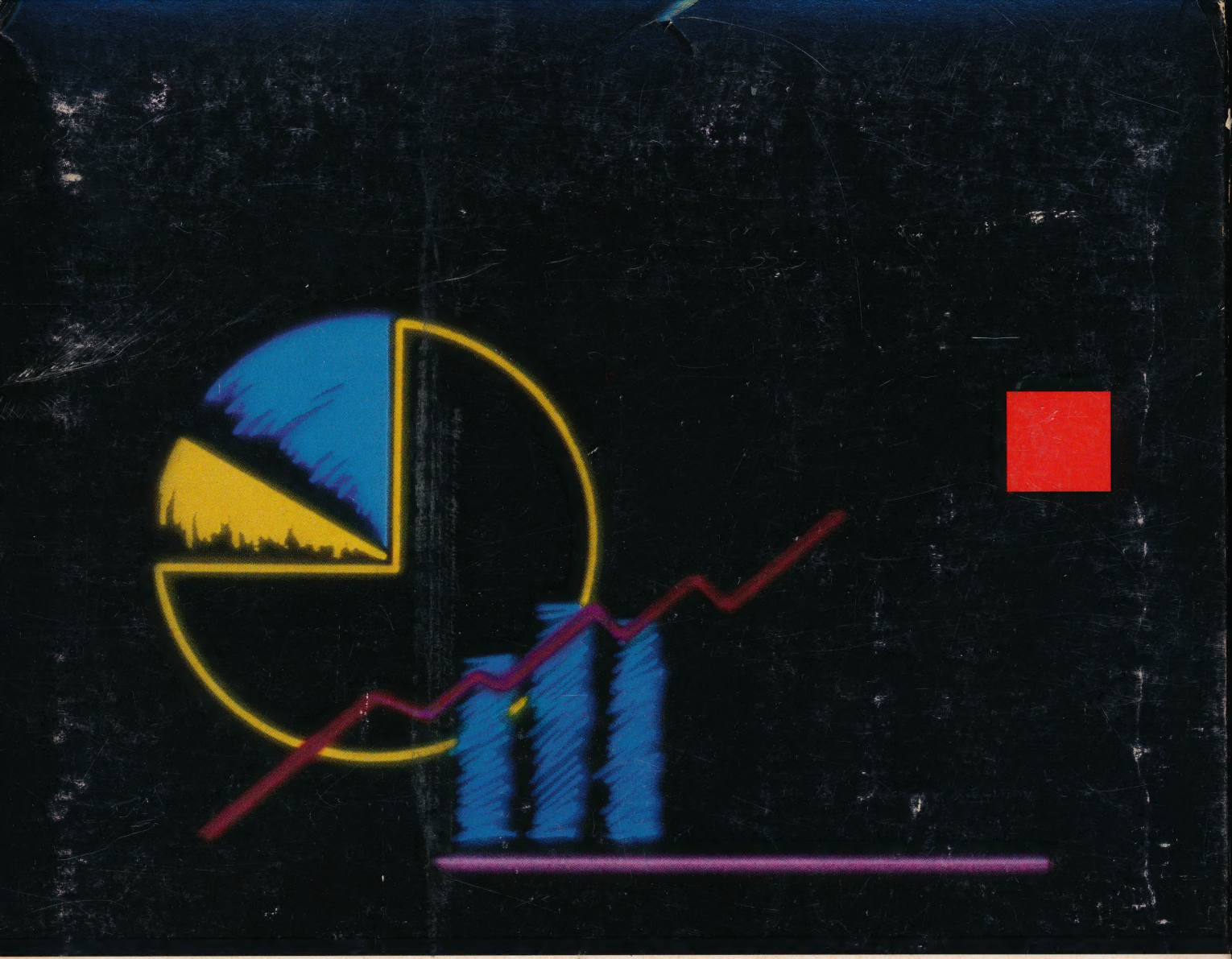


cricket

GRAPH

1.3

cricket GRAPH

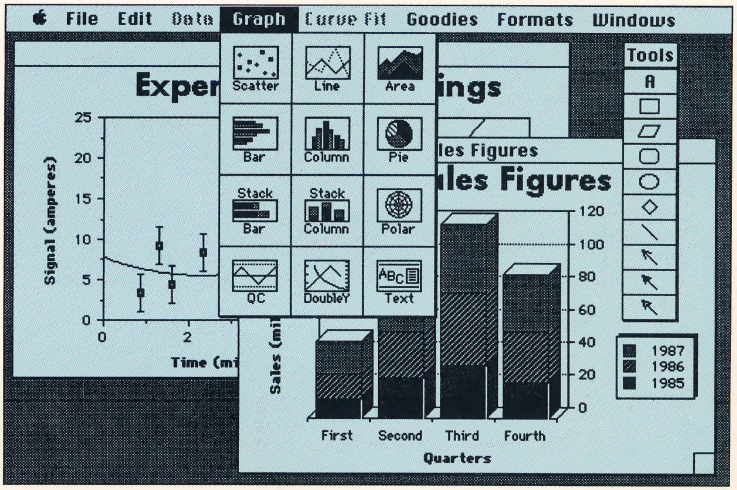
Professional Graphs Made Simple

For effective presentation quality graphs, there's no application more versatile than Cricket Graph™.

Cricket Graph lets you enter and edit data quickly – even import data from word processors, spreadsheets or databases using up to (with sufficient memory):

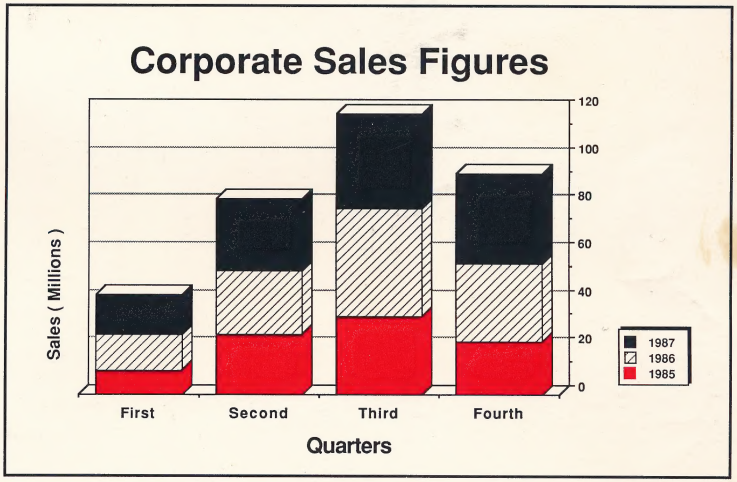
- 100 columns per data window
- 2700 rows per column

Change the graph style or any of the details with just a click of the mouse. Cricket Graph creates dynamic graphs with ease.



Powerful Features For Professional Presentations

- Data window; column formatting
- Sixteen bar patterns, 48 plot symbols, 6 line styles and 5 line widths
- Selection of fonts, sizes and styles
- Text, lines, arrows, rectangles, ovals, etc. added anywhere
- Reposition, stretch, shrink graphs
- Overlay multiple sets of data
- Large data sets (2000 or more points)
- Regression curve fits, error bars and grids
- Depth for added dimension
- Object & background COLOR selection
- Mathematical transformations on data in data window
- and much more



Choose From A Wide Variety Of Graphs And Charts

- Scatter
- Line
- Pie
- Bar
- Column
- Stacked Bar
- Stacked Column
- Polar
- Quality Control
- Area
- Double Y Graphs
- Text

Full Control Of The Printed Page

- Multiple graphs per page
- Position and size each graph on the page
- Print on Apple® LaserWriter®
- COLOR GRAPHS using Hewlett-Packard color plotters, ImageWriter® II or ImageWriter LQ
- Cricket Expression™ Device Drivers can interface non-PostScript® printers with Cricket Graph, offering more output device options.

SYSTEM REQUIREMENTS

Requires Macintosh®, Macintosh SE or Macintosh II. A hard disk or additional disk drive is required to run Cricket Graph.

cricket software
Great Valley Corporate Center
40 Valley Stream Parkway
Malvern, PA 19355
(215) 251-9890

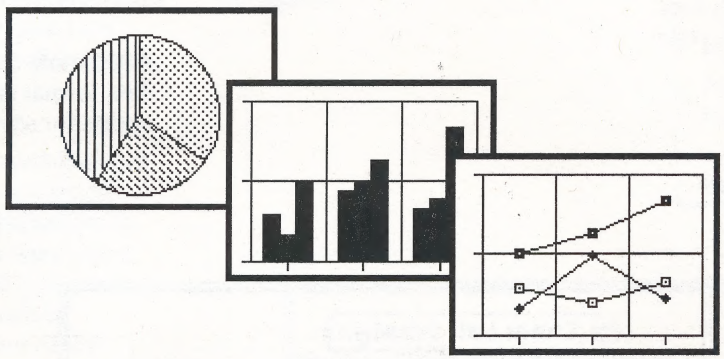
cricket GRAPH

APPLICATIONS

MADE IN JAPAN

W130877

cricket GRAPH 1.3



Release Notes

This upgrade of Cricket Graph™ represents significant improvements in accuracy and performance. In addition, we have included enhancements to give you more control over the appearance of your graphs.

We think you'll find that Cricket Graph 1.3 meets your most sophisticated graphing needs, and gives you even more power and ease of use than earlier versions.

Macintosh Compatibility

Cricket Graph 1.3 requires a Macintosh® Plus, Macintosh SE or Macintosh II, and System Software 6.0 or greater.

Memory and Disk Space Requirements

We have improved the data structure of graphs to increase the accuracy of computations. As a result, Cricket Graph 1.3 uses more memory to construct your graph, and graph files require more space on your disk.

MultiFinder Memory Requirement

When running under MultiFinder™, the default memory requirement for Cricket Graph 1.3 is 768K.

Extended Precision Variables

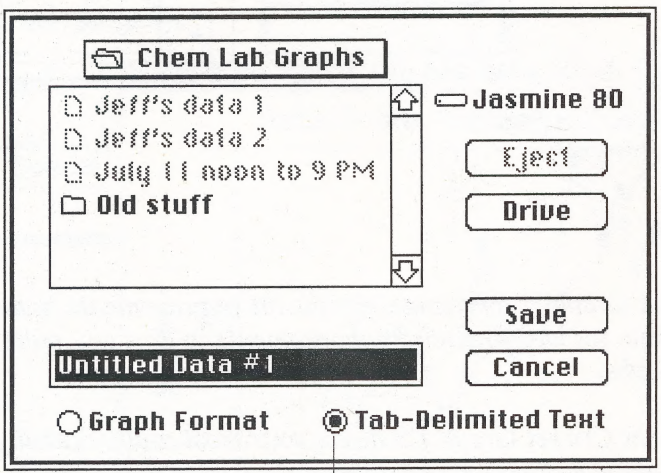
The minimum representable value for extended precision variables is -1.1E+4931. The maximum representable value is 1.1E+4931.

New Data Format

You can now save data as a tab-delimited ASCII text file. This allows you to export data to a wide variety of applications, running both on Macintosh computers and on other systems, such as IBM® PC compatibles.

Regardless of the column format (decimal, dollars, or percent), tab-delimited text files are saved in scientific format to preserve the actual numeric values of the data.

Please note that the StatWorks data format is no longer an option for saving files.



Improved Out-of-Memory Handling

If you run out of memory while running Cricket Graph 1.3, you will be able to save changes made to any open window except the frontmost window. Since the frontmost window was active when memory ran out, it is impossible to update its contents accurately.

Before you perform a memory-intensive operation—a complicated sort, for example—it's a good idea to save the file in the frontmost window. That way, if memory runs out, you won't lose data from any of the open windows.

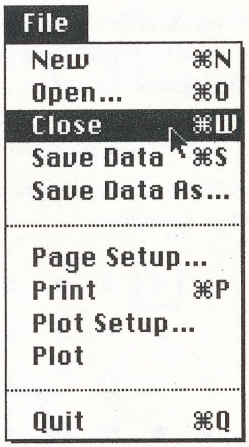
After you have saved changes to the other open windows, Cricket Graph returns you to the Finder. If you were using MultiFinder when you ran out of memory, you will be returned to another of the applications running under MultiFinder.

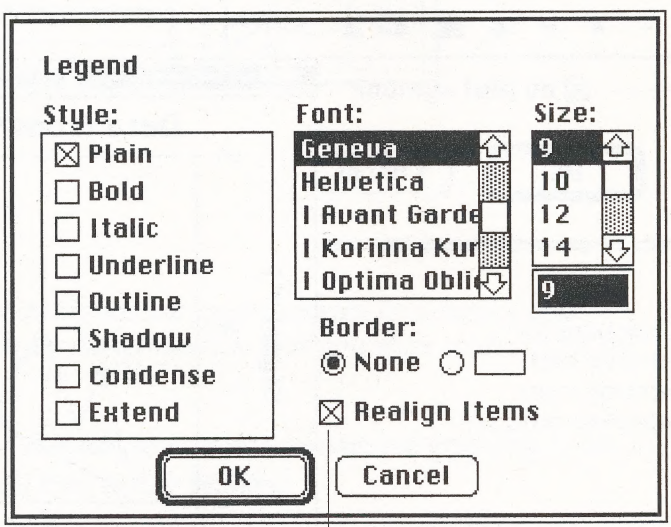
Realigning Legend Items

The Legend dialog box (which appears when you double-click a graph's legend) now contains a check box labeled "Realign Items." If you have ungrouped the legend and moved the items, regroup the legend and double-click it, then click this check box to ensure proper vertical spacing of the legend. This option also allows you to correct the line spacing between legend items after you have changed the font size used for the legend.

Command-W to Close

We've changed the Command-key shortcut for the Close command in the File menu from Command-K to the standard Command-W.

