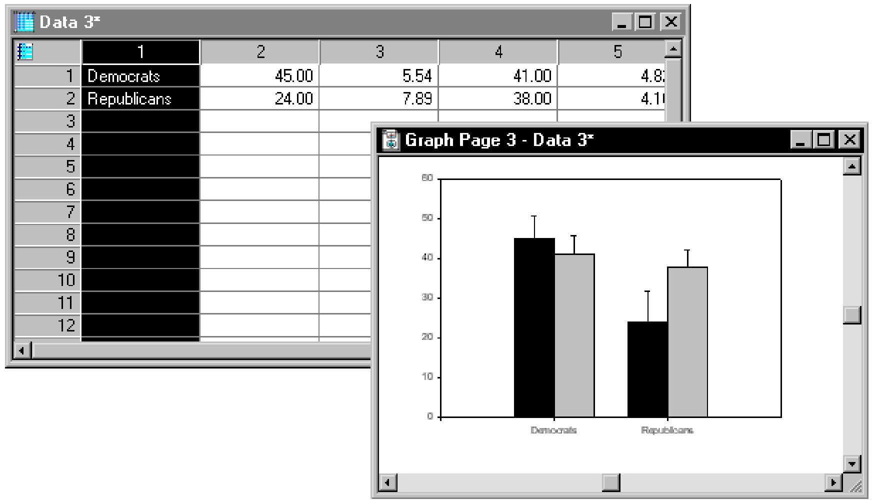
1. Enter your category data (text) into a worksheet column, and your corresponding data into other worksheet columns.

   If you want to select worksheet data before creating the graph, select the worksheet columns to plot before creating your graph by dragging the pointer over both the category and data columns. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

2. Create the graph using the graph toolbar or the Graph Wizard. If you did not already select your data from the worksheet, click the worksheet columns to assign them to the highlighted option in the Selected Columns list.

Plot your category column as the category axis data type, and pick your other column(s) as the corresponding data type. Click Finish to create the graph.

Figure 7–58
Plotting Category Data Using a Category Scale



Using a Date and Time Scale

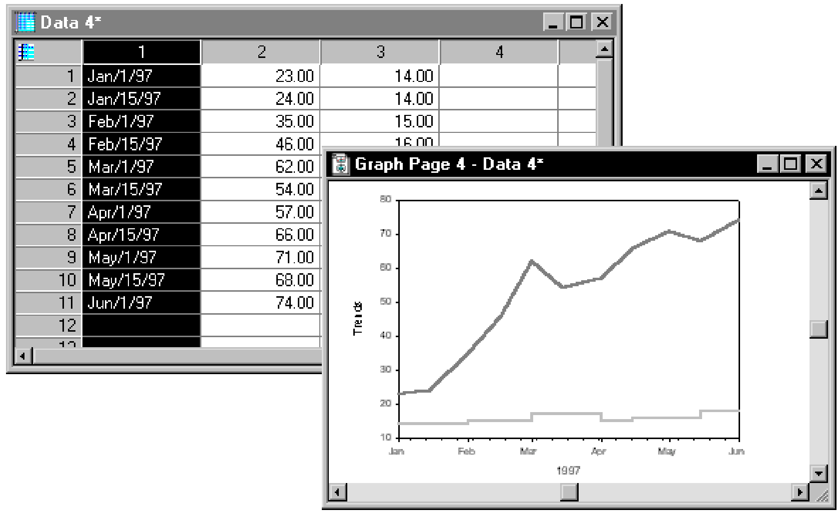
SigmaPlot graphs date and time data from worksheet columns as specific calendar dates and times against which corresponding data values in other columns are plotted.

To create a plot using a date/time scale:

1. Enter dates or times into a column of a worksheet. For example, enter 1/1, 2/1, 3/1, etc., indicating months and days. For more information on entering date and time data, see “Entering Dates and Times” on page 59.

2. Enter corresponding data into a separate worksheet column or columns.

Figure 7–59
A Worksheet With Dates in Column 1



If you want to select worksheet data before creating the graph, select the worksheet columns to plot before creating your graph by dragging the pointer over both the category and data columns. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

3. Create the graph using the graph toolbar or the Graph Wizard. If you did not already select your data from the worksheet, click the worksheet columns to assign them to the highlighted option in the Selected Columns list.

4. Plot your date and time column as the date/time axis, and pick your other column(s) as the corresponding axis. Click Finish to create the graph.

Using a Custom Axis Scale

Use the transform language to transform your data for a new axis scale, then use tick intervals from a column to the place correct ticks marks and labels.

For example, to use an Extreme Value Distribution scale, apply the transform:

f(y)=ln(ln(100/(100-y)))

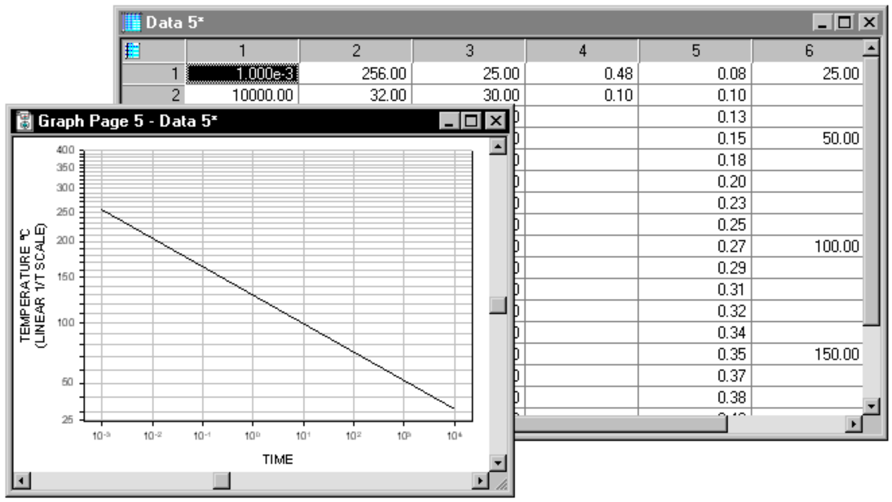
and for the Arrhenius scale, use the transform:

f(y)=1-273/(T+273)

Apply the transform to both your original interval values and data, then plot the transformed data using the transformed intervals as the tick mark values, and the original interval data as tick labels.

Figure 7–60
A Graph Using the Arrhenius Scale

You can skip labeling tick intervals by using empty cells in the tick label column.



For more information on using tick intervals from a column, see page 215. For more information on using tick labels from a column, see page 223.

For an example of an Extreme Value Distribution axis scale, refer to the *Programming Guide*

Changing Tick Mark Intervals

Use the Graph Properties dialog box to modify tick intervals. For information on changing tick marks for polar plots, see “Working with Axis Titles and Tick Labels” on page 200. For information on changing tick marks for ternary graphs, see “Changing Ternary Axis Tick Marks and Tick Labels” on page 381.

Σ The Tick Intervals options vary depending upon the axis scale used. There are no tick interval options for category axes.

Changing Linear and Probit Scale Tick Mark Intervals

To change the tick intervals for linear and probit axis scales:

1. Double-click the tick marks you want to change. The Graph Properties dialog box will open to the Axes panel, Ticks options.

You can also double-click an axis, then select the Ticks option from the Settings For list.

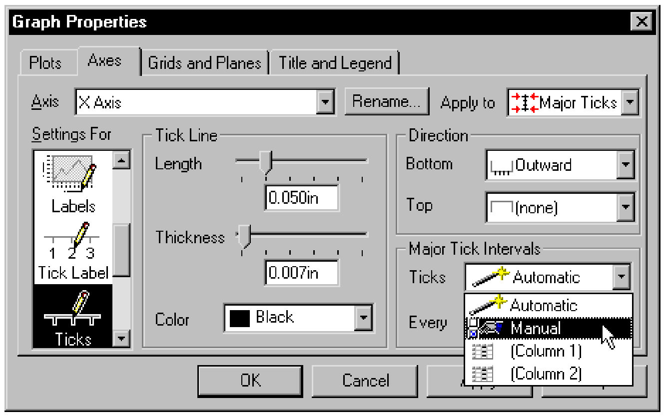


Figure 7–61 The Axes Major Tick Intervals Options for a Linear Axis

2. To change tick intervals, use either the Major or Minor Tick Interval options, depending on what you have selected in the Apply To list.

   Use the Axis list to modify tick marks on a different axis, or use the Apply To list to switch to modifying major or minor tick marks.

3. If you are modifying major ticks, use the Major Ticks Intervals list to choose an interval. Choose Automatic to have SigmaPlot automatically determine the interval to use, or choose Manual, to manually set major tick mark intervals.

4. If you select Manual, enter interval values by selecting the Every and From edit boxes and typing new values. The value in the Every edit box specifies how often major tick marks appear, and the From value specifies where on the axes major tick marks begin appearing.

   Custom Tick Intervals: The Major Tick Intervals list also enables you to choose major tick interval values from the worksheet. For more information on how to specify custom tick intervals, see “Custom Tick Intervals” on page 215.

5. If you are modifying minor ticks, select an interval from the Minor Tick Intervals list, or enter your own. Custom tick intervals are not available for minor ticks.

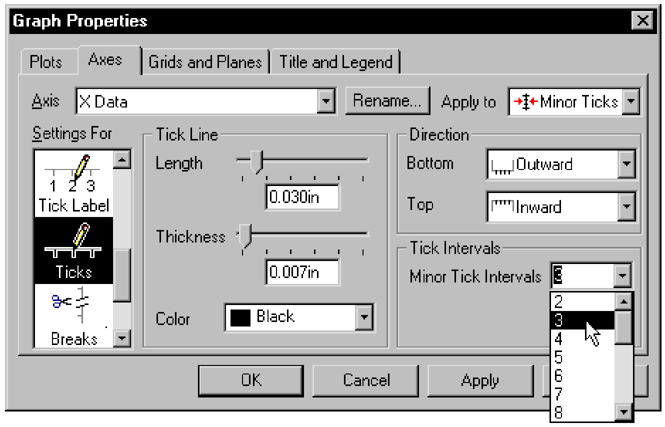


Figure 7–62
The Axes Minor Tick Intervals Options for a Linear Axis

6. Click Apply to keep the dialog box open, or click OK to apply your changes and close the dialog box.

Tick Intervals for Log Axes

Log axis major tick marks can only be specified automatically or from a column. However, you can select specific intervals for log scale minor ticks.

To change log scale minor tick intervals:

1. If necessary, change the axis scale to a log axis. For directions on changing axis scales, see “Changing Axis Scales” on page 203.

2. Double-click the tick marks you want to change. The Graph Properties dialog box will open to the Axes panel, Ticks options.

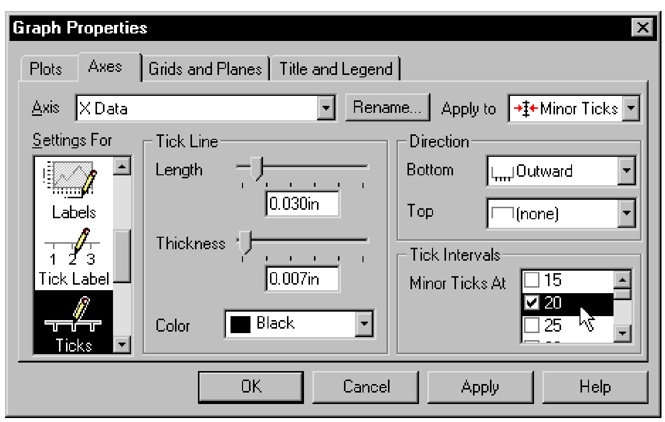
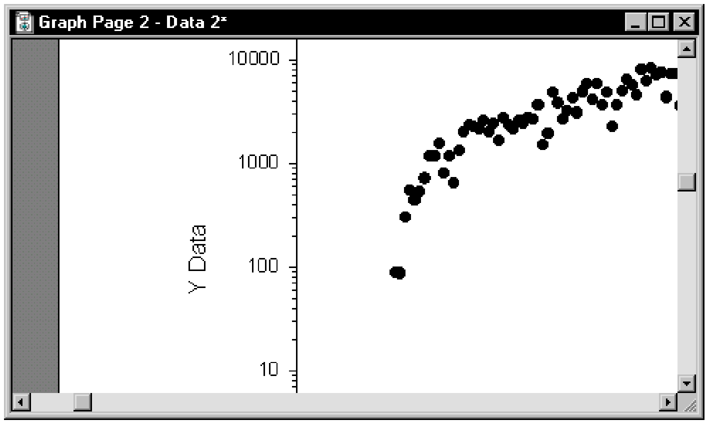


Figure 7–63
The Axes Minor Tick Intervals Options for a Log Axis

3. Use the Apply to list to switch to Minor Ticks. Check all minor tick intervals you want to appear, and clear those you want hidden.

Figure 7–64
A View of a Graph with Log Y Axis Minor Ticks

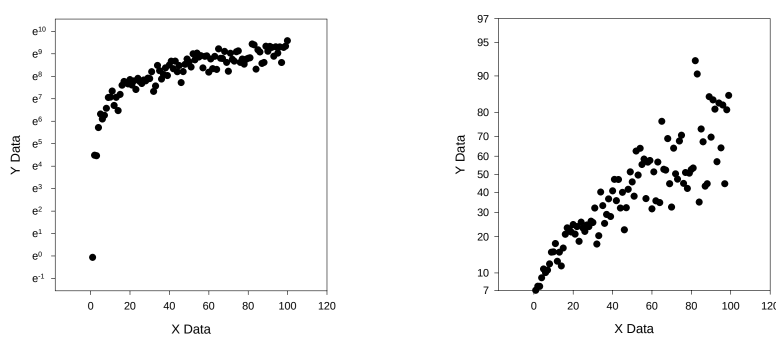


Natural Log and Logit Scales

Natural log and logit scales have only Automatic and from column Tick Intervals options. No minor tick marks are available for these axes, so the Apply to option is dimmed.

Natural log intervals occur at every factor of *e*. Logit ticks occur at 7, 10, then every ten until 90, then 95 and 97.

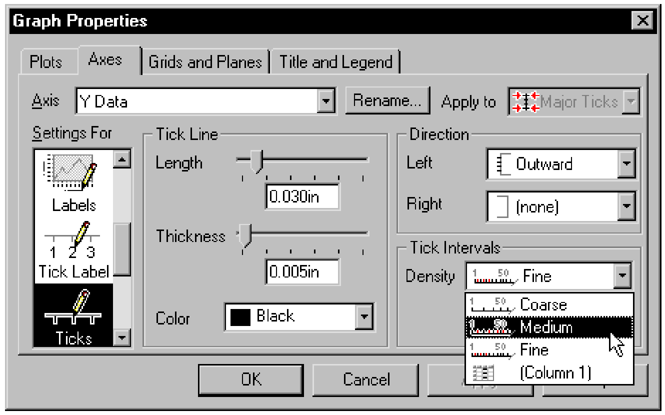
Figure 7–65
Tick Intervals for Natural Log and Logit Scales



Tick Intervals for Probability Scales

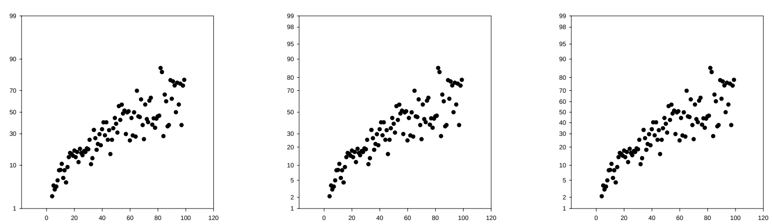
Probability scale axes have no minor ticks, but have three different settings for major tick intervals, coarse, medium, and fine, as well as the option to set tick intervals from a worksheet column.

Figure 7–66
The Axes Tick Intervals Options for a Probability Axis



To specify the tick mark density, double-click the tick marks, then change the Density setting to the desired value.

Figure 7–67
Coarse, Medium and Fine Tick Intervals for Probability Scales



Tick Intervals for Date/Time Axes

SigmaPlot automatically sets both major and minor tick intervals that are computed from the data range. You can also manually set Major Ticks and Minor Ticks.

To set tick intervals for a date/time axis:

1. Double-click the tick marks you want to change. The Graph Properties dialog box will open to the Axes panel, Ticks options.
2. Select a tick interval type. Tick intervals are defined by the unit Type used and the Count selected. Dates fall at 12:00 AM of the first day for that period.

   The major tick interval options available are limited by the data range. You are prevented from selecting time units that would create too many tick marks.
3. If desired, change the Count option to increase the period between tick occurrences. For example, you could set ticks to occur every other Type date by changing the Count to 2, or every fifth by changing the count to 5.

Counts must be positive integers.

4. To set minor tick intervals, use the Apply to list to switch to Minor Ticks.
5. Select the minor tick Type and Count. Any time unit equal to or smaller than the Major interval type can be used as the Minor interval type.

Σ Take care that you do not select a minor interval that creates hundreds or even many thousands of minor tick marks.

Changing Tick Mark Appearance

Use the Graph Properties dialog box to modify tick appearance including tick length and color. You can also specify tick mark direction, or hide tick marks altogether.

For information on changing tick marks for polar plots, see “Working with Axis Titles and Tick Labels” on page 200.

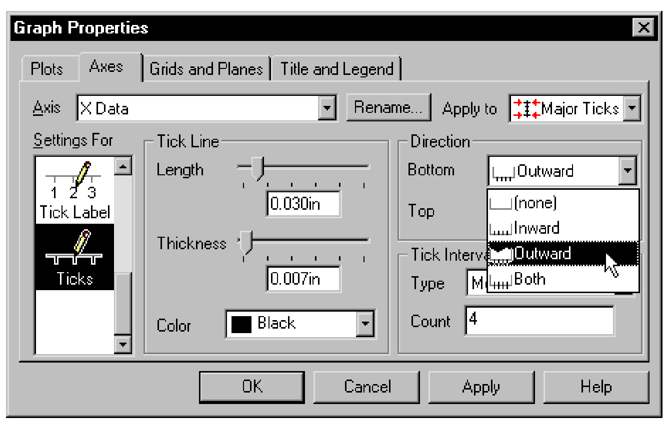
For information on changing tick marks for ternary graphs, see “Changing Ternary Axis Tick Marks and Tick Labels” on page 381.

Tick Mark Direction

To turn tick drawing on and off and to select tick directions for both sides of an axis:

1. Double-click the tick marks you want to change. The Graph Properties dialog box will open to the Axes panel, Ticks options.

Figure 7–68 The Axes Tick Direction Options



2. Select an option from the Direction list for either axis. You can:
   - ➤ Select Outward, to point tick marks away from the graph.
   - ➤ Select Inward to point tick marks toward the inside of the graph.
   - ➤ Select Both to point tick marks in both directions.
   - ➤ Select (none) to hide tick marks.

Directions for tick marks are independent for either side of the axis.

Hiding Tick Marks

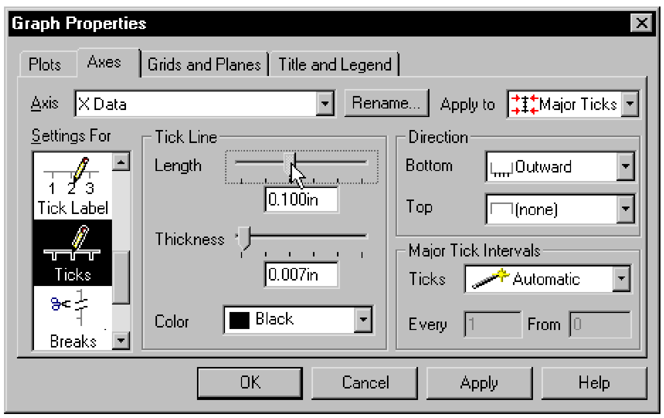
To simply hide tick marks, click the tick marks on the page and press Delete, or right-click and select Hide from the shortcut menu.

Changing Tick Mark Line Attributes

To change tick mark length, color, and thickness:

1. Double-click the tick marks you want to change. The Graph Properties dialog box will open to the Axes panel, Ticks options.

Figure 7–69 The Ticks Settings of the Graph Properties Dialog Box Axes Panel



2. Use the Apply To list to modify either Major Ticks or Minor Ticks.
3. To change tick length and thickness, use the Tick Line options Length and Thickness slider controls. Move the slider control by dragging it with the mouse or by clicking the scale, or set the tick length and thickness to specific values by selecting the Length and Thickness edit boxes and typing a value.
4. To change tick color, use the Tick Line options Color list. Choose from any of the listed colors, or select (custom) to use a pre-defined custom color or create your own color. Choose (none) to create transparent tick marks.

   For more information on using custom colors, see “Using Custom Colors” on page 146.

Custom Tick Intervals

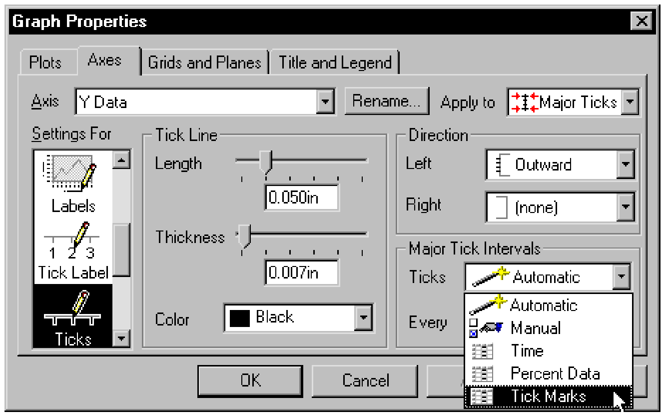
You can specify major tick locations by entering major tick values into a worksheet column, then selecting that column from the Graph Properties dialog.

Custom tick intervals are not available for minor ticks.

To specify tick intervals:

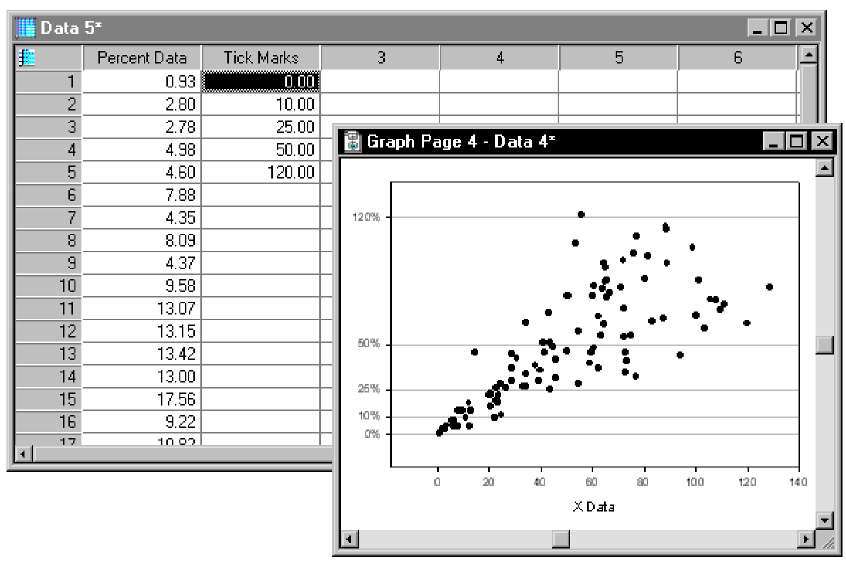
1. Enter the desired tick marks into an empty worksheet column, then double-click the tick marks you want to change. The Graph Properties dialog box will open to the Axes panel, Ticks options.

Figure 7–70 Selecting a Column for Tick Label Intervals



2. Select the Major Tick Intervals Ticks option, and select the column number or title of the column you want to use for major tick marks. Click Apply or click OK to apply the settings and close the dialog.

Figure 7–71 A Graph with Custom Tick Intervals from Column 3



Σ Note that the numeric values of the intervals are automatically used for tick labels, and that you can modify them like any other tick labels.

Changing Tick Labels

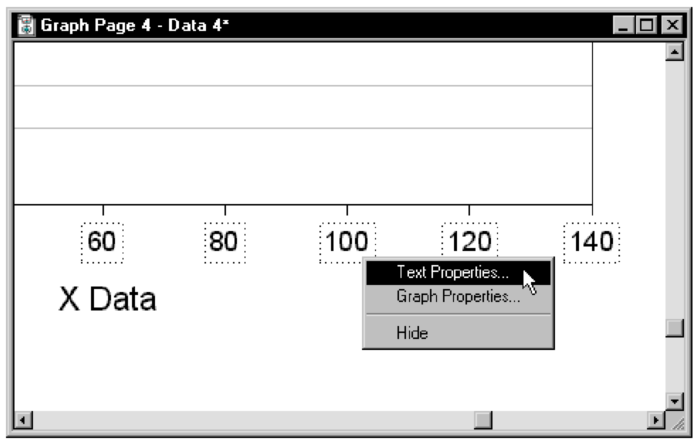
SigmaPlot can display tick labels in a variety of ways: for both major and minor tick marks, standard numeric labels, time and series labels, or values and text from a worksheet column. You can also add a suffix or prefix to all major or minor tick labels on a selected axis, and modify the calculation and precision of numeric labels, view different dates and times, select among many different series labels, and change the font and other text attributes.

Changing Tick Label Font and Other Text Attributes

To change the font size, style, or color of tick labels:

1. Right-click the tick labels, then choose Text Properties. You can also double-click the axis, select the Tick Label option from the Settings For list, then click the Font button.

Figure 7–72
Selecting a Column for Tick Label Intervals



2. Make your desired font changes. Change text attributes for tick labels the same way you would for any text label.

   You can also use the Rotation option in the Paragraph panel, but no other Paragraph settings are applied to tick labels.

   To learn more about using the Text Properties dialog, see “Formatting Text” on page 137.

Viewing and Hiding Tick Labels

You can hide tick labels by selecting the labels and pressing Delete, or right-clicking the labels and choosing Hide.

You can also hide and show tick labels from the Graph Properties dialog:

1. Double-click the axis, then select the Labels option from the Settings For list.
2. If necessary, select either Minor Ticks or Major Ticks from the Apply To list.

3. Use the Minor Tick Labels or Major Tick Labels options to display or hide tick labels for the current axis. A check indicates that the tick labels are shown.

Changing Tick Label Type

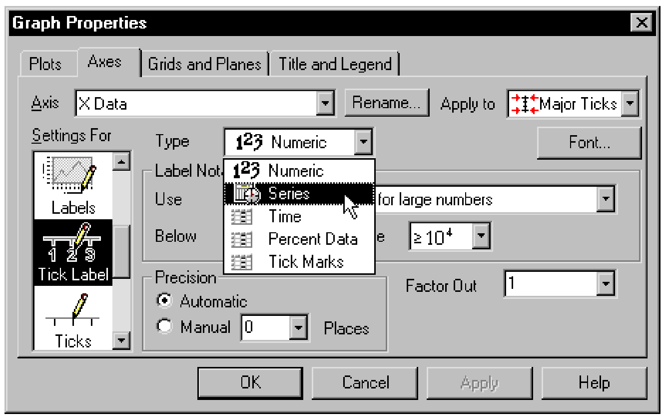
You can change the type of tick label used for all axis types except for category axes.

For date/time tick labels, see "Changing Date and Time Tick Labels" on page 221.

To change all other tick label types for all other axes:

1. Double-click the tick labels you want to change. You can also double-click the axis, and select Tick Labels from the Settings For list.

Figure 7–73 Changing the Tick Label Type



2. If necessary, use the Apply To list to select to either Major Ticks or Minor Ticks.
3. **To use a numeric type of tick label,** select Numeric from the Type list, then use the Label Notation options
4. **To use a series type of tick label,** select Series from the Type list.

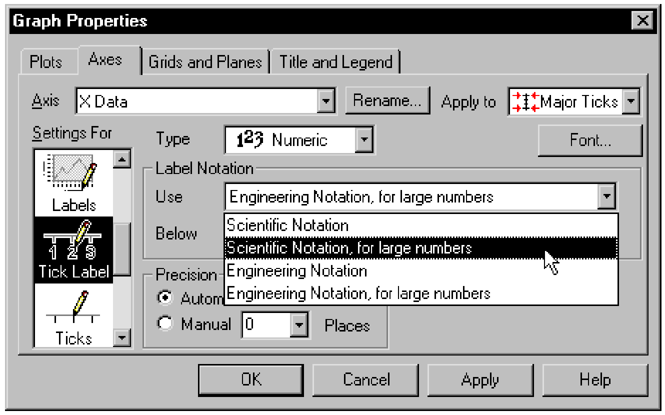
   Note that if you want to plot data versus true calendar dates, you should have entered date and time data in the worksheet, and use a date/time axis scale.

Formatting Numeric Tick Labels

To format numeric tick labels:

1. Double-click the tick labels of the axis you want to change. The settings for Tick Labels appear in the Graph Properties dialog box.
2. Use the Apply To list to select to modify either Major Ticks or Minor Ticks.

Figure 7–74
Selecting Numeric Tick Label Notation

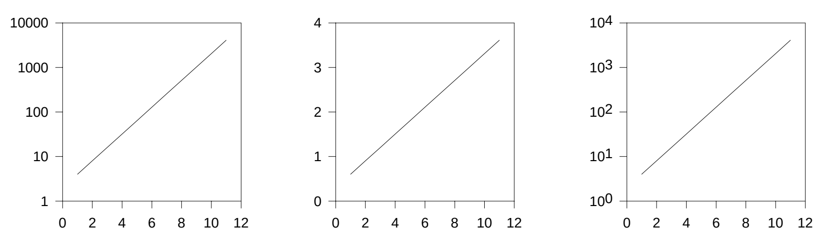


3. Use list to specify which type of numeric display to use. Choose from:
   - ➤ Scientific Notation
   - ➤ Scientific Notation, for large numbers
   - ➤ Engineering Notation
   - ➤ Engineering Notation, for large numbers

   Scientific Notation and ***Engineering Notation*** use scientific notation or engineering notation to display numbers. ***Scientific Notation*** or ***Engineering Notation for large numbers*** use scientific or engineering notation only when numbers exceed a specified range. Use the Below and Above lists to specify the range beyond which scientific notation or engineering notation is used.

   For ***log axes***, you can select to display number, only the Exponent, or both the Base and Exponent.

Figure 7–75
Log Scale Y Axes Using Numbers, Exponent Only, and Base and Exponent



For ***linear axes***, you can Always Use Scientific Notation, or use it only When Needed for large numbers. To specify when scientific notation is needed, enter the Lower and Upper ranges in the boxes, expressed in log units.

4. To divide numeric tick label values by a specific number, enter a divisor in the Factor Out box. A value of 2 divides label values in half, a factor of 0.5 doubles the tick label values, etc.

5. Use the Precision options to specify the number of places used to display numeric tick labels. Select Automatic to let SigmaPlot automatically determine precision, or select Manual, then select the number of decimal places to use from the Places list.

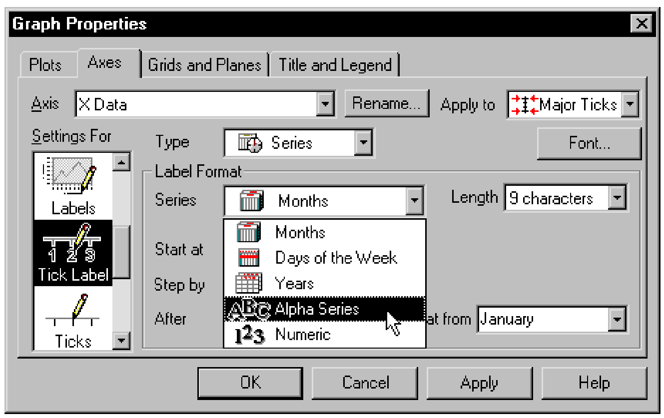
Formatting Series Tick Labels

To format series tick labels:

1. Double-click the tick labels of the axis you want to change. The settings for Tick Labels appear in the Graph Properties dialog.

2. Use the Apply To list to select to modify either Major Ticks or Minor Ticks.

Figure 7–76
Selecting Series Tick Label Format



3. Select the Label format Series list to specify the kind of series to use.

4. Use the Length list to set the number of characters to use for the tick label.

5. Use the Start At list to specify which series item to begin labeling tick marks with, then use the Step By list to set the frequency, or increment, of series items to use.

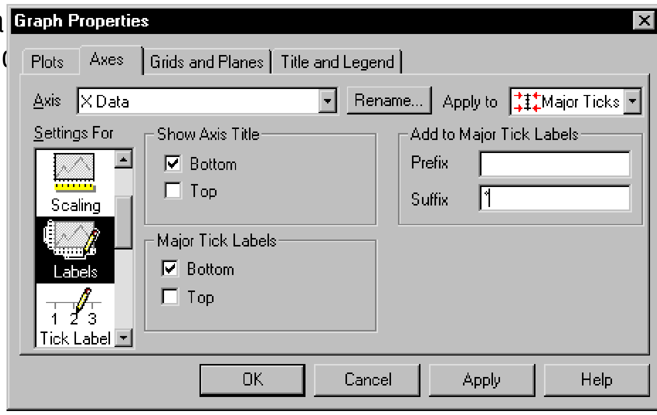
   For example, if you are using a Days of the Week series, you might choose to start with Monday, and to step labeling by 2 days at a time. Tick labels appear as Monday, Wednesday, Friday, Sunday, Tuesday , etc.

6. Use the After and Repeat From lists to re-start tick labeling from a specified point.

   For example, if you were using a Days of the Week series, and were stepping by 2 days at a time, you might use the After and Repeat From lists to specify that after Friday, repeat the series from Monday. Tick labels appear as Monday, Wednesday, Friday, Monday, Wednesday, Friday, etc.

7. Click Apply to keep the dialog box open, or click OK to apply your changes and to close the dialog box.

Figure 7–77
Entering a Suffix for Major Tick Labels



a … **ck labels on a selected axis:**

Tic … l select the Labels option from the

… r Major Ticks or Minor Ticks.

3. To add a prefix or suffix to the major or minor tick labels, type the prefix or suffix into the appropriate Add to Tick Labels box. All labels on the selected axis appear with the specified suffix or prefix.

   You can use any keyboard or extended characters. Use the Windows Character map accessory program, or Alt+Numeric keypad combinations to enter extended characters like degrees symbols (Alt+0176).

4. Click Apply to keep the dialog box open, or OK to apply the changes and close the dialog box.

Changing Date and Time Tick Labels

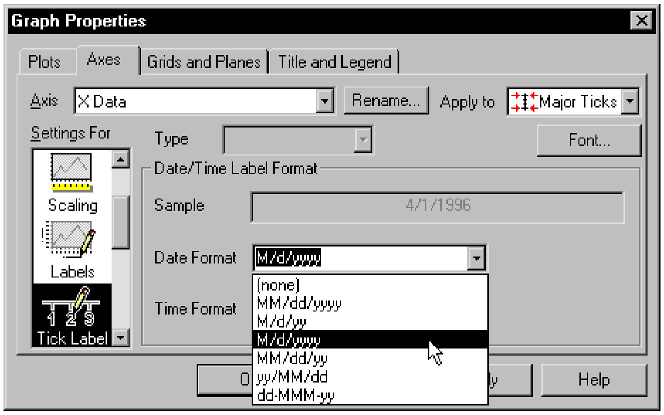
To change the format of date/time tick labels, use the Graph Properties panel. Entering values in these boxes is similar to entering date/time values in the worksheet.

To change date and time tick label format:

1. Double-click the tick labels of the axis you want to change. The settings for Tick Labels appear in the Graph Properties dialog box.

2. Use the Apply To list to modify either Major Ticks or Minor Ticks.

Figure 7–78 Changing Date/Time Tick Labels



3. To change the display Date format, select a format from the list, or use the following table to enter a new label, using any additional characters as delimiters (e.g., slashes, commas, spaces, etc.). As you enter a different format, the Sample window shows an example of the label.

Typing:	**Displays:**
M/d/yy	No leading 0 for single digit month, day or year
MM/dd/yy	Leading 0 for single digit month, day or year
MMMM	Complete month
dddd	Complete day
yyy or yyyy	Complete year
MMM	Three-letter month
ddd	Three-letter day
gg	Era (AD or BC)

4. To change the display Time format, select a format from the list, or use the following table to enter a new label, using any additional characters as delimiters (e.g., colons, spaces, etc.). As you enter a different format, the Sample window shows an example of the label.

Typing:	**Displays:**
hh or h	12 hour clock
HH or H	Military hours
mm or m	Minutes
ss or s	Seconds
uu or u	Milliseconds
H: h: m: s: or u	No leading zeroes for single digits
HH: hh: mm: ss: uu	Leading zero for single digits
tt	Double letter AM or PM
t	Single letter AM or PM

5. Click Apply to keep the dialog box open, or OK to apply the changes and close the dialog box.

Using Custom Tick Labels

You can enter text and numbers into worksheet columns and use them as major tick labels.

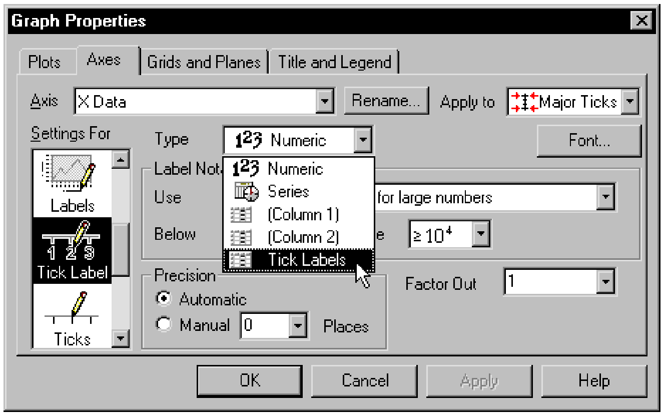
1. Enter the labels you want to use in a worksheet column, in the order you want them to appear. If you want to have minor labels, enter them in the right adjacent column.

   You can skip specific labels by leaving an empty cell for that tick mark when entering the labels into the worksheet column.

2. Open the Graph Properties dialog box to the Axes panel Tick Label settings by double-clicking the axis tick labels you want to modify.

3. Select the column used for major labels from the Type list. Labels for minor contours are automatically taken from the column to the right of the major tick labels.

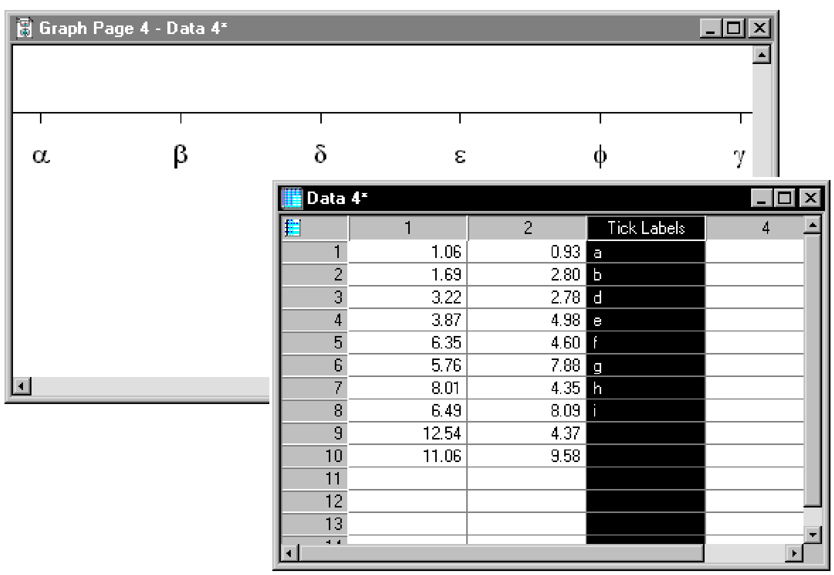
Figure 7–79 Selecting a Columns as the Source for the Tick Labels



4. If you want to change the font used for the tick labels, click the Font button. You can use the Symbols font for Greek characters, and the Wingdings and other symbol fonts for iconic labels.

5. Click OK to apply changes and close the dialog box, or click Apply to apply changes without closing the dialog box.

Figure 7–80 Tick Labels from a Column using the Symbol Font



Hiding, Displaying, and Deleting Axes

Hiding and Displaying Axes

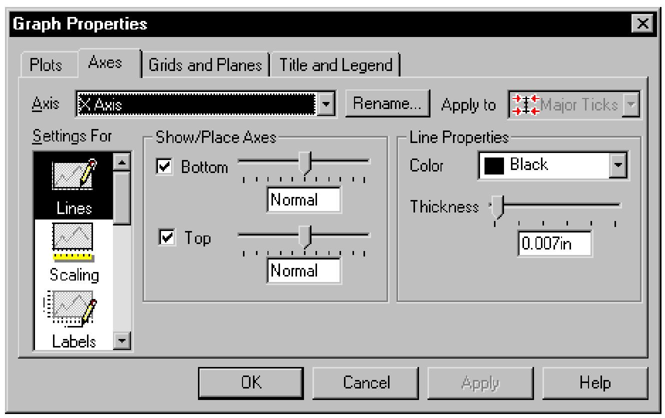
Control the display of axes using the Lines settings of the Graph Properties dialog box Axes panel.

The easiest way to hide an axis is to select it, then press Delete. The axis is hidden rather than deleted. You can also hide an axis by right-clicking the axis, then choosing Hide.

To view, hide or modify the display of an axis:

1. Double-click the axis (you can double-click hidden axes as well). The Graph Properties dialog box opens to the Axes Lines options.

Figure 7–81
The Lines Settings of the Graph Properties Dialog Box Axes Panel



2. Use the Show/Place Axes check boxes to control the display of axes in your graph. Check an axis to display that axis, or clear an axis to hide it. Hidden axes hide all ticks and labels associated with that axis.

3. Click Apply to apply your changes without closing the dialog box, or OK to apply your changes and close the dialog box.

Σ 3D axes can be hidden, but if frame lines are active, or if the graph has grid lines, a line will remain present. To learn about working with frame lines, see “Frame Lines for a 3D Graph” on page 296. For more information on grid lines, see “Displaying Grid Lines and Backplanes” on page 230 .

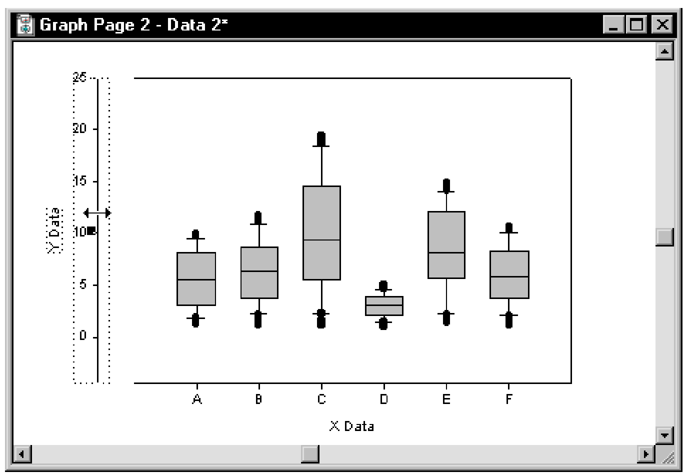
Moving Axes

2D axes can be moved with your mouse, or to a precise location with the Graph properties dialog box. 3D axes cannot be moved, but they can be hidden from view. For information on hiding 3D axes, see "Hiding, Displaying, and Deleting Axes" on page 225.

Moving 2D Axes Manually

To move a 2D axis with the mouse, select the axis and drag it to a new position. Y axes move only horizontally and X axes only vertically. Moving ternary graph axes changes the axis range and scale, along with the size and shape of the graph. Axis titles move with the axis.

Figure 7–82 Moving an Axis by Dragging

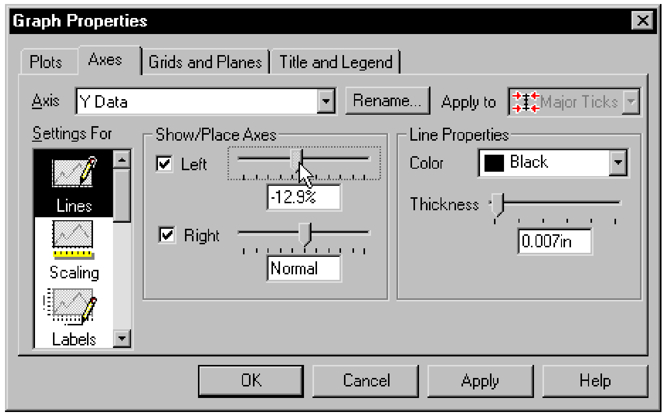


Moving Axes to a Precise Location

Use the Lines settings in the Graph Properties dialog box Axes panel to position axes a precise distance from the graph origin. (For ternary plots see "Modifying Ternary Axes" on page 374.)

1. Double-click the axis you want to move. The Graph Properties dialog box opens to the Axis Line options.

Figure 7–83 Moving an Axis Using the Graph Properties Dialog Box Axes Panel



2. Use the slider controls in the Show/Place Axes options to change the percentage in the Top and Bottom boxes for X axes or Left and Right boxes for Y axes, or select the value in the edit boxes and type a new value.

   Locations are described as the percentage of the graph dimension the axes lie from the original position. To move an axis up or right, enter a percent greater than 0 (positive). To move an axis down or left, enter a percent less than 0 (negative). The defaults are 0.0%, and Normal.

3. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

Axis Line and Color Thickness

To change the line of an axis from Graph Properties:

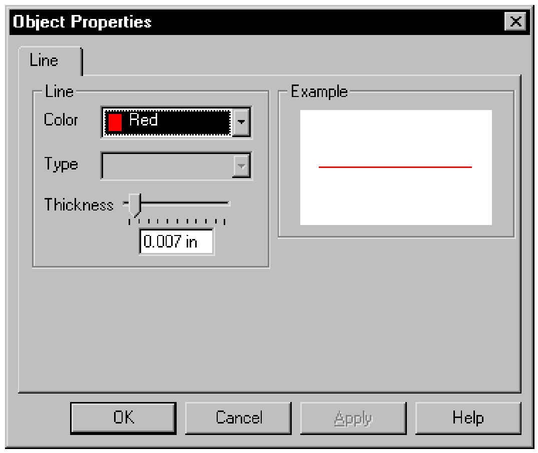
1. Double-click the axis to open the Axes Lines options. You can also right-click the axis and choose Graph Properties.
2. Use the Line Properties options to set a new line color and thickness. Choosing (none) as the color makes the axis transparent, and choosing (custom) as the color opens the Custom Color dialog box. For more information on custom colors, see "Using Custom Colors" on page 146.
3. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

Σ Note that 3D graph frame lines are drawn over axes lines and may obscure 3D axes modifications. For more information on frame lines, see “Frame Lines for a 3D Graph” on page 296.

Using the Object Properties Dialog Box

You can also change axis line attributes by right-clicking the axis and choosing Object Properties. You can also select the axis, then choose the Format menu Line command or click the button.

Figure 7–84 The Line Panel of the Object Properties Dialog Box Note that the Type option is unavailable for axes.



To learn more about using the Object Properties dialog box to change line appearance, see “Changing Lines” on page 124.