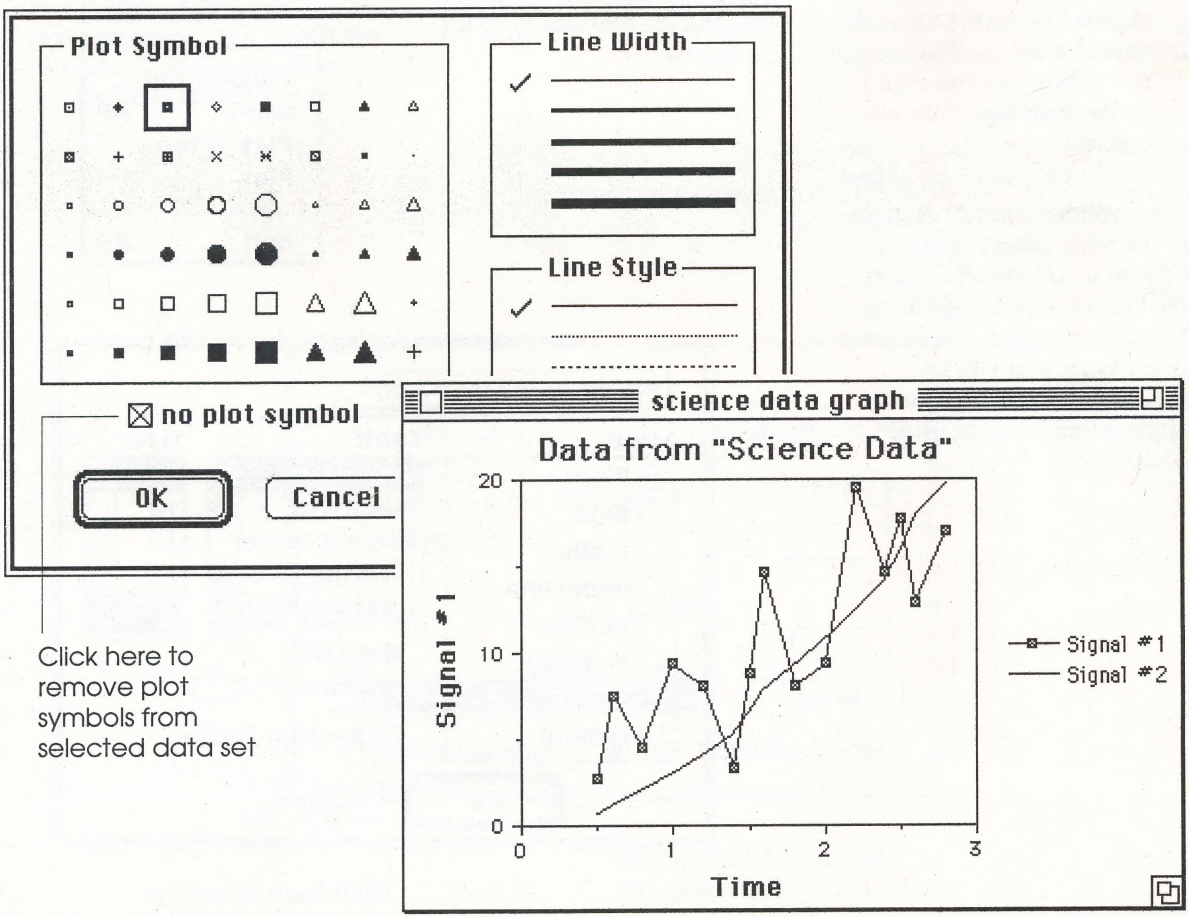


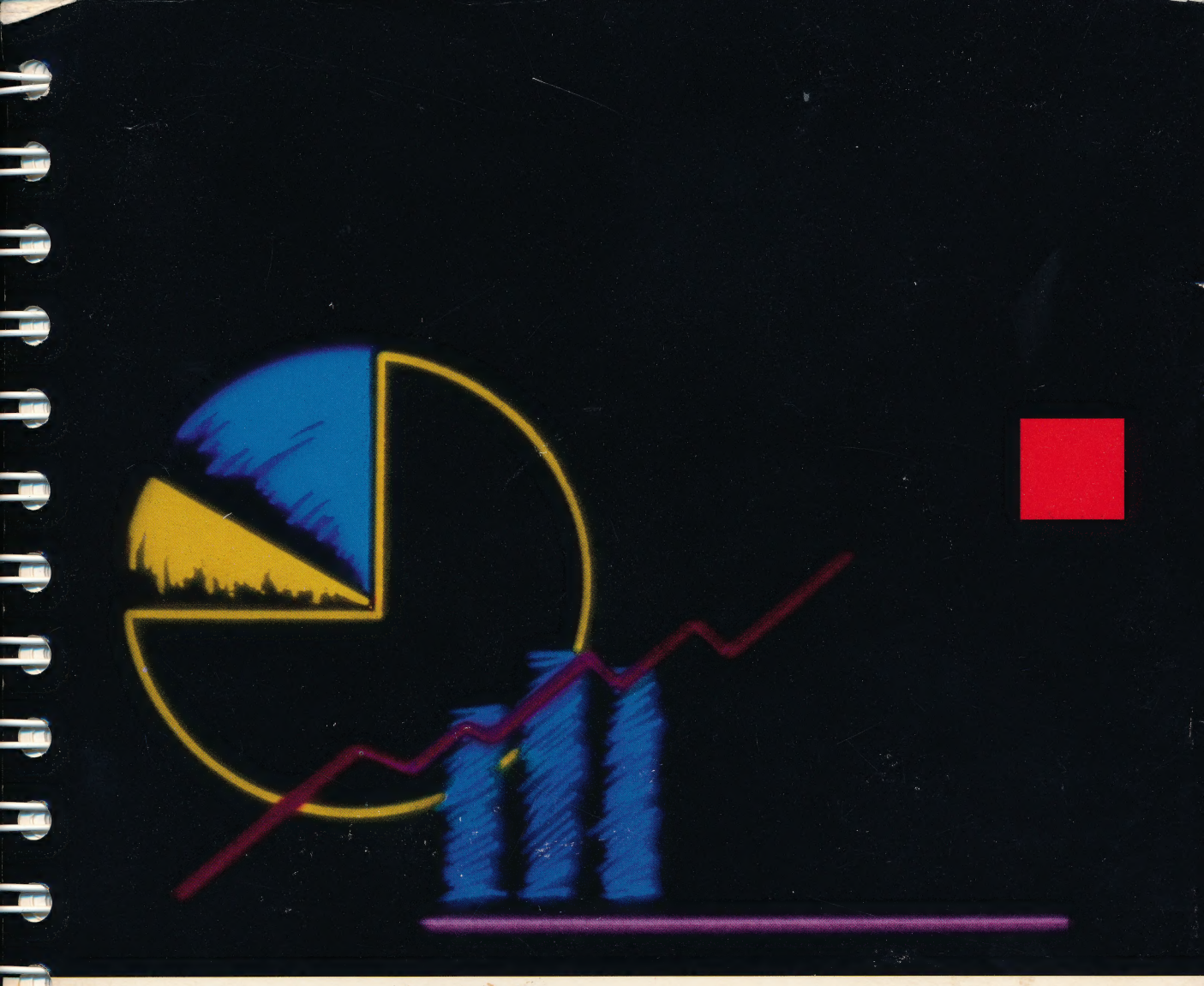


New Plot Symbol Option

If you wish, you can plot a data set in a line graph without a plot symbol. This option creates graphs that contain only lines. To remove plot symbols from a data set:

1. Start by double-clicking the plot symbol of the data set in the legend.
2. In the dialog box that appears, click the check box labeled "no plot symbol," then click OK to return to the graph window. The legend now displays a line symbol, with no plot symbol, for the data set.
3. If you want to use plot symbols again, double-click the line symbol to redisplay the plot symbol dialog box, then click the "no plot symbol" check box to remove the X. You can now choose a new plot symbol before clicking OK to close the dialog box.





cricket GRAPH

Registration # _____

License
Cricket Software, Inc. hereby agrees to grant you a non-exclusive license to use the enclosed program, subject to the terms and restrictions set forth in this License Agreement.

Copyright

40 Valley Stream Parkway
Malvern, PA 19355
(215) 251-9890

Limited Warrenty on Media and Manuals
If you discover physical defects in the media on which this software is distributed, or in the manuals distributed with the software, Cricket Software will replace the media or manuals at no charge to you, provided you return the item to be replaced with proof of purchase to Cricket during the 90-day period after you purchased the software. In some countries the replacement period may be different.

ALL IMPLIED WARRANTIES ON THE MEDIA AND MANUAL, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO NINETY (90) DAYS FROM THE DATE OF THE ORIGINAL RETAIL PURCHASE OF THIS PRODUCT.

Even though Cricket has tested the software and reviewed the documentation, CRICKET MAKES NO WARRANTY OR REPRESENTATION, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS SOFTWARE, ITS QUALITY, PERFORMANCE, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. AS A RESULT, THIS SOFTWARE IS SOLD "AS IS," AND YOU, THE PURCHASER, ARE ASSUMING THE ENTIRE RISK AS TO ITS QUALITY AND PERFORMANCE.

IN NO EVENT WILL CRICKET BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECT IN THE SOFTWARE OR ITS DOCUMENTATION, even if advised of the possibility of such damages. In particular, Cricket shall have no liability for any programs or data stored in or used with Cricket products, including the costs of recovering such programs or data.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESS OR IMPLIED. No Cricket dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Graph Registration # G 94638

Registration
Card

cricket GRAPH

Welcome to Cricket Graph
Another high-quality application from the Leader in Graphics Productivity Software.

The only thing between you and valuable technical support, as well as timely information on future updates to Cricket Graph, is this registration card.

Register Now!
You must complete this card to qualify for Cricket Software's Standard Service Plan, six months of ***free*** technical support on your new Cricket application. Our technical service team is eager to help you resolve any questions that may arise as you familiarize yourself with Cricket Graph. You'll also receive two free issues of *Reflections*, Cricket Software's News and Information quarterly. Your Standard Service Plan begins the moment we receive this card.

Cricket Software also offers Extended and Preferred Service Plans designed to meet the support requirements of every individual and business user of Cricket Software products. Please check the service plan information box on the registration card if you would like to receive more information on Cricket Software Service Plans.

CHANGE OF ADDRESS CARD

Graph Registration # G 94638

Please use this postcard to notify Cricket Software if you move. We need this information in order to keep you informed about new versions of Cricket Software products and to maintain our Customer Support files.

COMPANY

DEPT.

NAME

TITLE

STREET ADDRESS

CITY

STATE

ZIP

COUNTRY

TELEPHONE / HOME

OFFICE

PREVIOUS STREET ADDRESS

CITY

STATE

ZIP

Signature

REPLACEMENT DISK POLICY

Graph Registration # G 94638

If your master program disk becomes unusable and you wish to have it replaced, please complete this card and return it along with your original disk, a photocopy of your dated proof-of-purchase and $25.00 to Cricket Software.

COMPANY

DEPT.

NAME

TITLE

STREET ADDRESS

CITY

STATE

ZIP

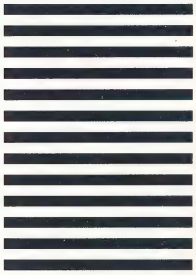
COUNTRY

TELEPHONE / HOME

OFFICE

Signature

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 45 MALVERN, PA

POSTAGE WILL BE PAID BY ADDRESSEE

Cricket Software, Inc.
Great Valley Corporate Center
40 Valley Stream Parkway
Malvern, PA 19355-9767

Presentation Graphics for Science and Business

Program by Jim Rafferty and Rich Norling

Great Valley Corporate Center
40 Valley Stream Parkway
Malvern, PA 19355
(215) 251-9890

This manual was produced using MacPaint™, MacWrite™, Switcher™ and a LaserWriter™.

Contents

CHAPTER 5: The Edit Menu

CHAPTER 6: The Data Menu

CHAPTER 7: The Graph Menu

CHAPTER 8: Changing Items in the Graphs

CHAPTER 9: The Curve Fit Menu

CHAPTER 10: The Goodies Menu

CHAPTER 11: Selecting Colors

CHAPTER 12: The Formats Menu

CHAPTER 13: Getting It on Paper

Appendix A: Do's & Don'ts of Creating Effective Graphs

Appendix B: Technical Details

Appendix C: Importing & Exporting with Other Applications

Appendix D: Working with MacDraw

Chapter 1: Introducing Cricket Graph

Welcome to Cricket Graph!
Cricket Graph is a high-performance product designed to meet your graphic needs in both science and business. At the same time, with Cricket Graph you can create and customize graphs quickly and easily.

Cricket Graph allows graphs to be printed on the ImageWriter™ I/II, LaserWriter™ and a number of color plotters (Apple and Hewlett Packard, to mention a few). Special versions of the software are also available for operating high quality film recorders and other high-end devices (if you would like more details, give us a call). With film recorders, you can capture high quality color slides and prints using Cricket Graph.

Not only can you create graphic output using a variety of devices (and in color) but you have total page arrangement capabilities in Cricket Graph. This means that you can determine the size and position of each graph on the page. You can also overlay one graph with another or place several side by side for comparison. You have complete control!

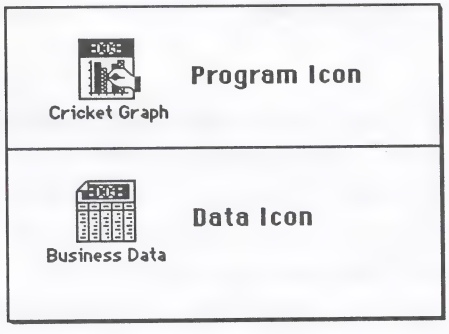
Though Cricket Graph is very easy to use, very complex things can be done with it. There are many powerful shortcuts available in Cricket Graph and you will not be able to learn everything all at once. That will come with time and practice (and of course from reading this manual). You will, however, be able to get presentation quality graphs completed and printed in no time at all.

Starting Cricket Graph

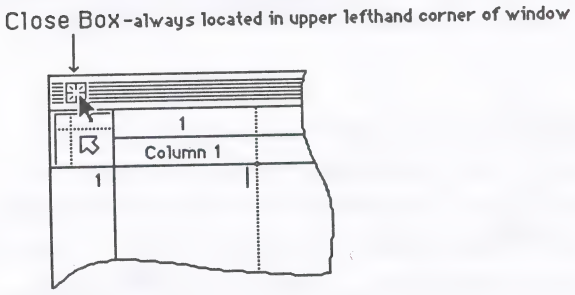
Cricket Graph comes on two disks. One is labeled "Graph Disk" and the other "System & Utilities". The Cricket Graph program and some sample data files are on the Graph Disk. The System disk contains a number of files including: System file; Switcher; a preconfigured Switcher document; and device installers for a number of color plotters. Switcher is a program licensed from Apple that allows you to have several programs in memory at once and allows switching back and forth between them (Appendix E: Using Cricket Graph with Switcher). The device installers are for installing the necessary resources for a variety of color plotters (Appendix F: Using Color Plotters).

Turn on your Macintosh and insert the Graph disk and the System disk into the disk drives (running Cricket Graph with less than two disk drives is somewhat impractical, but it can be done). After a few seconds, the desktop image will appear.

A number of file icons (graphic images representing an object) are used by Cricket Graph and are explained throughout this manual. The two icons you will need to be familiar with immediately are illustrated below.



Click the icon labeled **Cricket Graph** which will then be highlighted. Select **Open** from the **File** menu. The Cricket Graph program is now started. It will take a few seconds for the program to be loaded. When Cricket Graph is first started in this way, an empty data window will appear.



You can begin entering data at this point or you might wish to close this window (by clicking in the Close Box in the upper lefthand corner of the window) and open a data file from the disk.