Setting Axis Breaks

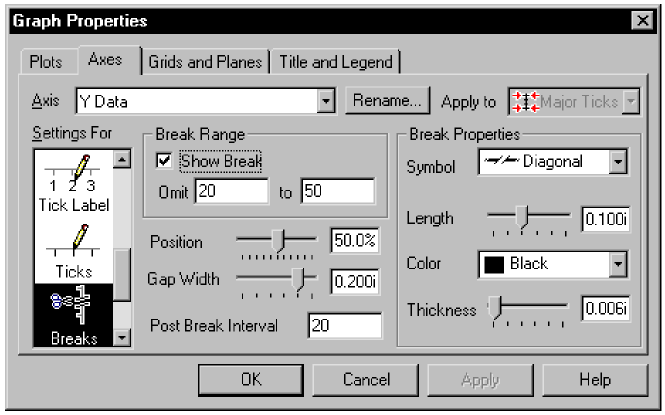
You can set axis breaks for 2D Cartesian graphs over specific ranges, at a specific location along the axis, and you can change the major tick intervals that occur after the break. You can also use several different break symbols.

Creating an Axis Break

To create an axis break:

1. Double-click the axis where you want to add the break, then select Breaks from the Settings For list.

Figure 7–85
The Graph Properties Dialog Box Axes Panel Breaks Settings



2. To display the break, check the Show Break option by selecting it, then enter the range of the axis break using the Break Range options.

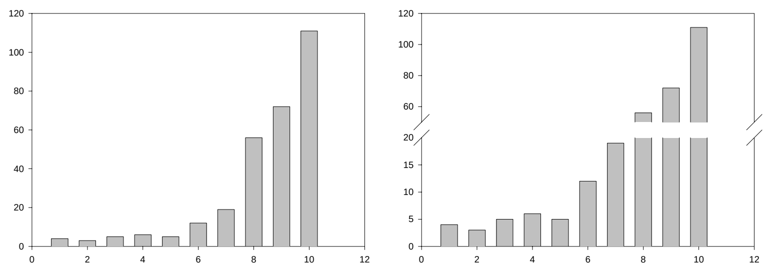
   Select the Omit box and type the starting point of the break, then select the To box and type the last point of the break.

Modifying Break Appearance

3. Use the Position slider control to specify the break position. The location of the break is determined as a percent of the total axis length, from the origin.
4. Use the Gap Width slider control to set the width of the space between break lines.
5. Enter the post break tick mark interval to use by selecting the Post Break edit box and typing a value. The default value is the interval specified for the axis range.

   Note that tick values from a column are not applied to the post-break interval.
6. Select a break symbol type from the Symbol list, then use the Length, Color, and Thickness options to set axis break appearance.
7. Click Apply to apply changes without closing the dialog, or click OK to apply changes and close the dialog box.

Figure 7–86
A Graph Before and After the Addition of a Y Axis Break



Displaying Grid Lines and Backplanes

Display and modify grids for each graph plane using the Graph Properties dialog box. Grid lines are associated with both a backplane and one of the two axes which form the plane. If a graph has multiple axes, the axes used are the original pair.

You can choose to turn on and modify grid lines for both major and minor tick intervals. Tick intervals are controlled using the Graph Properties dialog box Axes panel Scaling settings (see page 203).

Modifying Grids and Planes

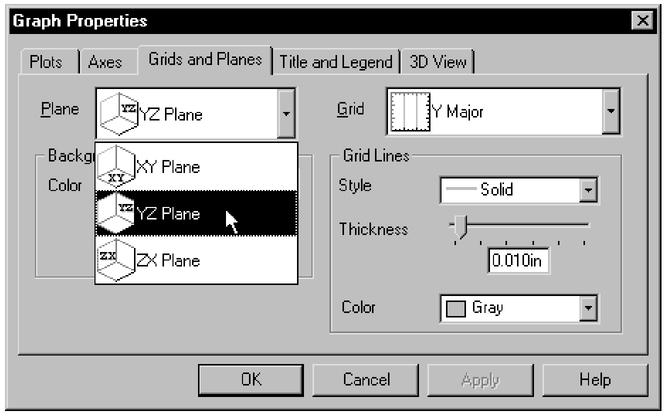
To change major or minor grid lines:

1. Double-click the graph to modify. You can also select the graph, then click the toolbar button or choose the Graph menu Graph Properties command.

2. Select the Grids and Planes tab. If your graph is a 3D graph, select the plane to modify from the Plane list.

Σ When modifying a 2D graph, only one plane is available.

Figure 7–87
Selecting the Backplane

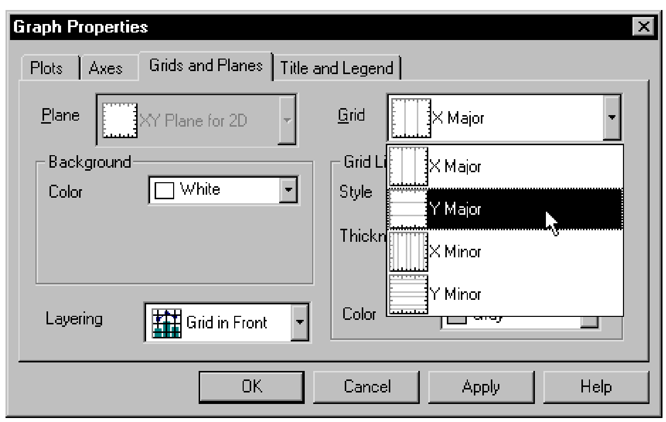


3. To select a background color for the selected plane, use the Background options Color list. Select any of the listed colors, or select (custom) to use or create a custom color. To learn about using custom colors, see "Using Custom Colors" on page 146.

   Select (none) to create a transparent plane. Transparent planes are especially useful when superimposing graphs over one another.

4. Use the Grid list to select a grid to modify or display. You can modify major or minor grid lines for any axis of the selected plane.

Figure 7–88
Selecting the Grid Lines



   The grid lines available for Cartesian plots are X, Y, and Z for 3D plots. The grid lines for polar plots are for the Angular and Radial axes. Ternary plots have X, Y and Z direction grid lines.

5. To change grid line style and thickness, use the Style and Thickness options. Choose a line style from the Style list, then use the Thickness slider control to

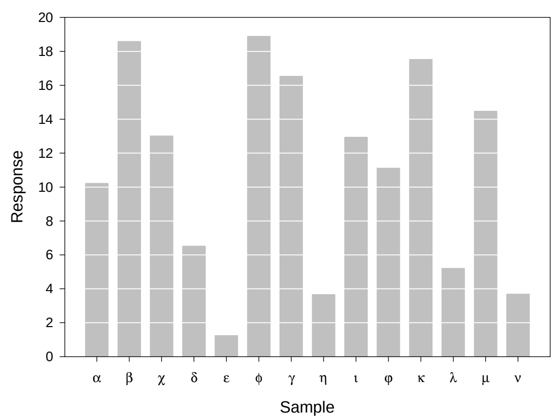
set line thickness, or select the Thickness edit box and type a thickness value.

6. Change grid line color using the Grid Lines options Color list. Choose any of the listed colors, or choose (custom) to use or create a custom color. Choose (none) to create transparent grid lines.

   To learn about using custom colors, see “Using Custom Colors” on page 146.

7. Use the Layering list to move the grid behind or in front of the plot. This feature is especially useful for bar charts.

Figure 7–89 A Bar Chart with a White Backplane and White Grid Lines Placed in Front of the Plot



8. Click Apply to keep the dialog box open, or click OK to apply changes and close the dialog box.

Hiding and Viewing Grid Lines

To view hidden grid lines, or hide visible grid lines, open the Graph Properties dialog box to the Grids and Planes panel, then choose the Plane and Grid to modify from the Plane and Grid lists.

Hide grid lines by choosing (none) from the Grid Lines options Style list, or display grid lines by changing the style to a style other than (none).

8

Working with 2D Graphs

This chapter describes two dimensional graphs and procedures specific to 2D graphs. To learn about making general graph modifications, like changing symbols, lines, or fills, see "Creating and Modifying Graphs" on page 151. Modifications to pie charts, polar plots, and ternary plots are discussed in "Working with Pie, Polar, and Ternary Plots" on page 351. For information on modifying axes, see "Modifying Axes and Grids" on page 199.

This chapter covers:

About 2D Plots

2D Cartesian (XY) plots can be created from many worksheet columns or column pairs. Each column is represented as a separate curve, set of bars, or box, depending on the plot type. 2D graphs must have at least one plot, but can hold many more plots, each with a different type and style.

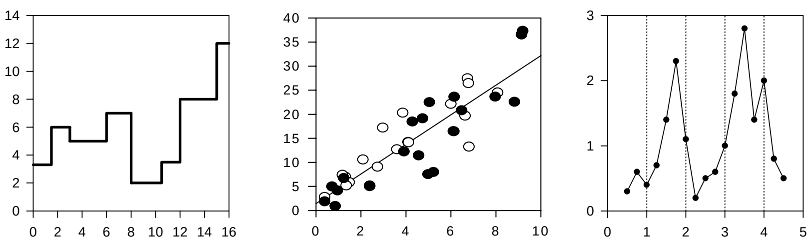
Linear or polynomial regressions with confidence and prediction intervals, and reference lines can be drawn for each curve. To learn about plotting with regressions, see "Regression Lines" on page 264. For information on adding reference lines, see "Adding Reference Lines" on page 271.

2D Plot Types

Scatter, Line, and Line/Scatter Plots

Scatter, line, and line/scatter plots graph data as symbols, as lines only with no symbols, or as symbols and lines. Line shapes can be straight segments, splines, or steps. Drop lines to either axis can be added to any of these plot types, and error bars can be added to plots with symbols. Linear or polynomial regressions with confidence and prediction intervals can be drawn for each curve.

Figure 8–1 Examples of a Stepped Line Plot, a Scatter Plot, and a Line Scatter Plot

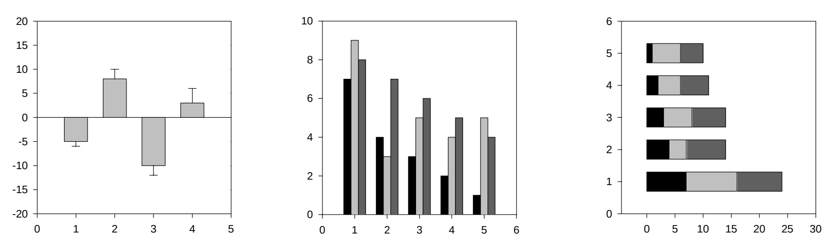


For more information on adding drop lines, see “Adding and Modifying Drop Lines” on page 196. Creating scatter and line/scatter graphs with error bars is described in “Creating Plots with Error Bars” on page 240.

Bar Charts

Bar charts plot data either as vertical or horizontal bars. They originate from zero in either a positive or negative direction. Simple bar charts plot each row of data as a separate bar, and grouped bar charts plot multiple columns of data, grouping data in the same rows. Stacked bar charts plot data as segments of a bar; each data point is drawn as a bar segment starting where the previous data point ended.

Figure 8–2 Examples of a Simple Bar Chart, a Grouped Bar Chart, and a Stacked Bar Chart

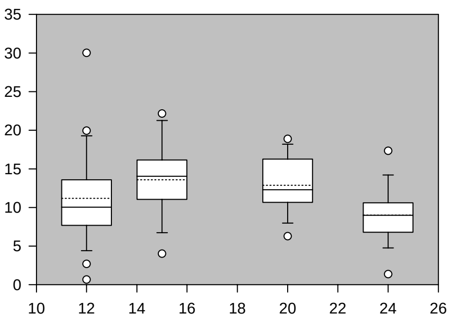


Use the Graph Properties dialog box to modify bar width, bar fill colors, and bar fill patterns. Error bars can be added to simple and grouped bar charts. To learn more about grouped bar charts, with or without error bars, see “Creating Grouped Bar Charts” on page 247. To learn about using the Graph Properties dialog box to modify bar fills and colors, see “Adding and Modifying Drop Lines” on page 196.

Box Plots

Box plots graph data as a box representing statistical values. The boundary of the box closest to zero indicates the 25th percentile, a line within the box marks the median, and the boundary of the box farthest from zero indicates the 75th percentile. Whiskers above and below the box indicate the 90th and 10th percentiles. In addition, the mean and outlying points can be graphed. For information on modifying box plots, see “Modifying Box Plots” on page 263.

Figure 8–3 Example of a Box Plot



Σ Note that a minimum number of data points is required to compute each set of percentiles. At least three points are required to compute the 25th and 75th percentiles, five points to compute the 10th percentile, and six points to compute the 5th, 90th, and 95th percentiles. If SigmaPlot is unable to compute a percentile point, that set of points is not drawn.

Arranging Data for a 2D Plot

Data for SigmaPlot graphs is always organized by columns. Data used for the X values of a graph must be placed in a single column, and the data for the corresponding Y values must be placed in another column.

When creating a graph, you will be asked what format your data is in. The following data formats are used for all 2D plots.

Σ For information on creating a graph, see “Creating and Modifying Graphs” on page 151. For information on creating another plot for an existing graph, see “Multiple Plots on a Graph: Adding New Plots” on page 170.

Data for a Single Curve (XY Pair)

If the graph you are creating uses only one set of X and Y values, enter all X data in one column, and all corresponding Y data in another column. These columns do not need to be adjacent or the same length (missing values are ignored).

Figure 8–4
Data for a 2D Graph Arranged and Picked as XY

Data is placed into two columns.

Data 1*

	1	2	3	4	5	6
1	2.00	5.00				
2	2.00	4.00				
3	4.00	4.00				
4	5.00	7.00				
5	8.00	2.00				
6	5.00	4.00				
7	4.00	4.00				
8	2.00	8.00				
9						
10						
11						
12						
13						
14						

Data for Multiple Curves (XY Pairs)

If the graph style you are creating plots more than one curve, place as many additional X and Y values in worksheet columns as you want to plot. X and Y data can be entered in the worksheet in consecutive columns, or in any order you want.

Figure 8–5
Data for a 2D Graph Arranged and PIcked as Multiple XY Pairs

Each x and y variable go into separate columns.

Data 1*

	1	2	3	4	5
1	2.00	5.00	5.00	6.00	
2	2.00	4.00	4.00	8.00	
3	4.00	4.00	5.00	7.00	
4	5.00	7.00	7.00	4.00	
5	8.00	2.00	8.00	2.00	
6	5.00	4.00	8.00	4.00	
7	4.00	4.00	8.00	1.00	
8	2.00	8.00	7.00	2.00	
9					
10					
11					
12					
13					
14					

Using the Same Column for Multiple Curves (Single X or Y vs. Many Y or X)

SigmaPlot can graph many curves using the same X or Y data column. There is no need to duplicate a column that is used for more than one curve; for example, enter the X data into only one column, and enter the corresponding Y data into as many columns as you have curves. Order and length of columns doesn't matter.

Figure 8–6
Data for a 2D Graph Arranged and Picked as X Many Y

Data for the single x variable is placed in one column, and the multiple y variables are placed in separate columns.

Data 1*

	1	2	3	4	5	6
1	2.00	5.00	2.00			
2	2.00	4.00	4.00			
3	4.00	4.00	5.00			
4	5.00	7.00	7.00			
5	8.00	2.00	5.00			
6	5.00	4.00	7.00			
7	4.00	4.00	5.00			
8	2.00	8.00	8.00			
9						
10						
11						
12						
13						
14						

Using Row Numbers for X or Y Values (Single X; Single Y; Many X; or Many Y)

SigmaPlot can also graph data as only X or Y values, and use the row numbers of the columns as the corresponding Y or X coordinates. If you want to graph data as only X or Y values, enter the data for each plot into a column, and do not enter data for corresponding coordinates.

Figure 8–7
Data for a 2D Graph Arranged and Picked as Many Y Only

Each y variable is placed in its own column. No x variables are required.

Data 1*

	1	2	3	4	5	6
1	2.00	5.00	2.00			
2	2.00	4.00	4.00			
3	4.00	4.00	5.00			
4	5.00	7.00	7.00			
5	8.00	2.00	5.00			
6	5.00	4.00	7.00			
7	4.00	4.00	5.00			
8	2.00	8.00	8.00			
9						
10						
11						
12						
13						
14						

Column Averaged Error Bar Plots

Certain graph styles plot data by representing the mean of an entire column as a single data point. In these cases, place the values you want represented as a single X or Y value into one column.

Creating 2D Plots

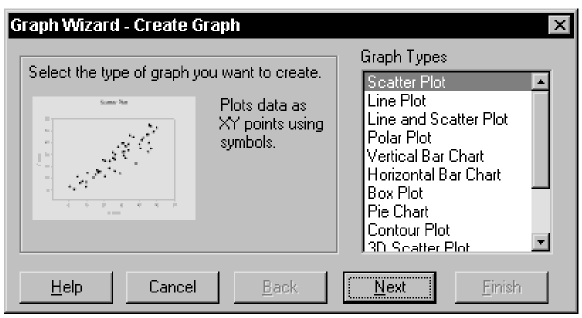
To create a scatter plot, line plot, line/scatter plot, simple bar chart, or box plot:

1. If you want to select worksheet data before creating the graph, select the worksheet columns to plot before creating your graph by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.
2. Select the desired graph type and style from the graph toolbar or open the Graph Wizard by clicking the toolbar  button, or by choosing the Graph menu Create Graph command. The Graph Wizard appears.

Σ During the graph creation process, the left side of the Graph Wizard changes depending on what is selected on the right side of the dialog box.

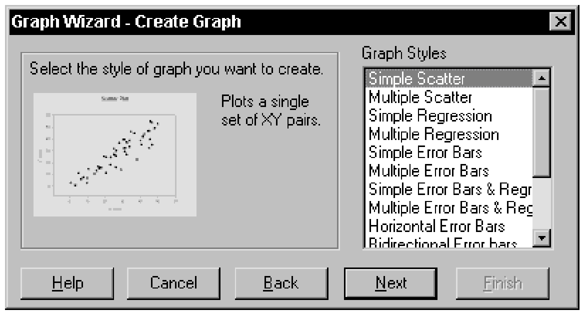
3. If you did not use the graph toolbar to open the Graph Wizard, select the type of graph you want to make from the scroll box in the dialog box. Use the scroll bar to view the entire list. Highlight the desired graph type by selecting it, then click the Next button.

Figure 8–8
The Graph Wizard Displaying a List of Graph Types



4. If you did not use the graph toolbar to open the Graph Wizard, the Graph Wizard displays the available graph styles in the scroll box. Highlight the desired graph style, then click Next.

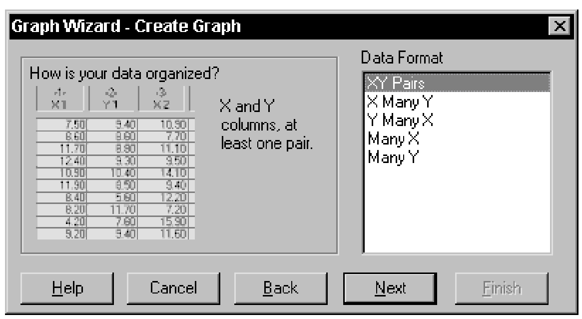
Figure 8–9
The Graph Wizard Displaying a List of Available Graph Styles for a Scatter Plot



5. Specify how your data is formatted by choosing the appropriate data format from the Data Format list. The data formats available depend on the graph type and style you are making. Choose the appropriate data format, then click Next.

   For information on the available data formats for the graph you are making, see the description of the graph style in "SigmaPlot Graph Style" on page 155 .

Figure 8–10
Using the Graph Wizard to Specify the Data Format



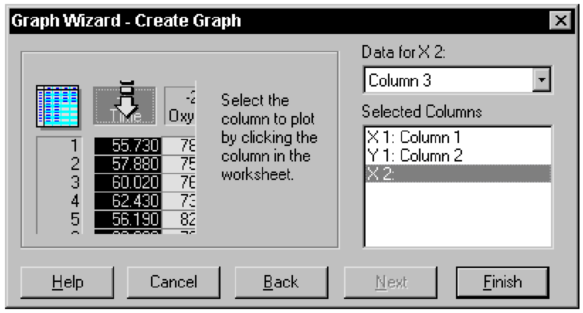
6. Specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box and you can click Finish to create the graph.

   If you have not already picked columns, note that a single data type is highlighted in the Selected Columns list. This shows the data type you are picking a column for. Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data Columns list. Repeat this process for every column you are using to create your graph.

7. If you make a mistake while picking data, select the wrong entry in the Graph Wizard, then choose the correct column from the worksheet. You can also clear a

column assignment by double-clicking it in the list.

Figure 8–11 Using the Create Graph Dialog to Pick Columns to Plot



8. When you have finished picking data, click Finish to create the plot and close the Graph Wizard.

Use the Graph Properties dialog box to modify the plot, or reopen the Graph Wizard to pick different data columns for your plot, or to add another plot to your graph. For more information on making general modifications to your plot, see "Creating and Modifying Graphs" on page 151.

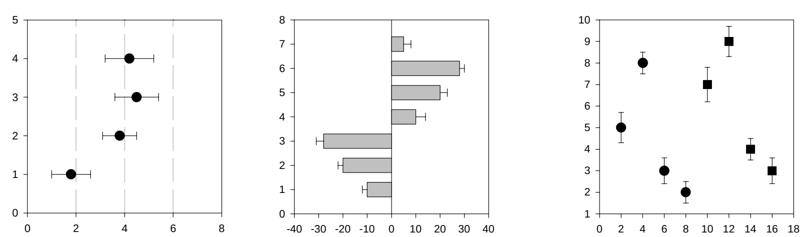
Creating Plots with Error Bars

In a Line and Scatter Plot with Error Bars, the means of each column are plotted as the Y value, with the standard deviations represented by error bars.

Use the Graph Wizard to create 2D plots with error bars. Scatter plots, line/scatter plots, or simple bar charts can be created with error bars. To learn about creating grouped bar charts with error bars, see "Creating Grouped Bar Charts" on page 247.

Figure 8–12 Examples of Some 2D Plots with Error Bars

The third graph is an example of a scatter plot with multiple error bars and two plots to distinguish between the two data sets.



Σ To add error bars to a pre-existing plot, you must change the plot type. For more information, see "Changing Graph Type and Style" on page 169.

To create a plot with error bars:

1. If you want to select worksheet data before creating the graph, select the worksheet columns to plot before creating your graph by dragging the pointer over

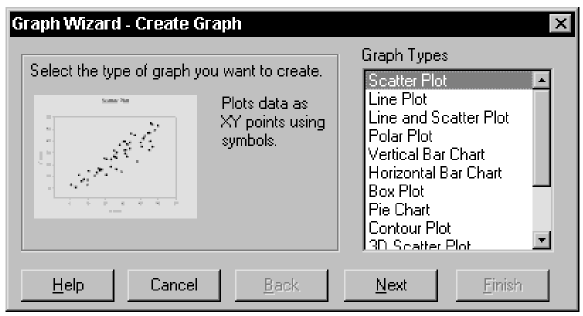
your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

2. Select the desired graph type and style from the graph toolbar. You can also click the toolbar button, or choose the Graph menu Create Graph command. The Graph Wizard appears.

Σ Note that during the graph creation process, the left side of the Graph Wizard changes depending on what is selected on the right side of the dialog box.

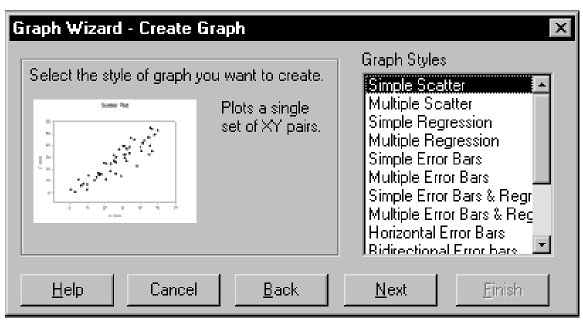
3. If you did not use the graph toolbar to open the Graph Wizard, select the type of graph you want to make from the scroll box in the dialog box. Use the scroll bar to view the entire list. Highlight the desired graph type by selecting it, then click the Next button.

Figure 8–13 The Graph Wizard Displaying a List of Graph Types



4. If you did not use the graph toolbar to open the Graph Wizard, the Graph Wizard displays the available graph styles in the scroll box. Highlight the desired graph style with error bars, then click Next.

Figure 8–14 The Graph Wizard Displaying a List of Available Graph Styles for a Scatter Plot



5. Use the Error Bar Source list to pick an error bar source and a value to use for the error bars. Choose either Column Means to use the column means as the error bar source, or Worksheet to use values you've entered in a worksheet column. You are prompted during data picking (Step 8) to specify the column to use as error bar source data.

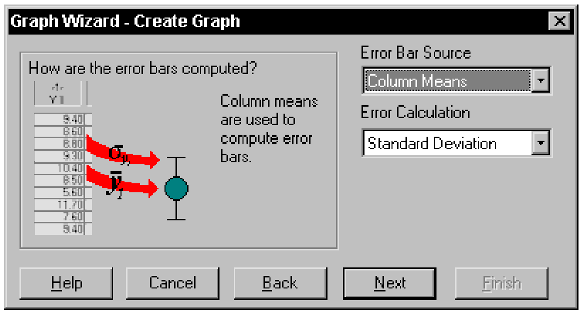


Figure 8–15 Using the Create Graph Dialog to Specify Error Bar Information

6. If you chose to use a worksheet column as the error bar source, click Next. If you chose Column Means as the error bar source, use the Error Calculation list to specify the calculation method to use for error bars. Choose either Mean, Standard Deviation, Standard Error, 95% Confidence, or 99% Confidence, then click Next.

Σ Note that X column averaged plots require a constant Y column value, and Y column averaged plots require a constant X column value.

7. Specify how your data is formatted by choosing the appropriate data format from the Data Format list. The data formats available depend on the graph type and style you are making. Choose the appropriate data format, then click Next.

   For information on the available data formats for the graph you are making, see the description of the graph style in "SigmaPlot Graph Style" on page 155 .

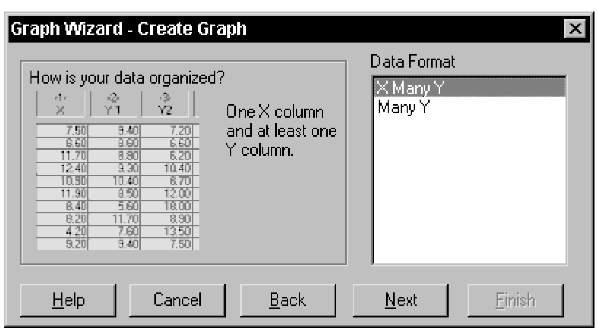


Figure 8–16 Using the Graph Wizard to Specify the Data Format

8. Specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box, and you can click Finish to create the graph.

If you have not already picked columns, note that a single data type is highlighted in the Selected Columns box. This shows the data type you are picking a column for. Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data Columns list.

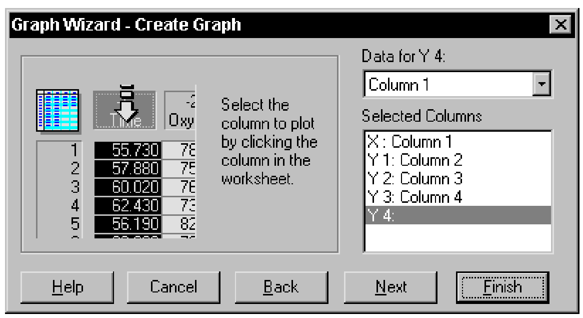
9. **If you are making a graph with simple error bars or a graph with multiple error bars using worksheet columns as the source for error bar data,** you are prompted to choose columns for error bar data. Repeat the data picking process for every column you are using to create your plot.

10. **If you are making a graph with multiple error bars using column means as the source for error bar data,** you can create a graph using a single plot, or a graph with multiple plots. Use multiple plots if you want to use different symbols to distinguish between data sets (see Figure 8–12 on page 240).

11. To create a single plot graph, choose data for every column you are using to make the graph. To create a graph of multiple plots, choose data for the first plot, then click Next to pick data for the next plot. Repeat this process for as many plots as necessary.

Figure 8–17
Using the Graph Wizard - Create Graph Dialog to Pick Columns for the First Plot in the Graph

Notice the Next button is enabled so that you can create an additional plot for the graph.



12. If you make a mistake while picking data, click the wrong entry in the Graph Wizard, then choose the correct column from the worksheet. You can also clear a column assignment by double-clicking it in the Selected Columns list. Use the Back button to access previous Graph Wizard panels.

13. When you have finished picking data, click Finish to create the plot and close the Graph Wizard.

To learn about modifying error bar information, see “Changing Error Bar Color, Line Thickness, and Cap Width” on page 258. To learn about repicking data for an existing plot, see “Picking Different Data for the Current Plot” on page 168.

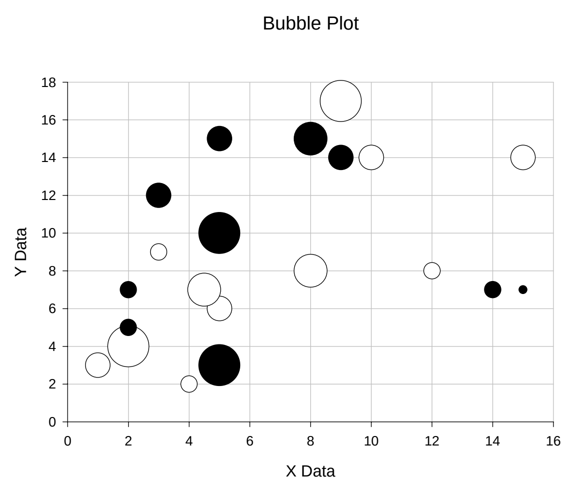
Bubble Plots

Bubble plots are XY scatter plots that use symbols to represent not only XY locations, but also a third dimension represented by the size of the symbol. Bubble plots are frequently used to plot population density, epidemiological data, or other similar data sets where a third variable can be clearly illustrated by the size of the symbols.

Arranging Data for Bubble Plots

Data for bubble plots can either be X, Y data in two separate columns or single X or single Y data in one column. In both cases, an additional column is needed to indicate bubble size values. Since the bubble size column corresponds to symbol diameter, you must convert the data for your third variable to diameters.

Figure 8–18 This bubble plot example can be opened from the SAMPLES.JNB notebook included with SigmaPlot.



Bubble plots must have at least one plot, but can hold many more plots using different data formats if appropriate. The bubble plot type has available only the default scatter style. You can change the symbol type; however, if you use something other than a circle you will need a different equation to transform area to diameter.

Using X, Y Values for Bubble Plots

Bubble plot X, Y data is arranged in the same way as other 2D plot X, Y data, with all X values in one column and all Y values in another. However, whether you are plotting XY Pair, Single Y, or Single X data, bubble plots require an additional column to indicate bubble size.

Data for Bubble Size

SigmaPlot can graph bubble plots using XY pair, Single Y, Single X, and bubble size data. Bubble size values must be entered in a separate column. Each value corresponds to the *diameter* of the symbol, in whatever page units are being used. If you want bubble size to correspond to area data, you must convert your area data to diameters before creating the bubble plot.

Converting Area Data to Diameters

If you want your bubble plot to display area data, you must run this transform where area is the source column number and the diameter is the results column number. This transform is derived from the formula for the area of a circle.

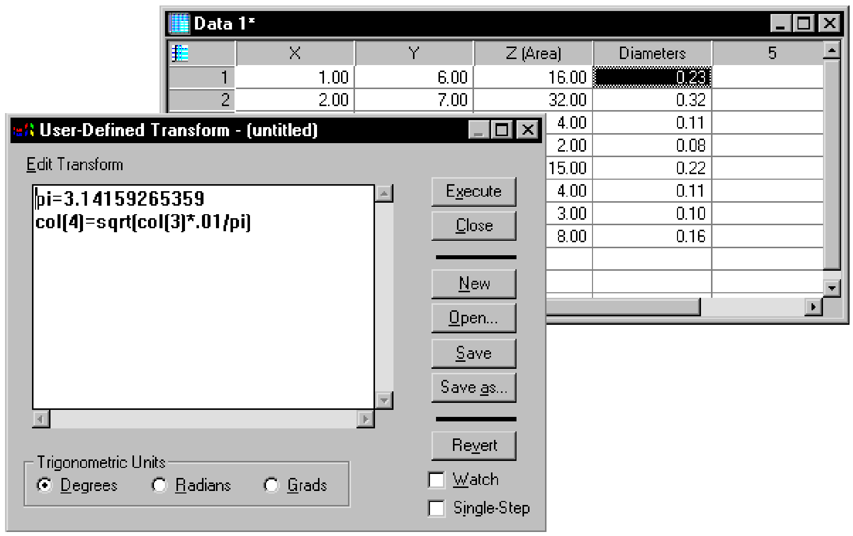
To convert your area data into diameters Press F10 or choose the Transforms menu User-Defined command; the User-Defined Transform dialog box appears. Now type the transform function as follows:

pi=3.14159265359
col(*diameter*)=sqrt(col(*area*)**factor*/pi)

where *diameter* is the column number for your diameter data, *area* is the column number for your original data to be represented by area, and *factor* is some number to increase or decrease the magnitude of your data to a reasonable range.

It is very important to reduce the diameters of your symbols to a reasonable size before plotting them.

Figure 8–19 Transforming Area Data to Diameters



Click Execute and your new data appears in the worksheet.

Σ If you change the symbol shape, you must use a different equation to transform area data.

Creating a Bubble Plot

To create a bubble plot:

1. Select the worksheet columns to plot before creating your graph by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

   Σ Bubble plot data must include bubble size values to specify plot symbol diameter. If you have area data to plot, you must convert it to diameters. For information on how to do this, see “Converting Area Data to Diameters” on page 245.

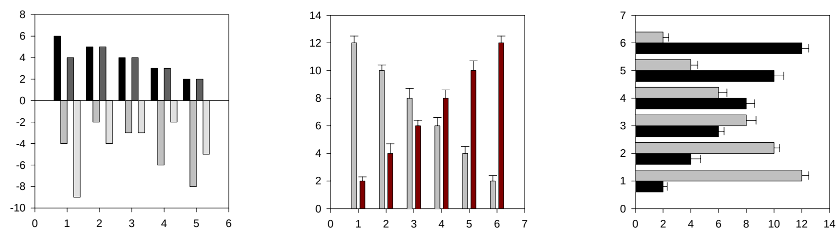
2. Open the Graph Wizard by clicking the Graph Wizard  button or by choosing the Graph menu Create Graph command. The Graph Wizard appears.
3. Select Bubble Plot as the graph type by highlighting it in the dialog box list. Then click the Next button.
4. The Graph Wizard prompts you to select the data format appropriate to the data you are plotting. Select the appropriate format and click Next.

5. When you have selected all the columns to plot, including the Bubble Size column, click Finish to create the graph. The Graph Wizard closes and the bubble plot appears displaying the plotted data.

Grouped Bar Charts

Grouped bars are created by picking multiple columns for a single plot. Data points within the same row appear within the same group, and each additional column adds another bar to each group. There are as many groups as there are rows of data.

Figure 8–20 Examples of Grouped Bar Charts with and without Error Bars



The order of the bars for each group is determined by the order of the column pairs in the list. To change the bar orders within groups, change the order the column pairs appear in the list by using the Graph Wizard to repick column data. For more information about repicking data, see “Picking Different Data for the Current Plot” on page 168.

Use the Graph Wizard to create grouped bar charts with or without error bars. If creating a grouped bar chart with error bars, error bar values must be from worksheet column values entered prior to creating the plot. You are prompted during graph creation for error bar worksheet columns.

Creating Grouped Bar Charts

To create a grouped bar chart:

1. If you want to select worksheet data before creating the graph, select the worksheet columns to plot before creating your graph by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

2. Select the Horizontal or Vertical Bar Chart button from the graph toolbar, then selecting either the Grouped Bar Chart, or Grouped Error Bars button. You can also click the toolbar button or choose the Graph menu Create Graph command. The Graph Wizard appears.

Σ Note that during the graph creation process, the left side of the Graph Wizard changes depending on what is selected on the right side of the dialog box.

3. If you did not use the graph toolbar to open the Graph Wizard, select to make either a Vertical or Horizontal Bar Chart, then click Next.

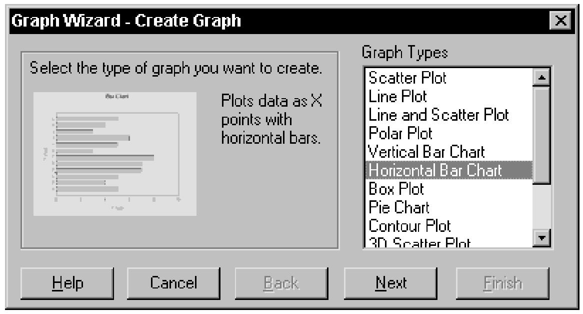


Figure 8–21 The Graph Wizard Displaying a List of Graph Types

4. If you did not use the graph toolbar to open the Graph Wizard, the Graph Wizard displays the available graph styles in the scroll box. Select either Grouped Bar, to create a grouped bar chart, or Grouped Error Bars to create a grouped bar chart with error bars, then click Next.

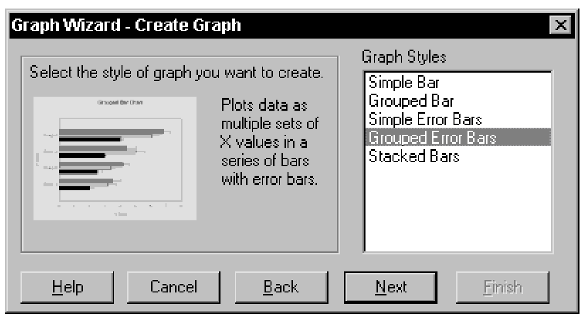


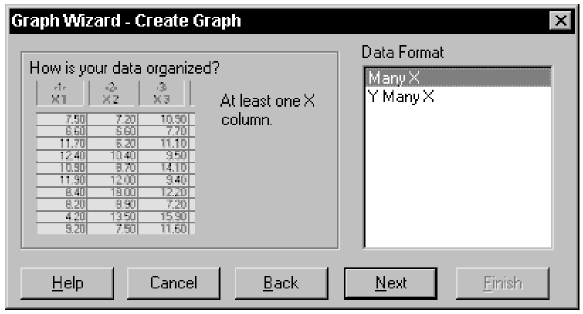
Figure 8–22 The Graph Wizard Displaying the Graph Styles

5. To plot a grouped bar chart using a category axis, enter the category data as labels into one worksheet column, and select the X many Y data format.

6. Specify how your data is formatted by choosing the appropriate data format from the Data Format list. The data formats available depend on the graph type and style you are making. Choose the appropriate data format, then click Next.

For information on the available data formats for the graph you are making, see the description of the graph style in “SigmaPlot Graph Style” on page 155 .

Figure 8–23
Using the Graph Wizard to Specify the Data Format



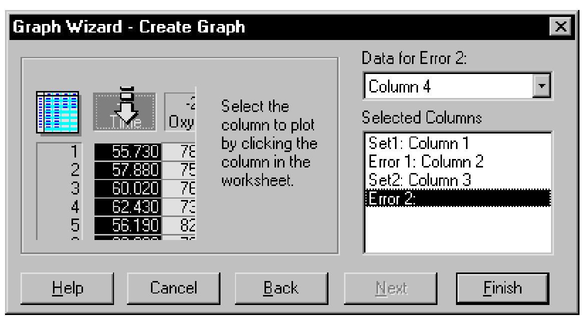
7. Specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box and you can click Finish to create the graph.

   If you have not already picked columns, note that a single data type is highlighted in the Selected Columns box. This shows the data type you are picking a column for.

   Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data Columns list. You are prompted to choose columns to plot, and columns for error bar data. Repeat this process for every column you are using to create your graph.

Figure 8–24
Using the Create Graph Dialog to Pick Columns to Plot

Notice that this dialog box also prompts you for the columns with the data to use as the error bar values.



8. If you make a mistake while picking data, select the wrong entry in the Graph Wizard, then choose the correct column from the worksheet. You can also clear a column assignment by double-clicking it in the Selected Columns list.

9. When you are done picking data, click Finish to create the plot and close the Graph Wizard.

To learn about modifying error bar information, see "Changing Error Bar Color, Line Thickness, and Cap Width" on page 258. To learn about repicking data for an existing plot, see "Picking Different Data for the Current Plot" on page 168.

Spacing Bars from Different Plots

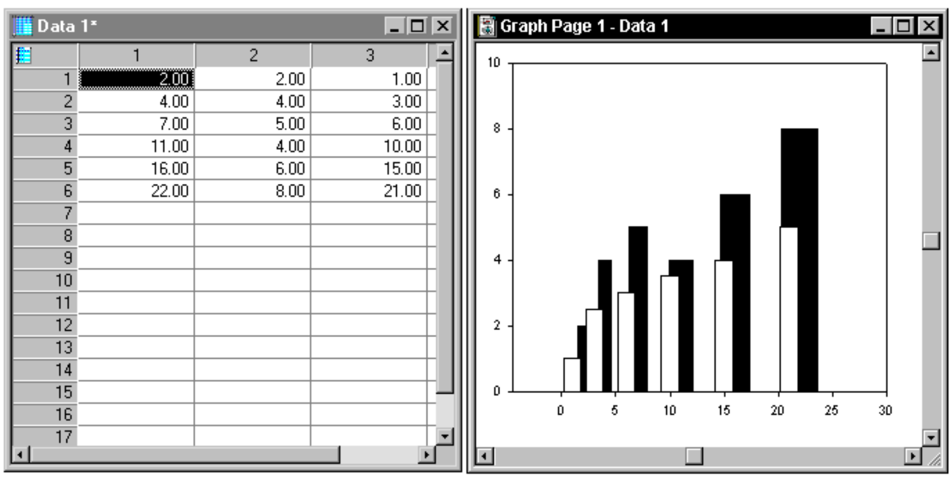
Normally, you use only a single plot for a bar chart. However, if you need to create a bar chart with two or more different axes scales, or a chart with overlapping bars, you must use multiple plots.

SigmaPlot does not automatically space bars from different plots; however, you can manually space bars by grouping your data column(s) with column(s) containing missing or empty data. This creates bar groups with null values and leaves room for other bars. When picking columns to plot, pick the missing columns in a different order for each plot, so that the bars do not overlap.

To overlap bars, plot your bar values versus a column of evenly incremented values rather than by row numbers.

Figure 8–25
Bars graphed with different plots that both overlap and are spaced differently by using different x increments.

The bar widths for both plots are set to variable.



Grouping Column Averaged Bars

You cannot create a grouped bar chart with error bars using column averaging; the bars do not group or space correctly. However, you can copy the worksheet means and standard deviations from the statistics window, then plot this data as a grouped bar chart with error bars.

To create a bar chart with grouped column averaged bars:

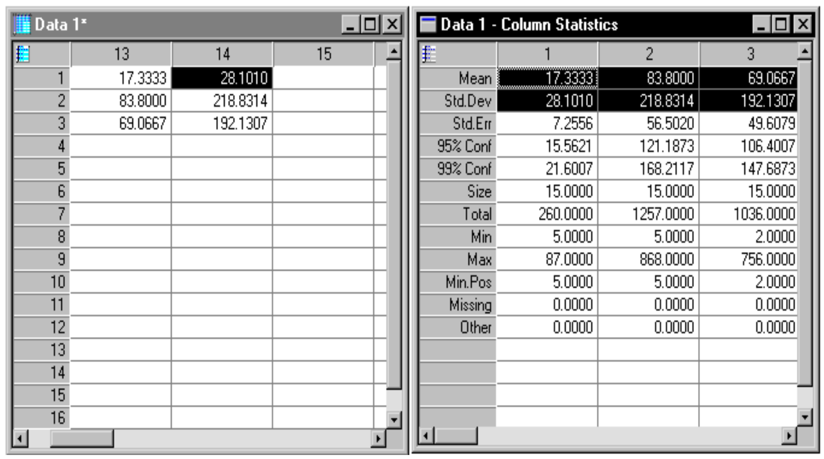
1. Open the statistics window for the worksheet by choosing the View menu Statistics command, or by clicking the toolbar button.
2. Select the block of data in the statistics window that consists of the means and

standard deviations (or other statistic) of the first set of bars, then choose Copy from the right-click pop-up menu.

3. Select the first row of an empty column in the worksheet, then choose the Edit menu Transpose Paste command. The first pasted column of data is the means, and the next column is the standard deviations (or other statistic). For more information on using the transpose paste feature see “Switching Rows to Columns” on page 81.

Figure 8–26 Example of Transposed Pasted Data

The data in columns 13 and 14 of the worksheet are transposed from the selected data in rows 1 and 2 of the Column Statistics window. Column 13 contains the means of the column data and column 14 contains the standard deviations of the data.



Data 1*

	13	14	15
1	17.3333	28.1010	
2	83.8000	218.8314	
3	69.0667	192.1307	
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Data 1 - Column Statistics

	1	2	3
Mean	17.3333	83.8000	69.0667
Std.Dev	28.1010	218.8314	192.1307
Std.Err	7.2556	56.5020	49.6079
95% Conf	15.5621	121.1873	106.4007
99% Conf	21.6007	168.2117	147.6873
Size	15.0000	15.0000	15.0000
Total	260.0000	1257.0000	1036.0000
Min	5.0000	5.0000	2.0000
Max	87.0000	868.0000	756.0000
Min.Pos	5.0000	5.0000	2.0000
Missing	0.0000	0.0000	0.0000
Other	0.0000	0.0000	0.0000

You can alternately copy then transpose paste the standard errors or confidence values instead of the standard deviations. The only difference is that two separate copy and paste operations are required. You can use the Worksheet Column Statistics Options to turn off display of all statistics except for the ones you are interested in.

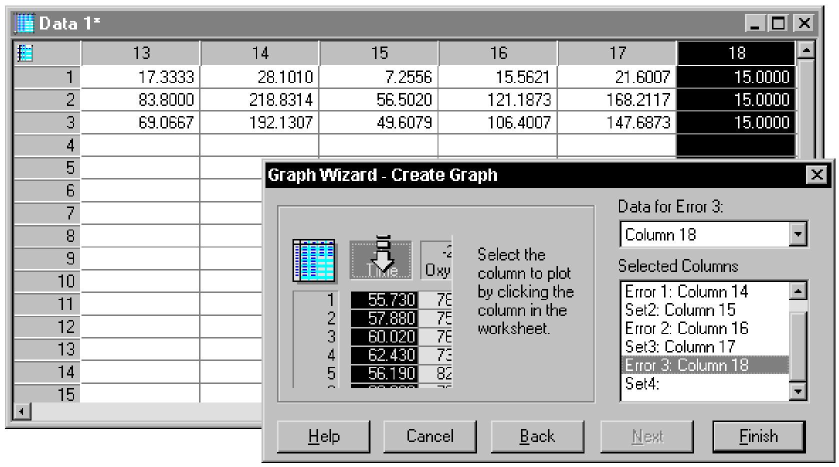
4. Repeat the copy and transpose paste procedure for the remaining sets of bars. Each pair of means and standard deviation columns you create adds an additional bar to each group.

5. To plot the results, select a vertical or horizontal bar chart graph type with grouped error bars from the graph toolbar. Select the desired data format. If you already have a graph, repick the plotted data by selecting the plot to modify, then clicking the toolbar  button.

6. If you select X Many Y as the data format, pick your constant value column (either a row number or a single column), then pick the first column of means as your data column, and the first column of standard deviations as the associated error bar column.