Learning to Use Cricket Graph

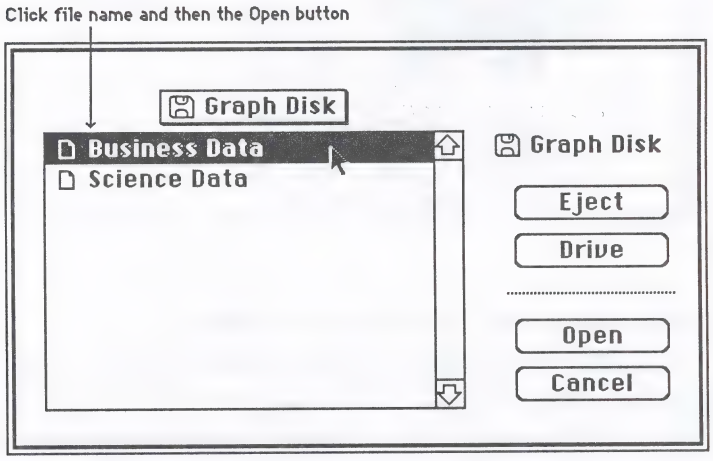
Each of the following chapters is organized so that new Macintosh users can follow their sequence and learn about the features available in Cricket Graph.

If you are already familiar with the Macintosh, you may wish to skip the next section, which runs through a couple of examples. A word of warning though: Cricket Graph uses some Macintosh features in new and powerful ways and therefore you may wish to work quickly through the examples even if you are an expert in the ways of the Macintosh.

The best way to learn this package is to begin to create some graphs of your own. To speed up this process, two examples are presented to show the basic steps in creating, customizing and printing graphs. One example is aimed at business and the other at science. Please work through both examples (even if you won't be doing graphs of the other type) because the two examples combined illustrate a number of powerful features available to you in Cricket Graph.

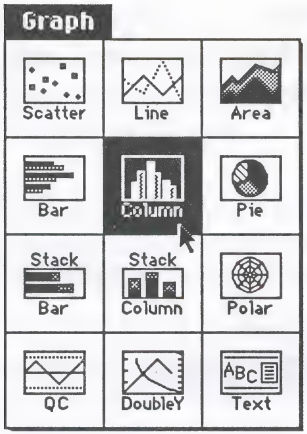
An Example from Business

Select the **Open** command from the **File** menu. The following dialog box will appear...

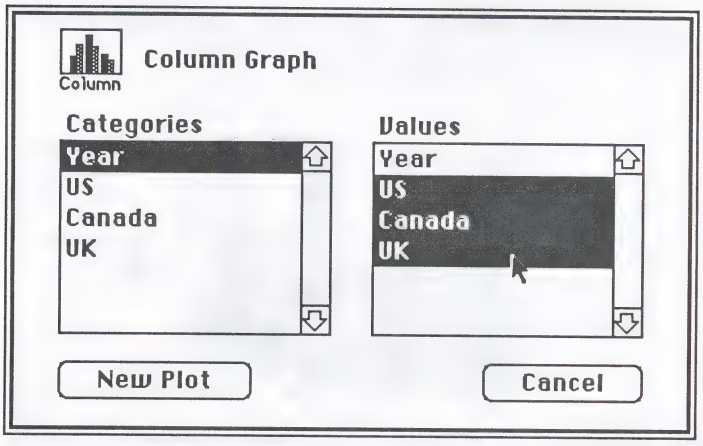


Click the name "Business Data" that appears in the variable selection box. This will select that file name (as indicated by highlighting). Then click the **Open** button.

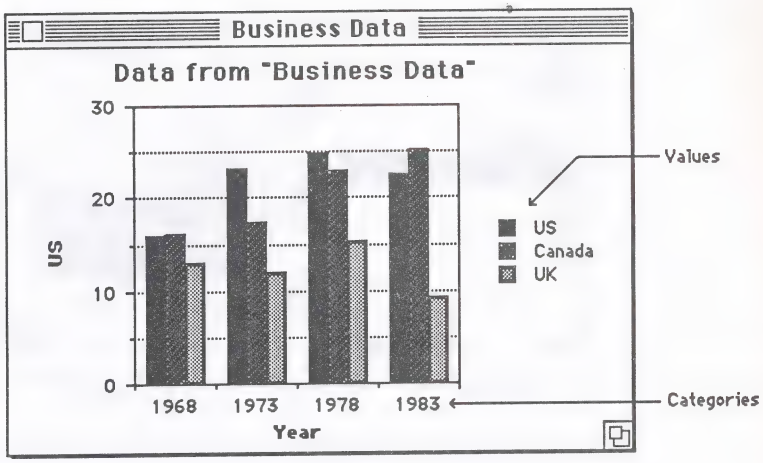
The data will appear after a few seconds in a data window. From here you could edit the data, but in this case we will just go ahead and create some graphs using this data set.



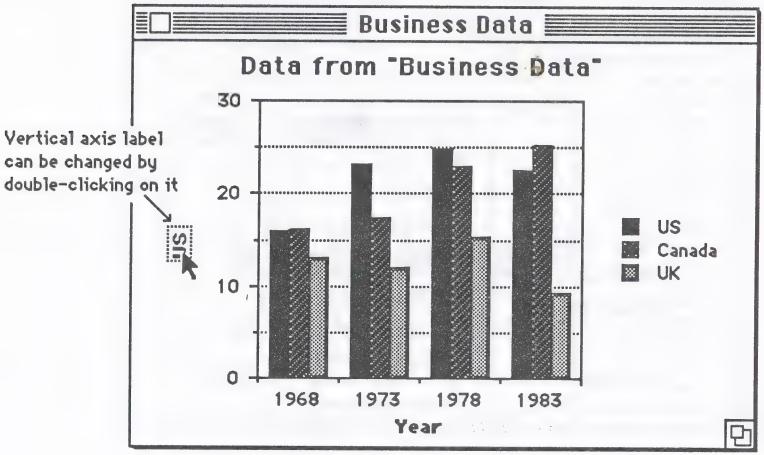
Go to the **Graph** menu and click the mouse button. Continue to hold the button down. The available graph types are displayed in this menu. To select any one type, drag to the icon of that graph and release the mouse button (dragging is moving the mouse while holding down the mouse button). Go ahead and drag down to the **Column** selection and release.



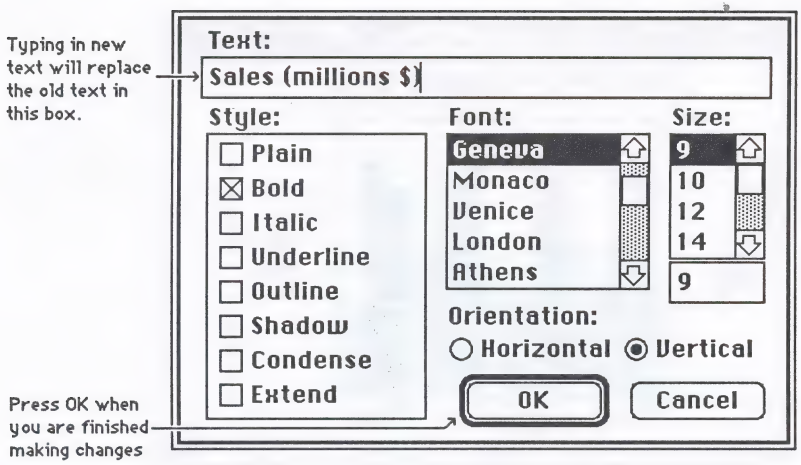
Each of the columns of data (usually referred to in this manual as variables) is named as illustrated in the top row of the data window. You may change these names at any time. They are originally assigned when the data set is created. To select variables for graphing, you simply click the appropriate names in a scrolling selection box (as illustrated above). Click the variable names as illustrated above (note: one variable contains the categories and three other variables contain values for these categories for three years).



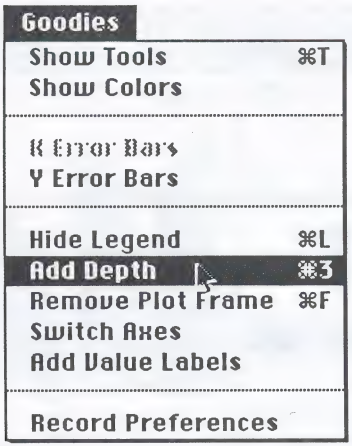
A column graph like the one above will be created. Notice how the series of three values for each of the categories is graphed as vertical bars in a side by side fashion. Column graphs such as this are great for comparing values over different time periods.



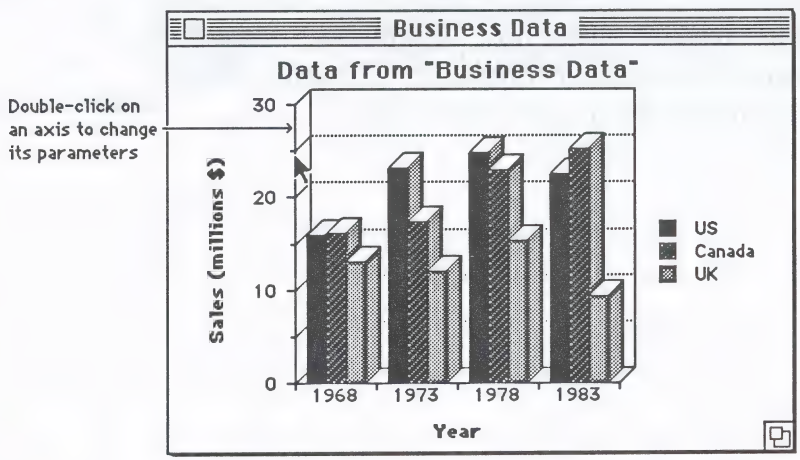
Once a graph is created, it is easily modified for a customized appearance. For instance, the vertical axis label is inappropriate (the label was chosen as the first variable name in the series of variables graphed and will most likely always need to be modified when you are graphing multiple data sets). Instead, indicating the units used for this measurement would be more appropriate. To change it, double-click this label (point to the item and press the mouse button twice in rapid succession).



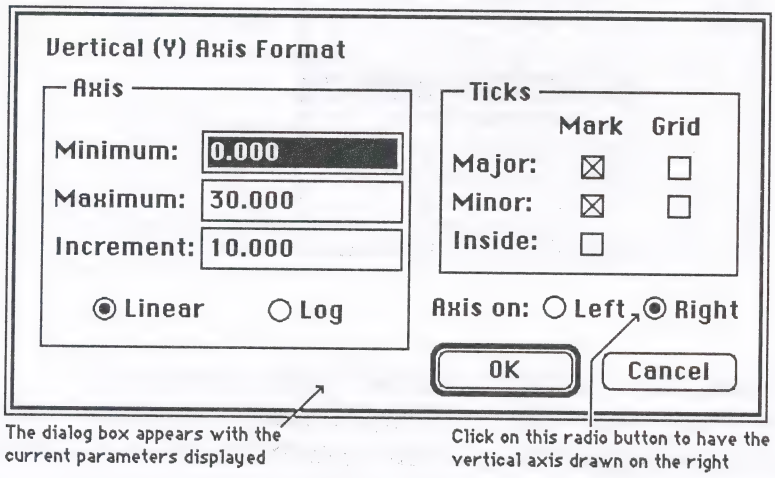
Double-clicking an item in the graph is the means by which you can change things. A dialog box (as illustrated above) will appear and you can change the text as well as its font, size, style and orientation. For right now, change what the label says by typing in "Sales (millions $)" in the edit box at the top of the dialog. The graph will be redrawn with the new vertical label.



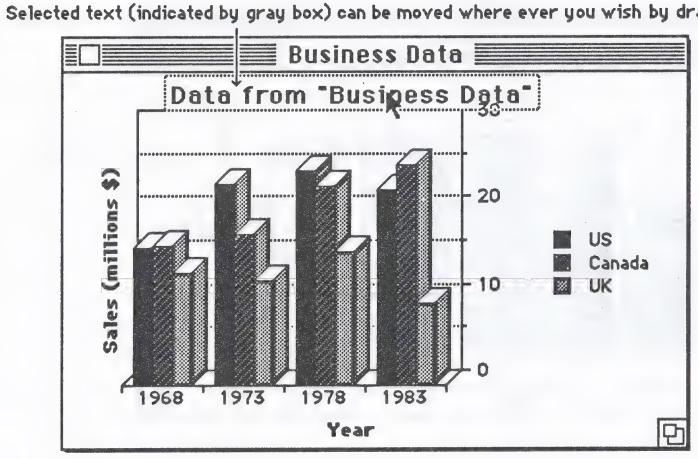
To add "pizzazz", try selecting the **Add Depth** command from the **Goodies** menu. The graph will be redrawn with a three-dimensional appearance. Adding depth really enhances the presentation appearance of bar and column graphs and their stacked counterparts (stacked bar and stacked column).



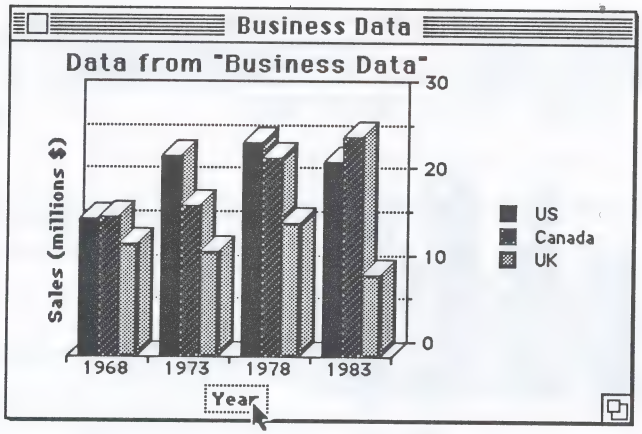
To illustrate how you might change the values of an axis, double-click the vertical axis. The following dialog box will appear...



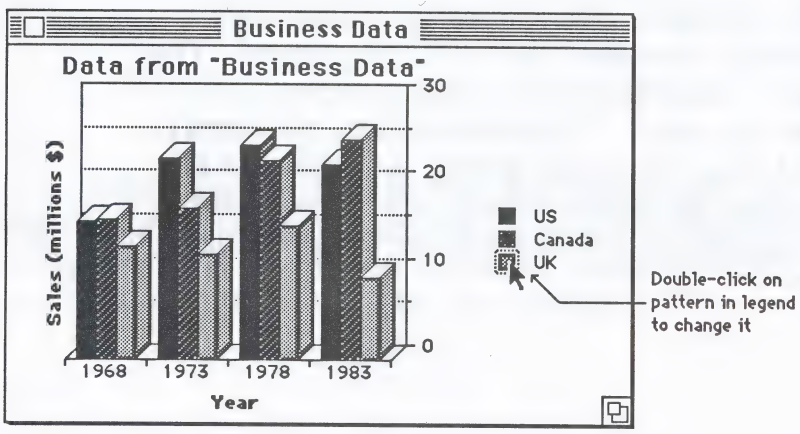
All the values used to describe the characteristics of this axis will appear in this dialog box. Each of the parameters displays the current values of this axis. Click the **Right** radio button to move the axis to the right.