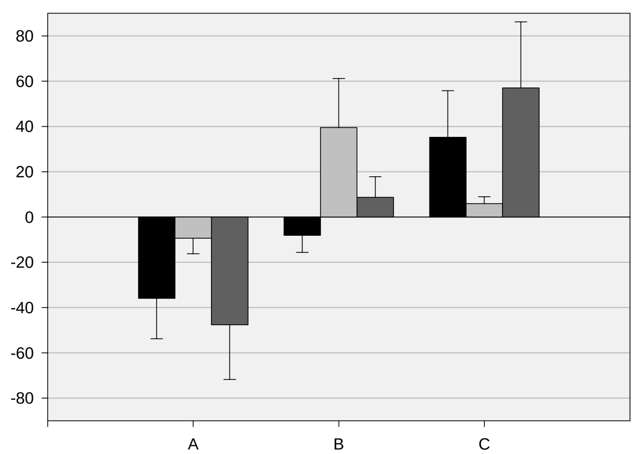
7. Continue picking the columns of means and error bars for each set. Click Finish when done.

Figure 8–27
Picking Data to Plot for a Grouped Bar Chart with Error Bars



8. Use the Graph Properties dialog box to edit the bar chart fills and widths as desired. For more information on modifying the appearance of bar charts, see “Changing Patterns and Fill Colors” on page 188 and “Changing Bar and Box Widths and Spacing” on page 193.

Figure 8–28
A Grouped Bar Chart with Column Averaged Error Bars



Creating Histograms

Histograms are step, needle, or bar charts that represent counts of the datapoints that fall within specified ranges. The Histogram Wizard guides you through the steps in creating a histogram: generating frequency data, specifying the number of buckets or intervals, and selecting a graph style.

The Histogram Wizard allows you to specify an *even bucket size* into which to partition the source data. The range of each interval is identical; the total range is the data minimum to the data maximum. The number of bars, steps, or needles displayed is generally equal to the number of buckets.

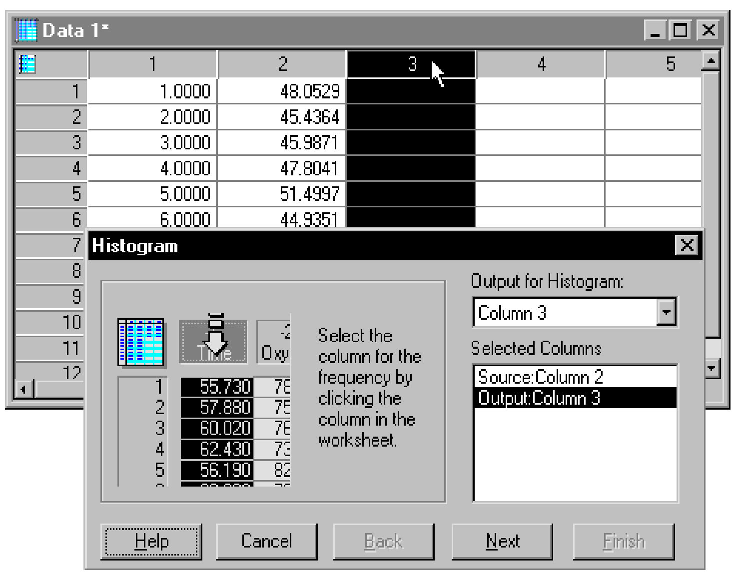
To create a histogram with an *uneven bucket size*, see "The Histogram Transform Function" on page 255. For a more detailed explanation of the histogram transform function, see the *Programming Guide*.

Using the Histogram Wizard

To use the Histogram Wizard:

1. Enter the data you want to analyze in an empty column of the active worksheet.
2. Choose the Statistics menu Histogram command to open the Histogram Wizard.

Figure 8–29
The Histogram Wizard – Pick Data Dialog

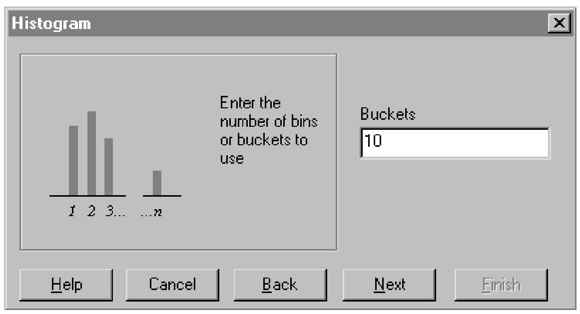


3. You are prompted to specify the worksheet column that corresponds to the source data for the histogram. If you selected the worksheet column prior to opening the Histogram Wizard, your column choice automatically appears in the Selected Column list.

   If you have not selected the source column, pick the data by either clicking the column directly in the worksheet, or choosing the appropriate column from the Source for Histogram list.

4. Select the column for your output or frequency data. Pick the output column by clicking the column in the worksheet and click Next.

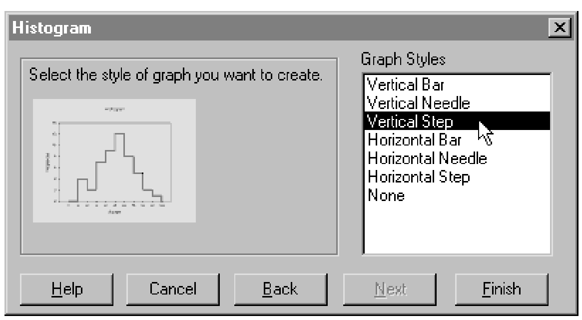
Figure 8–30
The Histogram Wizard – Buckets Dialog Box



5. Specify the number of buckets you want to use. If you attempt to type text or values less than 1 or greater than 1000, the value will be rejected and the edit box will display the default value. Click Next to specify the graph style you want to use for your histogram.

6. Specify the graph style from the list that appears in the Histogram Wizard Graph Style dialog box. View a preview of each graph style by selecting it from the list; a preview of the graph appears in the left-hand panel of the dialog box.

Figure 8–31
The Histogram Wizard – Graph Style Dialog Box



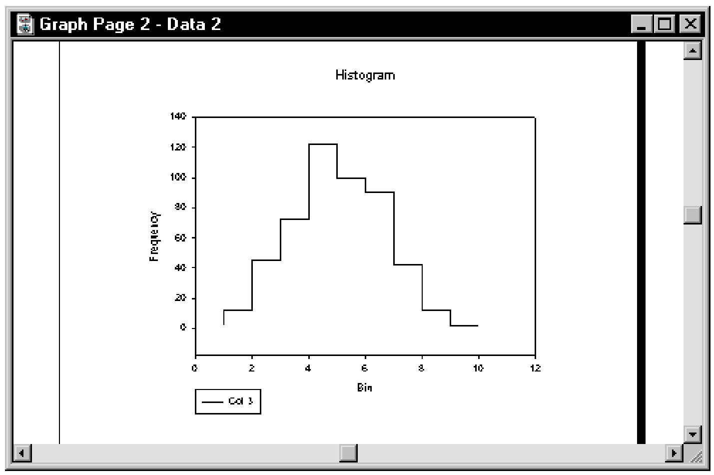
   Select None if you do not require a graph of your frequency data. Click Finish to create the graph and close the Histogram Wizard dialog box.

7. If you choose None, SigmaPlot displays the worksheet with the output

column containing the histogram frequency data.

8. If you choose to create a graph, the graph appears on the active graph page, or a new page if the worksheet has no associated graph pages. The X axis representing the buckets is titled Bin, and uses a category scale. The Y axis representing the frequency or the number of data points in each bin, is titled Frequency, and uses a linear scale.

Figure 8–32
Example of a Histogram Created Using the Histogram Wizard



For more information about modifying axes, see "Modifying Axes and Grids" on page 199.

The Histogram Transform Function

If you need to use uneven bucket sizes for a histogram, use SigmaPlot's built-in histogram transform function:

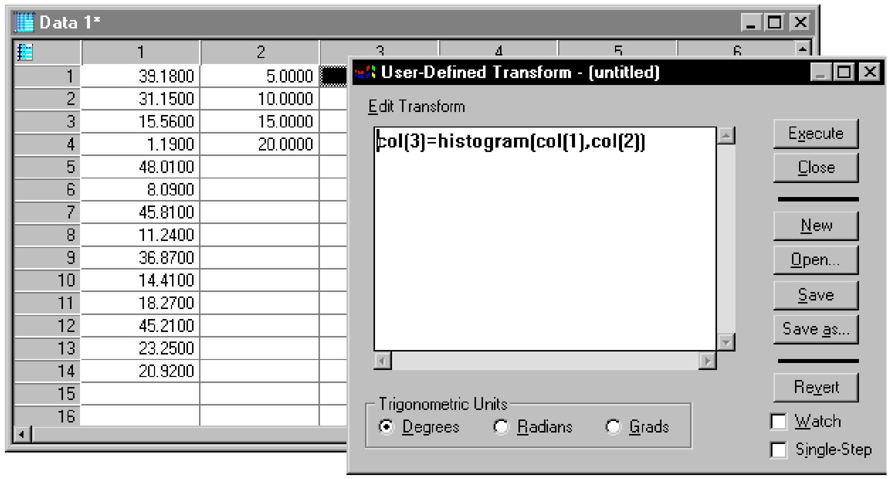
1. Enter your data to analyze in column 1 and your *bucket values* in column 2.

   The numbers in column 2 are used as the upper bounds (inclusive) of the histogram interval ranges. The number of data points that fall within each specified range is counted. The number of histogram bars is equal to the number of interval upper bounds entered. The number of values that fall beyond the largest upper bound is also counted.

2. After entering the appropriate data into columns 1 and 2, choose the Transforms menu User-Defined command, or press F10.

3. Enter the transform: col(3)=histogram(col(1),col(2))

Figure 8–33
Graphing the results of the HISTOGRM.XFM transform as a bar chart.



4. Click Execute. The histogram data is saved to column 3. To graph the data, plot column 3 as a bar chart.

5. Save as HISTOGRM.XFM.

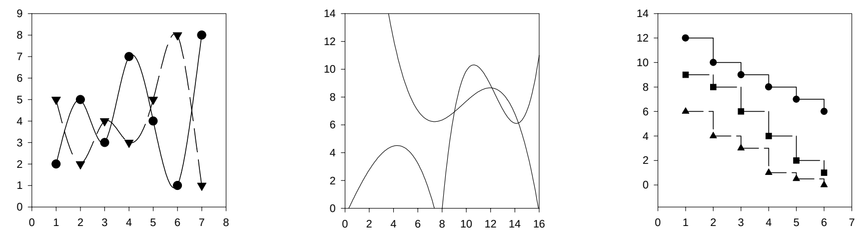
   Set the Bar Thickness control in the Graph Properties dialog box to 100%. For more information on modifying bar chart appearance, see “Changing Patterns and Fill Colors” on page 188 and “Changing Bar and Box Widths and Spacing” on page 193. Alternately, you can graph it as a line plot and choose a stepped line shape.

For details on the histogram transform function, see the *Programming Guide*.

Creating Multiple Curves

You do not have to create multiple plots to obtain multiple curves. To plot more than one curve, choose any of the plot styles described as *Multiple* and add additional columns, or column pairs to the list of curves in the Graph Wizard.

Figure 8–34
Plot Styles that Include Multiple Curves



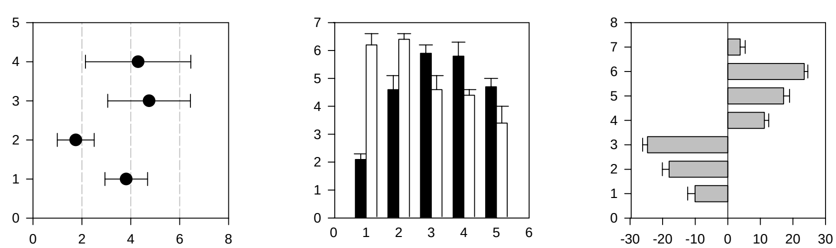
The order of the curves is determined by the order of the column pairs in the Graph Wizard. To change the curve order, repick columns by selecting them in the Graph Wizard, then clicking the worksheet.

Modifying Error Bars

Error bars can be computed for scatter, line/scatter, and bar charts. Error bar values are selected when you pick the data for a plot and can be computed using values in a worksheet column or using column means (see “Creating Plots with Error Bars” on page 240).

Σ Error bars cannot be added to existing plots; however, you can select the desired plot on the page and change its plot type and style so that it includes error bars. To learn about changing graph type and style, see “Changing Graph Type and Style” on page 169.

Figure 8–35
Examples of Graphs with Error Bars



Changing Error Bar Color, Line Thickness, and Cap Width

Use the Graph Properties dialog box to change error bar color, cap width, line thickness, mean computation method, and direction.

Note that error bar values are not selected from this dialog box; only the appearance of error bars is affected. Error bar values are determined when data is picked to plot.

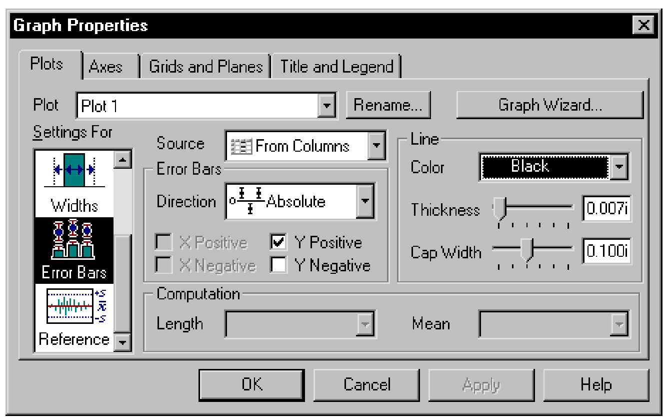
To change error bar appearance:

1. Double-click the plot to open the Graph Properties dialog box, and select the Error Bars option from the Settings For list.

   You can also select the plot and click the  button, or choose the Graph menu Graph Properties command, then select Error Bars from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the error bars to modify from the Plot list.

Figure 8–36
The Lines Settings of the Graph Properties Dialog Plots Panel



2. Select a color to use for error bars from the Line Color list. Choose (custom) to use a custom color, or to create your own color. For more information, see “Using Custom Colors” on page 146.
3. Use the Thickness and Cap Width slider controls to change line thickness and error bar cap width, or select the Thickness and Cap Width edit boxes and type a new value.
4. Apply your changes and close the dialog box by clicking OK, or click Apply to apply changes without closing the dialog box.

Changing Error Bar Directions

You can specify error bar direction using two different methods: absolute and relative. Absolute error bars can be specified to point in either a positive or negative direction; relative error bars can be specified to point either towards or away from zero.

To change error bar direction:

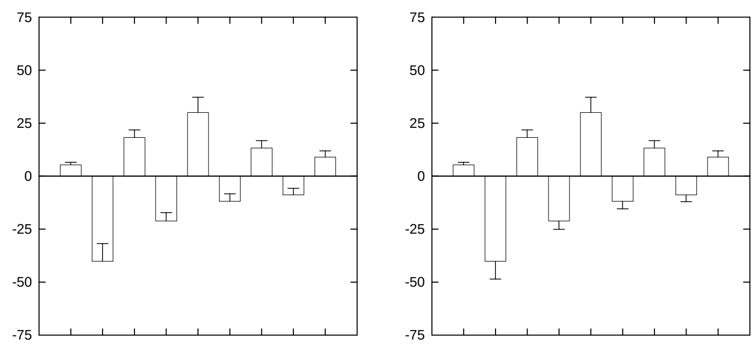
1. Double-click the plot to open the Graph Properties dialog box, and select the Error Bars option from the Settings For list.

   You can also select the plot and click the button, or choose the Graph menu Graph Properties command, then select Error Bars from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the error bars to modify from the Plot list.

2. To always point error bars in one direction, choose Absolute from the Direction list, then check either X or Y Positive or Negative. An X positive absolute direction always points right; a Y positive direction always point up. An X negative absolute direction always points left; a Y negative absolute direction always points down.

Figure 8–37
The bar chart on the left uses Y error bars with an absolute positive direction. The bar chart on the right uses a relative direction away from zero.



3. To orient error bar directions relative to zero, select Relative, and select X or Y From Zero or To Zero. A relative to zero direction always points toward or away from zero. This option is useful for bar charts that have negative values.

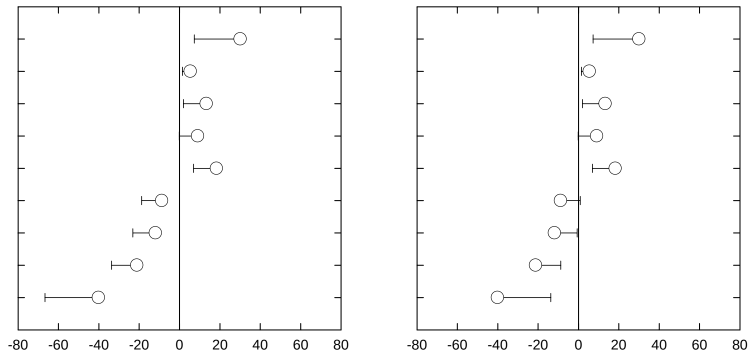


Figure 8–38
The bar chart on the left uses X error bars with an absolute negative direction. The bar chart on the right uses a relative direction towards zero.

4. Apply your changes and close the dialog box by clicking OK, or click Apply to apply changes without closing the dialog box.

Customizing Error Bar Directions

Control the error bar direction used for each data point by entering error bar directions into a worksheet column.

To use custom error bar directions:

1. Select the first cell in an empty worksheet column, then enter the codes for the error bar directions. The codes for the directions are:

Direction	Code
Absolute Positive	Positive or P
Absolute Negative	Negative or N
Relative From Zero	From Zero or F
Relative To Zero	To Zero or T
Absolute or Relative, Both Directions	Both, PN or FT

∑ Note that the codes you type in the worksheet can be either upper or lower case.

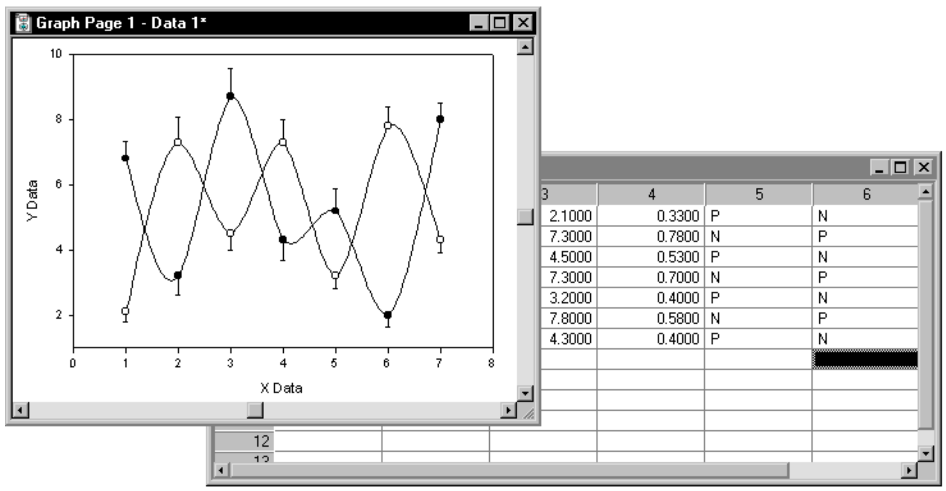
2. Double-click the plot to open the Graph Properties dialog box, and select the Error Bars option from the Settings For list.

You can also select the plot and click the button, or choose the Graph menu Graph Properties Dialog command, then select Error Bars from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the error bars to modify from the Plot list.

3. Use the Direction list to choose the name of the column which contains the error bar direction codes.

Figure 8–39 Error Bars Using Custom Directions from Worksheet Columns



Changing the Mean Computation Method

If you are using a log axis scale, you can choose between calculating the column means arithmetically (the default) or geometrically on a log scale.

To change the mean computation method:

1. Double-click the plot to open the Graph Properties dialog box, and select the Error Bars option from the Settings For list.

   You can also select the plot and click the button, or choose the Graph menu Graph Properties command, then select Error Bars from the Settings For list.

Σ If you opened the Graph Properties dialog box without first selecting the desired plot, choose the plot that contains the error bars to modify from the Plot list.

2. Select the desired mean computation from the Mean list under the Computation heading.

3. Apply your changes and close the dialog box by clicking OK, or click Apply to apply changes without closing the dialog box.

Σ This option is only available for log axis scales.

Changing Error Bar Source

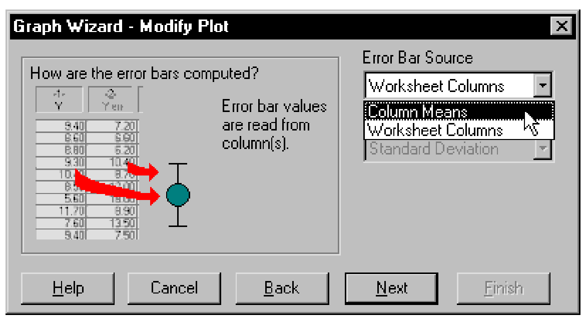
The method used to generate error bars is selected when creating a graph. You can select to generate error bars for your plot by plotting the means of worksheet columns as single data points and computing the error bars values from column statistics (column averaging), or using data in worksheet column(s) as error bar values (see “Creating Plots with Error Bars” on page 240).

To change the error bar source after you’ve created the graph:

1. Select the graph or plot to modify by clicking it. A selected graph or plot is surrounded by small square handles.

2. To change the error bar source from column means to values you entered in the worksheet, or vice versa, click the Graph Wizard button

Figure 8–40
The Graph Wizard - Modify Plot mode is used to change the error bar source for a plot.



3. Use the Graph Wizard Error Bar Source option to change the error bar source to the new type, then click Next.

4. Pick the appropriate worksheet columns, then click Finish. The graph appears with the new error bars.

Modifying Box Plots

Modifying Box Plot Fills, Widths, and Symbols

The fill, width, and symbol settings for the boxes can be modified using the appropriate Graph Properties Plot panel settings.

➤ For changing the symbols used to display extreme data points, see “Changing Symbol Type and Other Symbol Options” on page 176.

➤ For changing box fill color and patterns (including edge and whisker color), see “Changing Patterns and Fill Colors” on page 188.

➤ For changing box widths, see “Changing Bar and Box Widths and Spacing” on page 193.

Changing Other Box Plot Attributes

To add a mean line, change which outliers are displayed, and change the 10th and 90th percentile whisker cap widths:

1. Double-click the plot to open the Graph Properties dialog box, and select the Box Options from the Settings For list.

   You can also select the plot and click the  button, or choose the Graph menu Graph Properties command, then select Box Options from the Settings For list.

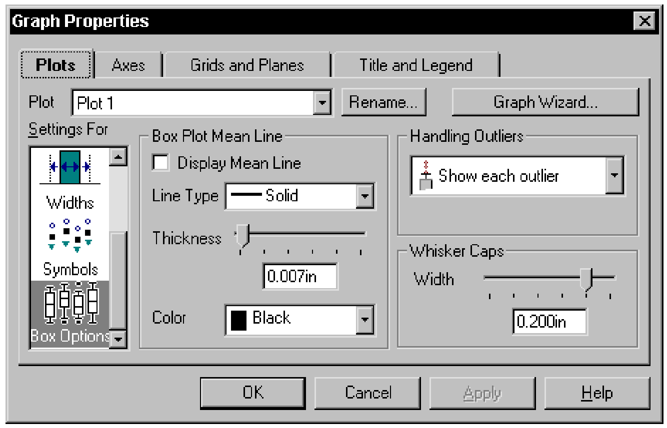
2. **To display a mean line in addition to the median line,** use the Box Plot Mean Line Options. Check the Display Mean Line box by selecting it to display the mean line. If the box is not checked, the mean line is not displayed.

3. **To modify the mean line,** choose a mean line type from the Line Type list, then select a line thickness and color using the Thickness and Color options.

   Selecting (none) from the Line Type or Color lists creates a transparent mean line. Selecting (custom) from the color list enables you to use a custom mean line color, or to create a new color.

For more information, see “Using Custom Colors” on page 146.

Figure 8–41 The Box Options Settings of the Graph Properties Plots Panel



4. **To change how outliers are handled,** use the Handling Outliers list. Choose either to Show Each Outlier (outside the 10th and 90th percentiles), or only to Show 5th/95th Percentiles. To hide outliers, or modify outlier symbols, use the Symbols settings. For more information on modifying symbols, see “Changing Symbol Type and Other Symbol Options” on page 176.

Σ Note that at least six data points are required to compute the 5th and 95th percentiles, and that there may not be any points beyond the 10th and 90th percentiles.

5. **To modify whisker cap width,** use the Whisker Caps option Width slider control, or select the Width edit box and type a new value.

6. Click Apply to apply changes without closing the dialog box, or click OK to apply changes and close the dialog box.

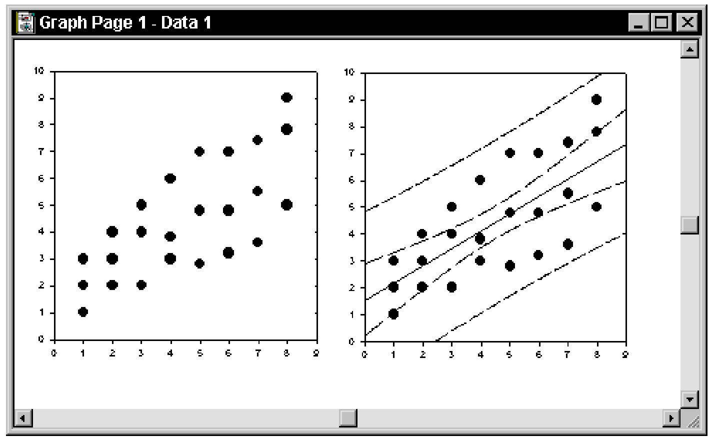
Regression Lines

You can automatically compute and draw linear and polynomial regressions with confidence and prediction intervals. The regression equation can be computed using all the data in a plot, or individually for each curve in a multiple-curve plot. Polynomial curves can be fitted up to the 10th order.

Regressions for column averaged data are computed using all the data from the columns, not from just the mean value. Regressions are computed and drawn linearly on nonlinear (*e.g.,* log, probability, *etc.*) axis scales.

Regression equation coefficients, R^2 values, and predicted values can be viewed and copied to the Clipboard.

Figure 8–42
A scatter plot before and after a 1st order regression with 95% confidence and prediction intervals was added.



To perform nonlinear regressions and curve fits, such as sigmoidal, exponential, and peak functions use SigmaPlot's Regression Wizard. The Regression Wizard provides an extensive set of equations for curve fitting. For a complete description of these capabilities, see the *Programming Guide*.

SPSS's SigmaStat statistical program also provides comprehensive linear and nonlinear regression diagnostics and results, and is designed to interface directly with SigmaPlot.

Creating a Graph with a Regression Line

You can add a first order regression to a graph by selecting one of the graph styles that has a regression. These styles are available for scatter plots; "Scatter Plots" on page 155. If you want to add a regression line to a non-scatter plot, follow the directions below.

Modifying and Adding Linear Regression Lines

To modify or add an automatically calculated regression to a plot:

1. Select the plot to fit a line to by clicking it, then choose the Statistics menu Linear Regression command. Select the Regression Line tab to display the Regression Line panel.

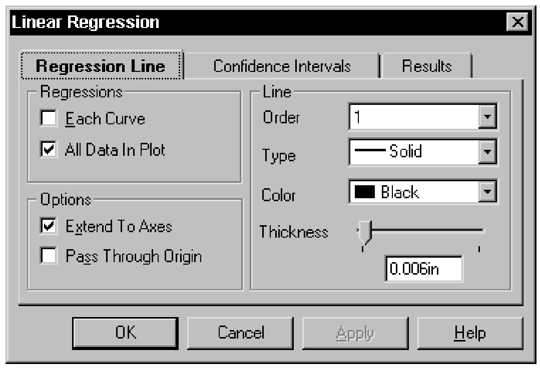


Figure 8–43 The Regression Line Panel of the Linear Regression Dialog Box

2. Select either Each Curve to draw a regression for the data in each curve of the selected plot, or All Data In Plot to draw a single regression for all of the data in the selected plot. A check mark indicates that the regression will be drawn; hide a regression line by clearing the box.

Σ If neither box is checked a regression is not drawn. If both boxes are checked, regressions are drawn for each curve *and* for all the data in the plot.

3. To specify the order of the regression, choose the desired order from the Order list. You can use up to 10th order polynomials as regressions; the default is 1st order (a linear regression).
4. Select the type of line to use for the regression from the Line options Type list.
5. Use the Color list to specify the color of the regression line. Use a predefined color, or choose (custom) to use a custom color or to create a custom color. If creating regression lines for multiple curves, use one of the many available color schemes to increment line colors. Choosing (none) creates a transparent regression line.

   For more information, see “Using Custom Colors” on page 146.
6. Use the Thickness slider control to change line thickness, or select the Thickness edit box and type a value to use for line thickness.
7. Regression lines normally extend over the range of the data. To set the extent of regression line(s) all the way across the graph, select the Extend to Axes option.
8. To force a regression line through the origin (0,0), select the Pass Through Origin option. Note that the regression line will not actually touch the axes unless the Extend To Axes option is also selected.

9. Click Apply to apply changes without closing the dialog box, or click OK to apply changes and close the dialog box.

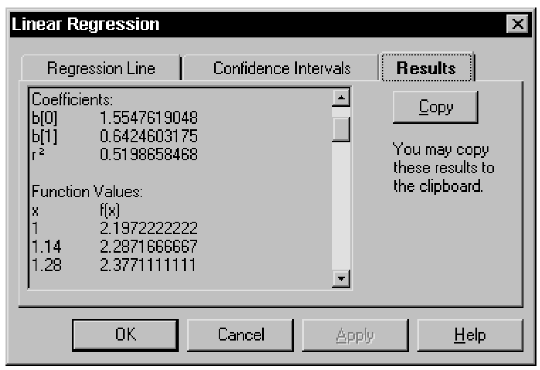
   For a description of the calculation of confidence and prediction intervals, see “Linear Regression, Confidence, and Prediction Calculation” on page 268.

Viewing and Saving Regression Equation Results

If you want to view and save the coefficients of the regression(s), select the Results tab of the Linear Regression dialog box. The Results panel appears displaying regression equation results.

The regression equation coefficients, correlation coefficient R^2, and function results are displayed for each regression curve computed. If you computed confidence and prediction intervals, these values are also displayed.

Figure 8–44 The Results Panel of the Linear Regression Dialog Box



Click Copy to copy the results and paste them into the worksheet, a report, or any other Windows application. For a description of the calculation of confidence and prediction intervals, see “Linear Regression, Confidence, and Prediction Calculation” on page 268.

Adding Confidence and Prediction Intervals

SigmaPlot can draw lines which describe either the 95% or 99% confidence and prediction intervals around a regression line.

Confidence intervals, also called the confidence interval for a regression, describe the range where the regression line values will fall a percentage of the time for repeated measurements.

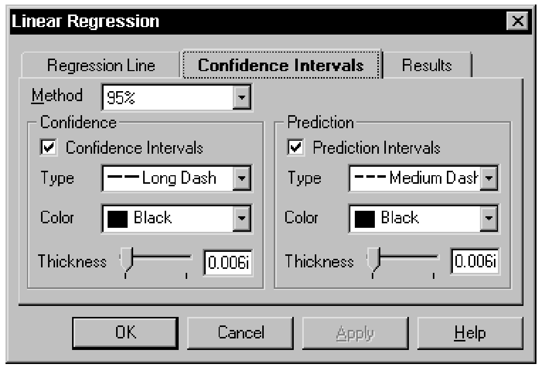
Prediction intervals, also called the confidence interval for the population, describe the range where the data values will fall a percentage of the time for repeated measurements.

Σ Note that you must compute a regression in order to compute confidence and prediction lines. To learn about adding regression lines, see “Modifying and Adding Linear Regression Lines” on page 266.

To add prediction and confidence lines:

1. Choose the Statistics menu Linear Regression command, then select the Confidence Intervals tab from the Linear Regression dialog box.

Figure 8–45
The Confidence Intervals Panel of the Linear Regression Dialog Box



2. Choose the method of prediction to use from the Method list. Select either 95% or 99% for confidence and prediction intervals.
3. Select the Confidence Interval and/or Prediction Interval option and select a line type and color, then use the thickness slider control or edit box to set line thickness. Line color, type, and thickness options work identically to the regression line type, color, and thickness options.
4. Click Apply to apply options, or OK (or Close) to apply options and close the dialog box.

For information on viewing confidence and prediction interval results, see "Viewing and Saving Regression Equation Results" on page 267.

Linear Regression, Confidence, and Prediction Calculation

Regression Calculation: SigmaPlot linear regression uses least squares to fit a set of data points (x_i, y_i) $i = 1, ..., n$ to a polynomial of order p where:

$$y = \beta_0 + \beta_1 x + \beta_2 x^2 + \ldots + \beta_p x^p$$

In vector-matrix notation this problem is formulated as:

$$Y = X\beta + \varepsilon$$

where the $n \times 1$ vector containing the y_i data is:

$$Y = \begin{bmatrix} y_1 \ y_2 \ \ldots y_n \end{bmatrix}$$

and the n **x** $(p+1)$ design matrix is:

$$X = \begin{bmatrix} 1 & x_1 & x_1^2 & \dots & x_1^p \\ 1 & x_2 & x_2^2 & \dots & x_2^p \\ \dots & \dots & \dots & \dots & \dots \\ 1 & x_n & x_n^2 & \dots & x_n^p \end{bmatrix}$$

β is a $(p+1)$ **x** 1 vector of parameters to be estimated:

$$\beta = \begin{bmatrix} \beta_0 \; \beta_1 \dots \; \beta_p \end{bmatrix}$$

ε is an n **x** 1 vector of residuals.

The solution for the least squares estimates of the parameters β is:

$$b = (X'X)^{-1}X'Y$$

SigmaPlot uses the Cholesky decomposition to invert the $X'Y$ matrix (see Dongarra, J.J., Bunch, J.R., Moler, C.B., and Stewart, G.W., *Linpack User's Guide*, SIAM, Philadelphia, 1979). This produces the regression curve

$$\hat{y} = b_0 + b_1x_0 + b_2x_0^2 + \dots + b_px_0^p$$

For further details on matrix linear regression, refer to chapter 2 of Draper, Norman, and Smith, Harry, *Applied Regression Analysis, Second Edition*, John Wiley & Sons, Inc., New York, 1981.

Confidence Interval Calculation

Given a set of ***n*** data points (x_i, y_i) from two columns in the worksheet, SigmaPlot computes the p^{th} order polynomial regression:

$$\hat{y}_0 = b_0 + b_1x_0 + b_2x_0^2 + \dots + b_px_0^p$$

where $(b_0, b_1, ..., b_p)$ are the $p + 1$ estimated parameters and $\hat{y}_0$ is the Y value predicted for any x_0.

The confidence interval for this calculated regression is defined by the two confidence limits:

$$\hat{y}_0 \pm t(n-p-1)s\sqrt{X'_0(X'X)^{-1}X_0}$$

where X_0 is the $(p+1)$ $\boldsymbol{x}$ 1 vector defined by:

$$X_0 = \begin{bmatrix} 1 & x_0 & x_0^2 & \dots & x_0^p \end{bmatrix}$$

X is the $\boldsymbol{n}$ $\boldsymbol{x}$ $(p+1)$ design matrix:

$$X = \begin{bmatrix} 1 & x_1 & x_1^2 & \dots & x_1^p \\ 1 & x_2 & x_2^2 & \dots & x_2^p \\ \dots & \dots & \dots & \dots & \dots \\ 1 & x_n & x_n^2 & \dots & x_n^p \end{bmatrix}$$

s is obtained from the variance about the regression:

$$s^2 = \sum_{i=1}^{n} \frac{(y_i - \hat{y}_i)^2}{(n-2)}$$

and the t value for $\boldsymbol{n-p-}$ 1 degrees of freedom and the standard normal percentile equivalent z (z = 1.96 or 2.576 for 95% and 99% confidence intervals respectively) is computed from a six term rational polynomial approximation taken from Sahai, H. and Thompson, W., "Comparisons of Approximation to the Percentile of t, χ^2, and F Distributions," *Journal of Statistical Computation and Simulation* , 1974, Vol. 3, pp. 81-93.

Prediction Interval Calculation

The prediction interval is calculated using the following equation:

$$\hat{y}_0 \pm t(n-p-1)s\sqrt{1 + X'_0(X'X)^{-1}X_0}$$

Adding Reference Lines

You can add horizontal or vertical lines at specific locations using the Graph Properties Plots panel Reference settings. Reference lines can be used to draw lines at specific values, to set quality control limits, and specify other reference values.

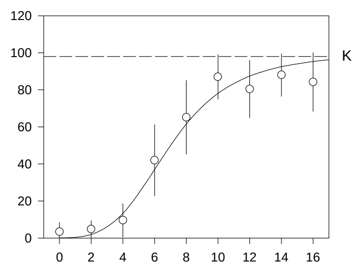
Σ Bar and stacked bar charts automatically place a reference line at the zero value.

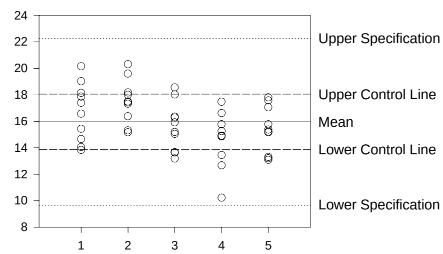
Up to five reference lines can be added. All lines can be drawn only horizontally or vertically as a set. The Reference settings display the current calculation, line type, label, and color for each line.

Σ One set of five reference lines, either horizontal or vertical, can be drawn for each plot. If you need more than five lines or need both horizontal and vertical lines, you must create an additional plot. For information on creating multiple plots, see “Multiple Plots on a Graph: Adding New Plots” on page 170.

Figure 8–46
Graphs Using Reference Lines

Reference lines can be drawn at both constants and at automatically calculated statistics.





Drawing Reference Lines

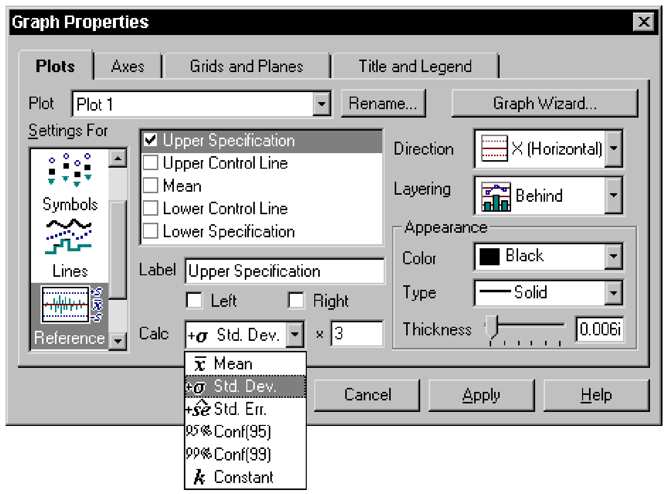
To draw reference lines:

1. Double-click the plot to open the Graph Properties dialog box, and select the Reference option from the Settings For list.

   You can also select the plot and click the button, or choose the Graph menu Graph Properties command, then select Reference from the Settings For list.

2. Select a reference lines to draw by selecting its check box. You can add up to five lines for each plot. The default names and calculations are the names commonly used when employing reference lines for quality control charts.

Figure 8–47
The Reference Settings of the Graph Properties Dialog Plots Panel



3. To change the reference line name, select the line from the list, then edit the Label box for that line.

   To display the label next to the reference line, check either the Left and/or Right check boxes for horizontal reference lines, or Top and/or Bottom check boxes for vertical reference lines.

4. To change the value or statistic used for the line, select an option from the Calc list.

   If you are not using a mean as the calculation, type a value to multiply the statistic by, or a value to use as a constant, in the box next to the Calc list. The calculation options apply only to the reference line highlighted in the Graph Properties dialog box list of reference lines.

   To set the reference line value to a specific value, select the Constant Calc option, and enter the value to the right.

   Automatically calculated statistics are derived from the plot data. All data points graphed, including multiple columns of data, are used for reference line calculations.

5. Use the Appearance options to set a line type, thickness, and color for the highlighted reference line. Each reference line can have separate line attributes.

6. Use the Direction list to draw reference lines horizontally or vertically.

7. Use the Layering list to draw reference lines either Behind or In Front of the selected plot.

8. Click Apply when finished modifying the current reference line, then highlight another reference line to continue modifying reference lines, or click OK.

Creating Multiple 2D Axes

About Axes and Plots

New pairs of X or Y axes can be created if you have more than one plot on a graph and you want to scale these plots differently.

Σ Additional axes can only be created for 2D Cartesian plots.

To learn about adding a plot to a graph, see "Multiple Plots on a Graph: Adding New Plots" on page 170. More more information on working with grids and axes, see "Modifying Axes and Grids" on page 199.

Creating Additional Axes for Multiple Plots

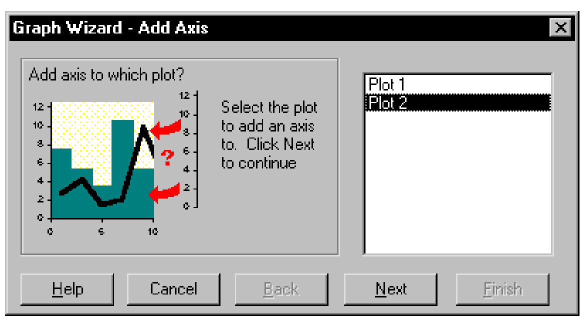
If you have more than one plot on a graph and want to use multiple axes, use the following steps to add additional axes.

To create additional an additional axis:

1. Right-click the plot you want to add a new axis for.
2. Choose Add New Axis. The Graph Wizard appears.

You can also select the graph to modify, then choose the Graph menu Add Axis command to open the Graph Wizard – Add Axis dialog box. This command remains dimmed until you create additional plots.

Figure 8–48 Using the Graph Wizard - Add Axis Dialog Box to Select the Plot for the New Axis

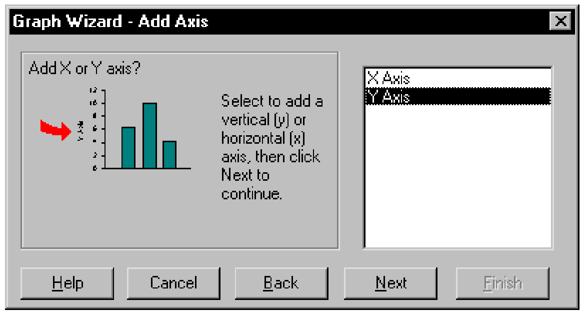


If necessary, select the plot to add the new axis to, then click Next.

3. Select to create either a new X axis or Y axis for the specified plot.

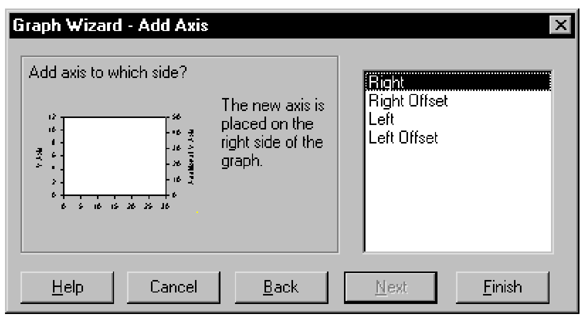
4. Click Next.

Figure 8–49
Selecting to Create a New Y Axis for the Selected Plot



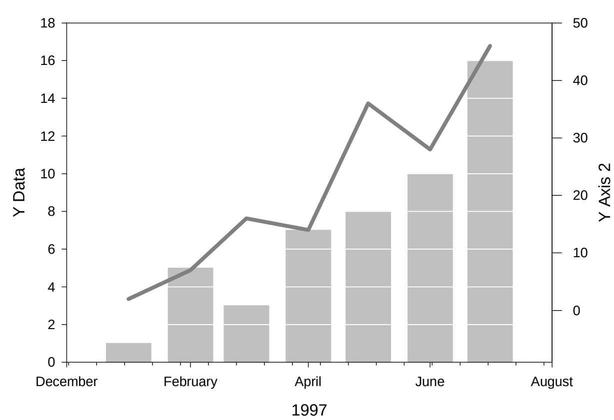
5. Select which side of the graph to add the new axis to. You can add the new axis to the left, right, top, or bottom of the graph. Selecting an Offset location moves the new axis slightly to the side, top, or bottom of the original axis.

Figure 8–50
Specifying Where to Place the New Y Axis on the Graph



6. Click Finish to add the new axis according to the specified settings. The New axis appears on the graph, and the plot re-scales to reflect the new axis.

Figure 8–51
Example of a Second Y Axis Added to the Graph for a Line Plot

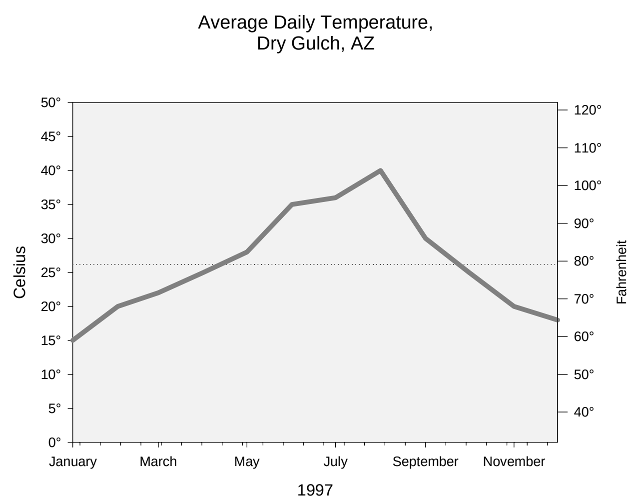


Creating Multiple Axes for a Single Plot

If you want to use two or more X or Y axes for a single plot (for example, to show two different units of measurement), you can create a plot which graphs empty columns, then add an axis to the empty plot.

1. Add a second plot to that graph. Right-click the graph and choose Add New Plot, or select the graph, then use the graph toolbar or the graph wizard. The plot type does not matter, so long as it is a 2D Cartesian plot.
2. Pick any data format. When prompted to select the data to plot, pick empty columns.
3. To create multiple axes, use the Graph menu Add Axis command. Create an axis for this "dummy" plot at the desired location
4. Select the new axis, then use manual scaling to set the appropriate range and tick interval for the new axis. This scale is often a linear transformation of the opposite axis scale, for example, a Celsius scale to a Fahrenheit scale.

Figure 8–52
The second temperature axis for the single plot was created by first creating a "dummy" plot, creating a Y axis for the dummy plot, then manually scaling the axis range.



To learn more about creating and modifying axes, see "Modifying Axes and Grids" on page 199.

Notes

9

Working with 3D and Contour Graphs

This chapter describes 3D graphs and procedures specific to 3D graphs. To learn about making general graph modifications like changing symbols, lines, or fills, see "Creating and Modifying Graphs" on page 151.