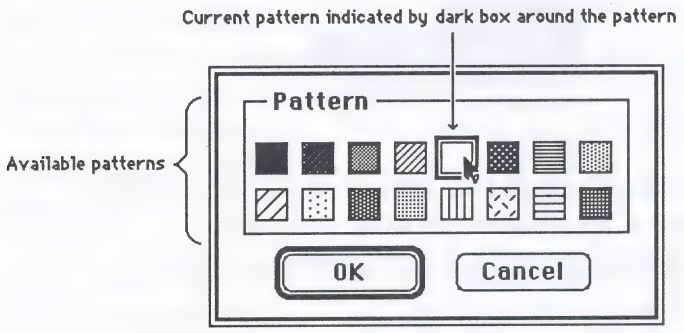
The graph is redrawn to reflect the change. Note, however, that two labels (the title and horizontal axis label) are no longer centered and need to be moved. You have already learned that double-clicking an item is how you go about changing it. To move an item, you simply point to it and drag it about the graph. An outline of the object will follow the mouse movements. When you let go of the mouse button, the item will be redrawn in its new location.



Go ahead and move the horizontal axis label and title by dragging.



To change a pattern, simply double-click the pattern in the legend (items such as plot symbols and patterns are always changed by double-clicking them in the legend, not in the graph).

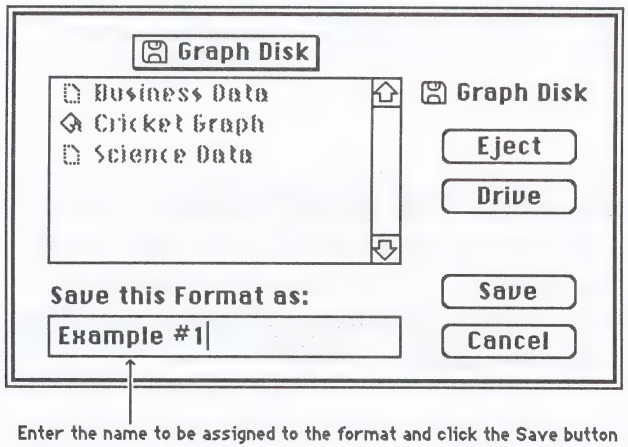


Clicking on a pattern will select that pattern

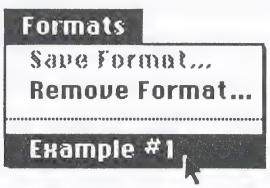
A dialog box will appear with the current pattern that you double-clicked selected (as indicated by the box around that pattern). To select a new pattern, click the desired pattern and then click the **OK** button. The graph will be redrawn using the new pattern.

You have just created and customized a graph. Cricket Graph allows you store the format of a graph (a format consists of all the details necessary to recreate that graph except the data and any data dependent items). By storing formats, you have essentially created a "Graphic Macro". A macro is a collection of a series of commands necessary to accomplish a task. The macro can now be executed by a single command. Macros are a way to automate the repetitiveness of frequently used groups of tasks. For instance, suppose you have created a graph with the properly selected fonts, arrows, extra text and perhaps depth (as in this case) and you wish to create the same kind of graph over and over but with different sets of data.

First create the desired graph and customize it (as we have just done) and then select **Save Format** from the **Formats** menu. The following dialog box will appear.



Name this format "Example #1" by entering the name in the text box and click the **Save** button.

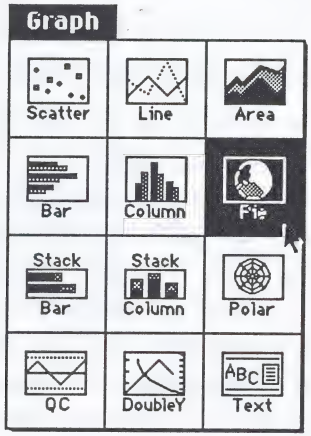


The format, saved under this name, will be added to the **Formats** menu.

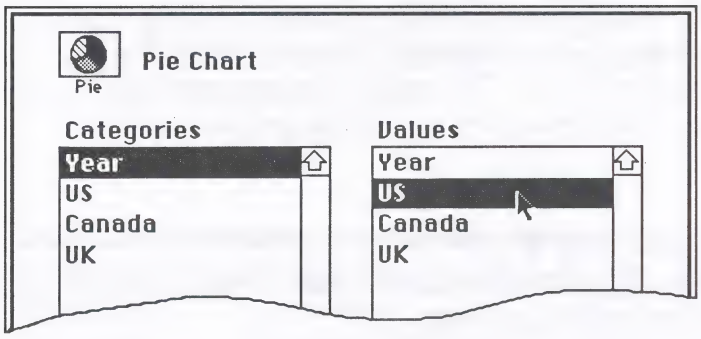
To illustrate how effective a "Graphic Macro" can be, put away all the windows currently open (by clicking in the Close Box in the upper lefthand corner of each window). Now select the "Example #1" macro that you just created (selection is accomplished exactly like any other pull-down menu command).

A series of events will happen. First, since there is no data, a dialog requesting the data set to be opened will appear. Select "Business Example" again. A dialog requesting which variables to use in creating the graph will appear. Select "Year" as the category variable and drag through "US", "Canada" and "UK" for the value variables (just as we did previously). Instantly after clicking the **New Plot** button, a column graph exactly like the one created initially will appear. The graph is drawn from the format saved under this macro. In this case we used the same data set as before. We could have used another data set (in fact, that is exactly what you would do to take full advantage of this macro capability in the real world).

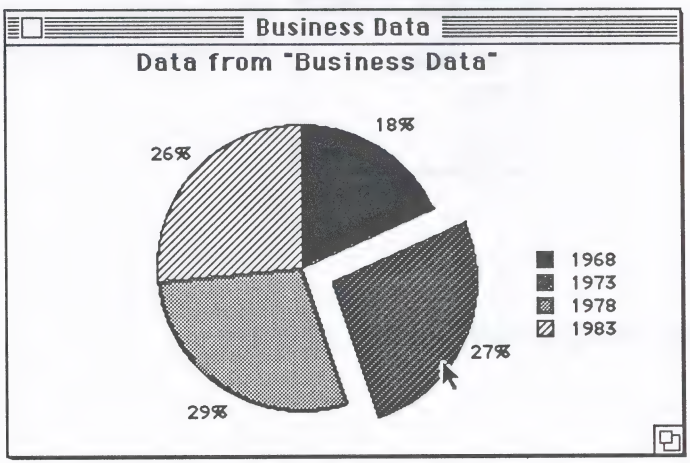
Let's compare the sales figures for the US for 1968, 1973, 1978 and 1983 by creating a pie graph.



Select **Pie** from the **Graph** menu just as you did for the column graph.



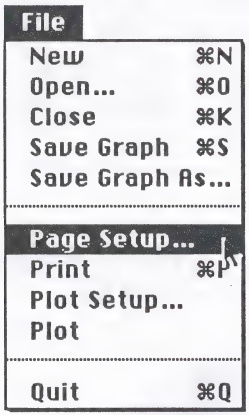
Again, select the variables desired in the dialog box that appears. In the case of pie graphs, only one value can be chosen at a time in the righthand variable selection box (as opposed to multiple selections in other kinds of graphs).



A pie graph will be drawn. To highlight a specific wedge of the pie, click that wedge and drag it outward from the center of the pie.

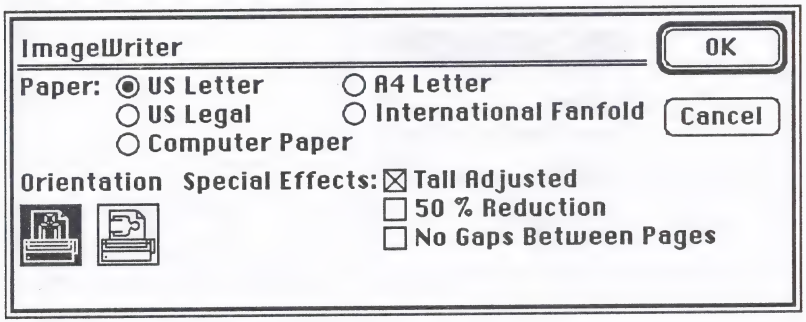
You now have two different kinds of graphs in two different windows. This is one of the many powerful features of Cricket Graph. To really demonstrate how powerful this capability is, let's print the graphs that you just created.

First, anytime we have graphs that contain circles (such as pie and polar graphs), we must make sure that we set the proper attributes before printing.

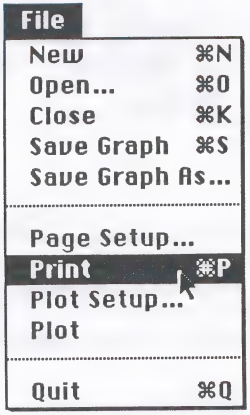


Go to the **Page Setup** command and select it.

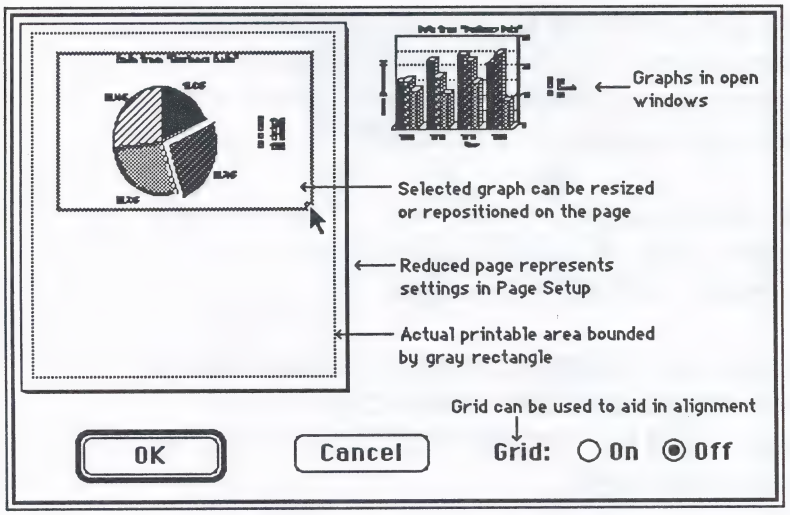
A dialog box will appear allowing you to set various parameters. In this case, we are especially interested in turning on the **Tall Adjusted** setting.



Tall adjusted is used so that when graphs are printed, circles appear as circles instead of being distorted into ovals.



Now select **Print** from the **File** menu to get a printout of our graph (in this case, graphs). Anytime you select **Print** or **Plot** from the **File** menu, a dialog box will appear that lets you set your page arrangement before printing or plotting.



In Cricket Graph, you have full control of the graph size and position on the page. Notice how a miniature image of a page appears on the lefthand side of the layout window with the graph in the most forward graph window centered on this page. On the righthand side is a scaled down image of the other graph that we first created (the contents of any other graph windows would appear also). By clicking the image of the graph, we can select it (as indicated by the gray rectangle around the graph).

Once selected, the graph can be moved anywhere on or off the page by dragging within this selection rectangle. To resize the graph, drag in the little gray box in the lower righthand corner of the selection rectangle.

You can drag other graphs onto the page. You can even place one graph on top of another since graphs placed behind other graphs will show through.

The image of the page is a scaled version of the settings that were set in **Page Setup** (for instance, you could rotate the page so that the images would be printed across the widest part of the page).

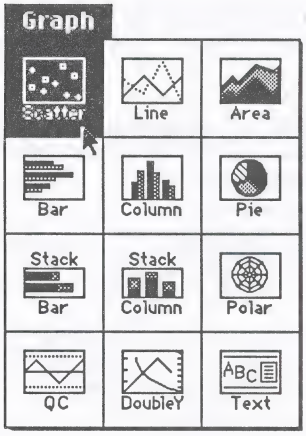
After clicking **OK** (that is, when you have finished deciding on your layout) another dialog box will appear allowing you to set the print quality if the printer you are using is an ImageWriter. This is the standard dialog used throughout most Macintosh applications. Graphs look best on an ImageWriter when printed in "Best" mode. When printing on the LaserWriter, everything is printed in draft mode and therefore there is no selection for print quality.

An Example from Science

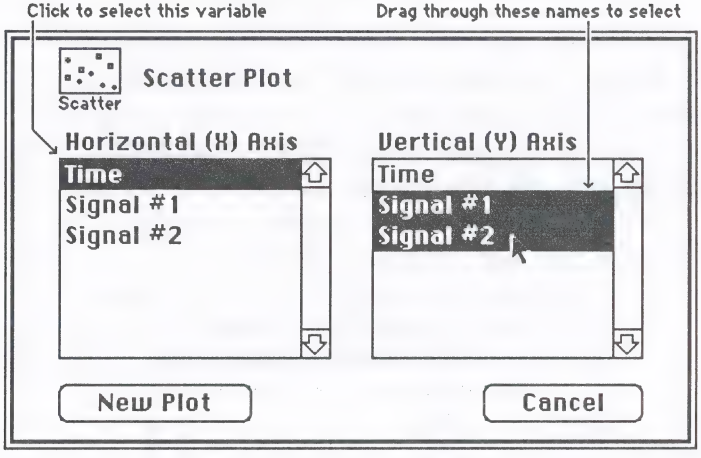
Let's create another graph but this time using a science data set. Close all windows that are currently open so that we can start with a fresh screen.

Select **Open** from the **File** menu so that a data set can be selected. Select and open the "Science Data".

This data set contains a variable with time measurements versus two other variables containing measured signals from a scientific instrument.

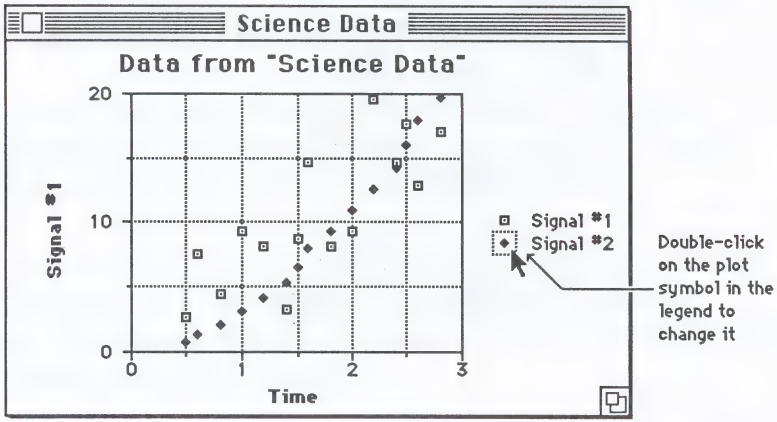


Select **Scatter** from the **Graph** menu.