This chapter covers:

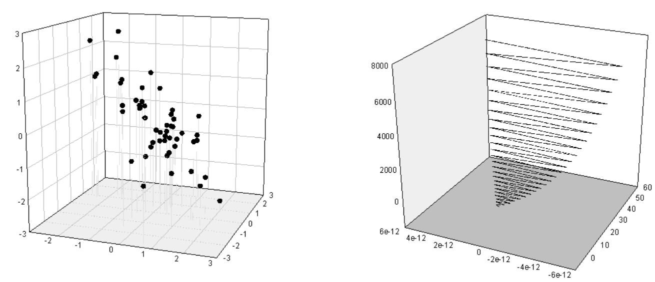
3D Plots

3D (XYZ) plots can be created from many worksheet columns or column triplets. XYZ plots must have at least one plot, but can hold many more plots, each with a different type and style. Graphs can be rotated and shading can be added to enhance the height and depth of mesh and bar charts. To learn about rotating graphs, see "Changing Graph Perspective, Rotation, and Shading" on page 292. For information on adding a light source to 3D graphs to produce shading, see "Changing the View of a 3D Graph" on page 292.

3D Scatter and Trajectory Plots

3D scatter and trajectory plots graph data as symbols, as lines only with no symbols, or as symbols and lines. Use the Graph Properties dialog box Plots panel Symbols settings to add symbols to a trajectory plot, or the Lines settings to add lines to a scatter plot. To learn about modifying or adding symbols and lines, see “Changing Symbol Type and Other Symbol Options” on page 176, and “Changing Line Type and Other Line Options” on page 185.

Figure 9–1 Examples of a 3D Scatter Plot and a Trajectory Plot

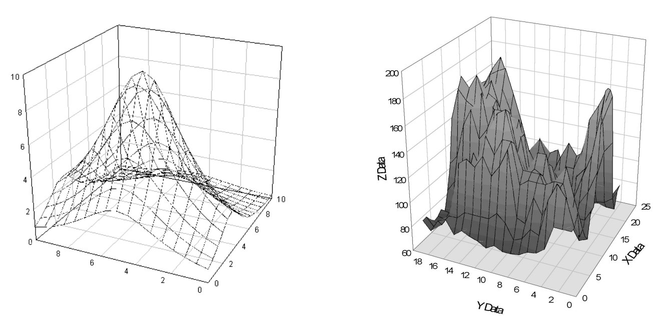


Drop lines to any back plane can be added to either of these plot types. For more information on adding drop lines, see “Adding and Modifying Drop Lines” on page 196.

Mesh Plots

Mesh plots graph 3D data as a continuous surface with a mesh. Use the Graph Properties dialog box to modify mesh lines, color, transparency, and to enable the light source for shading. To learn more about modifying meshes, see “Changing Mesh Lines and Fill Color” on page 291 and to learn about using the light source, see “Changing the View of a 3D Graph” on page 292.

Figure 9–2 Examples of a Mesh Plot with No Fill Color and with a Gradient of Colors



3D Bar Charts

Create bar charts in 3D space using 3D data. Modify 3D bar charts by changing fill color and pattern, and adjusting bar width and spacing.

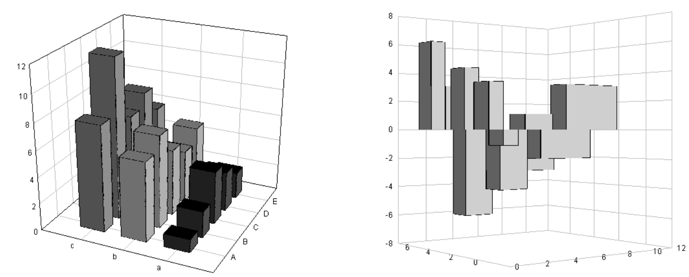


Figure 9–3
An Example of a 3D Bar Chart

For information on changing bar chart fill color and pattern, see “Changing Patterns and Fill Colors” on page 188. To learn about modifying bar width and spacing, see “Changing Bar and Box Widths and Spacing” on page 193.

Arranging Data for Contour Plots and 3D Graphs

Organize data for SigmaPlot graphs by column. Typically, data for contour plots and 3D graphs is composed of X, Y, and Z value columns, or one or more Z columns and optional X and Y columns. 3D bar charts, scatter plots, and line plots can use any three columns as XYZ data; however, contour and mesh plots require a strict arrangement of the data.

Σ If multiple Z columns are plotted, they must be continuous, that is, they all must be next to each other. The X and Y columns can be located anywhere.

Data for 3D Bar Charts, 3D Scatter Plots, and 3D Line Plots

Data for 3D bar charts, scatter plots, and line plots can be arranged either as XYZ triplet data, multiple columns of Z data, or as a single column for Y values, a single column for X values, and multiple columns for Z values. For each of these graph types, the data in each row is graphed as a data point. For bar charts, each column of Z data is plotted as a row parallel to either the X axis, with Y values as the constants.

If you are formatting XYZ triplet data, you also can use one of the multiple Z column formats designed for 3D mesh plots. For more information, see “Data for Contour and Mesh Plots” on page 280.

Σ 3D bar charts cannot use XYZ triplet data; however, you can plot your data using the X,Y, many Z format without having more than one Z column. For 3D scatter plots, the data can be entered in any order.

Data for Contour and Mesh Plots

Data for a contour or mesh plot requires XYZ coordinates for each intersection of a rectangular mesh.

	Y_1	Y_2	Y_3	Y_4
X_1	Z_1	Z_4	Z_7	Z_{10}
X_2	Z_2	Z_5	Z_8	Z_{11}
X_3	Z_3	Z_6	Z_9	Z_{12}

The arrangement of this data for the three possible methods of picking columns to plot are described in the following sections.

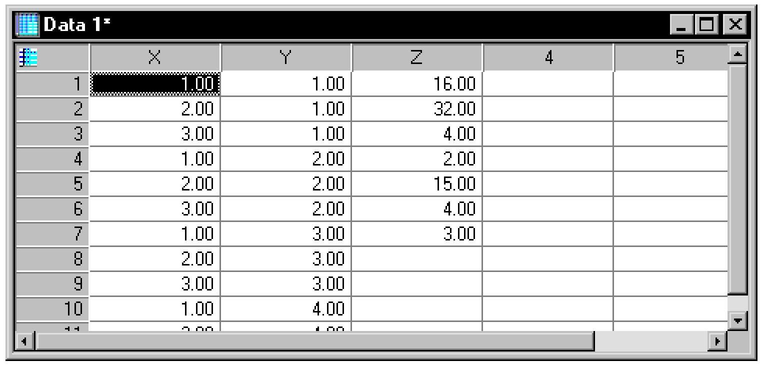
X, Y, and Z Data in Three Columns: To plot three columns as the X, Y, and Z values of a contour or mesh plot, the data must be in *long form mesh format*. This format assigns the proper Z value to each X and Y point in the mesh, in the required order.

For example, for the table of X, Y, and Z values shown above, the three column mesh format must be arranged as:

X data	Y data	Z data
X_1	Y_1	Z_1
X_2	Y_1	Z_2
X_3	Y_1	Z_3
X_1	Y_2	Z_4
X_2	Y_2	Z_5
X_3	Y_2	Z_6
X_1	Y_3	Z_7
X_2	Y_3	Z_8
X_3	Y_3	Z_9
X_1	Y_4	Z_{10}
X_2	Y_4	Z_{11}
X_3	Y_4	Z_{12}

This arrangement places the XYZ data point coordinate values in the required order. The XYZ columns must be the same length.

Figure 9–4 Data Arranged in Long Form Mesh Format



Data 1*

	X	Y	Z	4	5
1	1.00	1.00	16.00		
2	2.00	1.00	32.00		
3	3.00	1.00	4.00		
4	1.00	2.00	2.00		
5	2.00	2.00	15.00		
6	3.00	2.00	4.00		
7	1.00	3.00	3.00		
8	2.00	3.00			
9	3.00	3.00			
10	1.00	4.00			

X and Y Columns vs. Many Z Columns: You can also place the X and Y data in single columns, then place the corresponding Z data in many continuous columns. This method may work best if you have XYZ data laid out in a table, or if you have irregularly incremented X or Y values.

To use this option, your Z columns must be contiguous, you should have as many Z columns as you have Y rows, and the Z columns should be the same length as the X column.

X data	Y data	Z data			
X_1	Y_1	Z_1	Z_4	Z_7	Z_{10}
X_2	Y_2	Z_2	Z_5	Z_8	Z_{11}
X_3	Y_3	Z_3	Z_6	Z_9	Z_{12}
	Y_4				

The data in the first Z column is assigned to the first Y value, the data in the second Z column to the second Y value, etc.

The data in each row of the X column is assigned as the X value for the data in the same row in the Z columns.

Figure 9–5
XYZ Data Arranged as One X Column, One Y Column, and Many Z Columns

Data 1*

	x	y	z1	z2	z3
1	1.00	2.00	3.00	1.00	2.00
2	1.00	1.00	16.00	2.00	2.00
3	2.00	1.00	32.00	2.00	15.00
4					
5					
6					
7					
8					
9					
10					

The X and Y data must be strictly ascending or descending. Note that in this case, you can use columns of uneven length. Extra X, Y, or Z values created by uneven columns are not plotted, as mesh plots cannot graph missing values.

Z Data vs. Row and Column Numbers: You can also plot columns as Z values versus the cell columns and row numbers as the X and Y values.

This is the appropriate column assignment option to use: for mesh plots and 3D Bar Charts where X and Y values are evenly and equally spaced; for example, when graphing pixel intensity data for an image.

All data is assigned as a Z value, and the Z columns must be contiguous. To use this format for a mesh plot, no special data arrangement is required other than equal column length. The rows and columns of the cells can be used as either the X or Y values.

Figure 9–6
Mesh Plot Data Arranged as Z Data Versus Row and Column Numbers

Data 1*

	z1	z2	z3	4	5
1	16.00	2.00	3.00		
2	32.00	15.00	8.00		
3	4.00	4.00	23.00		
4					
5					
6					
7					
8					

Creating 3D Scatter Plots, Trajectory Plots, and Bar Charts

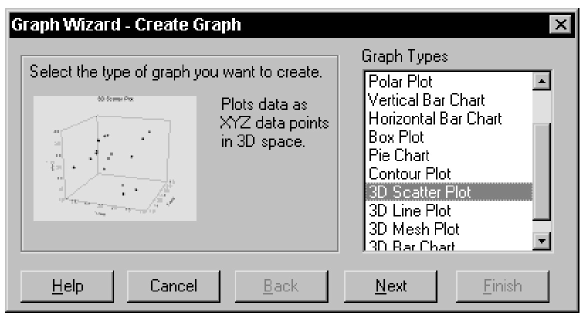
To create a 3D scatter plot, trajectory plot, or bar chart:

1. If you want to select worksheet data before creating the graph, select the worksheet columns to plot by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.
2. Select the desired graph type and style from the graph toolbar. You can also click the toolbar button, or choose the Graph menu Create Graph command. The Graph Wizard appears.

Σ Note that during the graph creation process, the left side of the Graph Wizard changes depending on what is selected on the right side of the dialog box.

3. If you did not use the graph toolbar to open the Graph Wizard, select the type of graph you want to make from the scroll box in the dialog box. Use the scroll bars to view the entire list. Select the desired graph type, then click the Next button.

Figure 9–7
The Graph Wizard Displaying a List of Graph Types

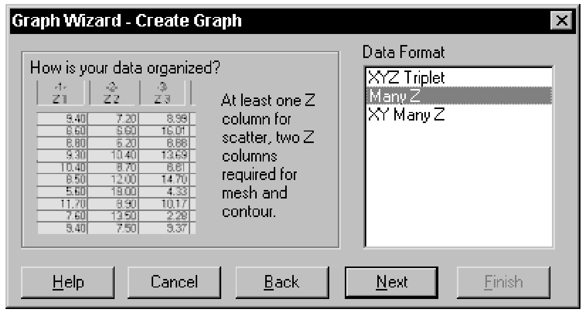


4. Specify how your data is formatted by choosing the appropriate data format from the Data Format list. The data formats available depend on the graph type you are making. Choose the appropriate data format, then click Next.

   Scatter and trajectory plots can use any data format; however, bar charts are limited to XY Many Z or Many Z only. For more information on the available data formats for the graph you are making, see the description of the graph type in

"SigmaPlot Graph Types" on page 153.

Figure 9–8
Using the Graph Wizard to Specify the Data Format

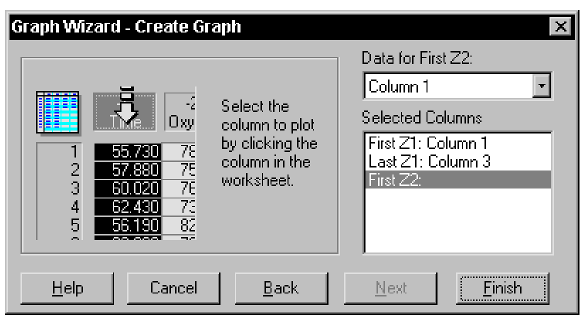


5. Specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box and you can click Finish to create the graph.

   If you have not already picked columns, note that a single data type is highlighted in the Selected Columns box. This shows the data type you are picking a column for. Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data Columns list. Repeat this process for every column you are using to create your graph.

6. If you make a mistake while picking data, select the wrong entry in the Graph Wizard, then choose the correct column from the worksheet.

Figure 9–9
Using the Graph Wizard to Pick Columns to Plot



7. When you are done picking data, click Finish to create the plot and close the Graph Wizard.

Use the Graph Properties dialog box to modify the plot, or reopen the Graph Wizard to pick different data columns for your plot, or to add another plot to your graph. For more information on making general modifications to your plot, see "Creating and Modifying Graphs" on page 151.

Creating Mesh Plots

When you create a mesh plot you can choose between solid and transparent mesh with discrete or gradient shading. A *transparent mesh* can be used to highlight the relationship of one mesh plot to another on the same graph.

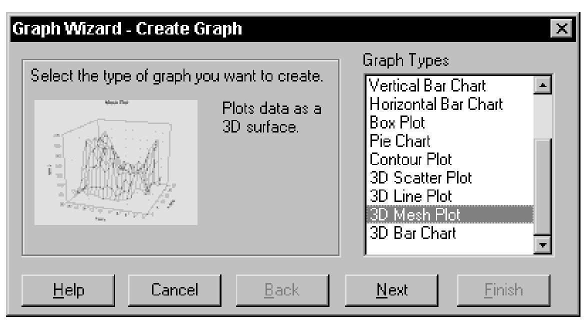
To create a 3D mesh plot:

1. If you want to select worksheet data before creating the graph, select the columns to plot by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation. For more information on data formats for mesh plots, see “3D Plots” on page 277.
2. Select the desired graph type and style from the graph toolbar. You can also click the toolbar  button, or choose the Graph menu Create Graph command. The Graph Wizard appears.

Σ Note that during the graph creation process, the left side of the Graph Wizard changes depending on what is selected on the right side of the dialog box.

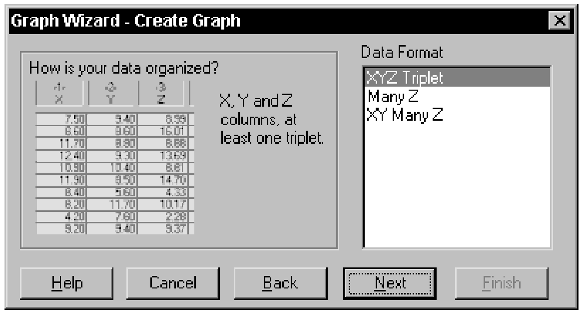
3. If you did not use the graph toolbar to open the Graph Wizard, select the type of graph you want to make from the scroll box in the dialog box. Use the scroll bars to view the entire list. Select the desired graph type, then click the Next button.

Figure 9–10 The Graph Wizard Displaying a List of Graph Types



4. Specify how your data is formatted by choosing the appropriate data format from the Data Format list. Choose either XYZ triplet data, many Z columns, or single X and Y columns with many Z columns, then click Next.

Figure 9–11
Using the Graph Wizard to Specify the Data Format



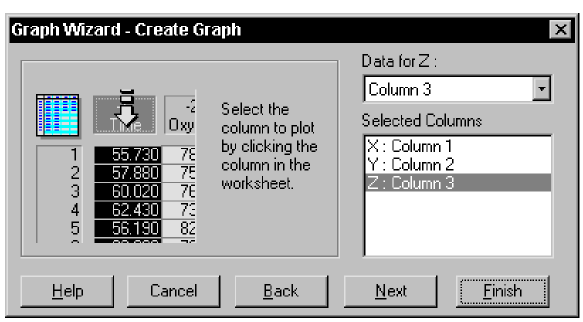
Σ 3D mesh plots use an XYZ coordinate system; the data points are graphed as intersections of a mesh grid. If you select Many Z as the data format, SigmaPlot uses column numbers as the X values, and row numbers as the Y values. If you are using XYZ triplet data, you may need to reformat the data. For more information on using XYZ triplet data for a mesh plot, see “Converting Unordered XYZ Triplet Data to Mesh Format” on page 287.

5. Specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box and you can click Finish to create the graph.

   If you have not already picked columns, note that a single data type is high-lighted in the Selected Columns box. This shows the data type you are picking a column for. Begin picking data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data Columns list. Repeat this process for every column you are using to create your graph.

6. If you make a mistake while picking data, select the wrong entry in the Graph Wizard, then choose the correct column from the worksheet.

Figure 9–12
Using the Create Graph Dialog Box to Pick Columns to Plot



7. When you are done picking data, click Next to pick data for an additional mesh plot, or click Finish to create the plot and close the Graph Wizard.

Use the Graph Properties dialog box to modify the plot, or reopen the Graph Wizard to pick different data columns for your plot, or to add another plot to your graph. For more information on making general modifications to your plot, see "Creating and Modifying Graphs" on page 151. For information on changing mesh attributes, see "Changing Mesh Lines and Fill Color" on page 291.

Converting Unordered XYZ Triplet Data to Mesh Format

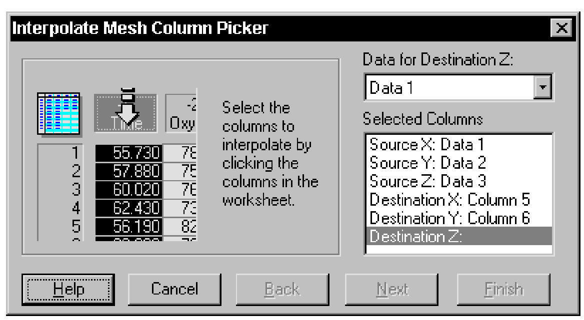
To convert a three column XYZ scatter plot to a mesh plot or take 3D scatter data and create a 2D contour plot, you can interpolate the mesh grid and graph the new data points as a contour or mesh plot.

Σ Note that because the inverse distance algorithm looks at the value of every original data point when calculating the value for each interpolated data point, large data sets will take a long time to process.

To interpolate mesh data:

1. Choose the Transforms menu Interpolate 3D Mesh command. The Interpolate Mesh Column Picker dialog box appears prompting you to select the source column for the X data.
2. Select the column with the original X data from the worksheet or the Data Source list. The selected column is assigned as the X Source in the Selected Columns list and you are prompted to select the Y data source.

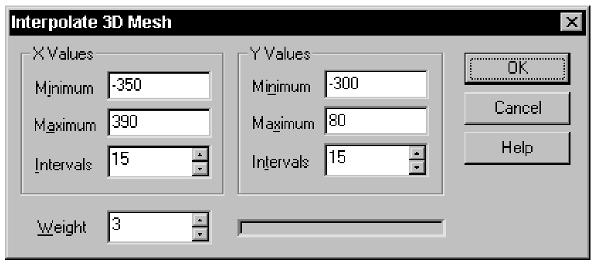
Figure 9–13 Selecting the Data Columns to Interpolate from the Interpolate Mesh Column Picker Dialog Box



3. Select the Y and Z columns from the worksheet or the Data Source list. You are prompted to select the X data destination column.
4. Select the X, Y, and Z destination columns as prompted, then click Finish. The Interpolate 3D Mesh dialog box appears.

5. If desired, change the Minimum and Maximum for the X and Y values to new beginning and ending values for the X and Y ranges. The X and Y Minimum and Maximum options display the minimum and maximum X and Y mesh values for the mesh. The default values are the smallest and largest values in the X and Y columns.

Figure 9–14
The Interpolate 3D Mesh Dialog Box



6. If desired, change the X and Y Intervals options. This is the number of intervals; the number of spaces created between the mesh lines.

7. If desired, change the Weight option value used to determine the weight of distant points in effecting the interpolation of values. Using a smaller weight results in a mesh that passes further away from the original data. A larger weight places greater emphasis on the nearest data points, resulting in a mesh passing closer to the data. For examples of the effects of different weight values, see Figure 9–16.

Σ If you use a low weight value and your original data points do not fall on the mesh intersections, the resulting mesh will not pass through the original data. You can either ensure that each original data point falls on a mesh intersection (using the Number of X and Y Values options), or use a higher weight value.

8. Click OK. Three columns of data—X, Y, and Z—are placed in the previously selected columns.

9. To graph the data, choose the Graph menu Create Graph command and create either a new contour plot or 3D mesh plot. For an existing 3D scatter plot, select the plot, click the toolbar Graph Wizard button, click Back, select 3D Mesh Plot, select XYZ as the data format, then repick the interpolated data as the data to plot.

For instructions on plotting XYZ data as a mesh plot, see “Creating Mesh Plots” on page 285.

Effects of Weight Values

The effect of changing the weight value varies from data set to data set. The effect depends on the differences in the Z values, the ratio of the number of original data points to the number of interpolated data points, and the number of grid lines (X and Y values). Low weights tend to produce a surface with spikes at the data points; large weights produce step-like surfaces.

Figure 9–15
A Scatter Plot and a Mesh Plot of the Interpolation Results

The interpolation used a weight of 3.0.

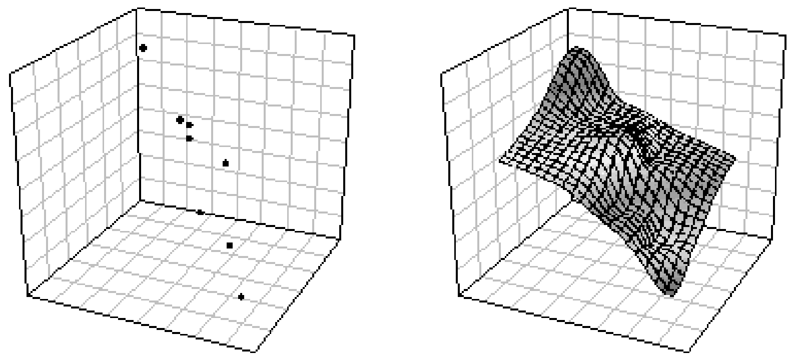
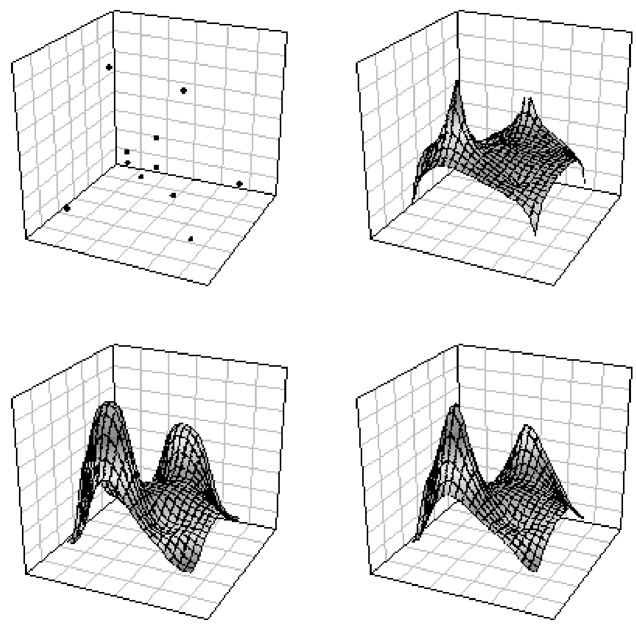


Figure 9–16
The Effect of Different Weight Values on Mesh Interpolation

From top left clockwise: original scatter data, weight value of 1, a weight of 2, and a weight of 3.

Note that for a weight of 1, the mesh does not pass through the highest data points, as the XY coordinates of the mesh points do not coincide with the original data points.



You may have to experiment with different weight values to determine the best results. Weights between 2 to 5 are generally recommended. For a mathematical description of the weight value, see the following section, “Inverse Distance Method” on page 289.

Inverse Distance Method

SigmaPlot uses an inverse distance method to generate Z values for an evenly spaced XY grid from XYZ triplet data.

Given n (x,y,z) triplets (x_1,y_1,z_1), (x_2,y_2,z_2),(x_n,y_n,z_n), and a mesh of X_{int} uniformly spaced X intervals from x_{min} to x_{max} and Y_{int} uniformly spaced Y intervals from y_{min}

to y_{max}, $X_{int} \times Y_{int}$ interpolated Z values are computed, corresponding to the X and Y values at the intersection of the $X_{int}Y_{int}$ grid.

$$z = \begin{cases} \dfrac{\sum_{i=1}^{n} w_i z_i}{\sum_{i=1}^{n} w_i} & x_i \neq x,\ y_i \neq y \\ z_i & x_i = x,\ y_i = y \end{cases}$$

where:

$$w_i = [(x_i - x)^2 + (y_i - y)^2]^{-\frac{p}{2}}$$

p is the distance weight value that can be specified in the Interpolate 3D Mesh.

Changing Mesh Lines and Fill Color

To modify mesh lines and fill color:

1. Open the Graph Properties dialog box to the Plots panel by double-clicking the plot. If you double-clicked the plot, the dialog box should open directly to the Mesh panel. If not, select the Mesh option from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar button or choose the Graph menu Graph Properties command, then select the Mesh option from the Settings For list.

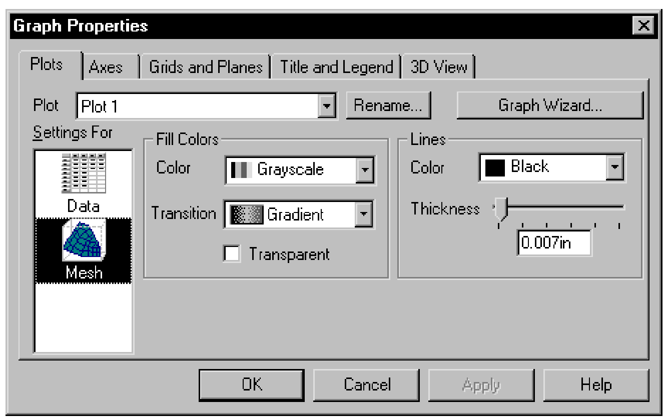


Figure 9–17
The Mesh Settings of the Graph Properties Dialog Box Plots Panel

2. **To change the color of the mesh,** use the Fill Colors options. Use the Color list to set a mesh color; selecting (none) creates a transparent mesh, selecting (custom) enables you to use a custom color or to create a color of your own (see “Using Custom Colors” on page 146), and selecting one of the color schemes or color columns increments the mesh from bottom to top using a color array. For information on using custom colors from a column, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191.

3. Select the Transparent check box to make your mesh translucent; objects behind it will be visible. Using the transparent option enables you to more clearly show

the intersections between two or more 3D meshes.

Σ You need to set your display to High Color (16 bit) or True Color (24 bit) for this feature to work properly. You may check your system's color capabilities under the Windows Display Properties Settings.

4. If you are using a color scheme, use the Transition list to specify how the colors flow across the grid. Choose Discrete to use an increment with a clear shift between colors, or choose Gradient to use an increment with a gradual shift between colors.

Σ The Transition list is available only when using a fill color scheme.

5. **To change mesh lines,** use the Lines options. Use the Color list to change line color. Selecting (none) creates transparent mesh lines, and selecting (custom) enables you to use or create a custom color. For more information on using custom colors, see "Using Custom Colors" on page 146.
6. Use the Thickness slider control to change line thickness, or select the Thickness edit box and type a new thickness value.
7. Click Apply to apply your changes without closing the dialog box, or click OK to apply your changes and close the dialog box.

Changing Graph Perspective, Rotation, and Shading

Modify the view of the 3D graph by changing perspective and rotation of the graph, and by enabling a light source to add shading.

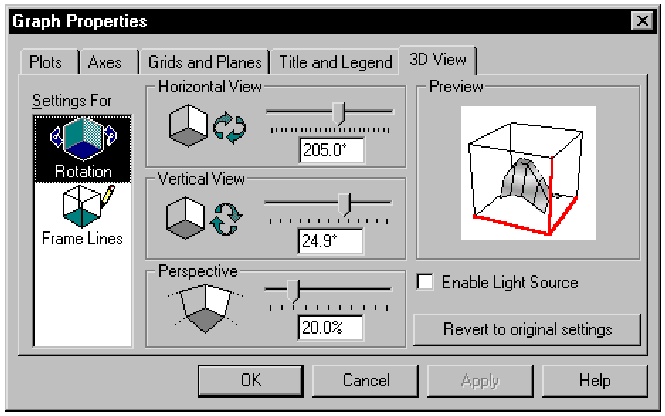
Changing the View of a 3D Graph

To change the perspective of a 3D graph, rotate a graph, and enable the light source:

1. Double-click the plot to open the Graph Properties dialog box, then click the 3D View tab. You can also select the plot, click the Graph Properties toolbar  button or choose the Graph menu Graph Properties command, then select the 3D View tab.
2. From the Settings For list, choose Rotation to view the rotation, perspective and light source options. Note that this panel has a Preview box that shows how the

current settings affect the selected graph.

Figure 9–18
The Rotation Settings of the Graph Properties 3D View Panel



3. **To rotate the graph,** use the Horizontal View and Vertical View slider controls, or select the edit boxes and type a horizontal or vertical value.

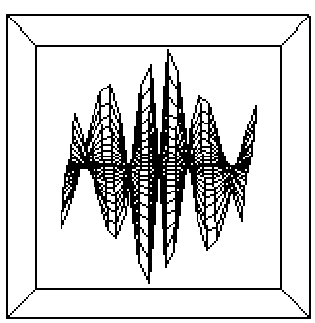
∑ Horizontal and vertical values are in degrees. Rotate the graph horizontally from 0° to 360°, or vertically from −90° to +90°. The recommended Horizontal View is 205°, and the Vertical View is 25°

The three solid red axes displayed in the Preview box of the 3D View panel are the *origin axes* for the rotation, and are used as reference when determining the angles of rotation. The rotation is displayed in the axes degrees from 0°. The origin used to determine the degree from the horizontal or vertical is the intersection of the three axes.

When both rotation angles are set to 0°, the origin as you see the graph, is the left bottom rear corner.

∑ The origin axes are not related to the axes marked with ticks and tick labels, but act as the zero point for tick labels and data.

Figure 9–19
A 3D graph with a horizontal rotation of 0°, a vertical rotation of 0°, and a perspective of 20.



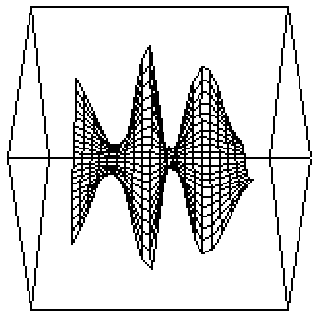


Figure 9–20
A 3D graph with a horizontal rotation of 0°, a vertical rotation of 45°, and a perspective of 20.

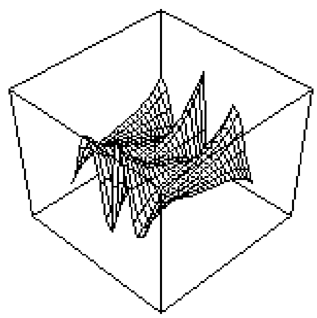


Figure 9–21
A 3D graph with a horizontal rotation of 45°, a vertical rotation of 45°, and a perspective of 20.

4. **To change the perspective of the graph,** use the Perspective slider control, or select the perspective edit box and type a new value.

∑ The Perspective value is based on the "depth" of the graph. A perspective of 0% means that the graph has no depth; 100% means that the graph has maximum depth. The recommended perspective is 20%.

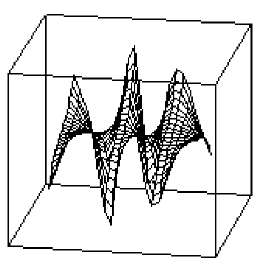


Figure 9–22
A 3D graph with a perspective of 0.

5. **To enable the light source and create shading on your graph,** check the Enable Light Source check box by selecting it. If the check box is not checked, the light source is not applied to the graph.

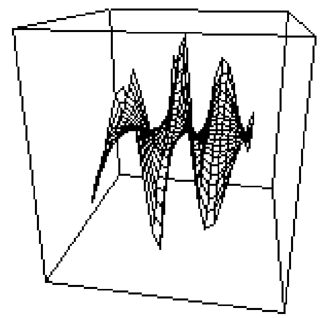


Figure 9–23
A 3D graph with a perspective of 50.

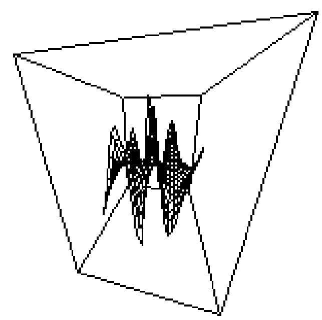


Figure 9–24
A 3D graph with a perspective of 100.

Σ You need to set your display to High Color (16 bit) or True Color (24 bit) for this feature to work properly. You may check your system's color capabilities under the Windows Display Properties Settings.

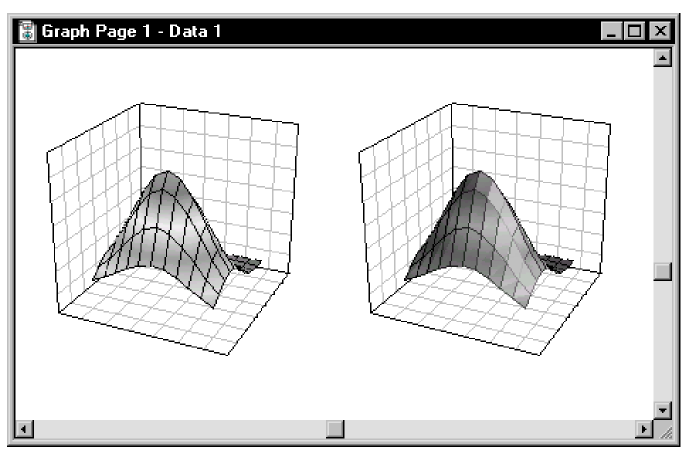


Figure 9–25
The graph on the right has the light source option selected.

Σ Trajectory and scatter plots are not affected by the light source option.

6. **To return to the 3D View settings you had before applying any changes,** click Revert To Original Settings.
7. Click Apply to apply changes, or OK to apply changes and close the dialog box.

3D Graph Axis Placement

3D axes are always at the following positions:

X: bottom right front
Y: bottom left front
Z: left front

Axis Placement During Graph Rotation

When you rotate the view of a 3D graph, SigmaPlot automatically repositions the visible axes to the front of the graph so that the axes do not become positioned behind the graph.

For more information on rotating 3D graphs, see “Changing Graph Perspective, Rotation, and Shading” on page 292.

Frame Lines for a 3D Graph

Drawing, Modifying, and Hiding Frame Lines

Drawing a 3D graph frame completes the “cube” surrounding the plotted data. Normally, these lines are hidden. You can use a frame to mark the origin axes, or to mark the 3D extent of the graph.

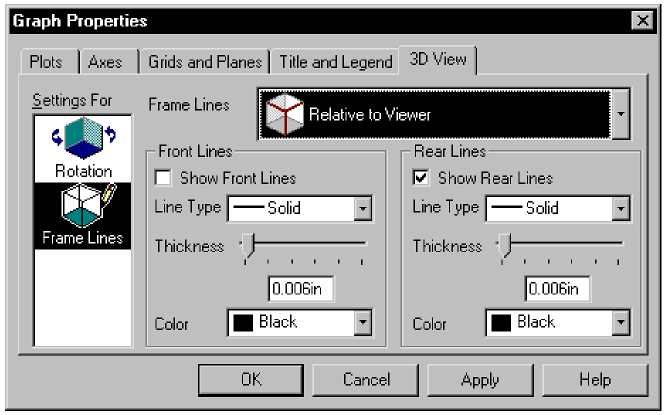
Σ Frame lines are unrelated to the lines used to draw axes and planes, and are controlled independently of those lines. Frame lines are drawn over the axes.

To add frame lines, modify frame lines, or hide frame lines from view:

1. Double-click the plot to open the Graph Properties dialog box, then click the 3D View tab. You can also select the plot, click the Graph Properties toolbar  button or choose the Graph menu Graph Properties command, then select the 3D View tab.

2. From the Settings For list, choose Frame Lines. The frame line options appear.

Figure 9–26
The Frame Lines Settings of the Graph Properties 3D View Panel



3. Use the Frame Lines list to modify frame lines Relative To Viewer, or Relative To Graph Origin.

   Relative To Viewer: If the frame is oriented from your perspective, one set of lines is composed of the three cube edges closest to you, and the other lines are the remaining sides of the cube. The position of these lines is independent of the graph's rotation. This is the default position.

   Relative To Graph Origin: If the frame is drawn according to the origin, one set of the lines is drawn over the *origin axes* (see page 293), and the other lines draw the remainder of the cube. The position of these lines is dependent on the graph's rotation.

Figure 9–27
These graphs use the Viewer as the point of reference. The graph on the left draws only the "front" lines, and the right graph draws only the "back" lines.

The position of these lines is independent of the graph rotation.

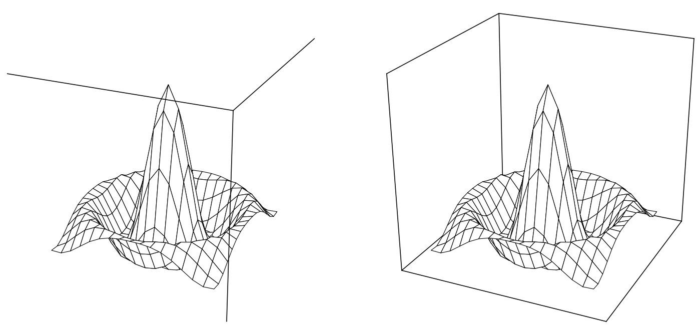
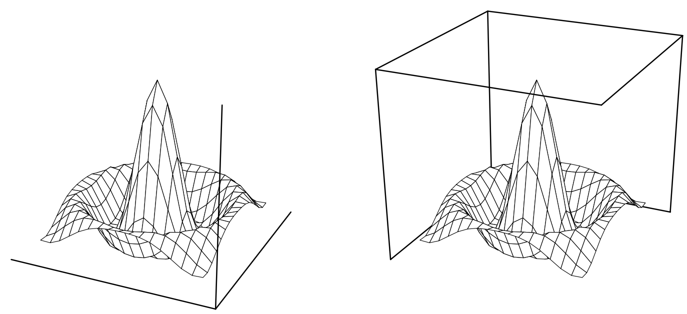


Figure 9–28
These graphs use the Origin as the point of reference. The graph on the left draws only the origin lines, and the right graph draws only the non-origin lines.

The position of these lines is *dependent* on the graph rotation.



4. Hide frame lines, or add frame lines to your graph by selecting or clearing the appropriate Show check box. Checked frame lines are drawn.

Σ A graph cannot display frame lines for both the Relative To Viewer and Relative To Graph Origin perspectives. If Relative To Graph Origin is selected from the Frame Lines list, the Show check boxes for Relative To Viewer are cleared automatically, and vice versa.

5. Use the Type list to change frame line type, and the Color list to change frame line color. Choosing (none) from either list creates transparent frame lines. Choosing (custom) from the color list enables you to use or create a custom color. For more information on using custom colors, see "Using Custom Colors" on page 146.
6. Use the Thickness slider control to the modify frame line thickness, or select the thickness edit box and type a new thickness value.
7. Click Apply to apply changes without closing the dialog box, or click OK to apply changes and close the dialog box.

Generating More Data for a Mesh Plot

The Transforms menu Interpolate 3D Mesh command can be used to increase the number of contours or grids in an existing mesh plot by generating additional mesh data. This method only applies to mesh data arranged in three column format.

1. View the worksheet, and choose the Transforms menu Interpolate 3D Mesh command.
2. Select the current X, Y, and Z mesh data columns, then select the destination columns, and click Finish.

   Change the X and Y Intervals to be exactly twice the current number of X and Y mesh intervals. Note that the default displayed value does not reflect the number of X or Y intervals in the current mesh.

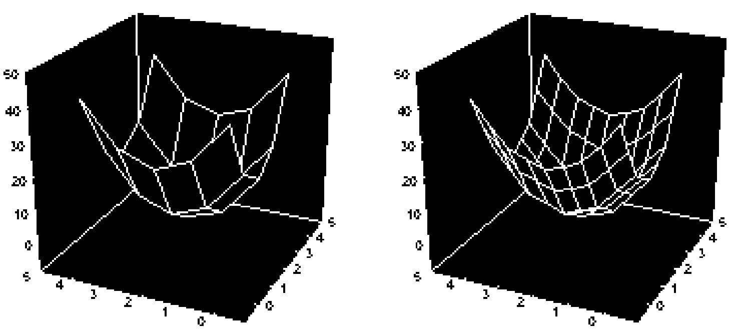
Note that if you create more than twice the original intervals, the resulting mesh contains the “peaks” and “valleys” associated with inverse distance interpolation.

3. Enter a weight of at least 5, then click OK. Three columns of interpolated mesh data—X, Y, and Z—are placed in the previously selected columns.

4. Select the plot, click the toolbar  button, accept the existing data format, click Next, then repick the interpolated mesh data as the data for the current 3D graph. For instructions on plotting XYZ data, see “Creating Mesh Plots” on page 285.

Figure 9–29
Mesh Plots Before and After Interpolation For More Grid Points

The original number of X and Y values is 5 each; the numbers used for the interpolation are 9 each.



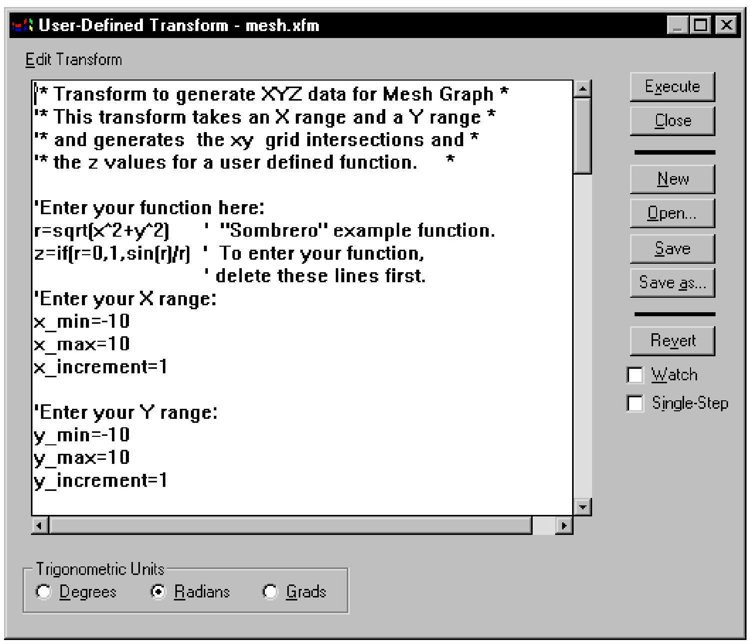
Generating Data for a 3D Function

You can use the MESH.XFM transform to generate XYZ mesh data for any 3D function. The transform results are automatically placed in worksheet columns 1, 2, and 3, so make sure these columns are empty, or edit the transform to specify new columns.

To use the MESH.XFM transform:

1. Choose the Transforms menu User-Defined command or press F10. The User-Defined Transform window opens.
2. Click Open, then open the MESH.XFM file in the SPW5\XFMS directory. The transform appears in the edit box.

Figure 9–30 Generating XYZ Mesh Data for a 3D Function Using the MESH.XFM Transform

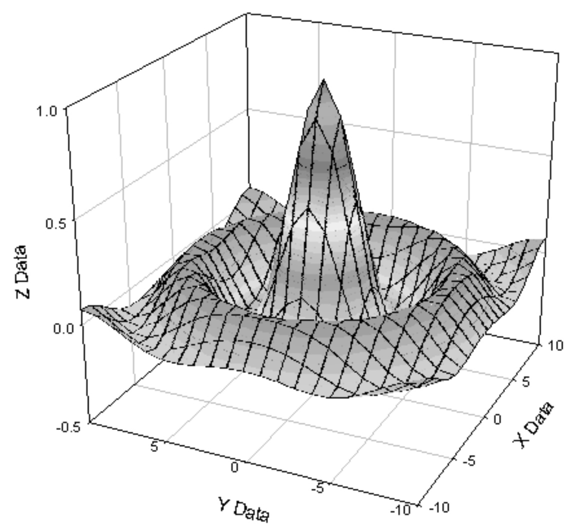


3. Select the edit box, move to the line below the comment
4. Enter your function here and then type in your function using the transform language. You can erase the existing example function. For an explanation of transform syntax, see the *Programming Guide*.
5. Enter the X and Y ranges and increments. Replace the existing x_min, x_max, x_increment, y_min, y_max, and y_increment variable values with your own.
6. When finished, click Execute. The X values are placed in column 1, the Y values in column 2, and the Z values in column 3.

Note that you can redirect the results to different columns by changing the column numbers in the transform.

7. To create the graph, choose the Graph menu Create Graph command and select 3D Mesh Plot as the graph type, XYZ Triplet as the data format, then select column 1 as the X column, column 2 as the Y column, and column 3 as the Z column (or whatever column you specified in the transform).

Figure 9–31
A Graph of the Sample Data Generated by the MESH.XFM Transform

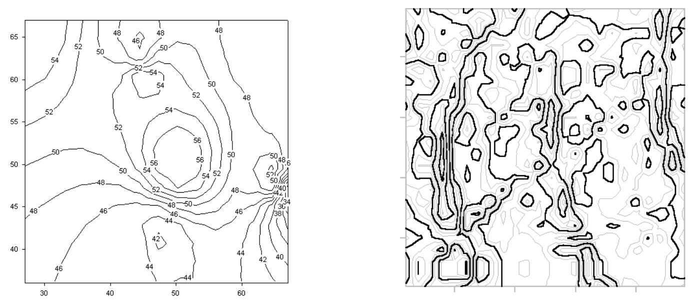


For more information on plotting XYZ data, see “3D Plots” on page 277. For an in-depth discussion of transforms, refer to the *Programming Guide*.

Creating Contour Plots

Contour graphs plot 3D data on an XY coordinate system with the Z data (vertical) indicated with lines at specified Z intervals.

Figure 9–32
Examples of Contour Plots



To create a contour plot:

1. If you want to select worksheet data before creating the graph, select the worksheet columns to plot by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can select the columns to plot during graph creation.

2. Select a contour graph from the graph toolbar. You can also click the toolbar  button, or choose the Graph menu Create Graph command. The Graph Wizard appears.

Σ Note that during the graph creation process, the left side of the Graph Wizard changes depending on what is selected on the right side of the dialog box.

3. If you did not use the graph toolbar to open the Graph Wizard, select Contour Plot as the graph type, then click Next. Use the scroll bars to view the entire list.