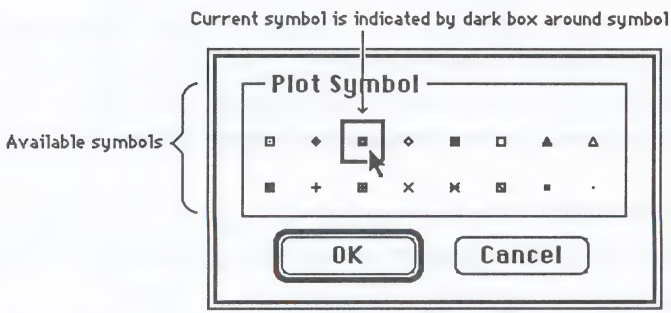


Let's graph the time variable along the x axis and the two measured signal values along the y axis (to do so, select the names as illustrated above).

The following scatter graph is created from the data...

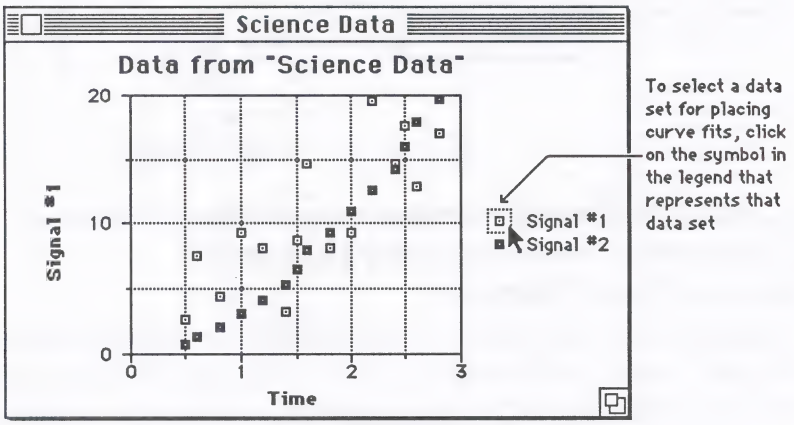


Suppose you wish to change the plot symbol used in the second set of values. Double-click this symbol in the legend (remember, the legend serves as a control point for changing plot symbols and patterns). The following dialog box will appear.

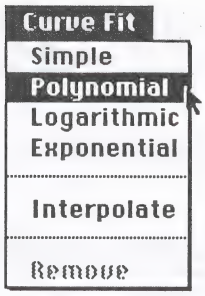


Clicking on a symbol will select that symbol

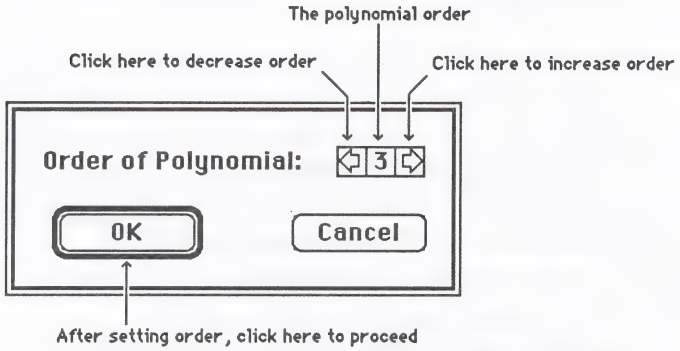
Select a new plot symbol just as you had previously selected a new pattern by clicking it and then clicking the **OK** button.



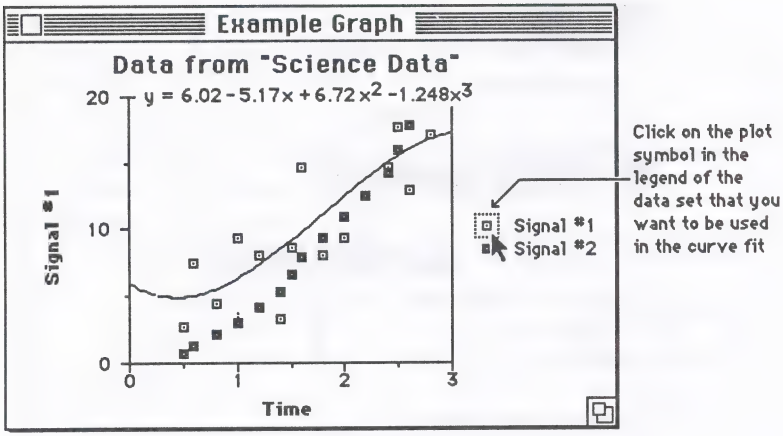
If you single-click a plot symbol instead of double-clicking, the data series represented by that symbol is selected (indicated by a gray box around the plot symbol). This is very useful in selecting specific sets of data on graphs that contain multiple data sets for performing regression curve fits, placing error bars or deleting data sets from the graph.



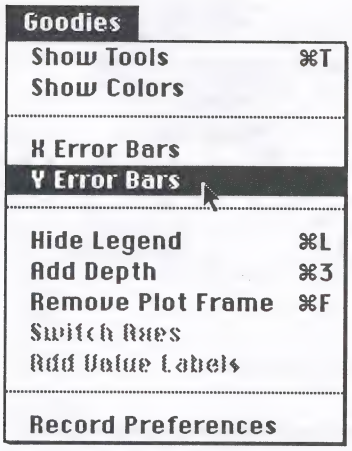
For example, select the first data set in the legend by clicking its plot symbol. Now choose the **Polynomial** command from the **Curve Fit** menu.



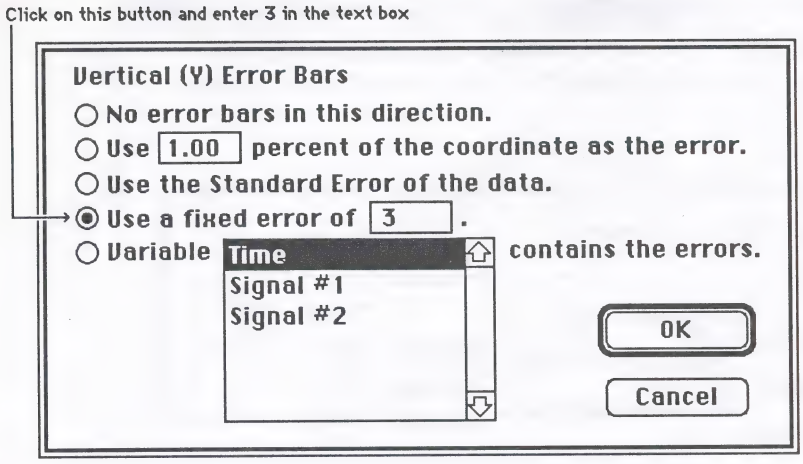
A dialog box will appear requesting that you select the degree of the polynomial. By clicking the left arrow in the control, the polynomial order will decrease. Likewise, clicking the right arrow will increase the polynomial order. Set the order to three (the maximum is five).



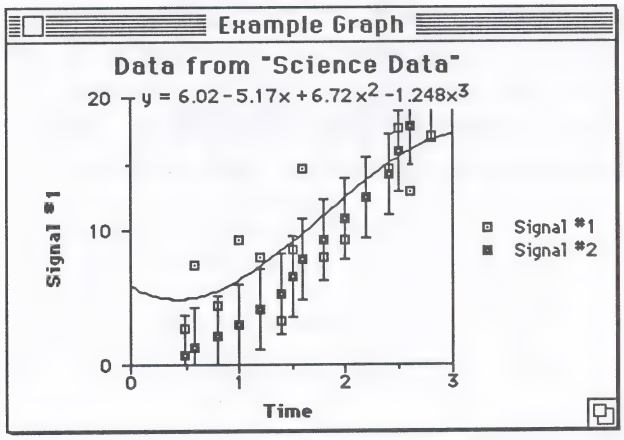
The best fitting polynomial curve is overlaid on the graph along with the equation that describes that curve. You can move the equation to another part of the graph by clicking it and then dragging. You can also remove the equation from the graph by clicking it and then pressing the **Backspace** key or selecting **Clear** from the **File** menu.



Now place error bars on the second data set by clicking its plot symbol (in the legend). A gray box will surround the plot symbol for this data set, indicating that it is selected. Now choose **Y Error Bars** from the **Goodies** menu.

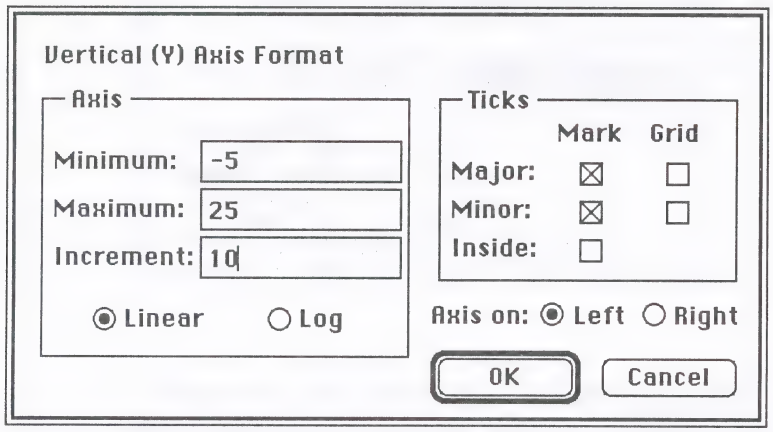


A dialog box will appear allowing you to choose one of several ways to specify the error. For this example, click the fixed error button and enter a value of 3 in the text box.

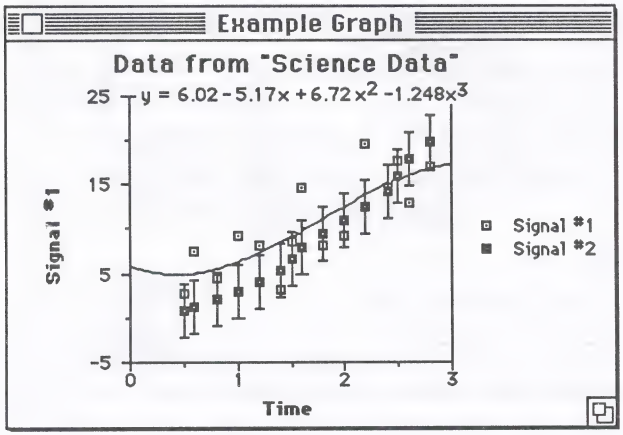


The error bars are drawn along with that data set. Note that some of the error bars extend beyond the plot frame and are therefore not entirely visible.

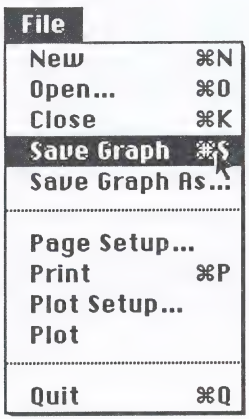
To change the vertical axis minimum and maximum so that the entire error bar will be shown in all cases, double-click the vertical axis.



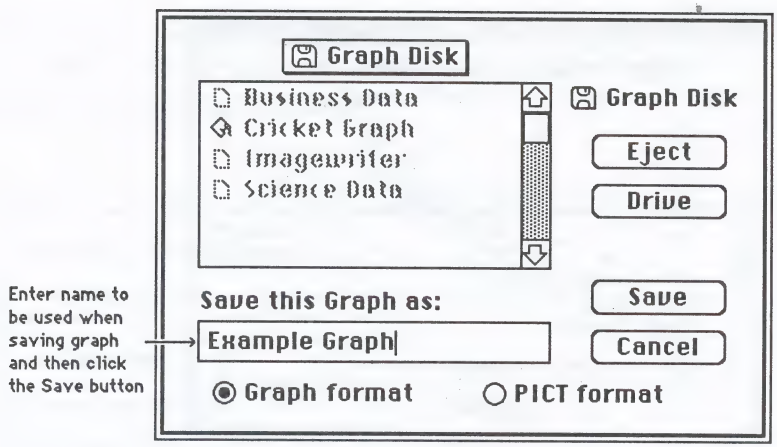
A dialog box with all the current axis parameters pre-set will appear. Go ahead and change the minimum to **-5**, the maximum to **25** and the increment to **10**. To change a value, drag over that value and enter a new value. After you have finished changing the values, click the **OK** button.



The graph is redrawn with the vertical axis conforming to the new parameters. Notice how all of the error bars are now visible.

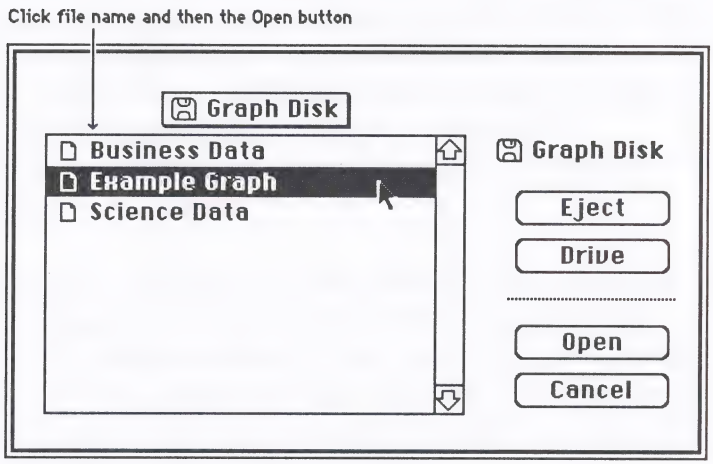


Suppose you were working on a graph and for some reason had to stop what you were doing and finish it later. With that graph in the active window, select the **Save Graph** command.



A dialog box will appear so that you can enter a name for the graph to be saved under. Enter the name "Example Graph". You have the option of saving a graph in Graph format or PICT format. Saving a file in Graph format allows you to recall that graph at a later time and continue to customize. Saving a graph in PICT format is a convenient way to create MacDraw™ files so that you can use MacDraw to further customize or modify the graph. Once modified in MacDraw, however, you will not be able to read that file into Cricket Graph. Go ahead and enter the name "Example Graph" and click **OK**.

To illustrate how you can later recall a saved graph, go ahead and close all the windows currently open. Now select **Open** from the **File** menu. Note that the name of the graph you just saved ("Example Graph") now appears in the selection box. Clicking this name and then clicking the **Open** button will now load that graph.



The previous examples have illustrated only a few of the Cricket Graph features. The rest of the Cricket Graph manual goes into each feature in detail.

Chapter 2
Entering and Editing Data

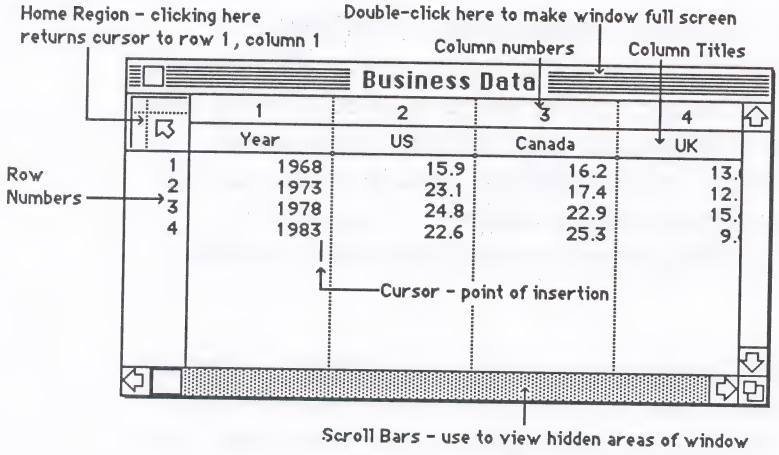
Graphs are simply visual representations of data. Therefore, it is only natural that you must be able to enter and edit data with ease. Data can be entered directly into Cricket Graph or imported from another Macintosh application. This chapter explains how to enter and edit data in Cricket Graph's data window. Appendix C explains how to import and export data between other applications.

Cricket Graph allows you to enter and edit data, whether numbers or characters, in a manner consistent with the Macintosh. The data window is a series of columns, each column having characteristics like MacWrite™. If you are familiar with MacWrite then you are already familiar with many of the editing operations possible.

In this manual we refer to the columns as variables. A variable is essentially a series of data. For instance, you may wish to plot one variable representing months along the X (horizontal) axis versus another variable representing sales volume along the Y (vertical) axis to create a column plot.

Basic Structure of the Data Window

The basic structure behind the data window is the column format where each column has editing characteristics like MacWrite (e.g. cut, copy and paste).



Data collected for a variable is entered down a column. The data window may contain up to 40 columns (variables) and approximately 2700 rows. The exact number of data items that can be entered is dependent on the available free memory.

Each variable can be assigned a name by entering the name in the box provided at the head of each column. This name is used in all graphs to identify the variable.

Scroll bars are present along the bottom and right edge of the data window. You can use these to scroll data into view that extends beyond the edge of the data window.

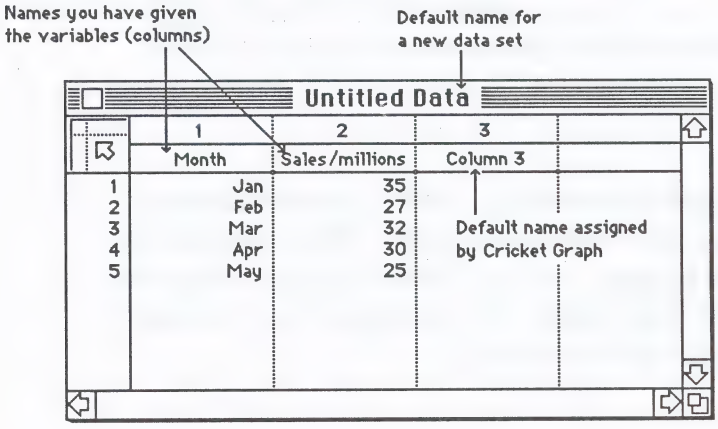
You will also note that across the top of the data window are column numbers, and running along the left edge are row numbers. Row numbers and column numbers are automatically assigned by the program. They will help you keep track of your location in a large data set when scrolling.

Clicking in the Home region in the upper left corner of the data window will always place row one, column one in the top left corner of the data window. This shortcut allows you to return to the first column very quickly no matter where you are in a large data set.

By double-clicking either in the Title Bar or Size Box, you can make the data window grow to full screen size. Double-clicking in this area again will make the screen return to its original size.

Text or Numeric

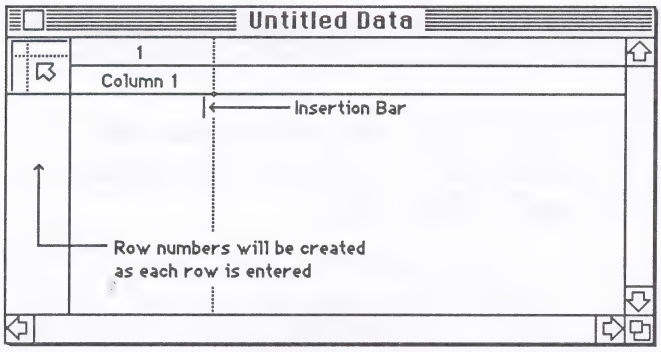
All operations in a Cricket Graph data window are the same whether the text entered is a number or a category name (for example, "Jan", "Feb", etc.).



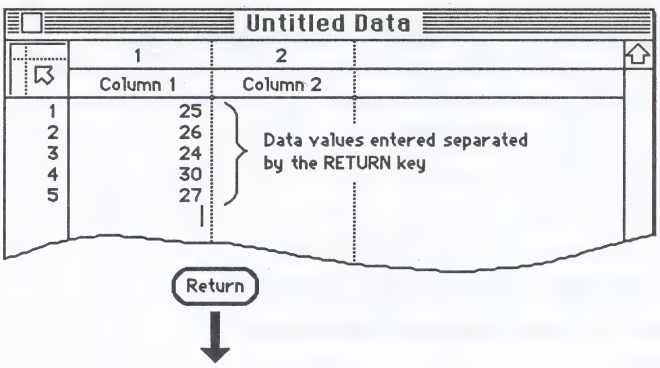
You can enter more characters for each value or label than you can see in a column. However, it is important to note that only the first fifteen characters are recognized by Cricket Graph.

Entering a Column of Data

When no data is present in the window, only one column and one row is labeled and marked. To enter data, click this column. A flashing vertical line called an ***insertion bar*** will appear at the top of the empty column. This insertion bar is your indication of where entry or editing will take place.



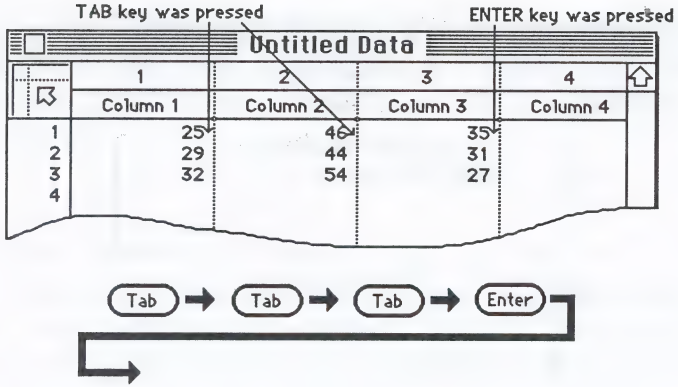
Go ahead and type a data value. After you are finished typing the value, press the **Return** key. The insertion bar will now appear on the next line in the column. Note that a second column is automatically created after you enter the first data value in the column.



At this point you may enter another data value. You can continue down the column in this same fashion until you have entered all the values for that variable.

Entering a Row of Data

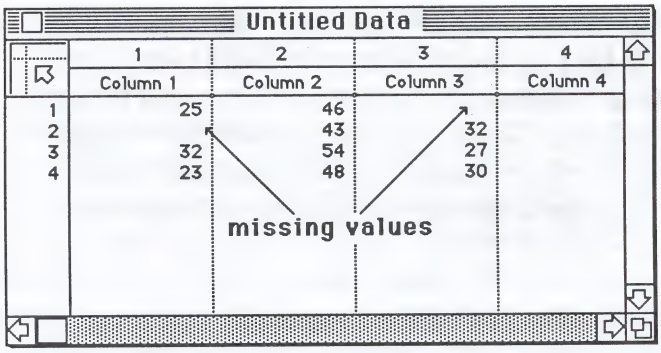
If after entering the first data value you press the **Tab** key instead of the **Return** key, another column is created and the insertion bar will jump to this new column. Using the **Tab** key after typing each data point is a way of entering several columns of data, a row at a time.



After entering all values for that row, press the **Enter** key to move the cursor to the next lower line, first column. You can now enter the next row of data. After you have entered the first row of data, you can use the **Enter** key after each data value instead of using the **Tab** key.

Entering Missing Values

Suppose, while entering data, you encounter a missing value (for example, the number of sales for a specific territory was recorded in 1975 and 1977 but in 1976 this number was never recorded). Simply press **Return** (or **Enter** or **Tab**, whichever is appropriate) to enter no value for that case. Cricket Graph will not plot a data pair when creating a graph if any one of the values in the pair is missing (two points, referred to as a data pair, are necessary for each point in a graph).



Editing Data

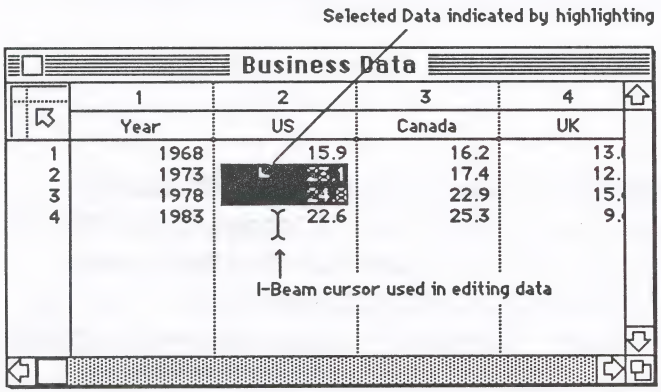
The same editing techniques used in MacWrite can be used in the data window. One way to correct an erroneous value is to click just after the value and then backspace over the data (by pressing the **Backspace** key). You can then retype the value. The newly typed value will replace the old value. You may also click at the location in a value where you wish to begin correcting. The flashing insertion bar will appear at that location and all further editing actions will occur there.

You can also drag over the data value to select it. The characters over which you drag will be highlighted, indicating that these characters are now selected. Any typing will now replace the selected area with whatever is typed.

A short cut method of selecting an entire value for editing is to double-click the value. Any typing will replace the entire selected area with whatever is typed.

Cutting, Copying and Pasting

Dragging over data values in a column selects and highlights those values. **Cut**, **Copy** and **Paste** affect the selected text. If **Cut** is chosen from the **Edit** menu, the selected values are removed from the column and placed on the Clipboard (the Clipboard is a temporary storage area used to hold text or pictures). All numbers in the column following the data that is cut will shift upwards.



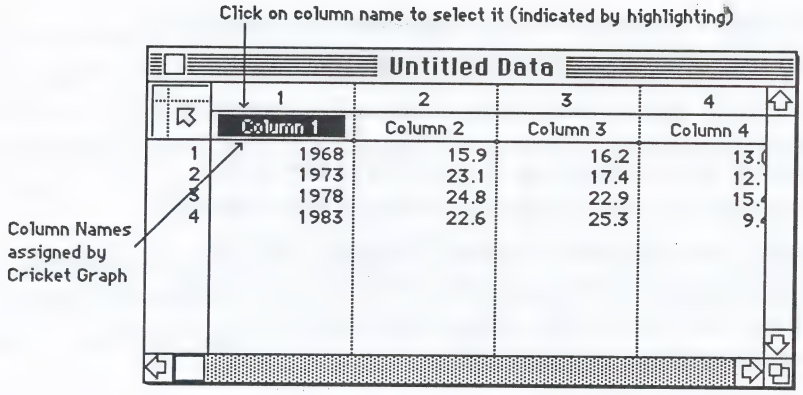
Copy works much the same way except that the text is not removed from the column when it is placed on the Clipboard.

If text is selected when **Paste** is chosen from the menu, the current contents of the Clipboard replace the selected text. If you wish to paste new data without replacing existing data, click at the location you wish to insert the new data. **Paste** will insert the data at the location indicated by the flashing insertion bar.

Once data values are on the Clipboard, they may be moved to another program or even to another data window.

Editing Variable Names

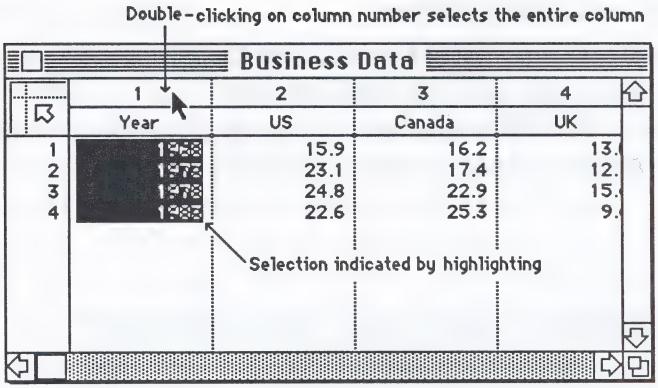
Each column represents a variable. You may name the column with a variable name that is meaningful to you. Variables for graphing are selected by their names. Columns are automatically named when created as "Column" followed by the column number. To change the column name, click the box containing the name. The entire name will become selected. Any typing will now replace this name.



You may, of course, wish to change only part of a name and not the entire name; clicking a second time in the column name box will place the insertion bar at the location where you clicked. Normal editing functions are now possible.

Selecting Columns or Multiple Columns

You may perform an editing operation (such as cut, paste or copy) on an entire data column at once. Double-clicking a column number selects the entire column.



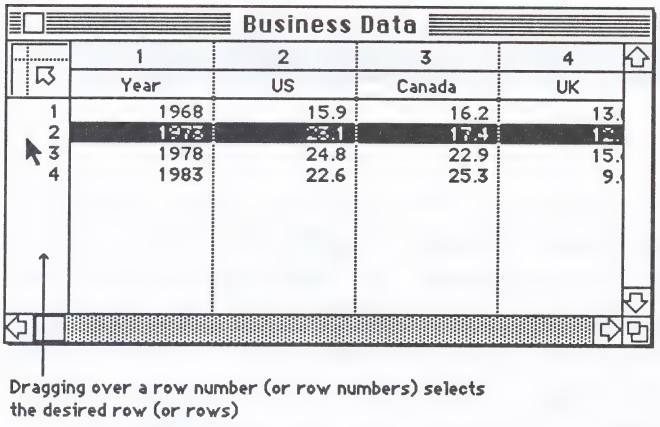
A number of contiguous columns may be selected by double-clicking in a column number, holding the **Shift** key and clicking in the column number of another column. All columns between the first and last column will become selected and highlighted. For instance, if you double-click the column number of Column 1 and then hold the shift key while you click the column number of Column 3, columns 1, 2 and 3 will become selected. Non-contiguous columns cannot be selected.

Deleting Entire Columns of Data

After selecting a column, pressing the **Backspace** key will delete the data from the selected column but the column will still exist. It will just be empty. If you wish to delete the entire column, including the column name, click in the column and then hold the **Shift** key while you click in the column number. Pressing the **Backspace** key will now delete the entire column. All columns to the right of this column will shift over to the left to fill the vacant spot.

Selecting Rows or Multiple Rows

An entire row may be selected by clicking the row number. You may also select contiguous rows by dragging over the desired row numbers or **Shift**-clicking in the row numbers to expand the selected area.