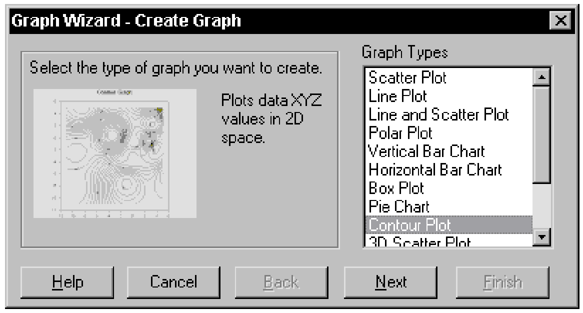


Figure 9–33 The Graph Wizard Displaying a List of Graph Types

4. Specify how your data is formatted by selecting the appropriate data format from the Data Format list. Choose either XYZ triplet data, many Z columns, or single X and Y columns with many Z columns.

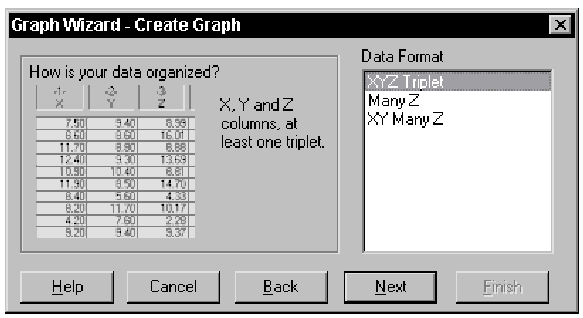


Figure 9–34 Using the Graph Wizard to Specify the Data Format

Σ Contour plots use an XYZ coordinate system. If you select Many Z as the data format, SigmaPlot uses column numbers as the X values, and row numbers as the Y values.

Σ If you are using XYZ triplet data, it may need to be reformatted as mesh data. For more information on using XYZ triplet format, see "Converting Unordered XYZ Triplet Data to Mesh Format" on page 287.

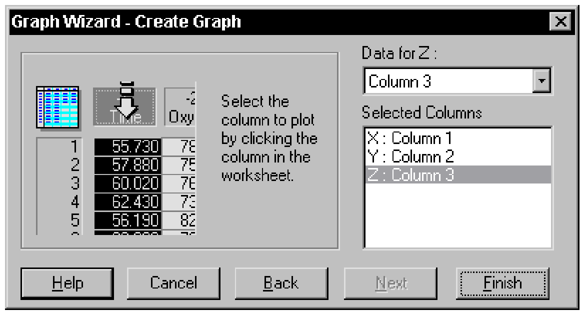
5. Click Next. The Graph Wizard prompts you to specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the Selected Columns list, and you can click Finish to create the graph.

   If you have not already picked columns, note that a single data format is highlighted in the Selected Columns list, indicating the data type you are picking a column for.

6. Pick data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data list. Repeat this process for every column you are using to create your graph.

   If you make a mistake while picking data, click the wrong entry in the Selected Columns list, then select the correct column from the worksheet. You can also clear a column assignment by double-clicking it the Selected Columns list.

Figure 9–35 Using the Create Graph Dialog Box to Pick Columns to Plot



7. Click Finish when you are done picking your data. The Graph Wizard closes and the specified contour plot appears.

Use the Graph Properties dialog box to modify the plot, or reopen the Graph Wizard to pick different data columns for your plot, or to add another plot to your graph. For more information on making general modifications to your plot, see “Creating and Modifying Graphs” on page 151.

Modifying Contour Plots

Modifying contour plots involves:

- Picking new data for the plot (see “Picking Different Data for the Current Plot” on page 168).
- Changing contour line attributes, and hiding or displaying lines (see “Displaying and Changing Contour Lines” on page 305).
- Modifying back plane color and grid lines (see “Modifying Grids and Planes, Titles and Legends” on page 164).
- Changing the vertical (Z data) range and scale (see “Changing Contour Vertical (Z Data) Range and Scale” on page 306).

- Changing X and Y axis and tick attributes (see “Modifying Axes and Grids” on page 199).
- Changing and displaying contour labels (see “Displaying and Modifying Contour Labels” on page 307).

To modify a contour plot, select the graph and open the Graph Properties dialog box. To learn about selecting graphs and using the Graph Properties dialog box, see “Using the Graph Properties Dialog Box to Modify Graphs” on page 163 , and “Selecting a Graph or a Plot” on page 165.

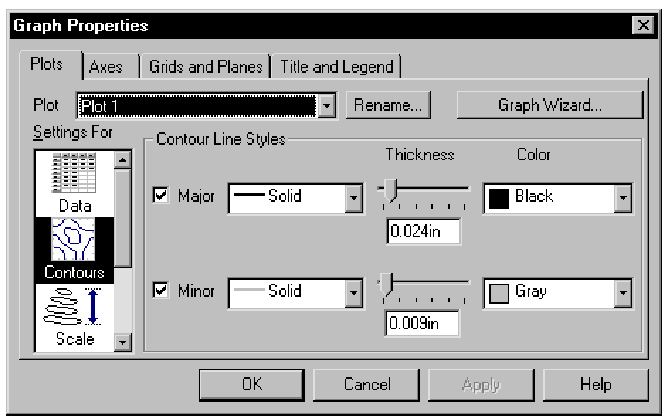
Displaying and Changing Contour Lines

To hide, display, and modify contour plot lines:

1. Open the Graph Properties dialog box to the Contours settings in the Plots panel by double-clicking the plot, selecting the Plots tab, then select Contours from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar  button or choose the Graph menu Graph Properties command, then select the Contours option.

Figure 9–36
The Contours Settings of the Graph Properties Dialog Box Plots Panel



2. **Display or hide contour lines,** by selecting the Major and Minor check boxes. Checked options display the lines, and cleared options hide the lines.

3. **Specify the line type of major and minor contour lines,** by selecting a line type from the Major and Minor lists. Select one of the incrementing schemes to increment contour line types, or select (none) to create transparent lines.

   To learn about using custom increment schemes, see “Using Custom Symbol, Fill, Line, and Color Increments” on page 191.

4. **Set the thickness of the contour lines** using the Thickness slider control, or by typing a new value in the Thickness edit box.

5. **Select the color of the contour lines from the Color list.** You can choose from several predefined color schemes, or select (none) to create transparent lines. Select the (custom) option to create a custom color. For more information see “Using Custom Colors” on page 146.

6. Click Apply to make the changes, or OK to apply your changes and close the Graph Properties dialog box.

Changing Contour Vertical (Z Data) Range and Scale

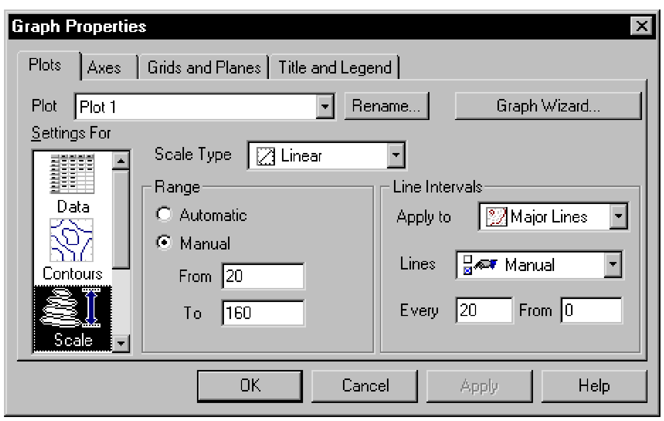
Use the Graph Properties Range settings to select the scale type and set the vertical range used by the contour lines.

To set the scale and range used by contour lines:

1. Double-click the plot to open the Graph Properties dialog box. Select the Plots tab, then select Scale from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar  button or choose the Graph menu Graph Properties command, then select the Scale option.

Figure 9–37 The Scale Settings of the Graph Properties Dialog Box Plots Panel



2. Select a linear or log vertical scale from the Scale Type list. The linear scale uses a standard base 10 numeric scale, and the log scale uses a base 10 logarithmic scale.

3. **To automatically set the range,** select Automatic. SigmaPlot automatically determines the vertical range based on the Z data plotted.

4. **To manually set the range,** select Manual, then type the beginning and ending range values in the From and To edit boxes.

5. Click Apply to assign the range settings without closing the dialog box, or OK to apply the range settings and close the dialog box.

Displaying and Modifying Contour Labels

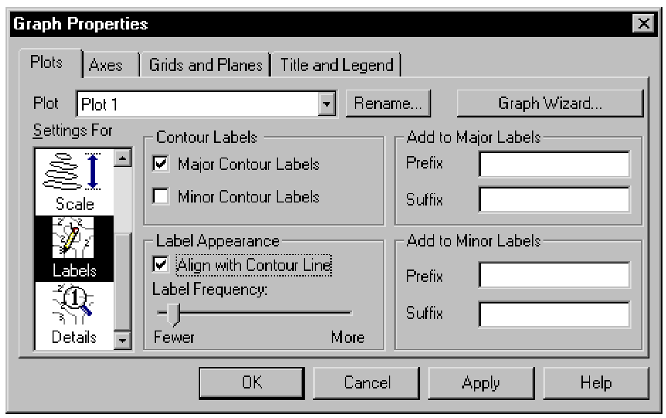
Use the Graph Properties dialog box Label settings to toggle contour line labels on/off, add prefixes or suffixes to labels, and rotate labels relative to the contour line. For information on modifying contour X and Y axis tick labels, “Changing Tick Labels” on page 217.

To add, hide, or modify contour line labels:

1. Open the Graph Properties dialog box to the contour label settings by double-clicking the contour plot, selecting the Plots tab, then selecting Labels from the Settings For list.

   You can also select the plot, click the Graph Properties toolbar  button or choose the Graph menu Graph Properties command, then select the Labels option.

Figure 9–38
The Labels Settings of the Graph Properties Dialog Box Plots Panel



2. **Display or hide contour labels,** by selecting the Major and Minor Contour Label options. Selected options display labels, and cleared options hide labels.
3. Select the Align With Contour Line option to align contour labels parallel to the contour line. Clear the option to align the contour labels parallel to the X axis.
4. Use the Label Frequency slider to control how many labels appear for the contour lines. Move the slider toward Fewer to reduce the number of contour labels, or move the slider toward More to increase the number of contour labels.
5. Type the prefix or suffix to add to the contour labels in the Prefix and Suffix edit boxes. To separate a suffix or prefix from the tick label, type a space before a suffix or after a prefix.
6. Select Apply to assign the contour label settings without closing the dialog box, or click OK to apply the settings and close the dialog box.

Changing Contour Label Text Attributes

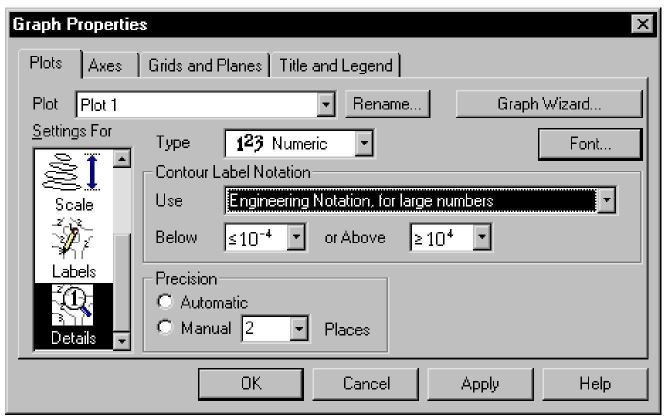
Changing the text attributes for both major and minor contour labels involves changing the font, style, size, and color of the text.

To open the Text Properties dialog box:

1. Double-click the contour plot, select the Plots panel, then select Details in the Settings For list.

   You can also select the plot, click the Graph Properties toolbar button or choose the Graph menu Graph Properties command, then select the Details option

Figure 9–39
The Details Panel for Contour Labels



2. When the Details settings appear, select the Font button. To learn about using the Text Properties dialog box, see “Formatting Text” on page 137.

Changing Numeric Contour Label Settings

Use the Graph Properties Detail settings to modify numeric contour labels.

To change numeric contour labels:

1. Open the Graph Properties dialog box by double-clicking the plot, selecting the Plots tab, then selecting Details from the Settings For list. The numeric contour settings appear.
2. **To use a numeric type of contour label,** select Numeric from the Type list, then use the Label Notation options.
3. Specify which type of numeric display to use by selecting the a notation from the Use list.

   The Scientific Notation and Engineering Notation options always use scientific notation or engineering notation to display numbers. F or large numbers options, use scientific or engineering notation only when numbers exceed a specified range. Use the Beyond lists to specify the range beyond which scientific notation or engineering notation is used.

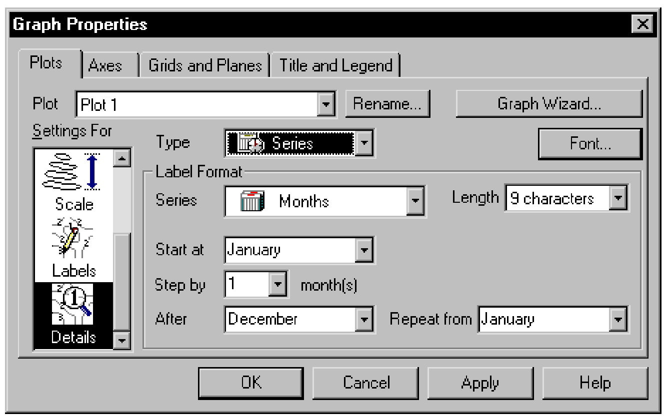
For log scale, you can select to display number, only the Exponent, or both the Base and Exponent.

For linear scale, you can always use scientific notation, or only when needed. If you use scientific notation only when needed, set the range to by typing values in the Lower and Upper ranges in the edit boxes. These values are expressed in log units.

4. Use the Precision options to specify the number of places used to display numeric tick labels. Select Automatic to let SigmaPlot automatically determine precision, or select Manual, then select the number of decimal places to use from the Places list.

5. **To use a series type of contour label,** choose Series from the Type list, then select the type of series to use from the Series list.

Figure 9–40
The Series Labels Settings for Contour Labels



6. Select the number of characters to use for the labels from the Length list.

7. Select the series item to begin labeling tick marks with from the Start At list, then select the frequency or increment for the series from the Step By list.

8. Use the After and Repeat From lists to restart tick labeling from a specified point.

9. To use values or text from a worksheet column, enter the values or text in a worksheet column, then choose the column containing tick labels from the Series list.

10. To change the font size, style, or color of text labels, click the Font button to open the Text Properties dialog box. To learn about using the Text Properties dialog box to format text, see “Formatting Text” on page 137.

11. Click OK to apply your changes and to close the dialog box.

Notes

10

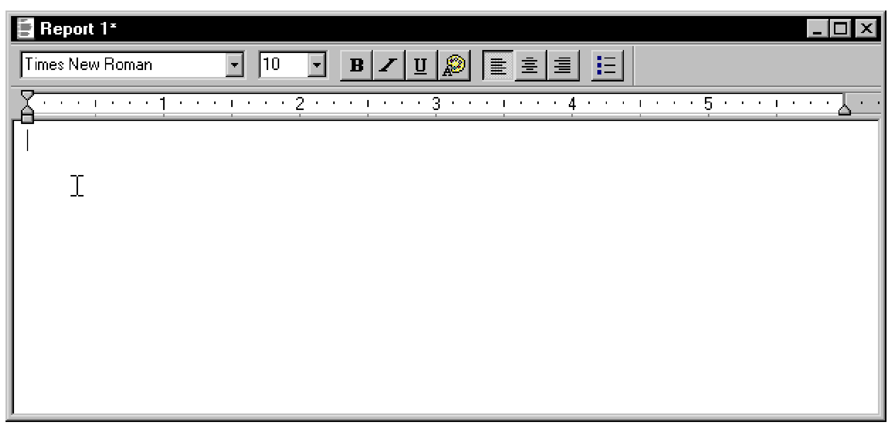
Using the Report Editor

The SigmaPlot *Report Editor* is an easy-to-use text processor for annotating and documenting your graphs and data. The Report Editor features a complete text editor and OLE2 insertion and editing. It is also used by the Regression Wizard to report regression results.

This chapter covers:

- ➤ Creating new reports (see page 312)
- ➤ Setting report view, toolbar and ruler options (see page 312)
- ➤ Setting the margins and paper size for a printed report (see page 314)
- ➤ Using the ruler (see page 315)
- ➤ Setting tab stops (see page 316)
- ➤ Indenting paragraphs (see page 317)
- ➤ Changing text appearance and paragraph alignment (see page 318)
- ➤ Inserting the current date and time (see page 319)

Figure 10–1
The Report Editor Window



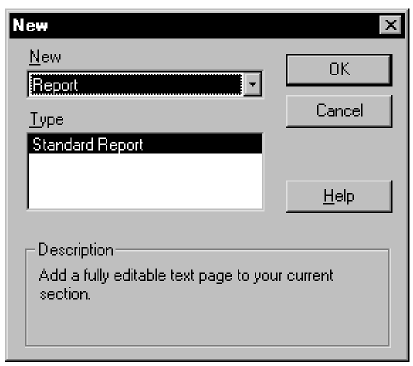
Creating Reports

Reports can be created with the New command (see “Creating New Notebook Files and Items” on page 43), or with the Regression Wizard. For information on generating a report from the Regression Wizard, see the *Programming Guide*.

To create a new report:

1. Right-click the section where you want to create the report, choose New, and choose Report. A report window opens and a new report is added to the selected section.
2. To create a report using the New command, select the section where you want the report to appear, then choose the File menu New command.
3. Select Report from the New list, then click OK. The new report is added to the selected section.

Figure 10–2
The Report Editor Options Panel



Setting Report Options

To set any of these options, choose the View menu Report Options command to open the Options dialog box.

Σ These settings apply to the current report, but not to other open reports. To have these settings apply to subsequently opened or created reports, make your changes, then close the page. Newly opened or created reports will use these settings.

Setting Ruler Units

The Options Panel is used to select the ruler units and enable or disable automatic word selection.

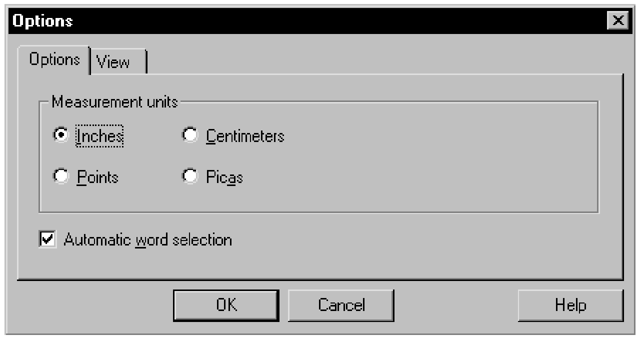


Figure 10–3
The Report Editor Options Panel

To open the report Options dialog box:

1. Select the report window you want the options to apply to, then choose the View menu Report Options command.
2. **To set the Measurement units to Inches, Points, Centimeters, or Picas,** select the appropriate box.
3. To enable Automatic Word Selection , select this option. Automatic Word Selection causes whole words to be selected when dragging the mouse across text in the report.

Toolbar and Text Display

The View panel sets the word wrapping behavior, and controls toolbar and ruler display.

To change your report view options:

1. Select the report window you want the options to apply to, then choose the View menu Report Options command.

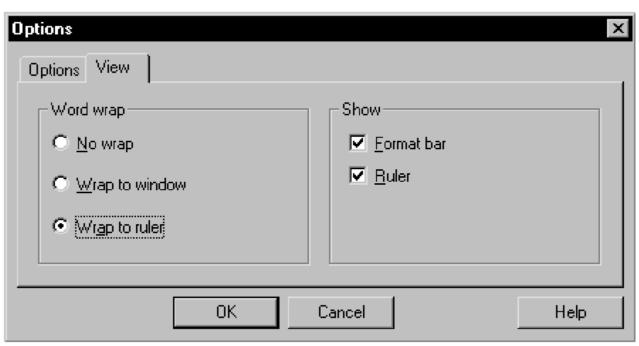


Figure 10–4
The Report Editor Options View Panel

2. To set Word Wrap, you can select one of the following options. The Word wrap options only affect how text appears on your screen, not when printed.
3. To show or hide the Ruler and Toolbar, select or clear the Format bar or Ruler options.

Setting Report Page Size and Margins

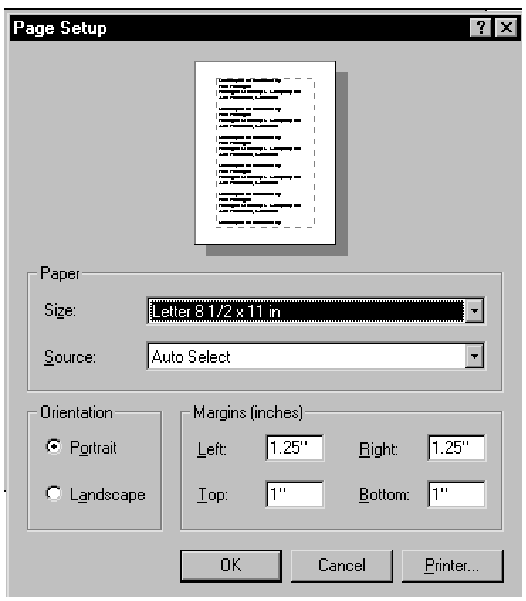
The report Page Setup dialog box is used to set report margins, paper orientation, paper size, and paper source.

Σ These settings apply to the current report, but not to other open reports. To have these settings apply to subsequently opened or created reports, make your changes, then close the page. Newly opened or created reports will use all of these settings.

To open the Page Setup dialog box:

1. Select the report window you want the options to apply to, then choose the File menu Page Setup command. The Page Setup dialog box for the report appears.

Figure 10–5
The Page Setup Dialog Box



The page sample at the top of the dialog box reflects changes made to all of the options.

2. To select the Paper Size and Source, select an option from the drop-down lists. The available options depend on the current selected Printer.
3. To view which printer is selected, click the Printer button. You can use the Page

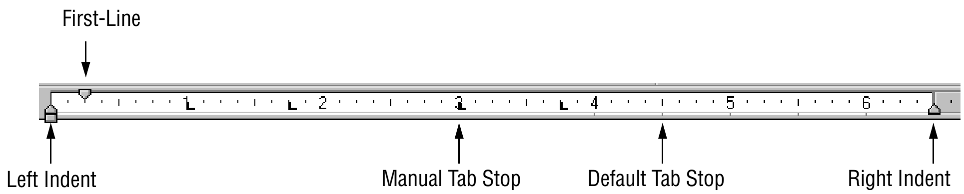
Setup printer dialog box to select and setup any printer configured for your system.

4. To change the paper orientation, select either Portrait or Landscape (sideways).
5. To change the margins, enter the desired values into the four Margins boxes. The current ruler units are displayed in the Margins title.

Using the Report Editor Ruler

The Report Editor ruler can be used to view margins and to both view and modify report page tabs and paragraph indents.

Figure 10–6 The Report Editor Ruler



The ruler indicates:

- Usable page column width (as defined by Page Setup for the Report; see "Setting Report Page Size and Margins" on page 314)
- Default tabs
- User-defined tabs
- Left and right paragraph indents
- First line indent

The ruler is also used to specify tabs and indents. See "Setting Tabs" on page 316 and "Setting Paragraph Indents" on page 317.

Setting Ruler Units

The ruler units are set using the report Options dialog box (see "Setting Ruler Units" on page 313). These settings apply to the current report as well as to subsequently created reports.

Showing and Hiding the Ruler

You can toggle ruler display by choosing the View menu Report Ruler command. This command hides or shows the rulers for individual reports.

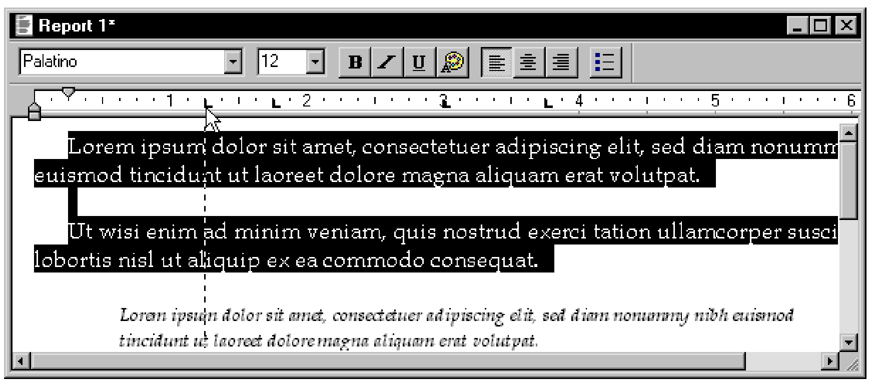
Setting Tabs

All tab stops are shown on the report ruler. The default tab stop is 0.25" regardless of the current units. Tab stops made for individual and selected paragraphs, and are saved with reports.

To set a tab:

1. Select the paragraph(s) for which you want to change the tab stops. To select multiple paragraphs, drag the mouse over the paragraphs.
2. Click the ruler where you want to place a tab. A tab marker appears at the clicked location.

Figure 10–7 Setting a Tab Stop From the Ruler



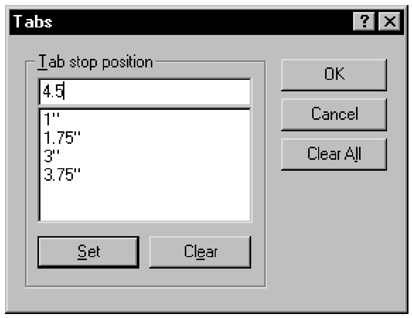
3. To move a tab, drag the tab marker to another location on the ruler. To delete a tab, drag the tab marker off the ruler.

You can also set tabs from the Tabs dialog box:

1. Choose the Format menu Tabs command. This command is only available while viewing a report window.

2. Specify tab stops in the Tab stop position edit box by entering the tab location. Tab locations must be entered using the current ruler units.

Figure 10–8
Setting Tab Stops from the Tabs Dialog Box



3. Click Set to add the tab setting to the list. Click Clear to remove a selected setting. Click Clear All to remove all tab settings.

Σ Note that all tabs are left-aligned.

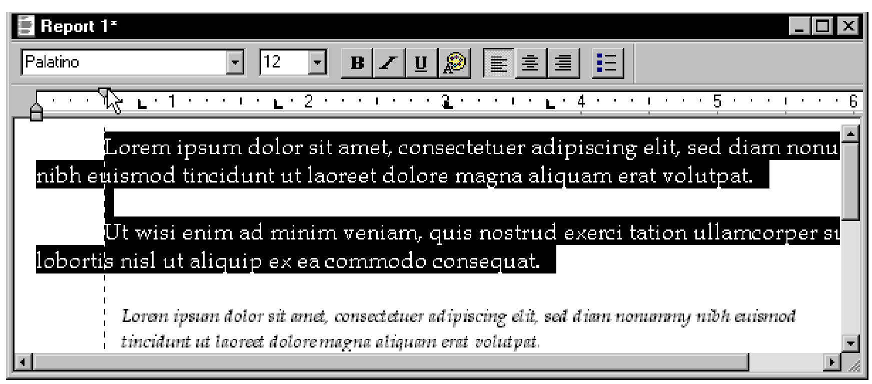
Setting Paragraph Indents

You can set left, right, and first line indents for individual paragraphs. These settings are saved with the report.

To paragraph indents:

1. Select the paragraph(s) for which you want to change the indents. To select multiple paragraphs, drag the mouse over the paragraphs.

Figure 10–9
The Report Editor Ruler

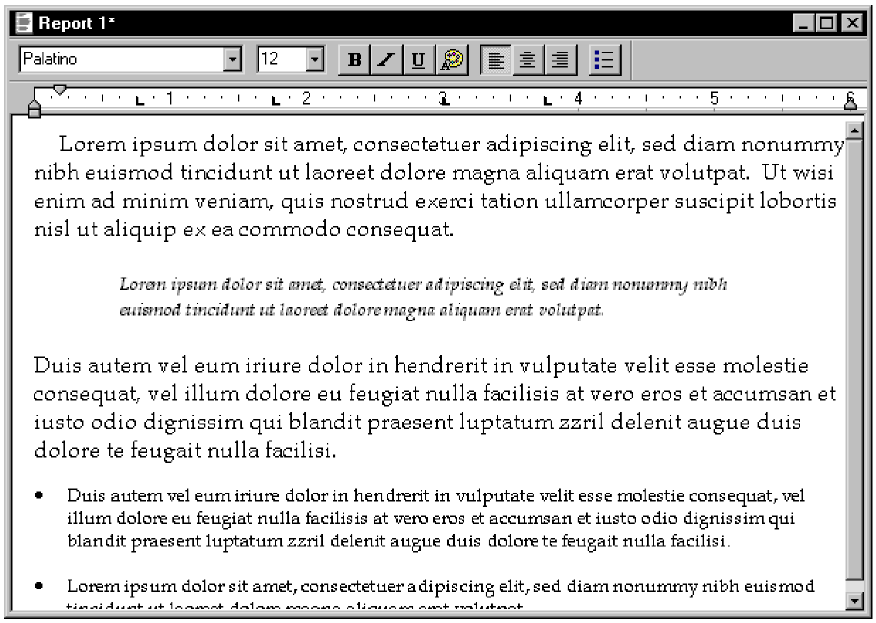


2. To change the left indent, drag the marker by the point (top). To move both the left and first line indents, drag the marker by the bottom.

3. To change the right indent, drag the on the bottom right side of the ruler.

   To change the first line indent, drag the marker at the top left of the ruler. To create an indented line, drag the marker to the right of the left indent. To create a hanging indent, drag the marker to the left of the left indent.

Figure 10–10
Examples of Paragraph Indent Formatting



Formatting Text And Paragraphs

You can change report text attributes such as font, font size, color, and style of selected text using the formatting toolbar.

To modify text with the Formatting Toolbar:

1. Select the text you want to modify. You can select individual characters, words, paragraphs, or the entire report.
2. To format character font, size, weight, angle, underlining, or color, use the formatting toolbar buttons.
3. **To set paragraph alignment,** use the formatting toolbar buttons for left, center, and right paragraph justification.
4. **To add bullets a to selected paragraph** , click the Bullets button . To remove bullets, click the Bullets button again.

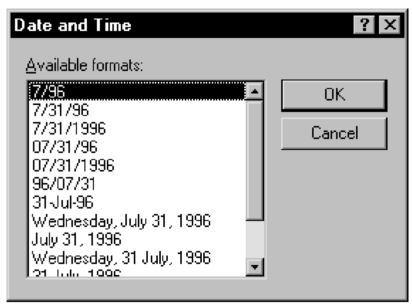
You can also choose the Format menu Bullet Style command or right-click the report page and select Bullet Style. Bullets are applied to the selected text.

Inserting the Current Date and Time into a Report

To insert the current date and time into reports:

1. Select the report and click where you want to insert the Date or Time, then choose the Edit menu Insert Date and Time command.
2. Select the date and time format from the list, then click OK. The current date and time are inserted as text at the specified location.

Figure 10–11
The Date and Time Dialog Box



Σ Note that the list of available date and time formats depends on your Regional Settings. You can view or modify the Regional Settings directly from your Windows control panel.

Notes

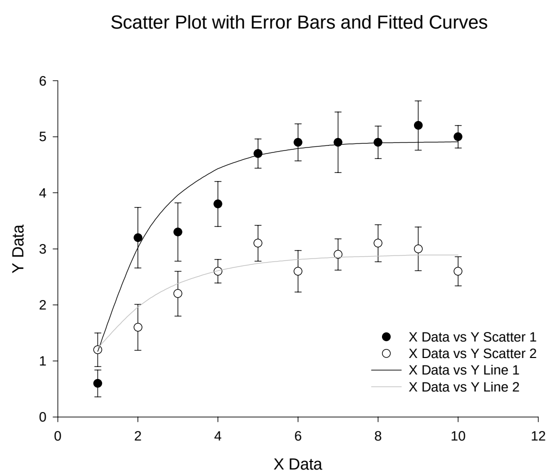
A

Sample Graphs

The sample graphs included with SigmaPlot can be found in the SAMPLES.JNB notebook, in the SigmaPlot program folder.

Example 1: Scatter Plot with Error Bars

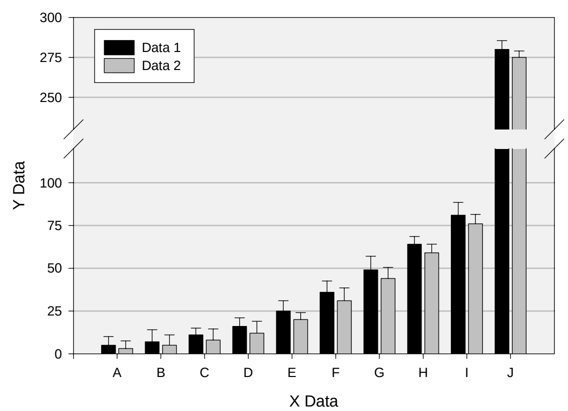
This is a scatter graph of symbols with error bars and a line plot draw through the symbols. If you don't have your fitted line data, you can use SigmaPlot's Regression Wizard to create the data for curves.



Example 2: Grouped Bar Chart with Error Bars

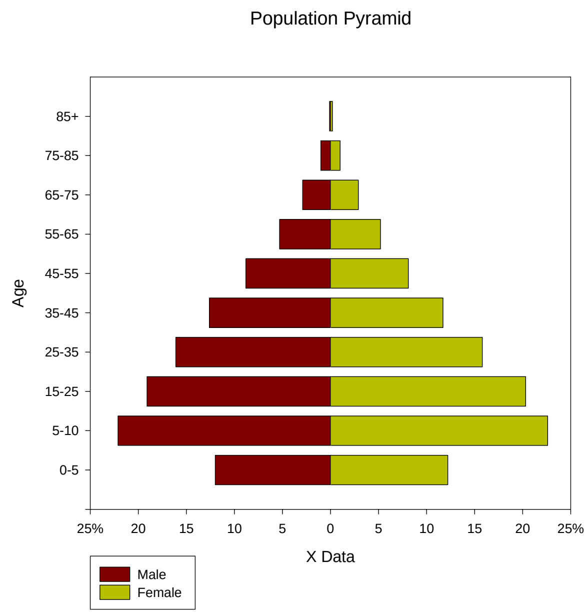
This bar chart plots two data columns along with two error bar data columns, and uses a Y axis break.

Grouped Bar Chart with Error Bars



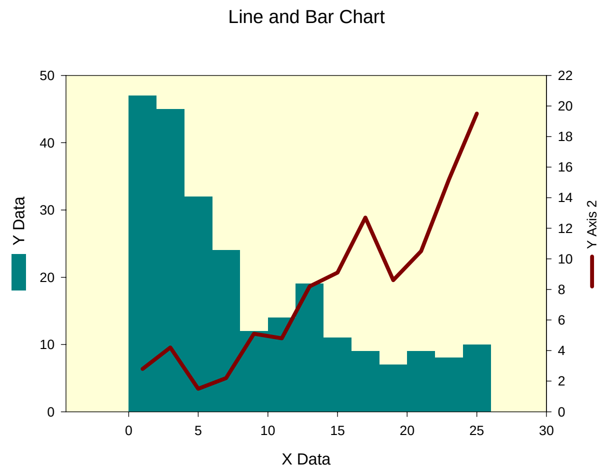
Example 3: Population Pyramid

A population pyramid created by using a stacked bar chart and tick labels from a column.



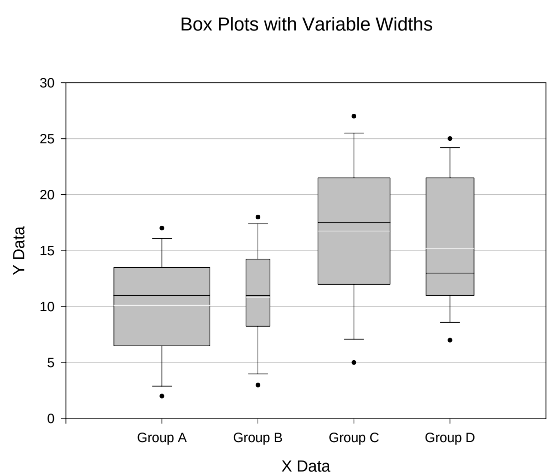
Example 4: Bar and Line Chart with Two Y Axes

This graph plots a line and bar chart on the same graph with different Y axes. The bar chart has a width of 100% and the same color for both fill and edge.



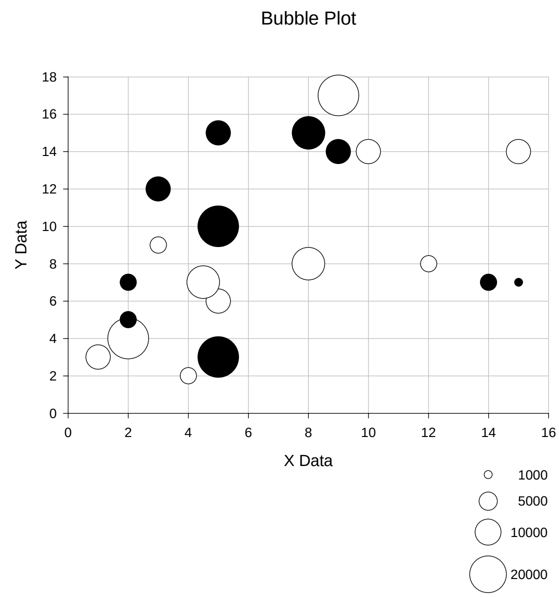
Example 5: Box Plot

This is a Tukey box plot with varying box widths, taken from a worksheet column. The X axis is a category axis.



Example 6: Bubble Plot

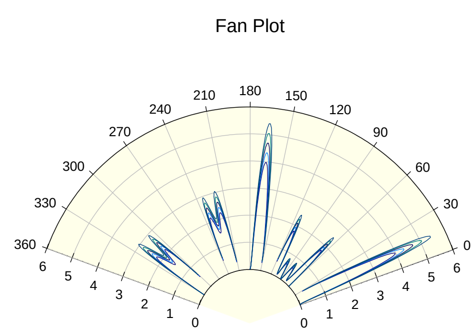
This is a bubble chart of two sets of xy data. Each bubble plot is a separate plot, since symbol sizes apply to entire plots, as opposed to individual curves.



The legend is created using legend symbols for a dummy plot that graphs area data transformed to reasonable symbol sizes.

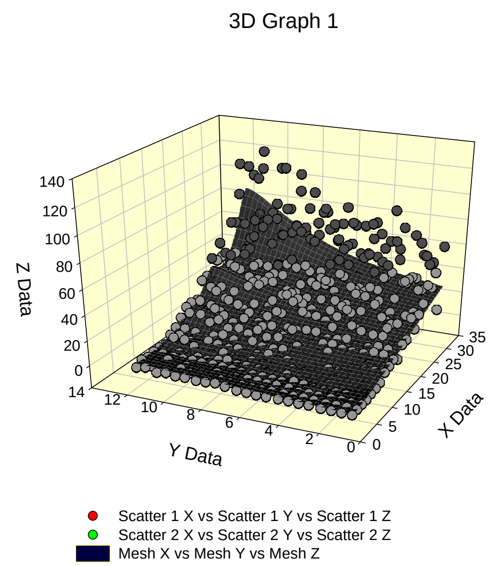
Example 7: Fan Plot

This is a polar plot with a restricted angular axis arc and radial axis length. The radial axis positions are moved to the stop and start angles of the graph.



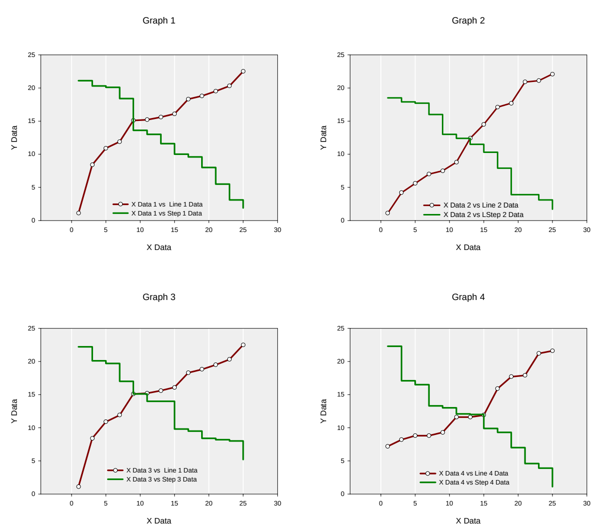
Example 8: 3D Mesh and Scatter

This is a graph of up to two 3D scatter plots and a mesh plot on a single graph.



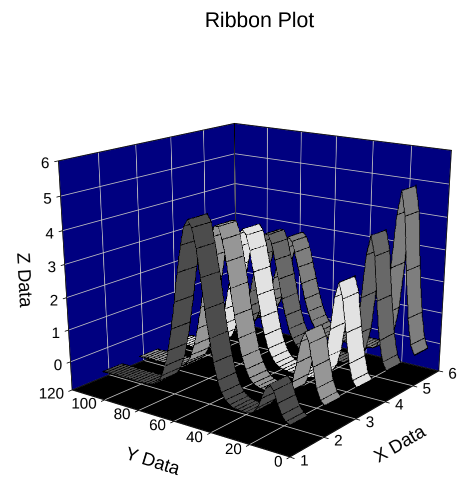
Example 9: 4 Up Line and Step Plots

This is a set of four line graphs, each with one set of x and two sets of y data plotted as a line and a step plot, respectively.



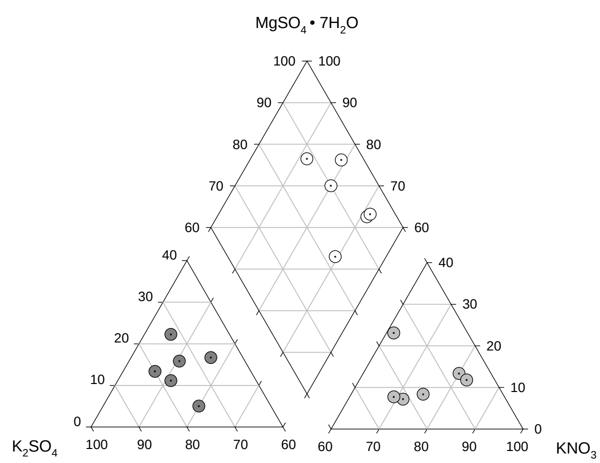
Example 10: Ribbon Plot

A ribbon plot is created by a series of one interval wide meshes. You can use the RIBBON.XFM transform file to convert columns of data into mesh ribbons.



Three Ternary Graphs

This graph is actually composed of three separate ternary graphs with different axis ranges and directions.



SigmaPlot Templates

The following templates are stored in Template.JNT. Open Template.JNT, or your own template source, as you would any ordinary notebook.

Template:	Effect:
Graph Pages	
Normal	Default page template, white, 8 1/2 x 11 letter-sized (International version is A4 portrait).
Landscape	Creates a page in landscape orientation.
A4	Creates an A4 page size. (International versions substitutes US Letter).
Legal	Creates a page in legal orientation.
Blue Slide	Creates a blue page suitable for slides.
Black Slide	Creates a black page suitable for slides.
Graphs	
Scatter Plot	Graphs your data as a standard scatter plot. The data source is Columns 1 and 2.
Bar Chart for Slide	Graphs your data as a standard bar chart with a black graph color and blue page. The data source is Columns 1 and 2.

B

Printing Tips

SigmaPlot relies entirely on Windows font and printer drivers for all of its output. These drivers were installed with Windows, or came with the printer and were installed separately.

The precise options and settings available for each driver vary. Options available for the drivers provided with Windows are described in the Windows *User's Guide.* Your printer vendor should have provided documentation for any drivers shipped with your printer.

Screen and Printer Fonts

All TrueType and PostScript fonts are fully supported using the Windows Fonts control panel and Adobe Type Manager. Some tips on using both TrueType and PostScript fonts are provided below.

For more information on the Windows Fonts control panel, see the Windows *User's Guide*. For more information on Adobe Type Manager, see the documentation provided by the program supplier.

Using TrueType Fonts

TrueType fonts are recommended if you are printing to printer(s) connected directly to your computer and are using a Windows compatible driver (provided either with Windows or by the printer vendor). Windows automatically renders TrueType fonts correctly in SigmaPlot both on your screen and printer.

TrueType fonts are controlled from the Windows Control Panel. Use the Fonts control panel to add, remove, and enable or disable use of TrueType fonts.

Additional TrueType fonts are provided with many other applications and can also be purchased as separate packages. SigmaPlot can use any correctly installed TrueType font.

Substituting Printer Fonts

For printers with their own built-in fonts, such as PostScript printers and later models of Hewlett Packard LaserJet printers, the printer setup dialog box option allows automatic substitution of the built-in fonts for TrueType fonts. These options are found in the advanced options of the style options log for that printer.

Σ Many high resolution typesetters and slidemakers still only support PostScript fonts, and not TrueType fonts. If you plan to take or send a printer file to a service bureau to output on a typesetter, color printer, or slidemaker, you should contact them and make sure they support the kind of fonts you want to use. If you must use non-TrueType fonts, you can disable TrueType fonts using the Fonts control in the Windows Control Panel.

Using PostScript Fonts

PostScript fonts can only be used when printing to PostScript or PostScript emulating printers. If you installed a PostScript printer driver, the PostScript fonts appear as printer fonts in the different font lists.

PostScript fonts are only available if you installed a Windows PostScript printer driver when you installed Windows or by using the Windows Setup program, or if you are using Adobe Type Manager. You do not have to actually have a PostScript printer to install a PostScript printer driver. You will need to install the driver if you plan to use an outside service to print graphs on their PostScript compatible device (see below).

When is PostScript Required?

Many high resolution typesetters and slidemakers still only support PostScript fonts, and not TrueType fonts. If you plan to take or send a printer file to a service bureau to output on a typesetter, color printer, or slidemaker, you should contact them and make sure they support the kind of fonts you want to use.

About Adobe Type Manager

PostScript fonts are not accurately rendered on your screen unless you have Adobe Type Manager installed. Windows will substitute similar fonts and display the widths correctly on the screen, and the fonts will print correctly. However, you can only install additional PostScript fonts using Adobe Type Manager.

Adobe Type Manager was included in earlier versions of Windows and can also be purchased independently or bundled with many other applications.

Optimizing Printer Output

Use Maximum Resolution

Some printers have a draft or lower resolution mode; if you are printing to a printer with variable resolution settings, make sure that the resolution is set to the highest level.

Use TrueType Fonts

Windows comes with TrueType fonts automatically installed. With TrueType fonts, you can access a wide range of typefaces. For more information about using TrueType fonts, see page 329.

Σ Note that some printing and slidemaking services do not yet support TrueType fonts; substituting printer fonts or using Adobe Type Manager generally solves this problem.

Thicken Lines

For full sized graphs, the default line thicknesses may be too thin. Thicker lines will be easier to read. You can use set default line options using the Format menu Line command to change line widths all at once. For more details, see “Changing Multiple Page Objects” on page 125.

Use Halftoning

If you are printing colors to a black and white printer, or are using different levels of gray, you can often improve the “dither” pattern using halftoning settings, available under the Advanced Options, for most laser printers. Laser printers default to a halftone screen of only 60, but can often handle up to 100. If you are producing high resolution at 1200 dpi, a halftone of 120 is possible, and at 2400 dpi, you can use a screen frequency of 150 (magazine quality).

Printing to High Resolution Typesetters and Slide Makers

There are a few points you should keep in mind when producing graphs for image setters and slide makers. Many of these are general design and layout principles that can be applied to any graph.