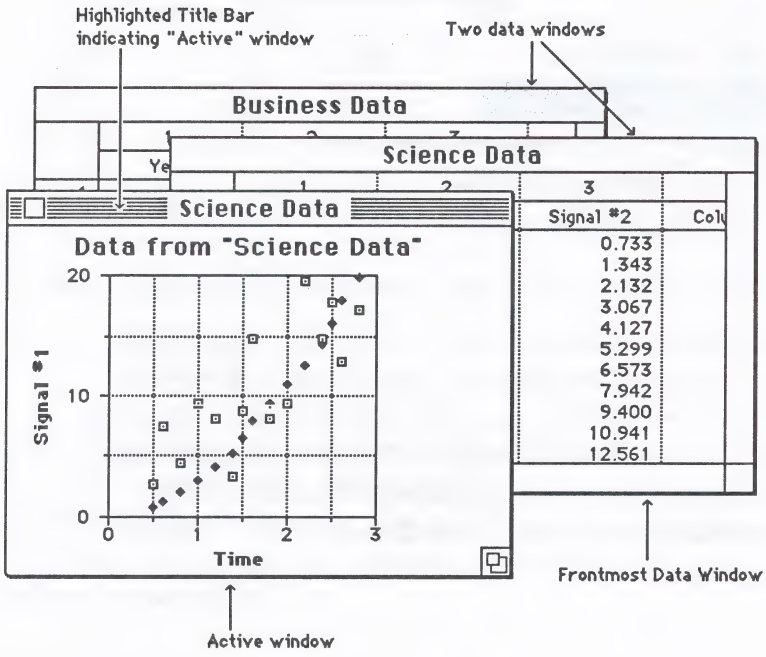


Deleting Rows of Data

After selecting one or more rows of data by dragging over the row numbers, you can delete the selected rows by pressing the **Backspace** key.

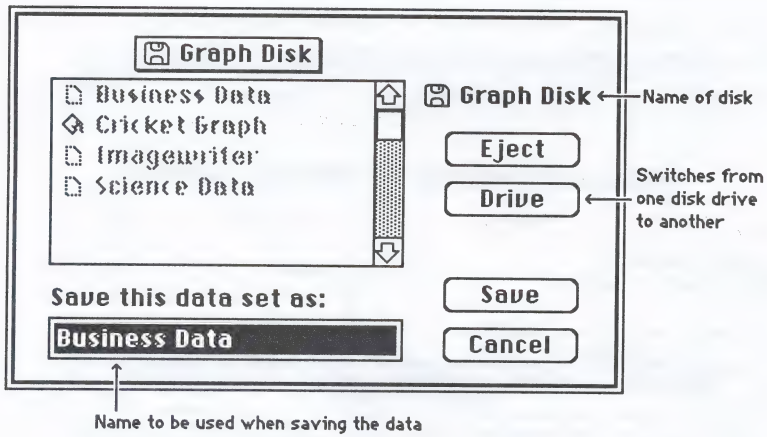
Multiple Data Windows

You may have more than one data window open at the same time. However, Cricket Graph creates all graphs from the data in the frontmost data window (The "frontmost data window" simply implies that no other data windows are forward relative to this window. This frontmost data window may or may not be the active window.). If the data set you wish to use in the plot is behind another data window, click on the desired data window and it will become the frontmost window.



Storing Data

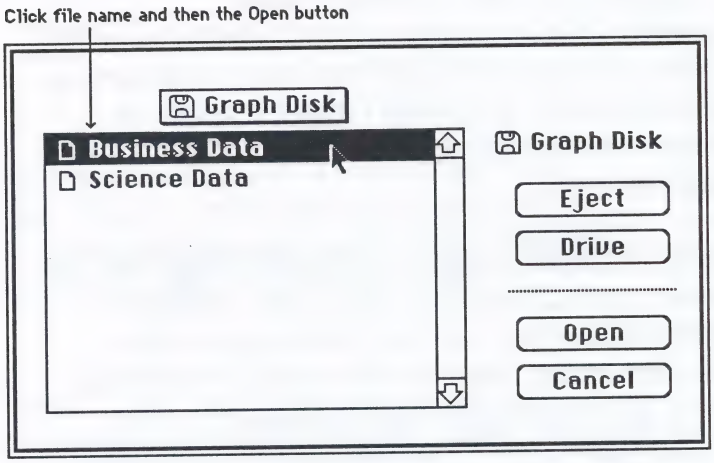
Make the data window the active window by clicking on it. Then choose the command **Save Data** or **Save Data As** from the **File** menu to save the data on disk.



If the **Save Data** command is used on data in an untitled data window, a dialog box like the one above will appear asking you to name the data set. Once named, the data set is stored with that name on the disk. If a data set with the same name already exists when you use the **Save Data** command, the data in the frontmost data window replaces the old version.

Recalling Data

Data may be recalled from disk by using the **Open** command from the **File** menu. A dialog box listing the data sets and saved graphs on the disk will appear, allowing you to select the data set you want to open. Click the name of the data set to select it.



The **Open** button confirms the selection. The **Eject** button can be used to swap disks and get a data set from a different disk. If you have an external disk drive or a hard disk, you may use the **Drive** button to switch from one disk volume to another.

Recalling data from disk causes a new data window, containing that data, to be opened.

If you wish to bring data into Cricket Graph, you may do so by one of several methods. Quite often, you may wish to transfer a small amount of data from another

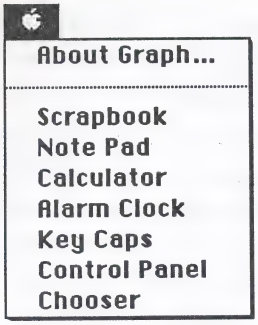
application, such as a statistical package, into Cricket Graph. Small amounts of data can easily be transferred via the Clipboard. Larger sets of data can be imported into Cricket Graph by first saving the data into TEXT files or SYLK files (SYLK is a format used by Microsoft in its Macintosh products).

Importing / Exporting with Cricket Graph

Data from Cricket Graph can also be transferred to another application either through the Clipboard or by first saving the data. All data saved by Cricket Graph is saved in TEXT file format and therefore can be read by many other Macintosh applications.

Most importantly, graphs created by Cricket Graph can be exported to other applications by one of two methods. The most common method is to copy the graph to the Clipboard and then paste into the other application (such as MacWrite™, Microsoft Word or MacPaint™). For programs such as MacDraw™ or MacDraft™, saving the graph as a PICT file will be most beneficial.

Appendix C explains in detail the ways you can import and export data and graphs between Cricket Graph and other applications. Several examples are also illustrated in that appendix. It is highly recommended that you read it.



Chapter 3
The Apple Menu

The **Apple** menu is standard in most Macintosh applications. On this menu you have access to information about the program and any of the desk accessories that are installed in the System file.

About Graph...

The **About Graph** command displays information on the program such as version number and publisher. The names of the program authors are also listed. If you need to contact the publisher, you will find the address in this window. Click anywhere to close this box.

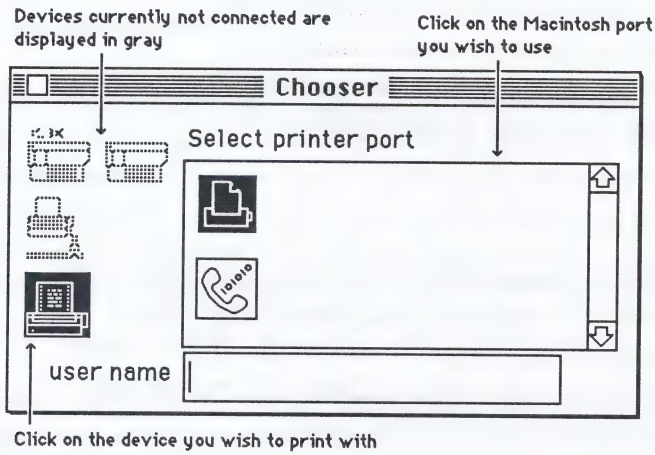
Desk Accessories

Choosing any of the desk accessories opens the accessory so you can use it. You can use **Cut, Paste** and **Copy** on the **Edit** menu to transfer information from many of the desk accessories to your data window. A desk accessory may be closed with its close box or with the **Close** option on the **File** menu.

You can install desk accessories of your choice using Apple's Font/Desk Accessory Mover (your local Apple dealer should have details). Therefore, the kinds of desk accessories that are available can vary from System file to System file. The System file included with the Cricket Graph package includes several accessories that are worth special mention.

Chooser

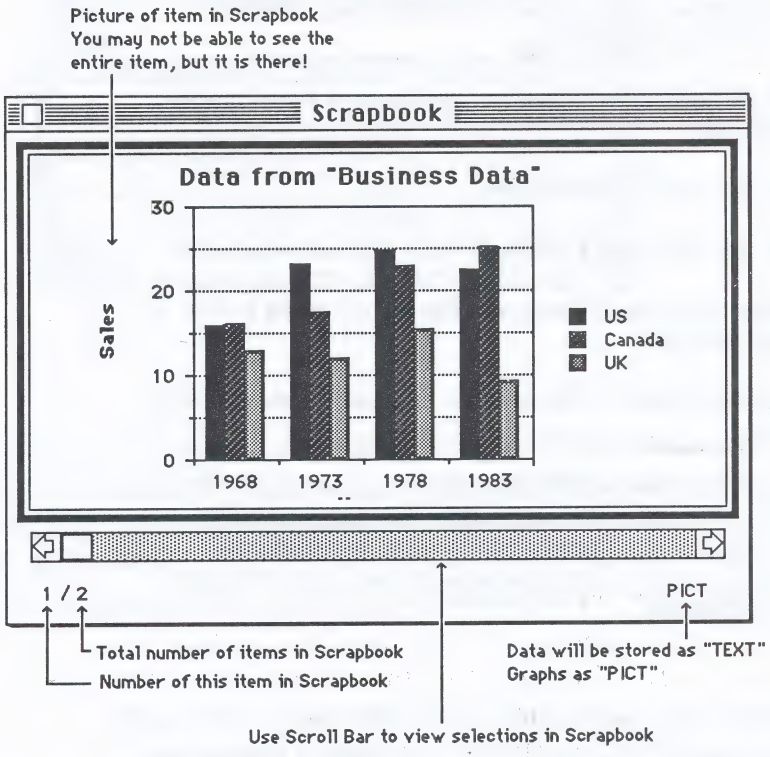
The **Chooser** desk accessory allows you to send all print requests to either a LaserWriter or ImageWriter.



To print using a LaserWriter, the printer must be connected to your computer using AppleTalk (Apple's networking scheme). Your local Apple dealer should be able to give you specifics about this network. The LaserWriter must be connected to the printer port (labeled with an Icon of a printer). The connection can be made at either serial port on the back of your Macintosh if you wish to print on the ImageWriter. Click on the icon of the port you will be using.

Scrapbook

One especially useful desk accessory with which you will (or should) become familiar is the **Scrapbook**. The Scrapbook is an area where you can store graphic images or data. Essentially, it is like the Clipboard for transferring items between applications with the exception that the Scrapbook can hold multiple items while the Clipboard can hold only one item at a time.



If you wish to transfer two graphs from Cricket Graph over to another application, for instance, you would do the following...

(1) Choose the Scrapbook desk accessory from the **Apple** menu. Move the open Scrapbook off to one side of your screen.

(2) Click on the first graph that you wish to copy to make it the active window

(3) Select **Copy** from the **Edit** menu

(4) Click on the Scrapbook to make it the active window

(5) Select the **Paste** command from the **Edit** menu. The first graph is now in the scrapbook.

(6) Click on the second graph that you wish to copy to make it the active window.

(7) Select **Copy** from the **Edit** menu.

(8) Click on the Scrapbook window to make it the active window.

(9) Select **Paste** from the **Edit** menu. The second graph is now in the Scrapbook also.

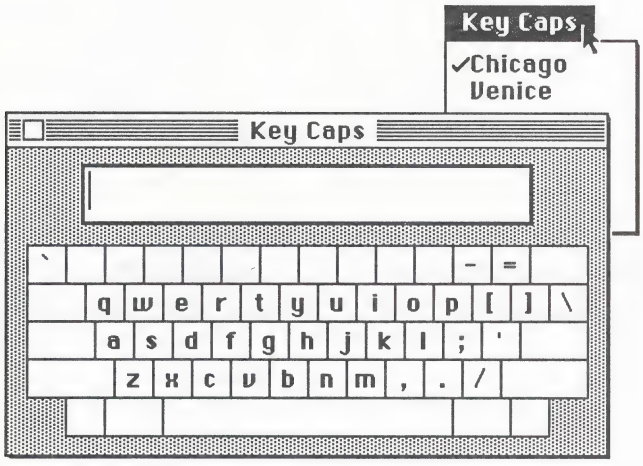
(10) Leave Cricket Graph by choosing the **Quit** command from the **File** menu.

(11) Both graphs are now in the Scrapbook. Start the other application. You can paste the graphs into this application (if this application can handle MacDraw type pictures) by reversing the sequence of steps that you used to get the graphs into the Scrapbook.

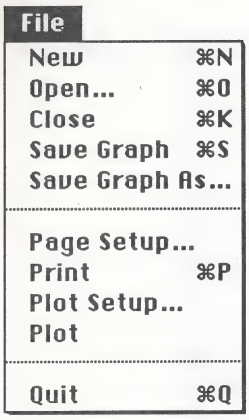
Multiple graphs can be transferred in this way. You may find this very useful if you wish to include a number of graphs in a report that you are writing with MacWrite or Microsoft Word.

Keycaps

The Keycaps desk accessory is useful for viewing the correspondence of keys on the Macintosh keyboard to characters in a selected font. This is very useful when you want to enter mathematical symbols or Greek characters which are available in many of the Macintosh fonts.



Notice that when you choose this desk accessory, a menu selection is added at the top of the screen. This menu is labeled Keycaps and allows you to select a font. By selecting the desired font, you can then view exactly what key is to be pressed to create a certain character out of that font.



Chapter 4
The File Menu

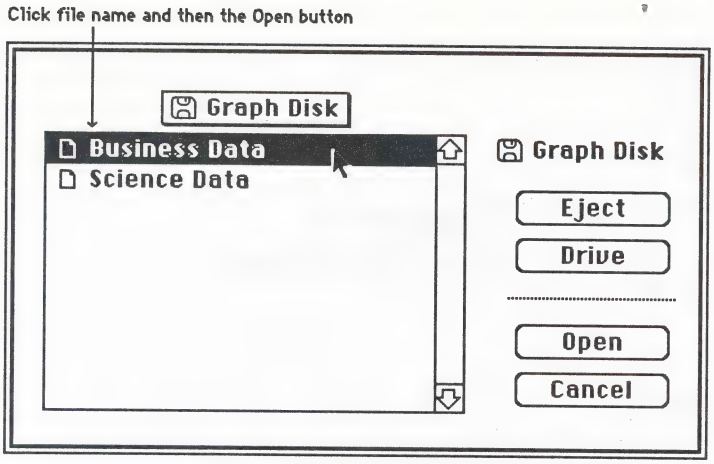
The **File** menu includes the commands that let you open data sets, save data sets on disk, open or save a graph, send your results to an output device, and quit the program.

New

The **New** command opens a new, untitled data window. Cricket Graph allows you to have more than one data set open at the same time. You can create a new data window even if you already have a data set on the desktop. You are restricted only by the amount of memory available in your machine.