- Don’t use hairline line widths. Although hairline may appear fine on laser printed output, it will be too thin for image setters and slide makers. You can use set default line options using the Format menu Line command to change line widths all at once (see “Changing Multiple Page Objects” on page 125).
- Many journals and magazines don’t accept color, so consider using a gray scale for fill colors. If you are producing slides, color generally achieves a better effect. Avoid the use of fill patterns (hatching) whenever possible, and never mix patterns and colors; this tends to be confusing.
- Don’t use too many different fonts type faces (no more than two) on one page. Also, many publications accept only san serif fonts (such as Helvetica or Arial).

You can format text labels and set default text options using the Format menu Text Properties command (see “Formatting Text” on page 137).

- Don’t use small point sizes. For a full page graph, you don’t want to use point sizes smaller than 24 points.
- Don’t use too many different colors, and watch your color combinations. Don’t use red and green together, since many people are red-green color blind, and don’t use red and blue together, because the human eye has difficulty focusing on both (unless you are trying to achieve a “3D” effect).
- For slides, a dark background, such as black, dark gray or dark blue, creates the best effect. Use light colored lines and text when you have a dark background. For changing the background color, use the File menu Page Setup command (see “Changing Page Color” on page 145).
- For publications that accept color graphs, a light graph background color sets off the graph from the page. For changing the background color, use the File menu Page Setup command; for more information, see “Changing Page Color” on page 145.

For other principles of graphing, you can refer to the resources listed under “References” on page 22.

Printing to Files

SigmaPlot can print pages to a disk file using any available Windows printer drivers, including PostScript using a PostScript printer driver, and HPGL using any Hewlett Packard plotter driver. PostScript files are required by many digital typesetters and slidemakers, and HPGL files can be imported into many word processors, desktop publishing, and drawing applications.

You can also create any other kind of printer file, that can be printed at a later date by sending the file to the printer. The kind of file created is entirely dependent on the printer driver used.

To print to a file rather than a printer:

1. Choose Print from the File menu, and check the Print to File option in the Print dialog box.
2. Click OK, then enter the file name for the output file. Click OK to create the print file.

Types of Files

PostScript: PostScript files are created when you use a PostScript printer driver to print file. PostScript files can be “dumped” to another printer or high-resolution output device later. Use PostScript files if you want to take graph pages to a typesetting or slide-making service.

∑ You do not need to have a PostScript printer connected to install and use a PostScript printer driver.

EPS: Encapsulated PostScript files are scalable line art graphic files. You can export graphs and pages to EPS files using the File menu Export command; see “Exporting Graphs and Pages” on page 51.

∑ Note that EPS files contain no scaling information and are not designed to be sent to a printer. If you attempt to print an EPS file directly to a printer, you may receive unpredictable results.

HPGL: Hewlett Packard Graphics Language files use the Hewlett Packard pen plotter language. HPGL files are created when you use a Hewlett Packard plotter driver to print to a file.

Many applications are able to read these files, some with great sophistication. Although HPGL files contain all color and line width information, not all applications will import this information correctly.

If possible, avoid using thick lines in HPGL files; increasing line thickness increases the size of the HPGL file dramatically. Labels also add to file size.

If you are directing HPGL output to a file for later “dumping” to a plotter, make sure that you have selected Hardware Handshaking in the Settings dialog box.

Some programs, such as Ventura Publisher, are designed to handle and interpret large and complex HPGL files.

Notes

C

Color, Symbol, Line, and Fill Schemes and Codes

Schemes

Color Schemes

The colors used along with the equivalent graphic cell code is provided for each color scheme.

Black & White	@rgb(0,0,0)
	@rgb(255,255,255)
Gray Scale	@rgb(0,0,0)
	@rgb(192,192,192)
	@rgb(64,64,64)
	@rgb(224,224,224)
	@rgb(32,32,32)
	@rgb(128,128,128)
Earth Tones	@rgb(128,0,0)
	@rgb(192,192,0)
	@rgb(96,0,0)
	@rgb(255,128,0)
	@rgb(128,64,0)
	@rgb(128,128,0)

Ocean	@rgb(0,0,128)
	@rgb(0,128,255)
	@rgb(0,0,96)
	@rgb(0,128,128)
	@rgb(0,64,128)
	@rgb(0,224,224)
Forest	@rgb(0,64,0)
	@rgb(0,255,0)
	@rgb(0,128,0)
	@rgb(192,255,0)
	@rgb(64,192,0)
	@rgb(255,255,0)
Muted Rainbow	@rgb(128,0,0)
	@rgb(255,128,0)
	@rgb(192,192,0)
	@rgb(0,128,0)
	@rgb(0,128,128)
	@rgb(0,64,128)
	@rgb(128,0,128)
Incremented	@rgb(0,0,0)
	@rgb(255,255,255)
	@rgb(255,0,0)
	@rgb(0,255,0)
	@rgb(255,255,0)
	@rgb(0,0,255)

@rgb(255,0,255)

@rgb(0,255,255)

@rgb(128,128,128)

@rgb(192,192,192)

@rgb(128,0,0)

@rgb(0,128,0)

@rgb(128,128,0)

@rgb(0,0,128)

@rgb(128,0,128)

@rgb(0,128,128)

Symbol Schemes

Doubles: Circle, Circle, Down Triangle, Down Triangle, Square, Square, Diamond, Diamond, Up Triangle, Up Triangle, Hexagon, Hexagon

Monochrome: Circle, + (cross), Down Triangle, Square, Up Triangle

Dotted Doubles: Circle, Dotted Circle, Down Triangle, Dotted Down Triangle, Square, Dotted Square, Diamond, Dotted Diamond, Up Triangle, Dotted Up Triangle, Hexagon, Dotted Hexagon)

Incrementing: Circle, Square, Up Triangle, Down Triangle, Diamond, Hexagon

Line Schemes

Monochrome: Solid, Dotted, Short Dash, Dot-Dot-Dash, Long Dash, Dot-Dash, Medium Dash

Incrementing: Solid, Long Dash, Medium Dash, Short Dash, Dotted, Dot-dash, Dot-dot-dash

Fill Pattern Schemes

Monochrome: Solid, None, Right-rising Fine, Cross Hatched Fine, Left-rising Fine, Horizontal Fine

Incrementing: None, Right-rising Fine, Right-falling Fine, Cross Hatched Fine, Horizontal Fine, Vertical Fine, Grid Fine

Graphic Cell Codes

You can sequence plot lines, symbols, and fill patterns from an order that appears in a column. These sequences can be placed into a column using the Edit menu Insert Graphic Cells command. You can also directly type the "@" code for these symbols into a cell. Correctly typed codes appear as a graphic in worksheet cells.

The codes for the symbols, lines, and patterns are shown below.

Symbol Codes

Codes for filled and unfilled (a fill color of none) symbols, as well as dotted and crossed symbols, are available.

Use the (none) symbol type when you want to create curves which alternate between lines only and symbols only.

Code	Symbol Type
@symbol(1,0)	(none)
@symbol(1,3)	dot only
@symbol(1,5)	crosshair only
@symbol(2,0)	hollow circle
@symbol(2,1)	solid circle
@symbol(2,3)	dotted solid circle
@symbol(2,2)	hollow circle with crosshair
@symbol(2,5)	solid circle with crosshair
@symbol(2,6)	hollow circle with crosshair
@symbol(3,0)	hollow square
@symbol(3,1)	filled square
@symbol(3,2)	dotted hollow square
@symbol(3,3)	dotted filled square
@symbol(3,4)	hollow square with crosshair
@symbol(3,5)	filled square with crosshair
@symbol(4,0)	hollow triangle up
@symbol(4,1)	filled triangle up
@symbol(4,2)	dotted hollow triangle up

@symbol(4,3)	dotted filled triangle up
@symbol(4,4)	hollow triangle up with crosshair
@symbol(4,5)	filled triangle up with crosshair
@symbol(5,0)	hollow triangle down
@symbol(5,1)	filled triangle down
@symbol(5,2)	dotted hollow triangle down
@symbol(5,3)	dotted filled triangle down
@symbol(5,4)	hollow triangle down with crosshair
@symbol(5,5)	filled triangle down with crosshair
@symbol(6,0)	hollow diamond
@symbol(6,1)	filled diamond
@symbol(6,2)	dotted hollow diamond
@symbol(6,3)	dotted filled diamond
@symbol(6,4)	hollow diamond with crosshair
@symbol(6,5)	filled diamond with crosshair
@symbol(7,0)	hollow hexagon
@symbol(7,1)	filled hexagon
@symbol(7,2)	dotted hollow hexagon
@symbol(7,3)	dotted filled hexagon
@symbol(7,4)	hollow hexagon with crosshair
@symbol(7,5)	filled hexagon with crosshair

Line Codes

Codes for all available line types are provided. Use the (none) line type when you want to create curves which alternate between lines only and symbols only.

Code	Line Type
@line(1)	(none)
@line(2)	solid
@line(3)	long dash
@line(4)	medium dash
@line(5)	short dash
@line(6)	dot
@line(7)	dash-dot
@line(8)	dash-dot-dot

Fill Pattern Codes

Codes for pattern types using the Windows default pattern density are provided. Use the (none) pattern when you want unfilled bars or boxes. The fill color of bars and boxes is controlled by the Fill dialog box Background Color options.

Code	Fill Pattern
@pattern(1)	(none)
@pattern(2)	solid
@pattern(3)	rising right
@pattern(5)	rising left
@pattern(6)	diagonal cross hatch
@pattern(7)	horizontal lines
@pattern(8)	vertical lines
@pattern(9)	horizontal cross hatch

D

The SPW5.INI File

Many system and option settings for SigmaPlot are saved in the SPW5.INI file, which can be found in your Windows directory. You can modify some of the settings in SPW5.INI directly by editing the file with the Windows Wordpad or another text editor; however, make sure you create a backup file before editing SPW5.INI. Take great care in modifying this file. SPW5.INI is used to handle the files that SigmaPlot shares with other programs, and changing these settings can lead to unpredictable results.

Note that only those entries that are considered useful are discussed below.

Last Opened File Types

```
[Application]
Last Open Filter=1
Last Import Filter=1
Last Export Filter=8
```

These setting under the [Application] heading determine the default open, import and export file types. Note that these are reset when new file types are selected from the Open, Import and Export dialog boxes.

The number corresponds to Last used type from the [Open Filter], [Import Filter] and [Export Filter] lists. See “Changing the File Type Orders” on page 342.

Regression Wizard

```
[Nonlinear Regression]
OneEditWindow=0
LastSection="3D"
LastEquation="Lorentzian"
```

The OneEditWindow setting can be used to display the Regression (edit code) dialog box as a single window in the style of previous versions of SigmaPlot. To set display to a single text window, set OneEditWindow=1. A setting of 0 creates multiple edit windows.

The LastSection and LastEquation settings determine the default category and equation opened upon startup of the Regression Wizard. These are saved each time an equation is both selected and run on data.

SigmaPlot Program Window Size and Position

```
[Settings]
WindowPos=0,1,-1,-1,-4,-4,168,22,930,669
```

The WindowPos settings determine the SigmaPlot application window state, size and location upon opening.

The first two settings determine the state of the window on startup:

0,1 = in window
0,2 = minimized
2,3 = maximized

The next two settings can be ignored. This setting does not apply to Windows 95.

The next pair of settings are unused.

The last four settings determine the Window size and position. They are the pixel screen coordinates for the top left x, top left y, lower right x, lower right y of the window, respectively.

When the SigmaPlot window is closed, the size and position on close is saved to this setting.

Changing the File Type Orders

File types listed in all of the SigmaPlot file dialog boxes (e.g. Open, Export, Import, etc.) are listed under the following headings. The name as it appears in order in the list is followed by the extension of the file type. You can change the order that these files appear in your file dialog boxes by changing the order they appear in these lists.

If an import filter is required, the DLL used as the filter is specified before the file extension(s); do not change the import filter assigned to the file type.

Σ Do not modify the [Export Page] heading; it is required to support export of SigmaPlot 1.0 and 2.0 files. The [Export Page Info] heading is used to support graphic file export.

```
[Open Filters]
SigmaPlot Notebook=,*.JNB
Template Notebook=,*.JNT
Regression Library=,*.JFL
SigmaPlot 1.0, 2.0=JS~IJXFF|JD~IJXFF,*.SPW
SigmaPlot Curve Fit=FIT,*.FIT
SigmaPlot Macintosh 4=JS~ISPGF|JD~ISPGF,*.*
SigmaStat 1.0=JS~IJXFF|JD~IJXFF,*.SPW
SigmaPlot DOS=JS~ISPGF|JD~ISPGF,*.SP5;*.SPG
SigmaStat DOS=JS~ISPGF|JD~ISPGF,*.SP5
```

```
MS Excel=JS~WKW_F|JD~WKW_F,*.XLS
Lotus 1-2-3=ImpOpenX|ImpOpenX,*.WKS;*.WK1;*.WK3;*.WK4
DBase=ImpOpenX|ImpOpenX,*.DB2;*.DB3;*.DBF
Quattro Pro=ImpOpenX|ImpOpenX,*.WQ1;*.WKQ
Paradox=ImpOpenX|ImpOpenX,*.DB
Symphony=ImpOpenX|ImpOpenX,*.WK1;*.WR1;*.W RK;*.WKS
Systat=ImpSystat|ImpSystat,*.SYS
Plain Text=JS~IASCF|JD~IASCF,*.TXT;*.PRN;*.DAT;*.ASC
Comma Delimited=JS~IASCF|JD~IASCF,*.CSV
SigmaScan, SigmaScan Pro
Worksheets=JS~IJXFF|JD~IJXFF,*.SPW
Mocha, SigmaScan Image
Worksheets=JS~IJXFF|JD~IJXFF,*.MOC
DIF=JS~IDIFF|JD~IDIFF,*.DIF

[Open Excel Filters]
EXCEL
SigmaPlot Notebook=,*.JNB
Template Notebook=,*.JNT
Regression Library=,*.JFL
SigmaPlot 1.0, 2.0=JS~IJXFF|JD~IJXFF,*.SPW
SigmaPlot Curve Fit=FIT,*.FIT
SigmaPlot Macintosh 4=JS~ISPGF|JD~ISPGF,*.*
SigmaStat 1.0=JS~IJXFF|JD~IJXFF,*.SPW
SigmaPlot DOS=JS~ISPGF|JD~ISPGF,*.SP5;*.SPG
SigmaStat DOS=JS~ISPGF|JD~ISPGF,*.SP5
MS Excel=EXCEL,*.XL*
Lotus 1-2-3=EXCEL,*.WK*
Quattro PRO/DOS=EXCEL,*.WQ*
dBase=EXCEL,*.DBF
Plain Text=EXCEL,*.TXT;*.PRN;*.CSV
```

```
SYLK=EXCEL,*.SLK

SigmaScan, SigmaScan Pro
Worksheets=JS~IJXFF|JD~IJXFF,*.SPW

Mocha, SigmaScan Image
Worksheets=JS~IJXFF|JD~IJXFF,*.MOC

DIF=JS~IDIFF|JD~IDIFF,*.DIF


[Import Filters]

SigmaPlot 1.0, 2.0 Worksheet=JS~IJXFF|JD~IJXFF,*.SPW

SigmaPlot Macintosh 4 Worksheet=JS~ISPGF|JD~ISPGF,*.*

SigmaPlot Macintosh 5 Worksheet=JS~IJXFF|JD~IJXFF,*.*

SigmaStat 1.0 Worksheet=JS~IJXFF|JD~IJXFF,*.SPW

SigmaPlot DOS Worksheet=JS~ISPGF|JD~ISPGF,*.SP5;*.SPG

SigmaStat DOS Worksheet=JS~ISPGF|JD~ISPGF,*.SP5

MS Excel=JS~WKW_F|JD~WKW_F,*.XLS

Lotus 1-2-3=ImpOpenX|ImpOpenX,*.WKS;*.WK1;*.WK3;*.WK4

DBase=ImpOpenX|ImpOpenX,*.DB2;*.DB3;*.DBF

Quattro Pro=ImpOpenX|ImpOpenX,*.WQ1;*.WKQ

Paradox=ImpOpenX|ImpOpenX,*.DB

Symphony=ImpOpenX|ImpOpenX,*.WK1;*.WR1;*.WRK;*.WKS

Systat=ImpSystat|ImpSystat,*.SYS

Plain Text=JS~IASCF|JD~IASCF,*.TXT;*.PRN;*.DAT;*.ASC

Comma Delimited=JS~IASCF|JD~IASCF,*.CSV

SigmaScan, SigmaScan Pro
Worksheets=JS~IJXFF|JD~IJXFF,*.SPW

Mocha, SigmaScan Image
Worksheets=JS~IJXFF|JD~IJXFF,*.MOC

DIF=JS~WKW_F|JD~WKW_F,*.DIF

Axon Binary=JS~AXF_F|JD~AXF_F,*.ABF;*.DAT

Axon Text=JS~AXF_F|JD~AXF_F,*.ATF
```

```
[Export Notebook]
SigmaPlot 3.0 Notebook=,,*.JNB
SigmaStat 2.0 Notebook=,,*.SNB
[Export Worksheet]
SigmaPlot 3.0 Notebook=,,*.JNB
SigmaStat 2.0 Notebook=,,*.SNB
SigmaPlot 2.0=JS~EJXFF|JD~EJXFF,SPW,*.SPW
SigmaPlot 1.0=JS~EJXFF|JD~EJXFF,SPW,*.SPW
SigmaPlot Macintosh 5
Worksheet=JS~EJXFF|JD~EJXFF,SPW,*.SPW
Excel 4=JS~WKW_F|JD~WKW_F,XLS4,*.XLS
Excel 3=JS~WKW_F|JD~WKW_F,XLS3,*.XLS
Lotus 1-2-3 v1.0=ExpOpenX|ExpOpenX,WKS,*.wks
DBase II=ExpOpenX|ExpOpenX,DB2,*.dbf
DBase III=ExpOpenX|ExpOpenX,DB3,*.dbf
Quattro Pro v1.0=ExpOpenX|ExpOpenX,WQ1,*.wq1
Paradox v3.0=ExpOpenX|ExpOpenX,DB,*.db
Symphony v1.0=ExpOpenX|ExpOpenX,WRK,*.wrk
Systat=ExpSystat|ExpSystat,SYS,*.sys
Comma Delimited=JS~WKW_F|JD~WKW_F,CSV,*.CSV
Tab Delimited=JS~WKW_F|JD~WKW_F,TAB,*.TAB
Plain Text=JS~WKW_F|JD~WKW_F,TXT,*.TXT
SigmaScan, SigmaScan Pro=JS~EJXFF|JD~EJXFF,SPW,*.SPW
Mocha, SigmaScan Image=JS~EJXFF|JD~EJXFF,MOC,*.MOC
DIF=JS~WKW_F|JD~WKW_F,DIF,*.DIF

[Export Page]
SigmaPlot 3.0 Notebook=,,*.JNB
SigmaStat 2.0 Notebook=,,*.SNB
SigmaPlot 2.0=JS~EJXFF|JD~EJXFF,SPW,*.SPW
```

```
SigmaPlot 1.0=JS~EJXFF|JD~EJXFF,SPW,*.SPW

[Export Page INSO]
SigmaPlot 3.0 Notebook=,,*.JNB
SigmaStat 2.0 Notebook=,,*.SNB
SigmaPlot 2.0=JS~EJXFF|JD~EJXFF,SPW,*.SPW
SigmaPlot 1.0=JS~EJXFF|JD~EJXFF,SPW,*.SPW
Bitmap=EBBMP2.FLT,BMP,*.BMP
TIFF=EBTIF2.FLT,TIF,*.TIF
MetaFile=EMWMF2.FLT,WMF,*.WMF
Encapsulated PostScript=EMPS_2.FLT,EPS,*.EPS
JPEG=EBJPG2.FLT,JPG,*.JPG
```

Paper Size Definitions

These are the paper size settings for the Page Setup dialog box for printed graph pages, given in 1/254".

```
[Paper Names and Sizes];
US Letter=, 2159, 2794
US Legal=, 2159, 3556
US Letter Small=, 2159, 2794
US Legal Small=, 2159, 2970
A4=, 2099, 2970
```

Text Defaults

These are the default options for newly created text, as set in the Text Options dialog box. These are reset each time the Text Options dialog box is opened and changed with no text selected.

```
[Text Options]
Name=Arial
Italic=0
Weight=400
Underline=0
Size=20
Color=0l
```

```
LineSpacing=139
Alignment=2
Rotation=0
```

Default Worksheet Option

You can choose to have the Date and Time worksheet options appear by default instead of the Number defaults. Set SHOWNNUMERIC=1 if you want numbers to appear first, or set it to 0 if you want Date and Time to appear first.

```
[DWWPREFINIT]
SHOWNUMERICS=1
```

Recent Equation Libraries

List of all Equation Libraries selected from the library panel of the Regression Wizard. You can change this list by editing the files under this heading.

```
[Recent Equation Library List]
Library1=C:\PROGRA~1\SPW5\Standard.jfl
Library2=C:\MYDOCU~1\Custom.jfl
```

Macro Preferences

These are the default options for macros, as set in the Tools menu Options dialog box.

```
[Macro Preferences]
FontSize=10
FontName=Courier New
HighlightBuiltin=0x00808000
HighlightComment=0x00008000
HighlightError=0x000000FF
HighlightExtension=0x00800000
HighlightReserved=0x00FF0000
HighlightBreak=0x00000080
HighlightExec=0x0000FFFF
MacroDefaultNotebook=C:\Program Files\SPW5\SigmaPlot
Macro Library.jnb
Toolbar=1
RequireDefinitions=1
```

Last Saved Files

List of the last four saved files. You can change this list by editing the files under this heading.

```
[Recent File List]
File1=C:\WIN95\Desktop\samples.jnb
File2=C:\SPW5\SAMPLES.JNB
File3=C:\My Documents\Example.JNB
File4=C:\SPW5\TEMPLATE.JNT
```

Graph Page Size

```
[PageW]
DefaultPageWidth=8500
DefaultPageHeight=11000
```

These are the page heights and widths used for new pages in the absence of a template file or if there is no page named Normal in the template file.

Metafile Bitmap Use for 3D Files

```
[PageW]
hmetares=300
MetaBitmap=1
```

By default SigmaPlot generates 3D plots using a bitmap rather than a metafile. The hmetares setting determines the default resolution of that bitmap. This setting is changed to match the resolution of exported graphic files.

The MetaBitmap setting determines whether a bitmap or metafile is used to render the 3D plot; 1=use a bitmap, 0=use a metafile. A bitmap is recommended if any gradient, lighting, and transparency is used. If you never use these setting, you can change MetaBitmap=0.

Grids, Rulers, Snap-to and Crosshair Settings

```
[pagew]
CrossHairsEnabled=0
GridShown=1
GridSpacing=250
GridDots=0
GridColor=0xffff80
RulersShown=1
GridSnap=0
```

These settings under the [pagew] heading determine the default grids, rulers, snap-to, and crosshair features; 1=show, 0=don't show.

Edit Text Dialog Box Position

```
[Dialog Positions]
Edit Text=302,349
```

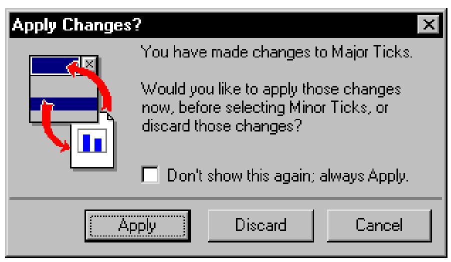
These setting control the location where the Edit Text dialog box for graph page appears when opened. When the dialog box is moved and OK is clicked, this setting is updated.

Graph Properties Dialog Box Automatic Apply

```
[PageDialogs]
AlwaysApply=1
```

When switching between the certain panels of Graph Properties dialog box, a prompt dialog box appears asking if you want to apply the changes before switching panels. If you click the Don't show this again; always Apply check box, this prompt is removed.

Figure D–1
The Apply Changes Prompt



You can re-activate this prompt by changing AlwaysApply=0.

Graph Default Settings

The settings for the graph defaults are provided as a reference in the event you would like to restore the settings to the original values using the SPW5.INI file.

```
[Graph Defaults]
Graph Height In MilliInches=3500
Graph Width In MilliInches=5000
Graph Position Left In MilliInches=1750
Graph Position Top In MilliInches=3500
Font=Arial
Page Color=16777215
Single Curve Symbol Color=0
Single Curve Symbol Color Repeat=2
```

```
Multi Symbol Color=0
Multi Symbol Color Repeat=61696
Single Curve Symbol Type=2
Single Curve Symbol Type Repeat=2
Single Curve Symbol Type Adornment=0
Multi Curve Symbol Type=2
Multi Curve Symbol Type Repeat=61952
Multi Curve Symbol Type Adornment=512
Single Curve Line Color=0
Single Curve Line Color Repeat=2
Multi Curve Line Color=0
Multi Curve Line Color Repeat=2
Single Curve Line Type=2
Single Curve Line Type Repeat=2
Multi Curve Line Type=2
Multi Curve Line Type Repeat=62464
Single Curve Bar Color=12632256
Single Curve Bar Color Repeat=2
Multi Curve Bar Color=0
Multi Curve Bar Color Repeat=61697
Bar Width=600
```

E

Working with Pie, Polar, and Ternary Plots

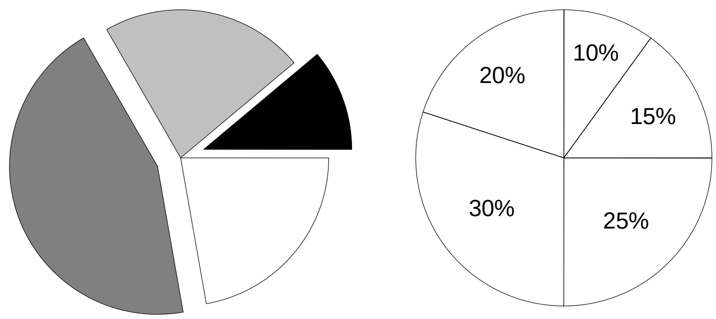
This chapter describes procedures specific to pie charts, polar plots, and ternary plots. To learn about making general graph modifications, like changing symbols, lines, or fills, see “Creating and Modifying Graphs” on page 151.

This chapter covers:

Pie Charts

Pie charts plot a single worksheet column by representing each data point in the column as a pie slice. Each data point in the column is graphed as a slice size equivalent to the data point's percent of the sum of all the data.

Figure E–1
Pie Charts



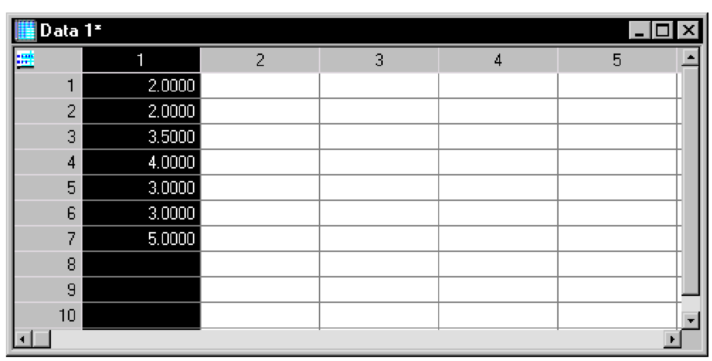
The first pie slice starts at 0° (3 o'clock) by default. Additional slices are added counterclockwise, in the order the data points occur in the column.

Arranging Data for a Pie Chart

To organize data for a pie chart, place data in a single worksheet column.

Figure E–2
Arranging Data for a Pie Chart

All data is placed into a single column.



Making a Pie Chart

To make a pie chart:

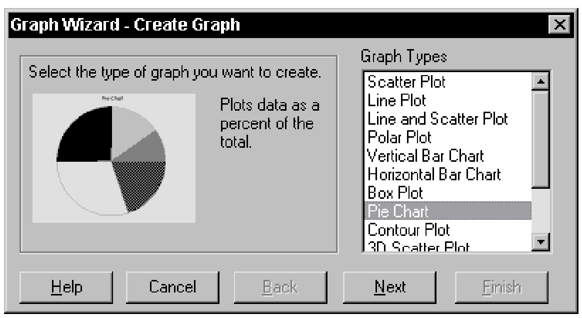
1. If you want to select worksheet data before creating the graph, select the worksheet column to plot before creating your graph by clicking your data. Note that you do not have to select data before you start a graph; you can select the column to plot during graph creation.

2. Click the Pie Chart button in the graph toolbar. The Graph Wizard appears.

   You can also open the Graph Wizard by clicking the  toolbar button or by choosing the Graph menu Create Graph command

3. If you did not use the graph toolbar to open the Graph Wizard, select Pie Chart as the type of graph to make from the scroll box in the dialog box, then click Next.

Figure E–3
The Graph Wizard Displaying a List of Graph Types



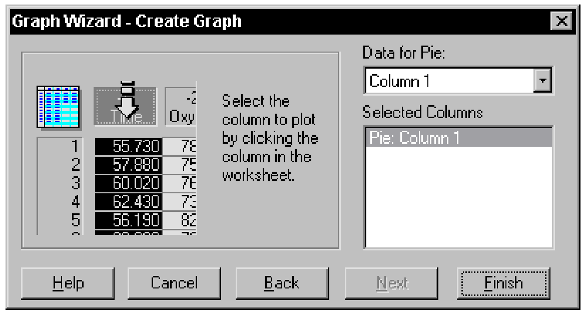
4. Specify which worksheet column corresponds to data for your plot. If you selected a column prior to opening the Graph Wizard, your choice automatically appears in the dialog box and you can click Finish to create the pie chart.

   If you have not already picked columns, note that “Pie” is highlighted in the Selected Columns box. This shows which data you are picking a column for the pie chart. Pick a column either by clicking the corresponding column directly in the worksheet, or selecting the appropriate column from the Data for Pie list.

5. If you make a mistake while picking data, click the wrong entry in the Graph

Wizard, then select the correct column from the worksheet.

Figure E–4 Using the Create Graph Dialog Box to Pick Columns to Plot



6. When you are done picking data, click Finish to create the pie chart and close the Graph Wizard.

Use the Graph Properties dialog box to modify the pie chart, or reopen the Graph Wizard to pick a different data column for your plot. For more information on making general modifications to your plot, see “Creating and Modifying Graphs” on page 151.

Σ You cannot add plots or axes to pie charts.

Modifying Pie Charts

Modifying pie charts includes:

➤ Picking new data for the graph (see “Picking Different Data for the Current Plot” on page 168).
➤ Changing fill color and patterns of pie chart slices (see “Changing Patterns and Fill Colors” on page 188).
➤ Rotating the pie chart (see the following section).
➤ Adding exploded pie slices to the pie chart (see the following section).

To modify a pie chart, select the graph and open the Graph Properties dialog box. To learn about selecting graphs and using the Graph Properties dialog box, see “Using the Graph Properties Dialog Box to Modify Graphs” on page 163 , and “Selecting a Graph or a Plot” on page 165.

Rotating the Pie and Adding Exploding Slices

To rotate the pie, or add an exploding slice:

1. Double-click the pie chart to open the Graph Properties dialog box. If you double-clicked the pie chart, the dialog box should open directly to the Pie Slices panel. If not, select the Pie Slices option from the Settings For list.

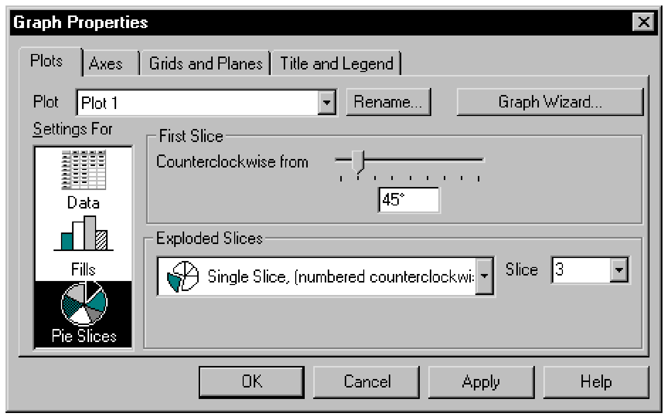
2. **To rotate the pie,** use the Counterclockwise From slider control to change the starting angle shown in the First Slice option or type a new starting angle value

in the Counterclockwise From edit box. Increasing the starting angle for the first slice moves the starting slice counterclockwise. Start the first slice at any angle from the default of 0° (3 o'clock) to 359°.

3. **To explode one pie slice,** choose Single Slice from the Exploded Slices list, and choose the number of the slice to explode from the Slice list. By default, the first slice begins at 0° and proceeds counterclockwise. If you have not rotated the pie chart, the slice number corresponds to the worksheet row number.

Σ Choosing No Exploded Slices replaces any exploded pie slices.

Figure E–5
The Pie Slices Settings of the Graph Properties Plots Panel



4. **To explode multiple slices,** close the Graph Properties dialog box then view the worksheet and select an empty column. For each row you want to emphasize with an exploding slice, type a 1 in the same row as the data point.

5. Open the Graph Properties dialog box to the Pie Slices settings of the Plots panel and select the column containing exploding slice data from the Exploded Slices list.

6. Select the Many Slices option under Exploding Slices, and enter the column number containing the slice numbers.

7. Click Apply to apply changes without closing the dialog box, or click OK to apply changes and close the dialog box.

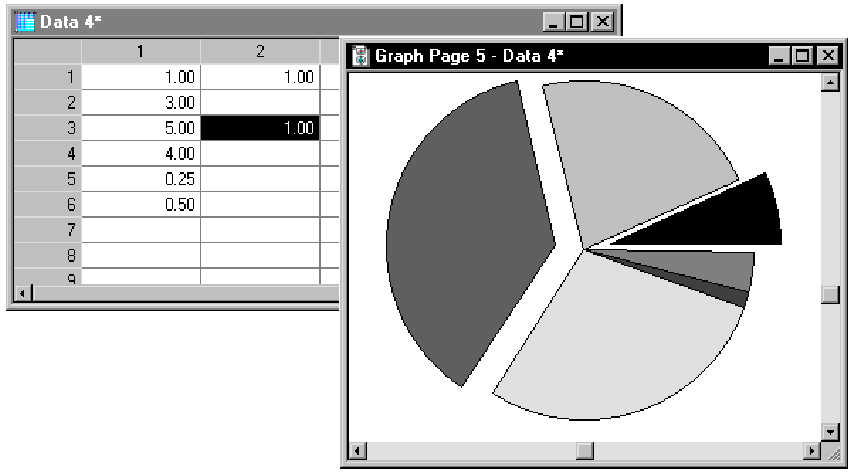


Figure E–6
A Pie Chart with Many Exploding Slices

Polar Plots

Polar plots show data in an $r = f(\theta)$ format where r is the distance from the origin of the graph, and theta (θ) the angle described by a line passing through the center of the graph and the plotted data point, and another line passing through the horizontal center of the graph.

Polar plots are useful for showing data where one value (θ) is modular in nature, like a clock. An example of this is a graph that shows average temperatures of differing geographical regions during the days of a month, or months of a year.

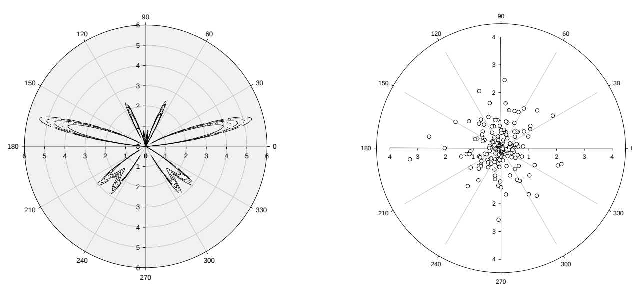


Figure E–7
Sample Polar Plots

Arranging Data for Polar Plots

Data for polar plots can be entered in either one of two ways:

- *R*, θ values
- X,Y coordinates

Data for Radial and Angular Values (R, Theta)

To arrange data using θ (angular) and *R* (radial) values, enter all θ values in one column, and enter the corresponding *R* values in another column. Data is plotted as θ versus *R*, which is similar to X,Y plots in organization, but differs from X,Y plots in that *R* is usually the dependent variable.

Using X,Y Values for Polar Plots

Polar plot X,Y data is arranged the same as 2D plot X,Y data, with all X values in one column, and all Y values in another column; however, polar plots are plotted as *R*,θ pairs defined as:

$$R = \sqrt{x^2 + y^2} \text{ and } \theta = atan\left(\frac{y}{x}\right)$$

where *R* is the radius, and θ is the angle of the data point.

Data for Multiple Curves

Since SigmaPlot can graph more than one curve per plot, place as many additional θ, *R* values, or X,Y coordinates, as you want to plot in worksheet columns.

Using Data from One Column for Multiple Curves

SigmaPlot can also graph many curves using the same column as the θ or *R* data (or, X or Y data). There is no need to duplicate a column that is used for more than one plot; for example, enter the θ data into only one column, and enter the corresponding *R* data into as many columns as you have curves.

Figure E–8 Theta, R Data for a Polar Plot

Data 1*

	1	2	3	4
1	0.00	-0.92		
2	30.00	-1.01		
3	60.00	1.71		
4	90.00	0.02		
5	120.00	-0.16		
6	150.00	1.13		
7	180.00	1.35		
8	210.00	-1.38		
9	240.00	-0.36		
10	270.00	1.46		
11	300.00	-2.07		
12	330.00	0.33		

Making Polar Plots

To use SigmaPlot to create a polar plot:

1. If you want to select worksheet data before creating the graph, select the worksheet columns to plot by dragging the pointer over your data. Note that you do not have to select data before you start a graph; you can also select the columns to plot during graph creation.

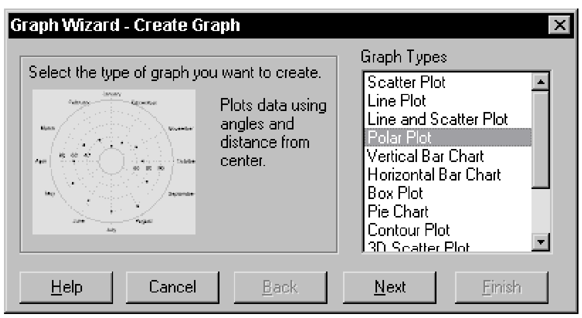
   If you want to select worksheet data before creating the graph, select the worksheet column to plot before creating your graph by clicking your data. Note that you do not have to select data before you start a graph; you can select the column to plot during graph creation.

2. Click the Polar Plot button in the graph toolbar, then select the style of polar plot you want to create. The Graph Wizard appears.

   You can also open the Graph Wizard by clicking the toolbar button or by choosing the Graph menu Create Graph command.

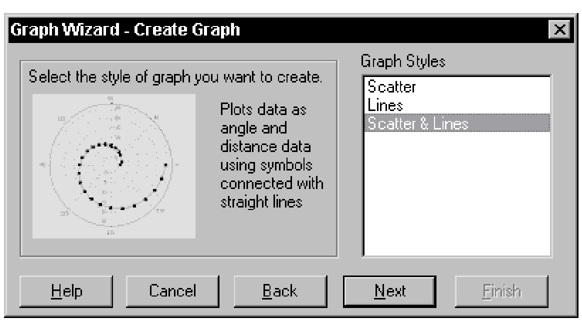
3. If you did not use the graph toolbar to open the Graph Wizard, select Polar Plot as the graph type. Use the scroll bars to view the entire list.

Figure E–9 The Graph Wizard Displaying a List of Graph Types



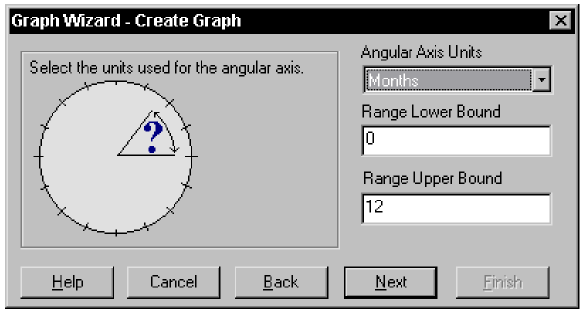
4. Click Next. The Graph Wizard displays the available polar plot styles. Select the desired graph style, then click Next.

Figure E–10 The Graph Wizard Displaying a List of Available Graph Styles for a Polar Plot



5. Set the number of units on the angular axis by choosing a unit type from the Angular Axis Unit list, then click Next. Note that the Range Lower Bound and Range Upper Bound options change depending on your selection from the list. For more information on polar axes, see “Modifying Polar Axes” on page 361.

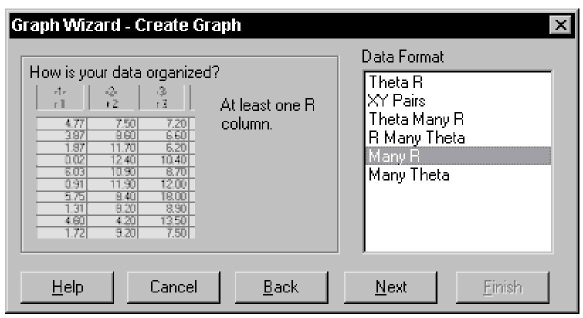
Figure E–11
Choosing an Angular Axis Unit from the Angular Axis Unit list



Σ If you don’t see the axis units you want to use for your polar plot listed in the list, you can type the desired values in the Range Lower Bound and Range Upper Bound edit boxes.

6. Specify how your data is formatted by selecting the appropriate data format from the Data Format list.

Figure E–12
Using the Graph Wizard to Specify the Data Format



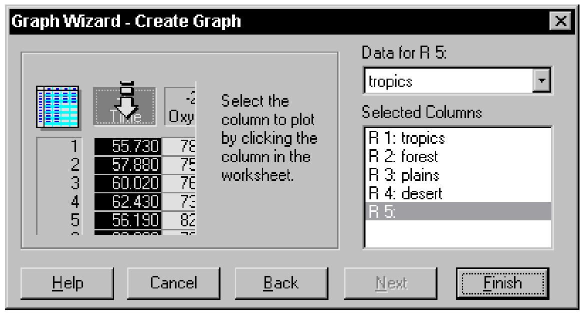
7. Click Next. The Graph Wizard prompts you to specify which worksheet columns correspond to the data for your plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the Selected Columns list, and you can click Finish to create the graph.

   If you have not already picked columns, note that a single data type is highlighted in the Selected Columns box, indicating the data type you are picking a column for.

8. Pick your data either by clicking the corresponding column directly in the worksheet, or choosing the appropriate column from the Data list. Repeat this process for every column you are using to create your graph.

   If you make a mistake while picking data, click the wrong entry in the Graph Wizard, then select the correct column from the worksheet. You can also clear a column assignment by double-clicking it in the Selected Columns list.

Figure E–13 Using the Create Graph Dialog Box to Pick Columns to Plot



9. Click Finish when you are done you picking data. The specified polar plot appears.

Use the Graph Properties dialog box to modify the plot, or reopen the Graph Wizard to pick different data columns for your plot. For more information on making general modifications to your plot, see “Creating and Modifying Graphs” on page 151.

Modifying Polar Plots

Modifying polar plots involves:

- ➤ Picking new data for the plot (see “Picking Different Data for the Current Plot” on page 168).
- ➤ Changing line and symbol type, size, and color (see “Changing Symbol Type and Other Symbol Options” on page 176 and “Changing Line Type and Other Line Options” on page 185).
- ➤ Modifying back plane color and grid lines (see “Modifying Grids and Planes” on page 230).
- ➤ Modifying angular and radial axes (see “Modifying Polar Axes” on page 361).

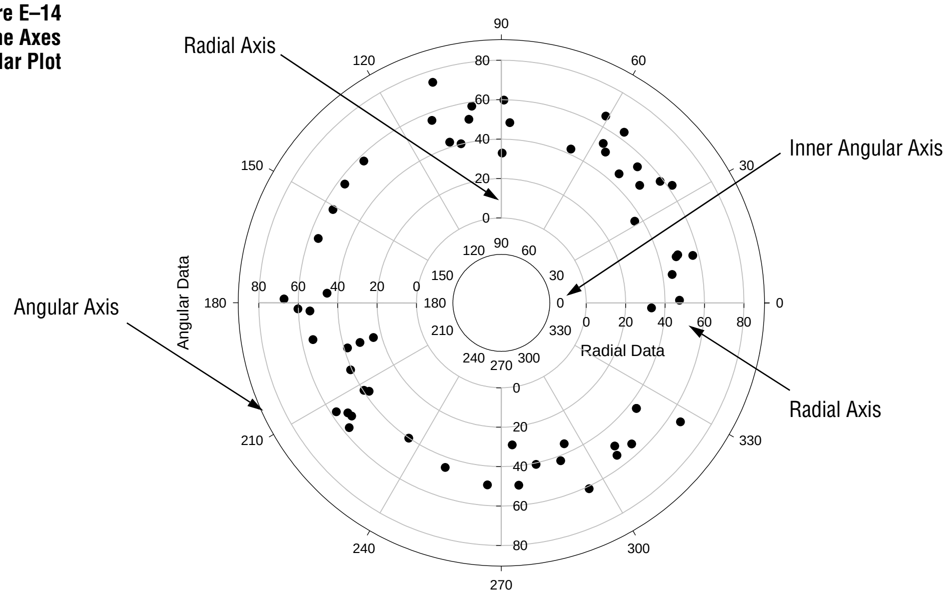
To modify a polar plot, select the graph and open the Graph Properties dialog box. To learn about selecting graphs and using the Graph Properties dialog box, see “Using the Graph Properties Dialog Box to Modify Graphs” on page 163 , and “Selecting a Graph or a Plot” on page 165 .

Modifying Polar Axes

Polar plots have a radial axis and an angular axis. The angular axis describes a circle and uses arcs or degrees (θ, or theta) as the scale. There are both outer and inner angular axes.

The radial axes are "spokes" of the circle and scale the distance from the center of the circle (the radius, or *R*). There are four radial axes, referred to as spokes 1-4.

Figure E–14
A Diagram of the Axes of a Polar Plot



Σ Axis breaks cannot be created for either radial or angular axes.

Angular Axes

The angular axes can be drawn along the inner and outer circumferences of the graph. By default, the inner axis is not displayed. Angular axes can be modified by:

➤ Changing axis titles (see "Working with Axis Titles and Tick Labels" on page 200).

➤ Displaying or hiding either axis (see "Hiding, Displaying, and Deleting Axes" on page 225).

➤ Changing axis lines (see "Axis Line and Color Thickness" on page 227).

➤ Changing axis scaling, range, and rotation (see "Changing Angular Axis Scaling and Position" on page 362).

➤ Changing the amount of polar arc displayed (see "Changing Angular Axis Scaling and Position" on page 362).

- Changing tick marks (see “Changing Tick Mark Intervals” on page 209).
- Changing axis tick labels (see “Changing Tick Labels” on page 217).

Radial Axes

The radial axes are drawn along the radius of the graph, and by default are displayed as four axes extending from the center of the graph to the outer edge of the graph. Each of the radial axes is a representation of the same data, so the range and scale must be the same for each radial axis; however, you can modify the color, tick marks, labels, location, and display of each radial axis independently. Radial axes can be modified by:

- Displaying or hiding any axis (see *“Modifying Radial Axes Lines and Position” on page 364*).
- Changing display of axis and tick label titles (see “Displaying and Changing Radial Axis Ticks and Labels” on page 366).
- Changing axis lines (see *“Modifying Radial Axes Lines and Position” on page 364*).
- Changing axis scaling (see “Changing Axis Scales” on page 203).
- Changing tick marks (see “Changing Tick Mark Intervals” on page 209).
- Changing axis tick label type (see “Changing Tick Labels” on page 217).

Changing Angular Axis Scaling and Position

Angular Axis Scaling

Polar plot angular axis scale and range settings control the axis units and increments used to plot data. You can modify axis scale, range, units, and rotation using the Scaling settings of the Graph Properties dialog box Axes panel.

To change an axis scale, range, units, and rotation:

1. Select the axis, then click the toolbar button.

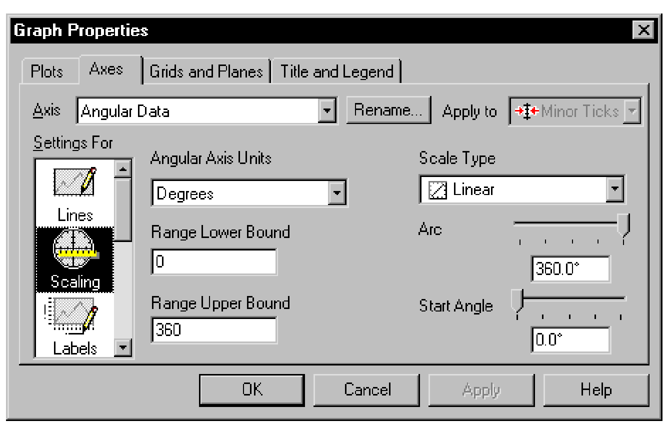


Figure E–15 The Angular Axis Scaling Settings of the Graph Properties Dialog Box Axes Panel

2. **To change the axis scale used,** choose the desired axis scale type from the Scale

Type list.

For descriptions of the different scale types available, see "Axis Scale Types" on page 204, and "Using a Custom Axis Scale" on page 208 .

3. **To change the measurement units of the angular axis,** use the Angular Axis Units list. If you don't see the axis units you want to use for your polar plot listed in the list, choose Other, then type new axis range values in the Range Lower Bound and Range Upper Bound boxes. If using a pre-defined measurement unit, the Range Lower Bound and Range Upper Bound box values are entered automatically.

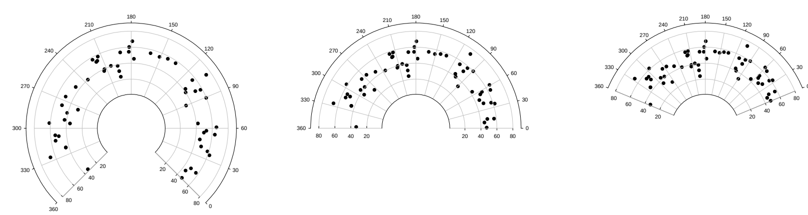
Σ The only effect of changing units is to change the pre-defined axis range. This range can be manually changed regardless of the current units.

4. **To change the displayed arc of the polar plot,** use the Arc slider control. A setting of 360° displays the entire circle, 270° displays three-quarters of the circle, 90° displays half of the circle, and so on.

Σ If you change the arc of the angular axis, the axis range remains the same. The current axis range appears along the new distance of the arc.

5. **To rotate the plot,** use the Start Angle slider control. The default is 0 ° (3 o'clock). Rotation is counterclockwise.

Figure E–16
Polar plots with: Starting angle of 315 ° and arc of 270 °; start angle of 0 ° and arc of 180 °; and start angle of 135 ° and arc of 22.5 °.



6. Apply axis scaling settings by clicking Apply, or apply changes and click OK to close the dialog box.

Moving Angular Axis Positions

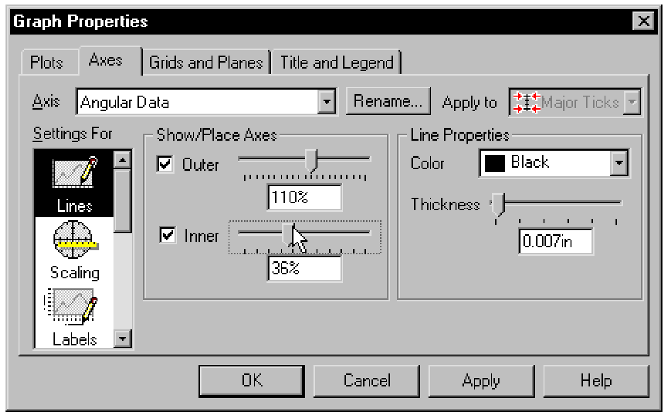
You can drag both inner and outer angular axes closer or further from the center of the graph. Just select the axis, and move it using the mouse.

To set exact locations for angular axes:

1. Double-click an angular axis. The Graph Properties dialog box Axis Line

options panel appears.

Figure E–17 Moving an Angular Axis Using the Graph Properties Dialog Box Axes Panel



2. Use the slider controls in the Show/Place Axes options to change the percentage in the Outer and Inner boxes axes, or select the value in the edit boxes and type a new value.

   Locations are described as the percentage of the distance the axes lie from the center of the graph. To move an axis out, increase the percent. To move an axis inward, decrease the percent.

3. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

Modifying Radial Axes Lines and Position

Control polar plot radial axes line settings using the Lines settings of the Graph Properties dialog box Axes panel.

Moving and Positioning Radial Axes

To move a radial axis:

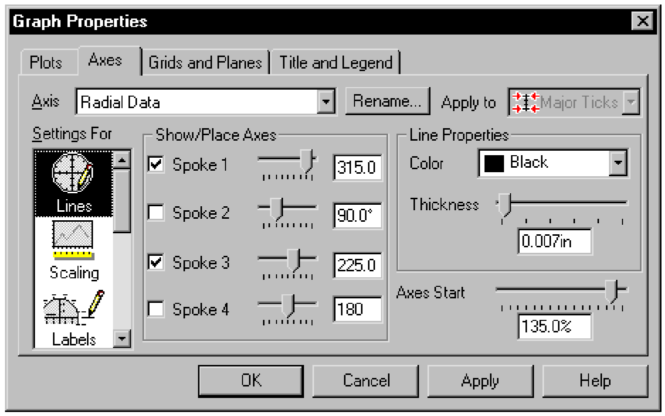
1. Select the axis on the page.
2. Use the mouse to drag it to a new location. Radial axes spin about the center of the graph like the spokes of a wheel.

To set radial axis positions to exact degree positions:

1. Double-click a radial axis. The Graph Properties dialog box opens to the Axis

Line options.

Figure E–18 Moving Radial Axes Using the Graph Properties Dialog Box Axes Panel

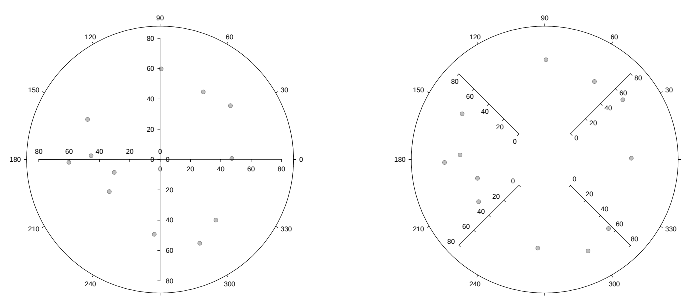


2. **To move a radial axis,** use the Show/Place Axes slider controls to set a new location, or select the edit boxes and type new values. The axis location is in degrees from 0° (3 o'clock). The defaults are 0°, 90°, 180°, and 270°.

3. **To offset an axis from the center of the graph,** use the Axes Start slider control to change the length of the radial axes.

   Setting the slider to 0% draws the axis from the center of the graph outward, 25% draws the axis beginning a quarter of the distance from the center, 50% draws it half the distance from the center, and so on.

Figure E–19 Radial Axes in the Default Positions, and Offset by 45° with an Axes Start of 30%.



4. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

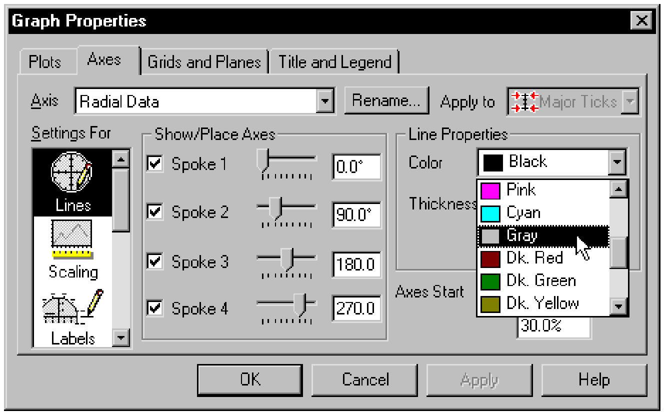
Changing Radial Axes Lines

To display and modify radial axes lines:

1. Double-click a radial axis. You can also right-click the axis and choose Graph

Properties, or select the axis and click the button.

Figure E–20 Selecting a Color for the Radial Axes



2. **To view or hide a radial axis,** use the Spoke 1, 2, 3, or 4 check boxes. The Show/ Place Axes edit boxes display the axis location on the graph.
3. **To change line color and thickness,** use the Line Properties options.
4. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

Displaying and Changing Radial Axis Ticks and Labels

Use the Graph Properties dialog box Axes panel Labels settings to display polar radial axis labels, and modify tick labels. Angular axes labels are analogous to standard Cartesian graph titles and labels. However, radial tick marks and labels have additional positioning options.

Other than display and position, polar plot tick marks and labels have the same options as Cartesian graph tick marks and labels.

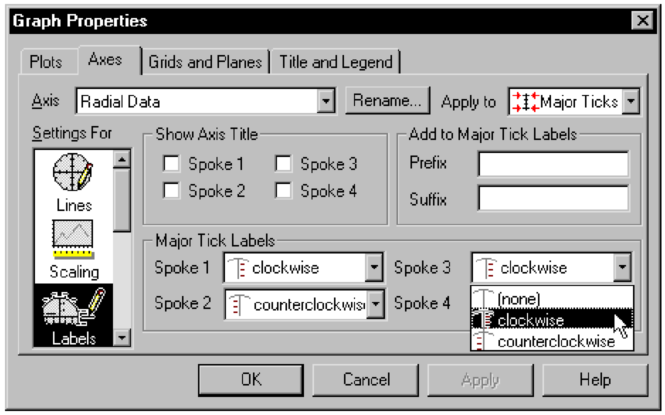
Changing Axis Title and Tick Labels Display

To view, hide, or move titles and tick labels on the radial axes:

1. Double-click a radial axis.

2. Select the Labels option from Settings For list.

Figure E–21
Selecting a Tick Label Direction for a Radial Axis



3. Select either Minor Ticks or Major Ticks from the Apply To list, then use the Major (or Minor) Tick Labels options to move or hide the major or minor tick labels on the radial axes.

4. Selecting (none) hides the labels, and choosing Clockwise or Counterclockwise moves the label from one side of the axis to the other.

5. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

Hiding Tick Marks

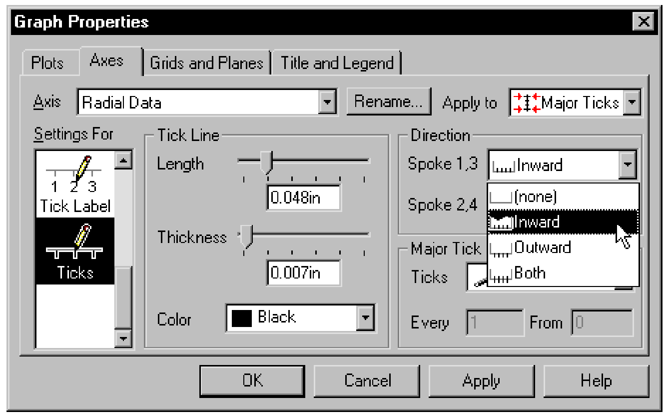
You can simply hide tick marks by clicking the ticks and pressing the Delete key. You can also right-click the labels and choose Hide.

Radial Axis Tick Mark Direction

You can specify the direction for radial axis tick marks for each pair of radial axes.

1. Double-click any radial axis tick mark.

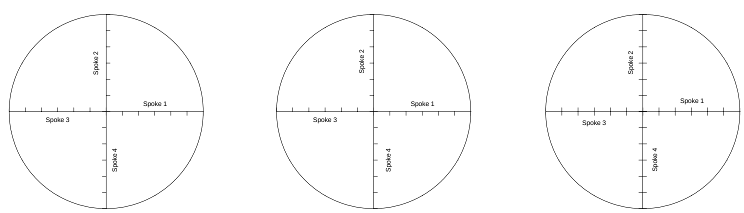
Figure E–22 Selecting a Tick Mark Direction for a Radial Axis



2. Select either Minor Ticks or Major Ticks from the Apply To list.
3. Use Direction options to change the tick directions on the radial axes. You can only change the directions for Spokes 1 and 3 together, and for 2 and 4 together.

   Selecting Inward orients the ticks clockwise, and Outward points the ticks counterclockwise.

Figure E–23 Polar Plots with All Ticks Pointing Inward, Spokes 1, 3 Inward and2,4 Outward, and All Ticks Pointing in Both Directions



4. Selecting Both directions draws ticks both clockwise and counter-clockwise, and selecting (none) hides the tick marks.
5. Click Apply to apply your changes, or OK to apply your changes and close the dialog box.

Ternary Graphs

Ternary graphs plot data on an XYZ coordinate system in the form of three variables that add up to 100% or 1. These variables are typically the normalized proportions of three substances and are plotted on three axes generally arranged as an equilateral triangle. These graphs are also commonly referred to as triangle plots.

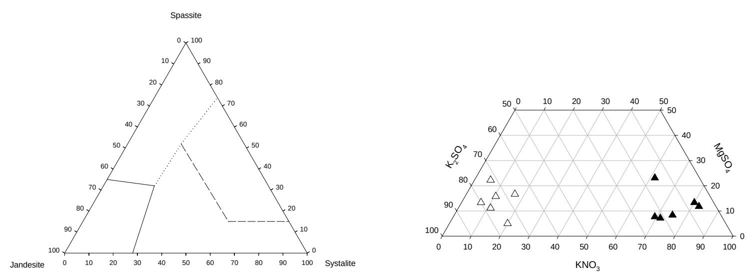


Figure E–24 Examples of a Ternary Line Plot, Scatter Plot, and Scatter and Line Plot

Ternary Plot Styles

You can create ternary scatter, line, and scatter and line plots. These graph data as symbols, as lines only with no symbols, or as symbols and lines, respectively. Line shapes can be straight segments or spline.

Arranging Data for a Ternary Graph

Data for ternary plots can be XYZ data in three separate columns or SigmaPlot can extrapolate a third column from data pairs in two columns. Ternary graphs must have at least one single or multiple-curve plot, but can hold many more plots, each with a different style and data format. If your raw values do not add up to 100% or 1, SigmaPlot can convert them to normalized ternary data. If you have XY, YZ, or YZ pair data, SigmaPlot can compute the third-column values shown in the resulting graph.

Σ For more information on creating another plot for an existing ternary graph, see “Multiple Plots on a Graph: Adding New Plots” on page 170.

Data for a Single-Curve Plot (Ternary Triplets)

If you are creating a graph with a single-curve plot using only one set of XYZ values whose sum is 100% or 1, enter all X data in one column, all Y data in another column, and the corresponding Z data in another column. The columns do not have to be adjacent to one another, but they must be the same length. Ternary triplet data should always add up to 100% or 1. For information how to convert data whose sum is not 100% or 1, see “Normalizing Ternary Data” on page 370.

Data for a Multiple-Curve Plot (Ternary Triplets)

If you are creating a graph with a multiple-curve plot using multiple sets of XYZ values where the sum of each set is 100% or 1, enter into worksheet columns as many additional ternary triplet data sets as you want to plot. Each set of ternary triplet data is a separate plot-curve. All ternary triplet data sets should add up to 100% or 1. For information how to convert data whose sum is not 100% or 1, see "Normalizing Ternary Data" on page 370.

Figure E–25
Multiple Columns of Triplet Percentage Data for a Ternary Plot

Data 1*

	Plot 1 X Data	Plot 1 Y Data	Plot 1 Z Data	4	5	6
1	0.00	11.00	89.00	25.00	0.00	75.00
2	17.00	10.00	73.00	24.00	15.00	61.00
3	34.00	10.00	56.00	24.00	30.00	46.00
4	50.00	10.00	40.00	24.00	46.00	30.00
5	67.00	9.00	24.00	25.00	60.00	15.00
6	92.00	8.00	0.00	27.00	73.00	0.00
7						
8						

Data for a Single or Multiple-Curve Plot (Ternary XY, YZ, or XZ Pairs)

If you are creating a graph with a single or multiple-curve plot using XY, YZ, or XZ pairs, enter all X, Y, or Z data in one column, and the corresponding X, Y, or Z pair values in another column. As long as all data pairs use a percentage or unitary scale, SigmaPlot will compute the third-column data shown in the resulting graph.

Σ SigmaPlot computes third-column data for plotting only. Computed third-column data is not displayed in the worksheet.

Normalizing Ternary Data

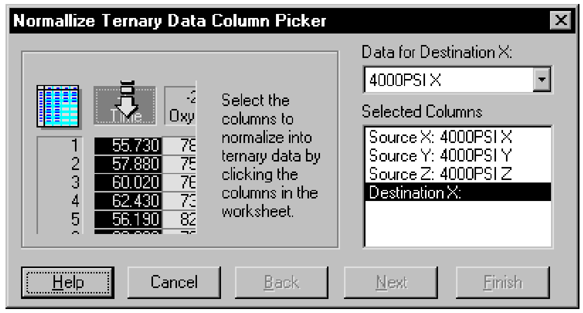
To create a ternary graph using data whose sum is not 100% or 1, first convert the raw XYZ data into normalized ternary triplet data by using the Normalize Ternary Data transform.

To normalize ternary data:

1. Choose the Transforms menu Normalize Ternary Data command. The Normalize Ternary Data Column Picker dialog box appears prompting you to select the source column for the X data.
2. Select the column with the original X data from the worksheet or the Data Source list. The selected column is assigned as the X Source in the Selected Col-

umns list and you are prompted to select the Y data source.

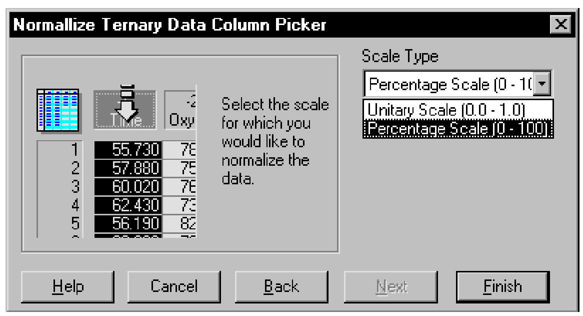
Figure E–26 Selecting the Data Columns to Normalize from the Normalize Ternary Data Column Picker Dialog Box



3. Select the Y and Z columns from the worksheet or the Data Source list. You are prompted to select the X data destination column.

4. Select the X, Y, and Z destination columns as prompted and click next. You are prompted to select the type of scale for which you would like to normalize the data.

Figure E–27 Selecting the Scale Type from the Normalize Ternary Data Column Picker Dialog Box



5. Select Percentage Scale (0-100) or Unitary Scale (0.0 to 1.0), then click Finish. The normalized ternary data appears in the previously selected worksheet columns.

6. To graph the data, select a ternary plot from the Graph toolbar, choose the Graph menu Create Graph command, or select the Graph Wizard button and create a new ternary plot using the normalized ternary data in the previously selected worksheet columns.

Creating Ternary Graphs

To create a ternary plot:

1. Select the worksheet columns to plot before creating your graph by dragging the pointer over your data. You do not have to select data before you start a graph; you can select the columns to plot during graph creation.

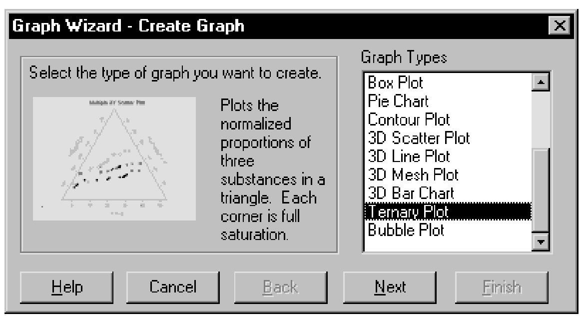
Σ Ternary plot data set (triplet or pair) must be based on a percentage or unitary scale with the sum of all values being 100% or 1. If your data does not add up to 100% or 1, use the Normalize Ternary Data transform. For more information, see “Normalizing Ternary Data” on page 370.

2. Click the Ternary Plot button in the graph toolbar.
3. Select the style of ternary plot you want to create. The Graph Wizard appears.

   You can also open the Graph Wizard by clicking the toolbar button or by choosing the Graph menu Create Graph command.

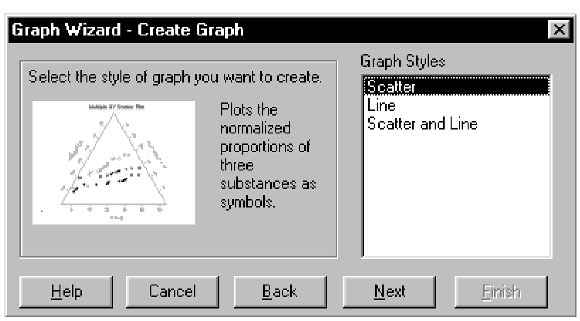
4. If you did not use the graph toolbar to open the Graph Wizard, select Ternary Plot as the graph type by highlighting it in the dialog box list. Then click the Next button.

Figure E–28
Selecting Ternary Plot from the Graph Wizard List of Graph Types



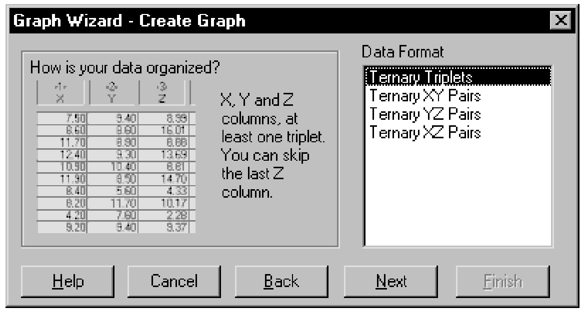
5. The Graph Wizard prompts you to select a ternary graph style. Highlight the desired style, then click Next.

Figure E–29
Selecting a Graph Style from the Graph Wizard



6. The Graph Wizard prompts you to select the data format appropriate to the data you are plotting. Select the appropriate format and click Next.

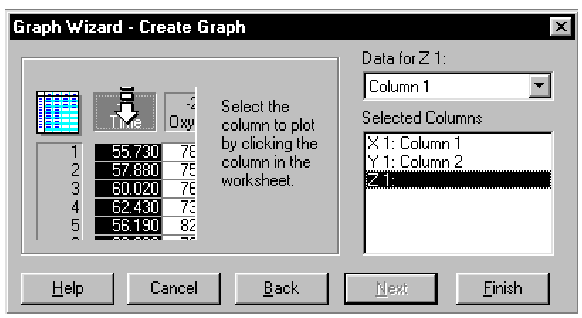
Figure E–30
Selecting a Ternary Graph Data Format from the Graph Wizard



7. The Graph Wizard prompts you to select the columns containing the data to plot. If you selected columns prior to opening the Graph Wizard, your choices automatically appear in the dialog box and you can click Finish to create the graph.

   If you have not already picked columns, begin picking them now by either selecting them in the worksheet or choosing the columns from the Data Columns list. When you have selected all the columns to plot, click Finish to create the graph.

Figure E–31
Selecting Columns to Plot Using the Graph Wizard



Σ If you make a mistake picking columns, highlight the wrong entry in the Graph Wizard, then choose the correct column either in the worksheet or from the column list.

8. The Graph Wizard closes and the ternary graph appears displaying the plotted data.

   Use the Graph Properties dialog box to modify the plot or to open the Graph Wizard to pick different data columns to plot or to add another plot to your graph. For more information on making general modifications to ternary plots, see “Creating and Modifying Graphs” on page 151. For detailed information on modifying ternary axes, see “Modifying Ternary Axes” on page 374.

Modifying Ternary Graphs

Modifying ternary graphs involves:

- Picking new data for the plot (see "Picking Different Data for the Current Plot" on page 168).
- Changing line and symbol type, size, and color (see "Changing Symbol Type and Other Symbol Options" on page 176 and "Changing Line Type and Other Line Options" on page 185).
- Modifying backplane color and grid lines (see "Modifying Grids and Planes" on page 230).
- Changing axis properties, including range and direction (see "Modifying Ternary Axes" on page 374).

To modify a ternary graph, select the graph and open the Graph Properties dialog box. To learn about selecting graphs and using the Graph Properties dialog box, see "Using the Graph Properties Dialog Box to Modify Graphs" on page 163 , and "Selecting a Graph or a Plot" on page 165.

Modifying Ternary Axes

Ternary axes are drawn to represent increases in data value in a counter-clockwise direction by default. Axis direction can be reversed, indicated by a reversal of tick labels, and the tick direction changes accordingly.

Because ternary axes are interdependent, any modification in the scale type or range of one of the axes is reflected in the other axes, and may alter the shape and size of the graph. You can modify the color and thickness of axis lines, the appearance of tick marks and tick labels, location and rotation of axis titles, and display of each ternary axis independently.

Ternary axes can be modified similarly to other graph axes. The following sections cover:

- Changing display of axis titles ("Modifying Ternary Axis Title Location" on page 375).
- Changing axis range, scale, and direction (see "Changing Ternary Axis Range, Scale, and Direction" on page 376).
- Changing axis tick labels (see "Modifying Tick Label Display" on page 384).
- Changing axis tick marks (see "Modifying Ternary Tick Mark Line Appearance" on page 383).

To learn more about displaying or hiding any axis see "Hiding, Displaying, and Deleting Axes" on page 225. For more information on changing axis lines, see "Axis Line and Color Thickness" on page 227 .

Σ Axis breaks cannot be created for ternary axes.

Modifying Ternary Axis Title Location

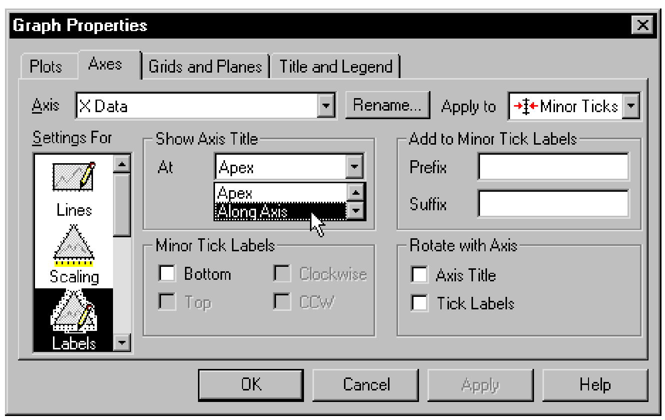
You can position axis titles of ternary graphs either at the apex or along the length of the axis. You can also rotate them to a position parallel to the axis.

To reposition a ternary graph axis title:

1. Double-click the axis with the title you want to change.
2. Select Labels from the Settings For list.

   To identify which axis is associated with and axis title, keep in mind that the title at the apex is always at the 100% point or maximum for that axis.

Figure E–32
Selecting a Ternary Axis Title Position

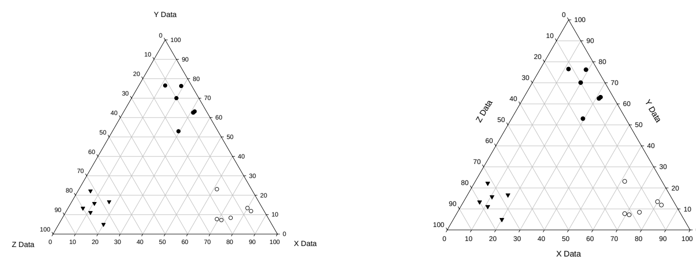


3. Select the desired location from the Show Axis Title list.
4. Choose None to hide the axis title.
5. To rotate the axis title parallel to the axis, check the Axis Title check box in the Rotate with Axis options.
6. Click Apply.

7. Continue to modify the titles of the other axes. Specify the axis title you want to change using the Axis list, then make the desired changes. When you have finished, click OK to close the dialog box.

Figure E–33
Axis Titles at the Apexes and Along the Axes

The titles along the axes are also rotated with the axes.



Changing Ternary Axis Range, Scale, and Direction

Ternary axis scale type and range settings control the units and increments used to plot the data. Axis scale, range, and direction are modified using the Scaling settings of the Graph Properties dialog box Axes panel. Axis range can also be modified by dragging a selected axis. Modifying ternary axis range can alter the size and even the shape of the graph.

Modifying Axis Range by Dragging

You can modify axis range by dragging a selected axis or apex. Because ternary axes are interdependent, dragging an axis to modify its range can change the ranges of the other axes.

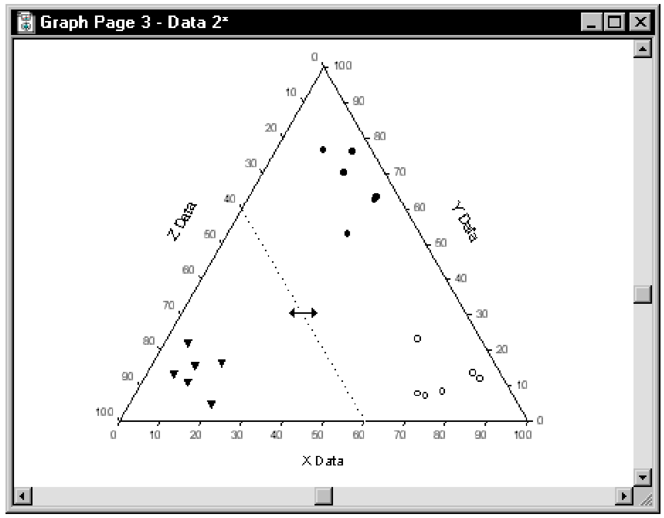
Dragging an apex modifies the ranges of the two axes which form the apex; reducing the maximum of an axis range introduces a fourth axis, creating a trapezoid graph. Dragging a selected axis toward or away from the center of the graph modifies all three axis ranges by the same increment, maintaining the original shape of the graph.

To modify ternary axis ranges:

1. View the ternary graph.
2. Select either an apex or an axis which you want to modify.

3. A selected apex displays a black, square selection handle and is surrounded by a dotted line; a selected axis displays a selection handle at the center point of its range and is surrounded by a dotted line.

Figure E–34
Dragging an Axis to Rescale a Ternary Plot Range

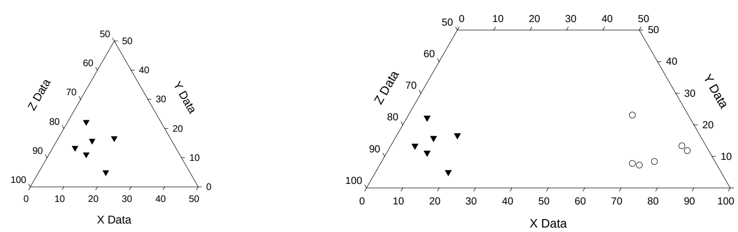


4. Drag either the apex or the axis toward or away from the center of the graph. The axis ranges adjust accordingly.

Σ Modifying axis ranges of ternary graphs often introduces additional axes. These axes are the second axes of each “pair” of axis lines. An axis which appears as a result of moving an apex is paired with the axis opposite the apex which moved. Additional axes can be modified and are controlled in the same way as the three original ternary axes using the Axes panel of the Graph Properties dialog box.

Figure E–35
The Results of Different Range Changes on Ternary Plots

The left graph Y axis was dragged to 50%. The right graph Y apex was dragged to 50%.

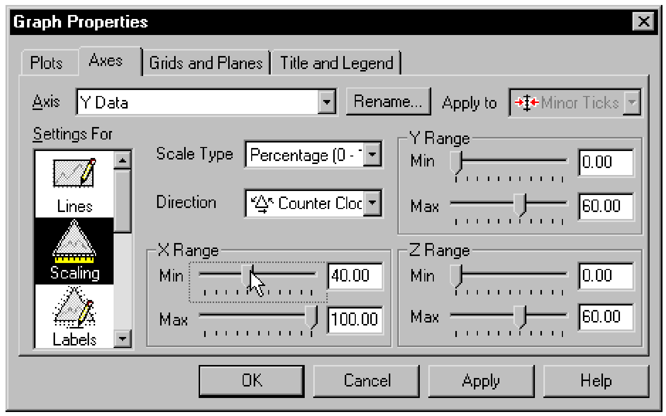


Using the Graph Properties Dialog Box to Modify Ternary Axis Range

You can also modify ternary graph ranges using the Graph Properties dialog box:

1. Double-click the angular axis and select the Scaling option from the Settings For list.

Figure E–36 The Graph Properties Dialog Box Axes Panel Showing Settings for Scaling



2. Use the slider controls for X Range, Y Range, and Z Range to change individual axis ranges or type the new range in the corresponding edit box.

Σ Note that when you change the Minimum for any axis, the maximums for the other axes adjust automatically. Changing the Maximum for any axis does not require changing the ranges for other axes.

3. When you have finished, click Apply to make the changes or OK to apply the changes and close the dialog box. The graph appears with new axis ranges.

Σ Increasing an axis range minimum reduces the size of the ternary graph because it is always reduces the other axis range maximums. Reducing the maximum of a ternary axis range changes the graph shape.

Ternary Scale Type

All ternary axes on a single graph use either the default Percentage (0-100) scale or the Unitary (0.0-1.0) scale. Data used by each scale should be within the required ranges for each scale.

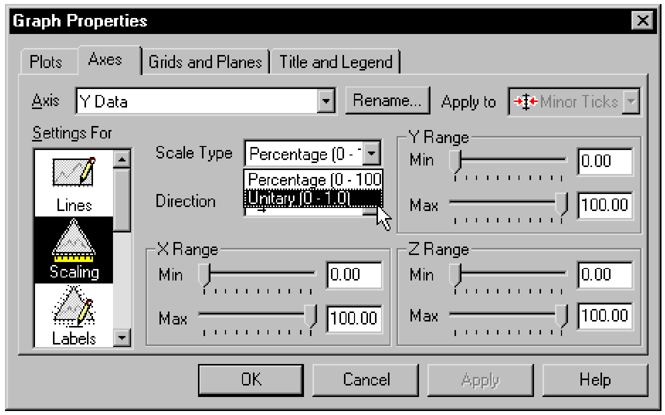
Graph creation determines the graph scale. There should be no need to change the scale unless a mistake was made during graph creation. Changing the scaling from Percentage to Unitary can also hide out-of-range data.

To change ternary axis scale type:

1. Double-click the angular axis.

2. Select the Scaling option from the Settings For list.

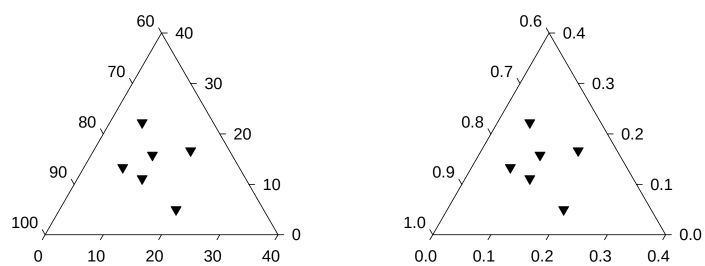
Figure E–37
The Graph Properties Dialog Box Axes Panel Showing Settings for Scaling



3. Select the new axis scale type from the Scale Type list.
4. Click OK to make the change and close the dialog box.

Figure E–38
Ternary GRaphs Using Percentage and Unitary Axis Scales

The data range used for Percentage is 0-100; the data range for Unitary data is 0-1.



Σ When you change the axis scale type for one axis, it is changed for all axes.

Changing Ternary Axis Direction

Ternary graph axes show data increasing in either a clockwise or counter-clockwise direction. Modifying axis direction changes all three axes; ternary axes are interdependent.

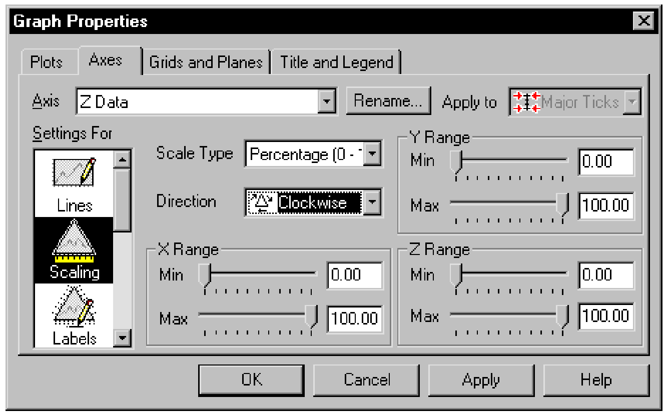
Ternary graph axes have interdependent axis ranges from 0 to 100, where 0 to 100 is the default setting. The axis range and scale control the axis units and increments used to plot data.

To modify the axis direction:

1. From the Axes panel of the Graph Properties dialog box, select Scaling from the Settings For list.
2. Select the axis you wish to modify from the Axis list.
3. Select the new axis direction from the Direction list.

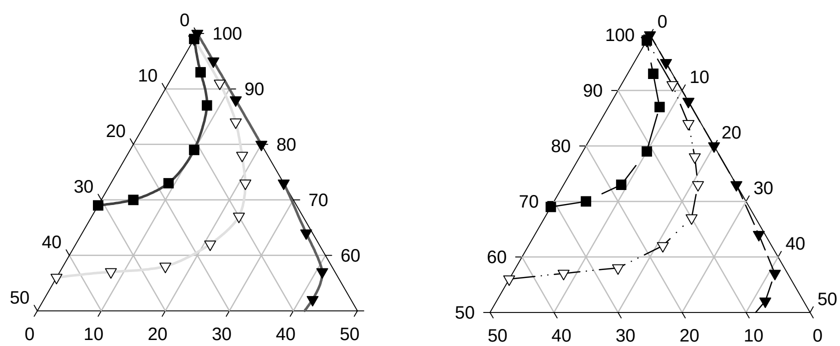
Click OK to apply changes and close the dialog box. The tick directions change on all three axes and the axis ranges reverse.

Figure E–39
The Graph Properties Dialog Box Axes Panel Showing Settings for Scaling



Changing the axis directions inverts the 0-100 direction of the labels and changes the direction of the tick marks. However, axis titles only move if they are positioned along an axis, not at an apex. Apex position for each variable remain constant regardless of axis direction

Figure E–40
Ternary Graphs Displaying Counterclockwise (Left) and Clockwise (Right) Axis Directions



Changing Ternary Axis Tick Marks and Tick Labels

Ternary axes tick marks indicate the precise location of each value at specific intervals determined by the axis range. Tick marks and tick labels along ternary axes have both direction and origin. Every tick location can have tick marks and labels pointing in clockwise, counter-clockwise, both clockwise and counter-clockwise, and perpendicular directions, independent of the actual direction of the data.

Tick and Tick Label Directions and Ownership

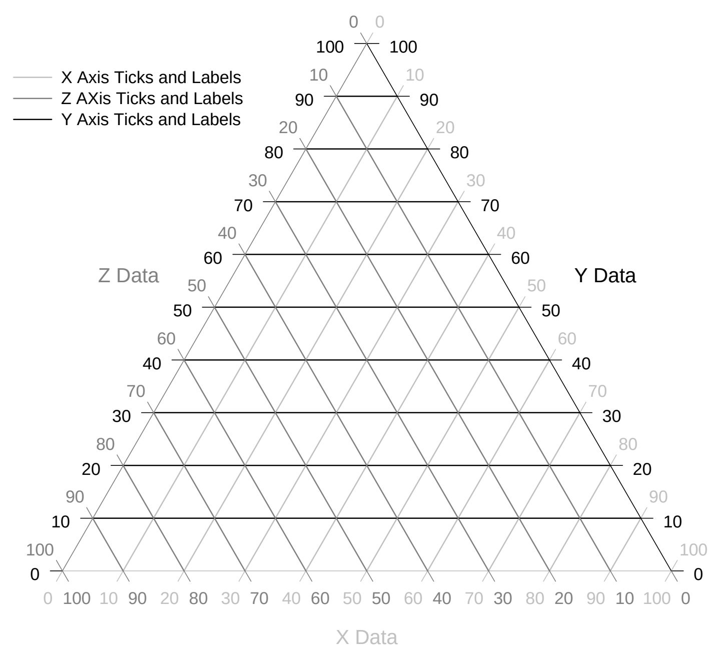
Tick marks and labels indicate which values correspond to the plotted data points by the direction they lean in. The direction also indicates which axis the tick is actually controlled by. This can be a different axis than the tick mark is actually drawn on.

For example, the default ticks for the X axis are drawn leaning in a clockwise direction on the bottom axis. These tick marks also correspond to the counter-clockwise tick marks on the Y axis. If you change the tick mark attributes for X axis ticks, you can affect tick marks that are actually drawn on a different axis.

The following figure best illustrates tick mark and label ownership.

Figure E–41 A Ternary Graph with All Tick Labels and Marks Drawn

The X Axis ticks and labels are drawn in light gray, the Y Axis ticks and labels are drawn in black, and the Z Axis ticks and labels are drawn in dark gray.

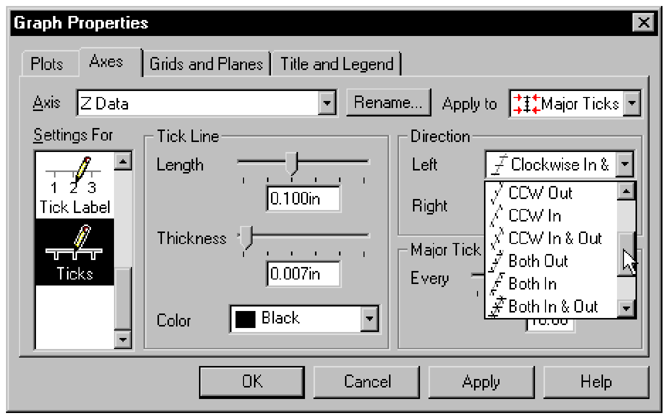


Modifying Ternary Tick Marks Direction and Intervals

Use the Graph Properties dialog box to modify tick appearance including tick length and color. You can also specify to view or hide tick marks, which side of the axis they extend from, and the tick interval.

1. Double-click the tick marks you want to change. You can also double-click the axis, then select Ticks from the Settings For list.

Figure E–42
Ternary Graph Tick Direction Options

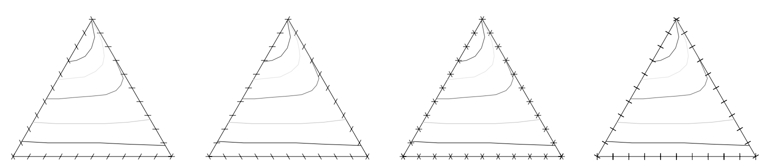


2. Use the Apply To list to modify either Major Ticks or Minor Ticks.

3. **To turn tick drawing on and off and to select tick directions for both sides of an axis line,** use the Direction lists. The second list is only available if a ternary plot range change has created a secondary axis.

   Select an Out, In, or In and Out option to display tick marks on the selected axis out from the center of the graph, in toward the center of the graph, or both outward and inward. Select a clockwise, counter-clockwise, both, or 90 ^{0} option to select the tick mark direction along the axis. Select (none) to hide tick marks.

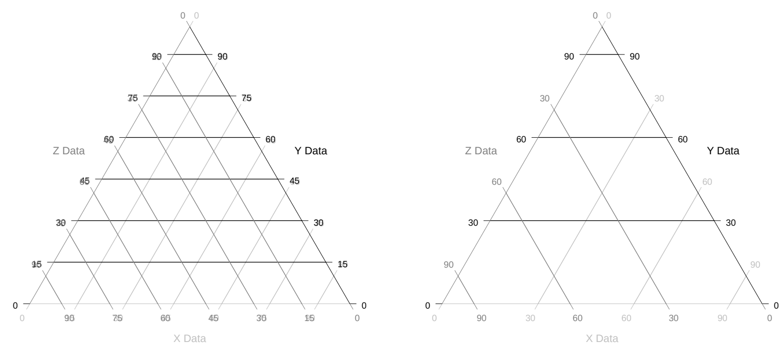
Figure E–43
Graph Examples of Tick Marks Pointing, Counter-clockwise, Clockwise, Both, and 90°



4. **To change major tick intervals,** use the slider control or type a new value directly into the Major Tick Intervals edit box.

5. **To change minor tick intervals,** select a new value from the Minor Tick Intervals list.

Figure E–44
Examples of Ternary Graphs with Tick Intervals of 15 and 30



The same tick intervals are used for all axes.

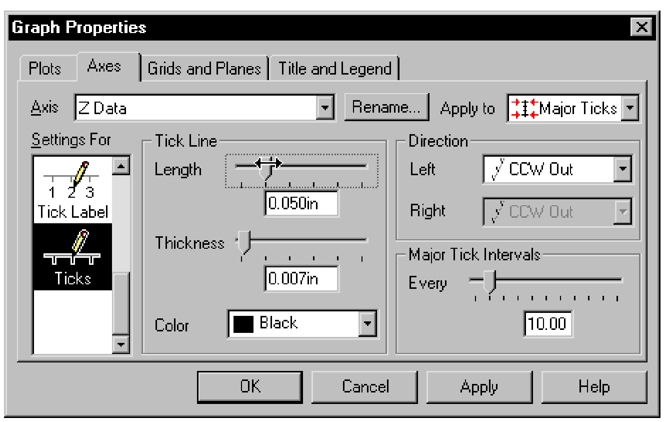
6. Click Apply.
7. Use the Axis list to modify tick marks on a different axis, or use the Apply To list to switch to modifying major or minor tick marks.
8. Click OK when finished to close the dialog box.

Modifying Ternary Tick Mark Line Appearance

To change tick mark display, length, color, and interval:

1. Double-click the tick marks you want to change. You can also double-click the axis, then select Ticks from the Settings For list.

Figure E–45
Changing Tick LIne Properties



2. Use the Apply To list to modify either Major Ticks or Minor Ticks.
3. **To change tick length and thickness,** use the Tick Line options Length and Thickness slider controls. Drag the slider control with the mouse or set the tick length and thickness to specific values by typing directly in the Length and

Thickness edit boxes.

4. **To change tick color,** use the Tick Line options Color list. Choose from any of the listed colors, or select (custom) to use a pre-defined custom color or create your own color. Choose (none) to create transparent tick marks.

   For more information on custom colors, see “Using Custom Colors” on page 146.

5. Click Apply.
6. Use the Axis list to modify tick marks on a different axis, or use the Apply To list to switch to modifying major or minor tick marks.
7. Click OK when finished to close the dialog box.

Modifying Tick Label Display

Tick labels are drawn using directions clockwise, counter-clockwise, and both clockwise and counter-clockwise. Tick label direction is controlled independently of the data direction. Tick labels can also be turned off, have a prefix or suffix added, and be rotated along the angle of the axis line.

The tick label text can also be modified. For more information, see “Formatting Numeric Tick Labels” on page 218.

To modify tick label display along an axis:

1. Double-click the axis you want to change.
2. Select Labels from the Show Settings For list.

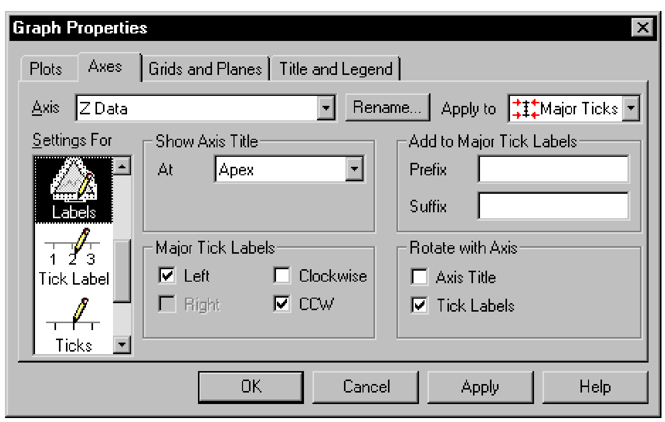
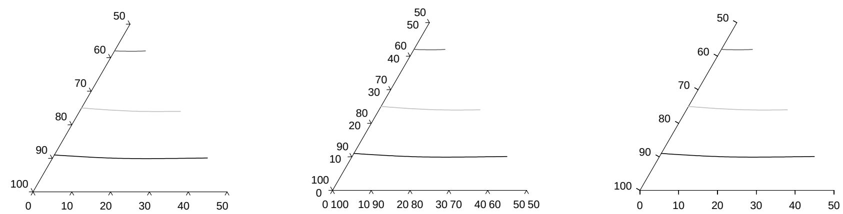


Figure E–46 The Graph Properties Dialog Box Axes Panel Showing Settings for Labels

3. To view or hide axis tick labels, check or clear the Major (or Minor) tick Labels check boxes. Depending on the selected axis, the check boxes are Top, Bottom, Left, or Right.
4. To change the direction of the axis tick labels, check or clear the Clockwise and Counter-clockwise (CCW) check boxes. Both directions can be drawn at once.

To draw tick labels at the 90 ° tick position, uncheck both direction options .

Figure E–47 Ternary Graph Axes with Tick Labels Counter-Clockwise, Both Clockwise and CounterClockwise, and Neither (90 °)



5. To add a suffix or prefix to the major or minor tick labels on ternary axes, choose either Major Ticks or Minor Ticks from the Apply To list, then use the Add To Major (or Minor) Tick Labels options to type a prefix or suffix to the major or minor tick labels.
6. To rotate major or minor tick labels parallel to their axis, choose either Major Ticks or Minor Ticks from the Apply To list, then check the Tick Labels check box in the Rotate With Axis options.
7. Click Apply.
8. Use the Axis list to modify tick labels on a different axis, or use the Apply To list to switch to modifying major or minor tick labels.
9. Click OK when finished to close the dialog box.

Σ Tick labels and tick marks are controlled by their axis of origin, but may be drawn on axes other than their own.

Notes

F

Troubleshooting

This appendix provides you with tips for resolving common problems and gives advice for improving SigmaPlot performance on your system. It includes:

- Installation suggestions
- Ways to reduce or eliminate memory and other errors
- Solutions to common printing problems
- Tips on improving printing speed
- Inserting special characters
- Inserting SigmaPlot graphs into WordPerfect

Troubleshooting Installation Problems

Certain conditions in your Windows Setup may interfere with the installation of your new version of SigmaPlot. This section describes how to resolve most common difficulties.

General Advice for Windows 95 Users

Install in SafeMode SAFEMODE is a mode of running Windows 95 that is designed specifically for troubleshooting problems and for the installation of new applications. In this mode, all Terminate and Stay Resident (TSR) programs will not be run, and the video display will be set to a generic VGA mode.

To install SAFEMODE, restart your computer, and when the words "Starting Windows 95" appear on the screen, press F8. Select SafeMode from the Microsoft Windows95 Startup Menu. When the Windows95 screen appears, begin installation.

Common Questions, Explanations, and Solutions

Question: My installation stalls and gives this message: "Cannot copy file THREED.VBX to \WINDOWS\SYSTEM, file already in use," followed by, "THREED.VBX is out of date, installation procedure cannot continue...."

Explanation: This problem may occur if you attempt to install while other Windows applications are running in the background. For instance, Microsoft Office makes use of the system-wide file VBRUN300.DLL. This means that this file cannot be copied to \WINDOWS\SYSTEM if you are running Microsoft Office while attempting to install SigmaPlot.

Solution: In this case, follow these steps:

1. Quit the installation procedure. Check to see which applications are currently running in the background by bringing up the Windows Task List on screen (Press CTRL+ESC on your keyboard). See "Install in SafeMode" on page 387 .
2. Keep a backup copy of the file on your system while preventing the Setup program from identifying it.

   Choose the File Manager Search command to examine files in your \WINDOWS\SYSTEM directory and to find the file THREED.VBX. The Search Results windows should show the file, THREED.VBX. Then choose the File menu Rename command to rename the file THREED.VBX as THREED.OLD and close the File Manager.

   Copy the file from the SigmaPlot installation disk to your \WINDOWS\SYSTEM directory.

   Σ If you are prevented from renaming the file in Windows, you can instead rename the file in DOS. Exit Windows, then use the DOS RENAME command by typing:

   C:\WINDOWS\SYSTEM>REN THREED.VBX THREED.OLD
3. You are now ready to try the installation again. The Setup program should install successfully.

Question: My installation stalls and gives this message: "Cannot copy file VBRUN300.DLL to \WINDOWS\SYSTEM, file already in use. The installation procedure cannot be continued," or, "Visual Basic Applications running, close applications."

Explanation: This problem may occur if you attempt to install while other Windows applications are running in the background. For instance, Visual Basic applications make use of the system-wide file VBRUN300.DLL. This means that this file cannot be copied to \WINDOWS\SYSTEM if you are running a Visual Basic application while attempting to install SigmaPlot.

Solution: In this case, follow these steps:

1. Quit the installation procedure. Check to see which applications are currently running in the background by bringing up the Windows Task List on screen (Press CTRL+ESC on your keyboard). Quit ALL applications other than Program Manager.
2. Keep a backup copy of the file on your system while preventing the Setup program from identifying it.

Choose the File Manager Search command to examine files in your \WINDOWS\SYSTEM directory and to find the file VBRUN300.DLL. The Search Results windows should show the file. Then choose the File menu Rename command to rename the file VBRUN300.DLL as VBRUN300.OLD and close the File Manager.

Copy the file from the SigmaPlot installation disk to your \WINDOWS\SYSTEM directory.

Σ If you are prevented from renaming the file in Windows, you can instead rename the file in DOS. Exit Windows, then use the DOS RENAME command by typing:

C:\WINDOWS\SYSTEM>REN VBRUN300.DLL VBRUN300.OLD

3. You are now ready to try the installation again. The Setup program should install successfully.

Question: The installation starts fine, but as soon as "Initializing Setup" appears on the screen, my computer crashes.

Explanation: Problems like this are usually linked to a video driver conflict. Switching the video driver you are currently using to a standard Microsoft VGA or SVGA driver will probably solve the conflict.

Solution: Here are the steps to make the setup changes:

1. Quit the attempted installation and double-click the Windows Setup icon (usually located in the Main group of the Windows Program Manager). Under the setting Display, you will see the name and resolution details (if any) of the video driver you are currently using. Write down the full details of the current settings so that you can return to those settings later.
2. Choose the Options menu Change System Settings command, scroll the list of video display options and choose either VGA or SVGA from the list. You will be prompted to install the "Current" or newer driver; choose "Current", then restart Windows for the change to take effect.
3. Attempt to reinstall once you are back in Windows. If you are unsuccessful, you may need to contact the manufacturer of your graphics card to update the driver.

SigmaPlot Errors

After installation, if you double-click the SigmaPlot icon and get an error message such as the one shown below, there are a number of possible solutions.

Figure F–1
The Too Many Users Warning

Important Network Information

As of SigmaPlot version 3.02, ALL workstations running SigmaPlot from a network must have FULL access to the application directory. Each time SigmaPlot is launched, it creates small files in the network application directory, and deletes them when it closes. If SigmaPlot cannot write to and erase from the application directory, it will not be able to run its counting routine and will not launch correctly.

Look in your SigmaPlot application directory for LOCKFILE.SYS. Delete the LOCKFILE.SYS file and then attempt to restart SigmaPlot.

Make sure that you have not exceeded the number of seats allocated on your network site license. If you have questions about the number of users allowed on your site, you can contact SPSS at:

Telephone: (510) 412-2900

Fax: (510) 412-2909

Single-User Solution

To resolve the error when NOT running from a network:

1. Check to see if you have another instance of SigmaPlot running on your system by viewing the windows task list. In Windows NT press Ctrl+Esc, and on Windows 95 press Ctrl+Alt+Del.
2. Check to make sure that you filled in the registration information because SigmaPlot will not run if you have not entered your registration number. Instead, an error message like, “unable to initialize properly...too many users or SigmaPlot is not properly registered,” will appear.

   If you have entered the registration information, but somehow the file got corrupted or tampered with, you can delete the file USERDATA.TXT from the application directory, and then double-click on the SigmaPlot Registration icon to re-enter the data.
3. Exit and Restart Windows.

Resolving Printing Problems

Common Printing Problems

Problem: My Hewlett Packard Deskjet 600c prints text characters too far apart, with a space between each pair of characters.

Explanation: This printer driver uses 2-cartridges, one for black and the other for color. The black cartridge supports three different resolutions: Best (600x600), Normal (600x300), and Econo (300x300). The color cartridge always prints at Econo (300x300) independent of the black settings.

Solution: Change the default setting from Normal (600x300) to either of the 2 selections, 600x600 or 300x300, to avoid getting any of the spacing problems for text characters.

Problem: While printing from SigmaPlot, objects on the screen look fine, but one of the following errors shows up: “Printer Busy,” “Memory Overflow Error,” “Printer Overrun”, or it prints no text, a blank page, or won’t print at all.

Solution: Try the following steps:

1. Update the printer driver to the latest version by obtaining the available printer driver from either the printer company or the SPSS Technical Support Department. To determine the current version of your driver go to the printer control panel (Settings/Printers from the Start bar in Win95) and select the desired printer by clicking it.
2. If you are using a Hewlett Packard Laserjet IV or above, or a compatible printer, select Raster as Graphics Mode. In Win95, this can be found under Settings / Printers / Properties / Graphics.

If the above does not work, try using a different printer driver. For example, the Apple Laserwriter II driver is a Postscript driver, and using this when printing to a Postscript printer will often yield good results.

Improving Printing Speed in SigmaPlot

Printing speed is influenced by your system's configurations and not by SigmaPlot. When printing, the "Updating Page" message appears and indicates that SigmaPlot is sending a "map" of the page through Windows. SigmaPlot waits for the Printer Driver within Windows to give the "go ahead" messages after each page segment is sent.

The following are some configuration variables to check.

The Spooler Make sure that the Windows spooler is up and running. In Windows95, it is selected in the START/Settings/Printers/Properties/Details/Spool Settings.

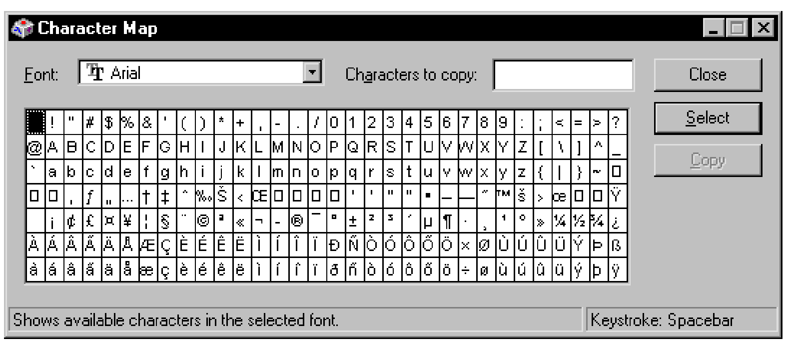
Printer Memory and Hard-Disk Space These are also factors in printing speed. The more printer memory and hard-disk space available, the faster the printing occurs.

Graphics Mode Choosing the correct graphics mode for a type of graph can make a difference for HP Laserjet IV or above, or any compatible printer. Printing on HPGL/2 (vector type) mode is faster than Raster (bitmap type), unless you are printing a graph with error bars, in which case it is the other way around.

Pasting Special Characters

From time to time, you may need to put some characters or symbols onto your graphs or presentations. These symbols can be found in the Character Map dialog box. In Windows 95, the Character Map is located in the Accessories group.

Figure 1–1
Character Map Dialog Box



Once a symbol is selected, the appropriate keystrokes that are necessary for this particular symbol shows in the bottom right corner.

For example, if you select the heart symbol, the bottom right corner shows “Keystroke: Alt+0169.” To insert the heart symbol into your graph, press the Alt key and then the numbers 0, 1, 6, and 9, while keeping the Alt key depressed. Release the Alt key and the heart will appear. For better appearance, make sure the font selected in SigmaPlot matches the font selected in the Character Map dialog box. If using the key pad, make certain that the Num Lock is set on.

Inserting SigmaPlot Graphs into WordPerfect

There are two basic ways to get a SigmaPlot graph into a WordPerfect document. One is to copy and paste the graph and the other is to insert the graph as a picture.

Copy and Paste or Paste Special

In SigmaPlot, select the object you would like copied into your WordPerfect document. Choose the Edit menu Copy command to place the object on the Clipboard.

Now open your WordPerfect document and place the cursor where you want the Clipboard contents copied. Choose the Edit menu Paste command. You can also choose the Edit menu Paste Special command to paste a picture of a graph. For more information about inserting page objects, see “Cutting, Copying and Pasting Graphs and other Page Objects” on page 108.

Insert the Graph as a Picture

To insert your SigmaPlot for Windows graph as a picture, first convert your SigmaPlot file into a graphical format that WordPerfect can read.

The graphical formats available to output a SigmaPlot graph are EPS (Encapsulated PostScript), WMF (Windows MetaFile), BMP (Windows Bitmap), TIFF, and JPEG. For direction on exporting graphs and pages to files, see “Exporting Graphs and Pages” on page 51.

Once your graph is saved in a format that WordPerfect will accept, open your WordPerfect document and choose the File menu Insert command, then select File from the list. In the Insert File dialog box, set the List Files of Type to All Files, then select the file you want to insert into WordPerfect and click OK.

Notes

Glossary

95% or 99% Confidence Lines See Confidence Line.

Angular Axes The angular axes of polar plot are drawn along the inner (if applicable) and outer circumferences of the graph. By default, the inner axis is not displayed, but if your radial axes are offset from the center of the graph, you can choose to display the inner angular axis. See also Polar Plot, Radial Axes.

Apex The maximum/minimum or tip of the triangle for ternary plot axes.

ASCII File See text file. (ASCII stands for American Standard Code for Information Interchange.)

Aspect Ratio The Aspect Ratio option allows for resizing of graphs and objects without distortion. To maintain the aspect ratio (the ratio of length to height) of a graph or object during manual resizing, make sure the Stretch Maintains Aspect Ratio option is checked in the Options.

AUTOEXEC.BAT A DOS file that automatically executes a series of commands when DOS is booted.

Axis In a Cartesian graph, an axis indicates the direction and range of X, Y, or Z values. In SigmaPlot, axes define the origin and scaling of a plot, and include tick and label definitions.

Multiple axes for 2D graphs can be created using the Graph menu Add Axis command. Because each 2D Cartesian plot can be associated with only one set of X and Y axes, you can only create new axes if your graph contains multiple plots. However, since a graph can contain an unlimited number of plots, you can create an unlimited number of X and Y axes for a graph.

∑ Note that an unlimited number of plots can share a single axis.

Axis Break A range along the axis where portions of a plot are omitted. If there is a large empty range between two sets of data, you can use an axis break to omit the empty range.

Axis Direction For ternary axes, the direction that the data increases. This can be counter-clockwise (by default) or clockwise.

Axis Label Axis titles and tick labels. Axis titles can be automatically taken from the Axis name (as shown in the Axis panel of the Graph Properties dialog box) or manually typed using the Tools menu Text command. Tick labels can be numeric, time series, or taken from a worksheet column. See also Tick Labels.

Axis Pair The top and bottom or left and right pairs in an axis. Each axis in the pair can be moved or turned on or off independently using the Lines settings of the Axes panel in the Graph Properties dialog box.

Axis Range The minimum and maximum values of an axis, controlling the scale and extent of the plotted data. SigmaPlot uses default axis ranges unless you specify the range manually in the Scaling settings of the Axes panel in the Graph Properties dialog box. Major tick intervals are also controlled by the axis range.

Axis Placement The position of an axis relative to the origin and "extent" of the graph. The graph extent is the size of the graph as indicated in the Object Properties dialog box. Use the Lines settings of the Axes panel in the Graph Properties dialog box to change axis positions.

Placement is described as a percentage of the axis distance from the original position with respect to the graph extent, where 0% is the original position. Axis position can also be changed by selecting an axis and dragging it.

Axis Title See Axis Label.

Axon File The format produced by an Axon Instruments data acquisition device. This file format can be read into SigmaPlot worksheets using the Import command.

Backplane The plane at the back of a graph formed by the axes. Grid lines are attached to backplanes. Backplanes are selected and modified using the Grid and Planes panel of the Graph Properties dialog box.

Bad Points Any of three types of data points: 1) data that fall outside the range specified for the axes; 2) empty, missing, or non-data cells; 3) data outside the legal range for an axis, for example, a non-positive value on a logarithmic scale. You can ignore bad points using the Data settings of the Plots panel in the Graph Properties dialog box.

Bar Chart A plot which graphs data as vertical or horizontal bars with bar lengths equal to the data values. If you plot more than one column of data, the data is plotted as groups of bars. Select a plot, then use the Graph Wizard – Modify Plot dialog box to change a plot to a bar chart. See also Plot Type and Stacked Bar Chart.

Base (of an exponent) The number that is raised to the exponential power (for example, 10 or *e*).

Bitmap A general description for an image composed of individual bits, or pixels. Also a term for the Window bitmap graphic file format.

The resolution of a bitmap is dependent on the dpi, or dots per inch, it is created with. Because the number of pixels that compose a bitmap is constant, making a bitmap appear smaller increases its relative resolution by increasing its dpi. Conversely, making a bitmap larger reduces the dpi and its resolution.

Block 1) A selected, rectangular region of worksheet cells. Blocks can be copied, deleted, pasted, transposed, sorted, printed, and exported. 2) A transform language function that operates on worksheet blocks.

BMP See Bitmap

Box Plot A plot type that displays the 10th, 25th, 50th, 75th, and 90th percentiles as lines on a bar centered about the mean, and the 5th and 95th percentiles as error bars. The mean line and data points beyond the 5th and 95th percentiles can also be displayed. See also Plot Type.

Bubble Plots A special case of scatter plot where a third dimension is graphed using the areas of the symbols.

Cartesian A graph using a rectangular XY (or XYZ) coordinate system. SigmaPlot can create both 2D and 3D Cartesian graphs. See also Coordinate System.

Category Scale A scale which uses numerical values or text from a worksheet column used to generate a plot. Each distinct entry in the column is a separate *category* against which the corresponding data values are plotted.

Cell 1) A location on the worksheet that holds a single data value or label, described by its column and row number. 2) A transform language function that specifies the coordinates and contents of a worksheet cell.

Clipboard The Windows data buffer where cut or copied data and graphics are stored. Press Ctrl+V or use the Edit menu Paste command to paste Clipboard contents to the worksheet or page. Note that data and graphics are stored in the same Clipboard, so cutting additional data or objects overwrites current Clipboard contents. Cleared (deleted) data or graphics bypasses the Clipboard and leaves the current contents intact.

Codes (graphic cell) Graphic cell codes can be typed into a worksheet column to sequence different types for plot lines, symbols, and fill patterns. You can also use the Edit menu Insert Graphic Cells command to sequence lines, colors, symbols, and fill patterns.

Coefficient A real number that multiplies a variable in an algebraic expression. See also Correlation Coefficient and *R* Value.

Column Averaging Plotting the mean value of each column. This is most often used as a means of creating error bars. Standard deviation, standard error, or 95% or 99% confidence values can be used as error bar values.

Column The SigmaPlot worksheet consists of columns and rows. A column generally holds a range of numbers to be plotted as a set. This set can be X, Y, or Z values, plotted against another column or against their row numbers. Columns can also be plotted as pie chart slices, or averaged and plotted as a single data point. See also Pie Chart and Column Averaging.

Columns can also hold labels, and sequences of custom symbol or line types, fill patterns, error bar directions, and colors.

Column Statistics A collection of statistics computed for each column. Open the Column Statistics window by choosing the View menu Column Statistics command.

Common Log Scale An axis type that plots data along a logarithmic scale with base 10. See also Natural Log Scale.

Confidence Line For a regression line, there is a probability that any given data point will fall within a certain distance from the line. A confidence interval is the region where a data point will fall with a specific degree of probability. SigmaPlot can calculate 95% and 99% confidence intervals.

Contour Plot Contour plots are a rendering of three dimensional data in two dimensions. The *z*, or vertical, dimension is represented by drawing lines that follow the XY coordinates of specific *z* intervals. Topographic maps are an example of contour plots.

CONFIG.SYS A DOS file that installs device drivers and sets system parameters when you turn on or restart your computer.

Coordinate System A system that defines the method of defining data point placement on a graph. SigmaPlot supports 2D and 3D Cartesian graphs, polar plots, ternary plots, and pie charts.

- Cartesian graphs use two or three rectangular axes to describe data point location.
- A polar plot describes data using angle and radius within a circular region.
- Ternary graphs plot data along three axis ranges that have a sum of 100%.
- A pie chart uses polar coordinates to assign slice sizes to data point values.

A graph's coordinate system is fixed when you create the graph and cannot be changed. See also Plot.

Copy Place selected worksheet data or graphic objects in the Windows Clipboard without removing the data or objects. The Clipboard contents can be placed elsewhere on the worksheet or page by pressing Ctrl+V or selecting the Edit menu Paste command or Edit menu Paste Special command.

Correlation Coefficient (R) *R*, or the measure of closeness of a regression to the data. Specifically, it is the covariance divided by the product of the sample standard deviations. SigmaPlot calculates the correlation coefficient for linear regressions.

Cubic Spline Interpolation A mathematical formula connecting data points with a smooth curve. It can be roughly described as a running interpolation of cubic polynomials.

Cursor Specifically, the blinking vertical entry bar for text, or the current cell highlight on the worksheet. See also Pointer.

Curve The graphical display of a single data set, either a line/scatter curve or a set of bars or boxes. SigmaPlot data sets are the data in a single worksheet column or in a set of XY or XYZ columns. A plot can consist of multiple curves where more than one set of data columns are plotted. See also Plot.

Curve Fit See Nonlinear Regression.

Cut Remove selected data or graphics and place them in the Windows Clipboard. Press Ctrl+X or use the Edit menu Cut command to cut data or graphics. Cut displaces any current Clipboard contents. Only the last cut item can be pasted. Note that data and graphics use the same Clipboard.

The Clipboard contents can be placed at any selected worksheet or page location by pressing Ctrl+V or choosing the Edit menu Paste command or Edit menu Paste Special command. Clipboard contents can also be pasted into other Windows applications. See also Paste.

Data Set A column or set of worksheet columns that have been picked to plot. Column assignment labels at the bottom of the worksheet indicate the data sets for the currently selected plot. See also Plot and Curve.

Date/Time Scale An axis that plots true calendar dates and times using real time increments.

Delimiter A symbol or character used to separate data fields within a data file format; for example, white space, commas, semicolons, or colons.

Dialog Boxes Windows of commands and options that appear on the screen. Use dialog box options to view and change graph and program settings.

DOS Shell Used to access the DOS prompt from within Windows to run DOS commands. The DOS window mays not contain enough memory to run large applications.

Drag Move the mouse while holding down the left mouse button. Dragging is used to move objects, stretch objects, or select regions.

Drop Lines Lines which can be added to 2D and 3D plots which use symbols.

Edges This term refers to the outline of bar chart bars, symbols, box plot boxes, pie chart slices, and the lines in a 3D graph mesh grid. Edge color is determined by the color of the fill pattern. Edge thickness can be modified using the Fills settings of the Plots panel in the Graph Properties dialog box.

Edit Text Dialog Box A dialog box used to enter or edit text labels or symbols on the graph page.

Embed Use the Edit menu Paste Special to embed an object on a graph page. Embedding an object on the page places a copy of the object on the graph page and enables you to edit the object by activating the object's source application when you double-click it, but does not change the original file from which the object was pasted.

Encapsulated Postscript File (EPS) Encapsulated PostScript files are scalable line art graphic files. Use this file format to export SigmaPlot graphs to other word processor and graphic applications. To create an EPS file, you must have a correctly installed Postscript printer driver supported by Windows.

Error Bar A graphical display of the data variability. Error bar values can be automatically calculated through column averaging, or they can be entered in the worksheet columns.

Error Bar Column A data column containing error bar values.

Error Bar Direction The error bar direction can be specified for each curve or for each data point within a curve. These directions can be absolute (always up or down), relative (toward or away from zero), or both.

Excel Workbook The file format for Microsoft Excel, which can be opened and used in its native format by SigmaPlot.

Exploding Pie Slice A slice in a pie chart that is separated from the rest of the chart for emphasis.

Exponent The power to which the base is raised. See Base.

Export Save worksheet data or a graph page from SigmaPlot to a file, for use with other programs. Choose the File menu Export command to export files.

Fills Fills include pattern of lines and colors that fill bar chart bars, pie chart slices, 3D graph mesh grids, 3D bar fills, and drawn objects. Fill patterns affect the color of bar, box, and slice edges and mesh grid lines. Fills and edges are specified using the Fills settings of the Plots panel in the Graph Properties dialog box. Use the Format menu Fill command for drawn objects.

Film Recorder A hardcopy device used to print SigmaPlot graphs on a slide or photo for presentation. Slidemakers are a type of film recorder.

Font A style or type of character. TrueType fonts are available from the Windows system. Other fonts, such as PostScript and Hewlett Packard fonts, are only available if the printer drivers are installed.

Frame Lines Lines which are drawn to complete the "cube" outlining a 3D Cartesian graph. Frame lines can be drawn using either the viewer or the origin as the reference. Use the Frame Lines settings in the 3D View panel of the Graph Properties dialog box to turn on/off frame lines.

Gaussian 1) A continuous probability distribution defined by two parameters, mean, and variance. Also called the normal distribution. 2) A transform language function used to generate random normally distributed data.

Geometric Mean The mean obtained by taking the antilog of the mean of the logarithm of the original variable. Error bars created using the logarithm of the variable are equidistant from the geometric mean when displayed on a logarithmic scale. This option is only available when using logarithmic axes.

You can use the geometric mean instead of the arithmetic mean when using error bars. See Error Bar and Column Averaging.

Graph In SigmaPlot, a graph is an object on the page of specific size and location, associated with a coordinate system. Back planes, plots, and axes are attached to graphs. Graphs can contain multiple sets of plots. 2D graphs can have multiple axes. Graphs are created with the Graph Wizard or Graph menu Create Graph command.

See also Back Plane, Coordinate System, Page, and Plot.

Graph Defaults A limited set of graph attributes that can be set to apply to newly created graphs. Graph defaults do not affect existing graphs.

Set graph defaults using the Tools menu Options. command.

Graph Style The style of a graph determines the appearance of data on the graph. The style you can assign to a graph depends on the graph type. The Graph Wizard lists the available graph styles once you have selected a graph type.

Graph Type The kind of representation for graphed data. SigmaPlot can produce 2D line and/or scatter plots, bar and stacked bar charts, Tukey box plots, line and/or scatter polar plots, contour plots, and 3D line and/or scatter, bar charts, and mesh plots. Pie charts do not have different plot types.

Graphic Object See also Object.

Any object appearing on the page and capable of being moved; for example, text, lines, boxes, ellipses, and graphs.

Grid Horizontal or vertical lines incremented according to the tick mark intervals of the associated Cartesian axes. Grid lines are modified using the Grids and Planes panel of the Graph Properties dialog box.

Grid lines are attached to graph back planes. See also Back Plane and Tick Marks.

Grouped Bar Chart See Bar Chart.

Help System A system of indexed screens linked by hypertext providing on-line information about SigmaPlot commands and operations. Press F1 to view the Contents screen of the help system, or choose one of the Help menu commands to get additional help information.

Related topics are linked through highlighted words on the screen; selecting these brings up the entry for that topic.

Histogram A representation of frequency distribution showing the number of occurrences within specified intervals, usually displayed as a bar or step chart.

The histogram of a worksheet column can be generated and plotted by choosing the Statistics menu Histogram command, or by using the histogram transform function.

Hot Key A quick method of selecting menu commands and dialog box options. A letter in the command or option appears highlighted; pressing that letter selects the command or option. See also Keyboard Shortcut.

Import Transfer data from a file to the SigmaPlot worksheet for plotting or other operations. SigmaPlot recognizes text, .DIF, .Lotus 123, Quattro, Excel, SigmaPlot (*.SPW, *.SP5, and *.SPG), Mocha worksheets, and other file formats.

Choose the File menu Import command to select files to import.

Increment See Scheme

Insert A data entry mode where existing data is moved aside to make room for entered data. When typing text labels on the page, you are always in insert mode.

To switch between insert and overwrite modes on the worksheet, press Insert or choose the Edit menu Insertion Mode command. Worksheet data is moved down one row.

When entering text, press the Insert key to toggle between insert and overwrite modes. In insert mode, characters are moved to the right to make room for the new characters. See also Overwrite.

Inverse Distance Interpolation Inverse distance interpolation is a method of generating an evenly spaced XY mesh from XYZ data points. The Z value for each interpolated data point is calculated using the Z values of all original data points. The weight given the value of the nearer original data points versus the farther data points can be modified.

JPEG A compressed bitmap graphic file format commonly used on the World Wide Web. See also Bitmap.

Label Any text string, including tick labels, axis titles, and text entered using the Tools menu Text command. Tick labels are modified using the Tick Labels settings of the Axes panel in the Graph Properties dialog box.

Text labels manually placed on the page can be modified by double-clicking them or using the Format menu Text Properties command. See also Axis Label, Rotation, Label Size, Font, and Tick Labels.

Label Size The size of text label characters, specified in points (one point = $1/72$ inch).

Landscape Orientation of a page so that page width is greater than page height. Page orientation is controlled using the File menu Page Setup command or Printer Properties options in the Print dialog box. See also Orientation (Page) and Portrait.

Legend An explanation of the symbols on a graph. Legends are inserted by choosing the Tools menu Text command, selecting a location on the page, then selecting the

Symbols button to specify the graph, placement of symbols, and legend style to use for the legend.

Line Graph A plot type in which data points are connected by lines. Line graphs and trajectory graphs are 2D Cartesian graphs or 3D Cartesian graphs using a line plot type. Use the Graph Wizard – Modify Plot dialog box to change a plot type and style. See also Scatter Plot and Plot Type.

Linear Curve Fit or Linear Regression A linear regression of plotted data performed to a specified order. SigmaPlot can calculate 1st to 10th order regressions, and save the coefficients and *R* values to the worksheet. Use the Statistics menu Regressions command to perform regressions. See also Confidence Interval and Regression.

Linear Axis Scale An axis scale in which values along the axis increment arithmetically.

Link Use the Edit menu Paste Special command to place a linked object on the graph page. Linking the object appears to place a copy of the object on the page, but actually only places a reference to the original object file, and modifies the object every time the original file is changed.

Logarithmic Scale See Common Log and Natural Log.

Logit Scale An axis scale based on the logit equation

$$Logit = ln\left(\frac{y}{100 - y}\right)$$

Menu Bar A list of menus appearing at the top of the SigmaPlot screen. These menus can be selected with a mouse, or by pressing Alt and the first letter of the menu name. When one menu appears, the adjacent menu can be pulled down by pressing $\rightarrow$ or $\leftarrow$.

Mesh Plot A mesh plot is a 3D Cartesian plot of an even XY grid from XYZ data points, generating a surface. The worksheet data for mesh plots must be in a specific order to create the mesh.

Mesh data can be generated from scatter data using inverse distance interpolation. See also “Inverse Distance Interpolation.”

Metafile A standard Windows graphic file format, also known as a Windows picture file. Metafiles are a vector, or line-based file format, as opposed to a bitmap format. Metafile graphics are printed at the highest resolution a printer is capable of, no matter what size they are scaled to.

Natural Log Scale An axis type that plots data along a logarithmic scale using base e.

Normalize Ternary Data Raw data must be converted to unitary data (0-1) or percentage data (0-100) in order to be plotted on a ternary graph. The Transforms menu Normalize Ternary Data command does this conversion for you.

Notebook File SigmaPlot notebook files are files that contain worksheets, graph pages, reports, and regression equations. Notebook files are provided as a means for automatic file organization, enabling you to keep separate notebooks for separate groups of data.

Novice Prompting Messages alerting you to certain situations or which double check some choices (for example, telling you that data contains missing values or asking for confirmation before clearing data). Novice prompting can be disabled using the Tools menu Options command.

OLE2 Objects pasted from the Clipboard to a graph page can be linked, embedded, or placed on the page as a generic object without any kind of file reference. Linked and embedded objects use OLE2, Object Linking and Embedding version 2.

Open Load a file into SigmaPlot, either a .JNB (notebook) file,.JNT (template notebook) file, or any other file format supported by SigmaPlot.

Options Settings used to customize SigmaPlot behavior and to set program defaults. Use the Tools menu Options command to access the Options dialog box.

Orientation (page) Describes the orientation of a page. Page orientation can be either portrait (right-side up) or landscape (sideways).

Page orientation is controlled using the File menu Page Setup command or Printer Properties options in the Print dialog box. See also Portrait and Landscape.

Orientation (text) Describes the rotation of a text label around an axis so the text reads left to right, top to bottom, or bottom to top. The orientation is entered as the number of degrees the label is to be rotated from the left-to-right. Also called rotation.

Origin Axes For 3D Cartesian graphs, the axes intersecting at the X,Y, and Z coordinates closest to zero. The origin axes are used as a point of reference when rotating the view of a 3D graph, and appear as red lines in the 3D View panel of the Graph Properties dialog box. See also Rotation (3D Graph).

Overwrite A data or text entry mode in which newly typed characters replace characters already on the screen. See Insert.

Page (graph) A SigmaPlot item where graphs, labels, and graphic objects are drawn. The page displays the current graph(s) and other objects as they appear when printed.

You can use Tools menu drawing commands and the Edit menu and Format menu commands to directly edit, move, resize, delete, and paste graphs and objects on the page.

Paste Place the contents of the Clipboard at the selected location. On the worksheet, the upper left corner of the Clipboard data block appears at the highlighted cell. On the Page, the Clipboard contents are offset from the original object's position.

Press the Ctrl+V, Shift+Ins, click the Paste toolbar button, or choose the Edit menu Paste command to paste data or graphics.

Paste Special Place the contents of the Clipboard as an object of specified file type, as an embedded object, or as a linked file object.

Percentage Scale A scale ranging from 0-100 as the absolute minimum and maximum, used for ternary graphs.

Perspective A 3D graph view option, controlling the apparent "depth" of the graph. Use the Rotation settings of the 3D View panel in the Graph Properties dialog box to change a 3D graph's perspective.

Pie Chart A graph where each data point in a column is represented as a pie slice equivalent to its percentage of the total.

Plane See Backplane.

Plot The graphed results of paired sets of data columns. 2D and 3D Cartesian plots can contain multiple curves, and 2D and 3D Cartesian graphs can contain multiple plots. Plots are created when you create a graph using the Graph menu Create Graph command, or added to an existing graph using the Graph menu Add Plot command.

Each plot is also associated with a set axes. All curves in a plot must use the same plot type. See also Axis, Curve, Graph, and Plot Type.

Note that 2D Cartesian, 3D Cartesian, polar, ternary, and pie charts are considered different coordinate systems. See also Cartesian, Polar Plot, Ternary Plot, Pie Chart, and Coordinate System.

Point (pt) A unit of measure used in typesetting. Seventy-two points equal one inch.

Pointer The tool controlled by the mouse used to choose commands, select dialog box options, select data on the worksheet, and select and modify page objects. Sometimes called the cursor.

The pointer is usually arrow shaped. On the page, the shape of the pointer changes according to its current function.

Polar Plot Polar plots show data in an $r = f(\theta)$ format where r is the distance from the origin of the graph, and theta (θ) is the angle described by a line passing through the center of the graph and the plotted data point, and another line passing through the center of the graph horizontally on the page.

Portrait Orientation of the page so that the height is greater than the width. Page orientation is controlled using the File menu Page Setup command or Printer Properties options in the Print dialog box. See also Landscape and Orientation.

Position Defines the position of a graph on a page. Graph position is displayed in the Size and Position panel of the Object Properties dialog box, accessed by right-clicking a selected graph, and choosing Properties from the popdown menu. You can also use the Format menu Size and Position command to center and align selected graphs and objects with respect to the page.

Preferences See Options.

Probability Scale An axis scale in which a sigmoidally shaped curve identical to the Gaussian cumulative distribution function appears as a straight line.

Probit Scale An axis scale identical to the probability scale, except that it is expressed in terms of standard normal deviates increased by five. A probability of 0.5 (50%) corresponds to 0 standard normal deviates, or five probits. One standard normal deviate on either side of zero encompasses 68.2% of the area under the normal curve. A probit of 6 (1+5) corresponds to the 84.1% probability and a probit of 4 (-1+5) corresponds to the 15.9% probability (68.2% = 84.1% - 15.9%).

Quality Control Lines See Reference Lines.

R Value The correlation coefficient, or square root of R^2. R^2 is sometimes called the coefficient of determination and is a measure of the closeness of fit of a scatter graph to its regression line where $R^2 = 1$ is a perfect fit.

SigmaPlot calculates R when performing all regressions. See also Correlation Coefficient and Regression.

Radial Axes The radial axes of a polar plot are drawn along the radius of the graph, and by default are displayed as four axes extending from the center of the graph to the outer edge of the graph.

Reference Lines Horizontal or vertical lines on a Cartesian graph drawn at specific values. The value can be computed as either the mean of the data, a specified multiple of a specific statistic above or below the mean, or a specific number. The statistics available are standard deviation, standard error of the mean, and 95% or 99% confidence intervals.

Regression Regression is most often used by scientists and engineers to visualize and plot the curve that best describes the shape and behavior of their data.

Regression procedures find an association between independent and dependent variables that, when graphed on a Cartesian coordinate system, produces a straight line, plane or curve. This is also commonly known as *curve fitting*.

SigmaPlot uses a least squares method to curve fit your data. Choose the Statistics menu Regression Wizard command to pick an equation and run the curve fitter. You can also define any equation using the SigmaPlot transform language. See also Transform.

Regression Coefficients The coefficients $a_0,...,a_{10}$ calculated for polynomial (linear) regressions. SigmaPlot can save these regression coefficients to the worksheet. See Regression.

Regression Equation (Library Notebook) A notebook file which stores sets of regression equations, which can be viewed, browsed, open and run by the Regression Wizard.

Regression Order The exponent of x in the polynomial regression $y = a_0 + a_1x + a_2x^2 + ... + a_{10}x^{10}$. SigmaPlot can calculate up to 10th order regressions. See also Regression.

Regression Wizard A graphical wizard interface used to guide you trough nonlinear regression (curve fitting) procedures. See Regression.

Report A text document that supports text and paragraph formatting and object pasting. Reports are saved to notebooks. Reports are also produced by running the Regression Wizard.

Rich Text Format (RTF) A text file format that supports complex text and paragraph attribute formatting. The SigmaPlot report is stored in RTF.

Rotation (3D Graph) The vertical and horizontal angles of rotation for a 3D Cartesian graph. These indicate the number of degrees the origin axes are from the absolute 0,0,0 origin.

Use the Rotation settings in the 3D View panel of the Graph Properties dialog box to change the rotation of a 3D graph. See also Origin Axes.

Rotation (Text) See Orientation (Text).

Scatter Plots A plot type where a symbol represents each data point. Scatter plots are 2D or 3D Cartesian graphs using a scatter plot type.

Select the plot, then use the Graph Wizard – Modify Plot dialog box to change a plot to a scatter plot. See also Line Graph and Plot Type.

Scheme Symbols, lines, colors, and fill patterns can be sequenced by using schemes. Schemes can be customized by right-clicking the property options list, then selecting First from the popdown menu to specify the order of the sequence. Schemes can also be created by entering graphic cell codes into a worksheet column.

Scientific Notation A form for expressing numbers using the letter e to represent the power of 10. For example, the scientific notation for 10.0 is 1×10^1.

Scroll Box A dialog box option containing a list of items. You can scroll up or down to reveal more selections. Selected scroll boxes have a scroll bar appearing along the right side. You can use the mouse to drag the scroll bar up or down, or click the up and down arrow buttons.

Section Sections are a subdivision of the notebook file which is a compound file used to save all data and graphs in SigmaPlot. Notebook sections are individual "folders" that contain notebook items. Notebook items are worksheets and graph pages you have created using SigmaPlot.

Each notebook section may contain only one worksheet, but can contain unlimited pages. Within sections, notebook items are indicated as worksheets or graph pages by icons that appear next to item names.

Select (object) To choose an object on the page in order to perform an operation (such as move or delete) on it. Graphs, axes, text labels, and drawn objects can be selected. Items can only be selected when the Tools menu Select Object command is checked.

To select an object, click while the pointer is over the object. Selected objects are surrounded by square handles or a dotted line. You can select multiple objects by dragging a dotted-line box completely around the objects, or by holding down the Shift key while selecting individual objects.

Series Labels Tick labels that are automatically incremented in time units (days, months, or years), or in an alphabetic or numeric sequence. Series tick labels are selected using the Tick Labels settings of the Axes panel in the Graph Properties dialog box.

SigmaLink Links SigmaPlot to worksheets from open copies of SigmaStat or SigmaScan. Choose the File menu SigmaLink command, or press Ctrl+L to link worksheets.

Sort To arrange items in an ascending or descending order. Selected blocks of worksheet data can be sorted using the Transforms menu Sort Selection command. If you sort more than one column, all columns are sorted according to the selected key column.

Spline Curve A smooth curve passing through all the data points of a scatter graph. SigmaPlot uses a cubic spline interpolation to generate the curve. Use the Plot menu Lines/Options command to change a line to a spline shape.

Stacked Bar Chart A bar chart plot type where each bar is divided to represent each category. SigmaPlot plots each row in the selected columns as a stack in a bar.

Standard Deviation (Std Dev) A measure of the spread of the data about the mean. The sample standard deviation is the square root of the ratio of the sum of the squares of the residuals divided by degrees of freedom (the number of data points, minus one).

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2}$$

Standard Error (of the Mean) The standard deviation of the mean, computed by dividing the sample standard deviation by the square root of the sample size.

$$Std\ Err\ =\ \frac{s}{\sqrt{n}}$$

Swap File Windows makes use of virtual memory swapping temporary buffers and information to a swap file specified in the Virtual Memory settings in the Control Panel. You can use a swap file to optimize the performance of SigmaPlot on your system.

Symbol The figure (such as a circle or triangle) used to represent a data point in a line or scatter plot. Plot symbols are modified using the Symbols settings of the Plots panel in the Graph Properties dialog box.

Template All of the settings for a page except for the data. Use templates to create complicated sets graphs from existing pages.

SigmaPlot includes a template notebook file containing several page templates you can use to create new pages with specific attributes. You can also create your own page templates and save them in a Template Notebook file (*.JNT), or use a graph page as a template by copying it into a different section.

The SigmaPlot Notebook Template file, TEMPLATE.JNT, is located in the program directory. Use the File menu New command to create pages from these templates.

Ternary Plot A graph that plots the proportions of three values on using three axes. The proportion that each value is equal to its percentage of the whole, and coordinates for each data point on the graph add up to 100%.

t-Test A statistical test used to determine if there is a difference between the means of two samples. Also called Student's t-test. Use the Statistics menu *t*-test and Paired t-test commands to perform a t-test for two worksheet columns.

Text Box A dialog box option used to enter text information, such as file names or values.

Text File A “plain text” file format widely used by word processing, desktop publishing, and spreadsheet programs. SigmaPlot can import and export text files.

Tick Labels Labels (usually numeric) which appear next to axis tick marks, indicating the value of each tick. Alphabetic characters can be added as prefixes or suffixes to the numbers. You can also use date and time, category, or series labels.

Choose the Tick Labels settings of the Axes panel in the Graph Properties dialog box to modify tick labels. See also Axis Range.

Tick Marks Marks along an axis indicating the precise location of each value at specific intervals. Major tick mark intervals are determined by the axis range. Minor tick marks create a specified number of intervals between major tick marks.

Tick mark intervals are also used as grid line intervals. See also Axis Range and Grid. Use the Ticks settings of the Axes panel in the Graph Properties dialog box to specify major and minor tick intervals.

Tick Origin The value used to compute the starting tick mark locations along an axis (usually zero). The actual starting value is determined by the range and major tick increment. If the origin is less than the beginning of the axis range, the tick increment is added to the tick origin until the axis range is reached.

The tick origin is specified in the Ticks settings of the Axes panel in the Graph Properties dialog box. See also Axis Range.

TIFF Tagged Image Format File. This is one of the most common bitmap graphic formats used by both PCs and Macintoshes, and is the native file format for many graphic programs, such as Adobe Photoshop. See also Bitmap.

Toolbar Toolbars are floating palettes containing buttons to execute many common File, Edit, View, Format, Tools, and Graph menu commands and to select a graph type and style with a single click. These include selecting text, line, box, and ellipse drawing modes, inserting legends, grouping objects, and moving objects to the front or back of the page.

You can view the function of a toolbar button using Tool Tips. Move the mouse pointer over the button, and leave it there for a moment without clicking to view the Tool Tip.

Transform A mathematical equation that generates data, either by performing calculations on columns of data in the worksheet, or by producing series of random or automatically incremented numbers.

Transforms are created using the Transforms menu User-defined command. See the *Programming Guide* for a complete description of transform functions.

Transparent Meshes Turning a 3D mesh plot transparent enables you to more clearly show the intersections between two or more 3D meshes. You must have a High Color (10 bit) or True Color (24 bit) video card for this feature to work properly. You may check your system's color capabilities under the Windows Display Properties Settings.

Transpose Paste Switches the orientation of worksheet data so that columns become rows and rows become columns.

Use the Edit menu Transpose Paste command to paste Clipboard data with rows and columns transposed.

Unitary Scale An axis scale with an absolute range of 0-1, used by ternary plots.

Worksheet Worksheets are the containers for the data you analyze and graph. They are spreadsheet-like in appearance but are much more limited in function, and are column rather than cell oriented.

A worksheet opens automatically every time a SigmaPlot notebook is open. You can also open a worksheet any time you are using SigmaPlot. You can enter worksheet data manually, import it, or, in some cases, data is automatically placed in worksheet columns by SigmaPlot. Some functions are available for displaying and manipulating worksheet data.

Whiskers Indicate the 10th and 90th percentiles of a box plot. Whisker cap width can be modified and color can also be applied to whiskers.

Error bars are sometimes referred to as whiskers.

Zoom Enlarge or shrink the view of the current page. Click the toolbar zoom button, then click and drag to specify an area of the page to zoom, use the drop-down list in the toolbar to use pre-set zoom levels, or choose the View menu Zoom command to change the zoom level. You can view a page at 50%, 100%, 200%, 400%, full screen, or fit the page in the current window.

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