Open...

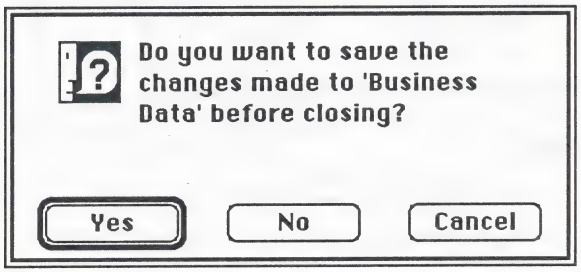
The **Open** command opens an existing data set or graph on the disk. You can open a data set even though you may already have another data set open.



A dialog box listing the data sets and graphs on the disk will appear, allowing you to select the file you want to open. To confirm the selection, you may click the **Open** button or double-click the selected file's name. The **Eject** button can be used to swap disks and get a data set from a different disk. If you have an external disk drive or a hard disk, you may use the **Drive** button to switch from one disk volume to another.

Close

The **Close** command closes the currently active window.



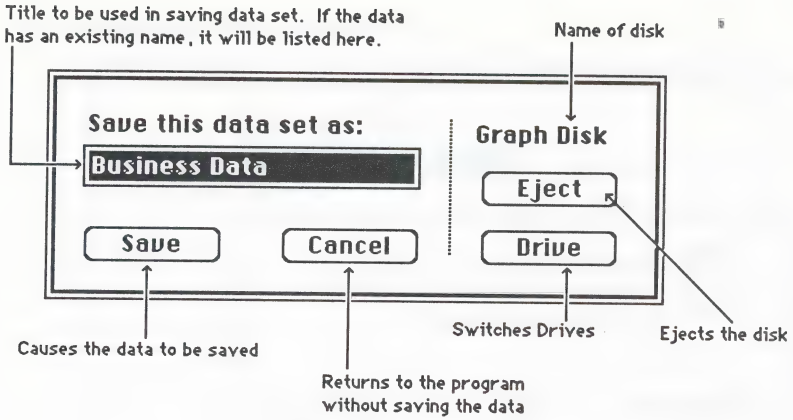
If you close a data window in which changes have been made to the data, a dialog box will ask you if you wish to save the changes. You may choose either to save the changes, cancel the operation, or discard the changes.

Choosing **Close** has the same effect as clicking in the close box of the active window.

Save Data / Save Graph

The **Save** command works in one of two ways depending on whether the active window is a data window or a graph window.

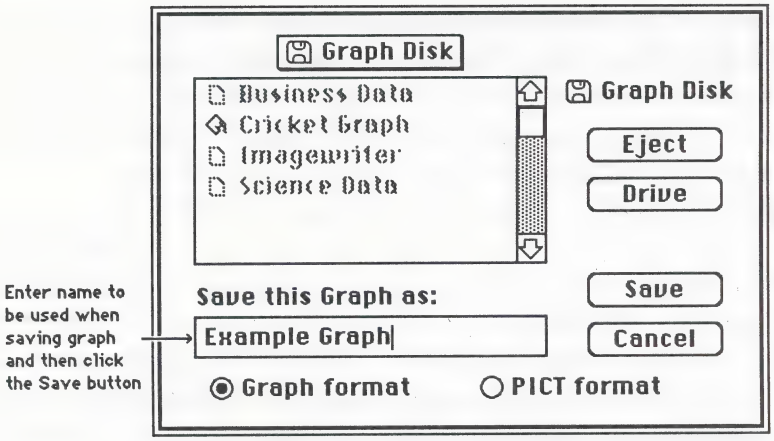
If the active window is a data window, use this command when you want to update the data set on disk after making changes to it.



If the **Save Data** command is used on data in an untitled data window, a dialog box will appear asking you to name the data set.

Icon for saved data

Once named, the data set is stored with that name on the disk. If a data set with the same name already exists when you use the **Save Data** command, the data in the active data window replaces the old version.



If the active window is a graph, you will be able to save the graph to a disk file by using the **Save Graph** command. A dialog box (like the one above) will appear and you can give the graph a name. You can select one of two file formats in which to save the graph, Graph format or PICT format.

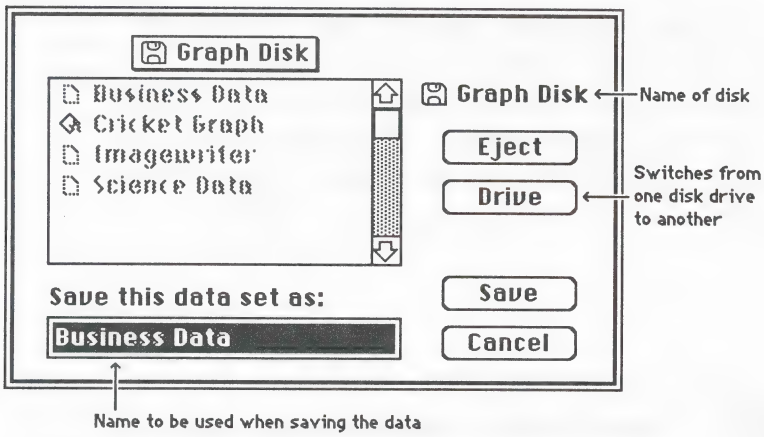
Icon for graph saved in Graph format

Icon for graph saved in PICT format

If you select Graph format, the graph can be reloaded into Cricket Graph at a later date and you can then continue to modify it. The PICT format saves the graph in a format that programs like MacDraw can read. Therefore, if you save a graph in PICT format, you will be able to open this file from within MacDraw. Appendix D illustrates how to do that.

Save Data As... / Save Graph As...

The **Save As** command is used to save a data set or graph on disk under a new name or on a different disk.



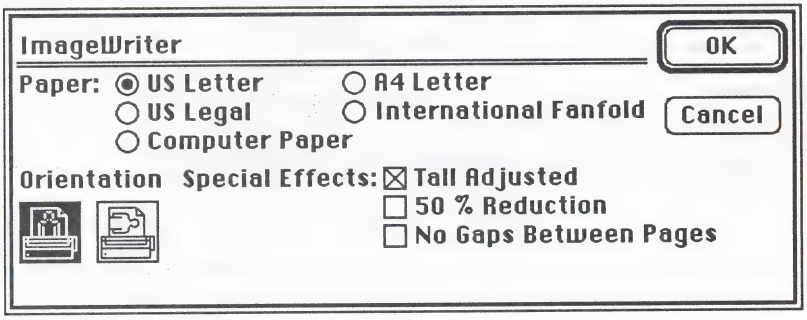
If the active window is a data window, a dialog box will appear asking you to name the data set. If you wish to save the data set on another disk, you may use the **Eject** button to swap a disk for the one currently in the drive. If you have an external disk drive or a hard disk, you may also use the **Drive** button to direct the file to the hard disk or the external drive.

If the active window is a graph window, you will be asked to name the graph and you can select Graph format or PICT format. You can switch drives and eject disks just as you do when you save data.

Page Setup...

The **Page Setup** command lets you specify the size of the paper on which you will be printing information and how it will be printed. The dialog box that you will see depends upon which printer is currently selected. The following example assumes the currently selected printer is an ImageWriter.

You can use the **Orientation** selection in **Page Setup** to rotate the page so that printing occurs across the widest part of the page.

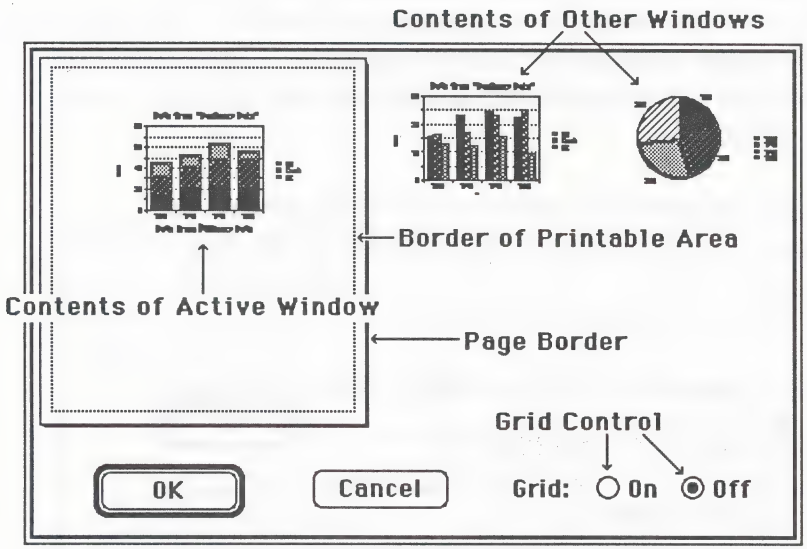


Select **Tall Adjusted** in this dialog box to print graphs to a true scale (so circles will be printed as circles instead of as ovals).

Page Setup is dimmed if there are no windows currently on the desktop or if there is no printer resource on your disk.

Print

The **Print** command produces a printed copy of the currently active window using the settings specified in **Page Setup**. If the active window contains a graph, you will be presented with a miniature page layout form.

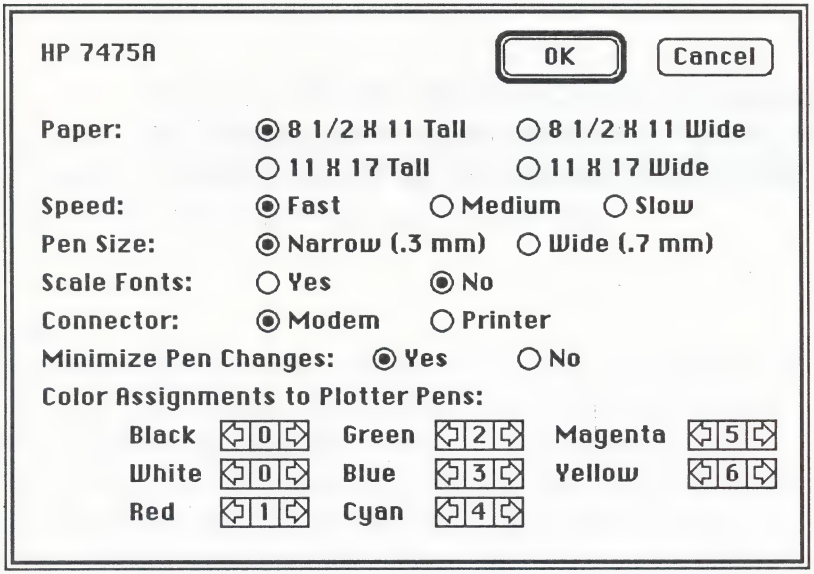


The outline of the page on the left side of the window reflects the current settings of **Page Setup,** such as size of paper and orientation. Images of all graphs in open windows will appear in this window. You can resize or reposition one or more of these graphs on the page (further details can be found in Chapter 13: Getting It On Paper).

If the active window was a data window, the data set will be printed. If necessary, the printing of the data set will occur over several pages.

Plot Setup...

After choosing the **Plot Setup** command, you will need to set the options as desired in the plot dialog.



This dialog is specific for the type of plotter that you will be using and allows you to set pen colors as well as other operating characteristics (details are not explained here, refer to Appendix F: Using Color Plotters).

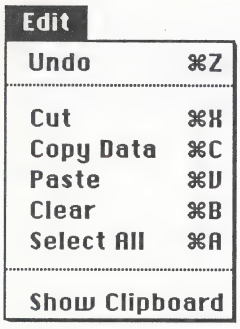
Plot

The **Plot** command sends your graph to a color plotter connected to one of the serial ports on the back of your computer. As with the **Print** command, you will be presented with a page layout window.

The page layout for the plotter works exactly as described under the **Print** command. Details on selecting colors and other options can be found in Appendix F, which discusses plotters and their use.

Quit

The **Quit** command exits Cricket Graph and returns to the Finder. If any changes were made to the data, you will be asked if you wish to save the changes before returning to the Finder.



Chapter 5
The Edit Menu

The **Edit** menu contains the standard Macintosh editing commands. It also contains an option that allows you to show or hide the Clipboard and its contents.

Undo

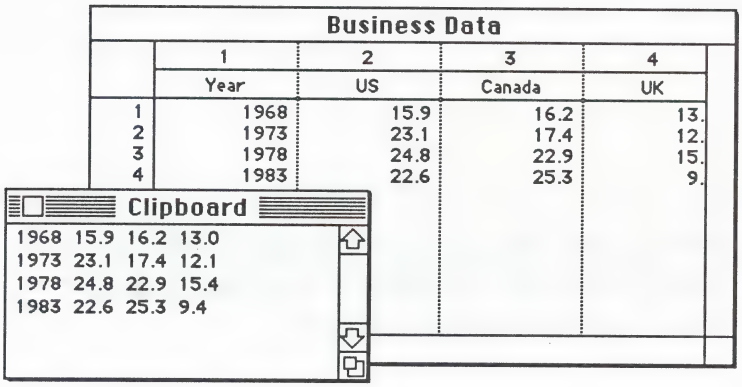
The **Undo** command is used by some desk accessories to undo your last action. In Cricket Graph, **Undo** serves a slightly different purpose as well. If the active window contains a graph with several data sets on the graph, each time you select the command **Undo**, the last data set drawn will be removed from the graph. You can **Undo** all overlaid graphs in the reverse order from the order in which they were added to the graph. You can **Undo** only up to the last remaining data set on the graph.

Cut

The **Cut** command removes selected text from the data window and places it on the Clipboard, replacing the previous contents of the Clipboard. The text on the Clipboard can be pasted back into a Cricket Graph data window or the Scrapbook, or even another application.

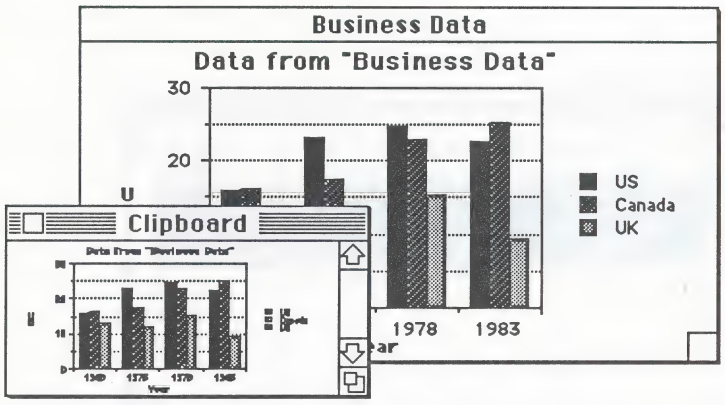
Copy Data / Copy Picture

The **Copy Data** command copies selected data in a data window to the Clipboard. The previous contents of the Clipboard are replaced.



The **Copy** command differs from the **Cut** command in that it does not remove the item it has copied from the front window.

If the front window contains a graph, this command reads **Copy Picture** on the menu. Selecting **Copy Picture** copies a picture of the entire graph to the Clipboard.



Paste

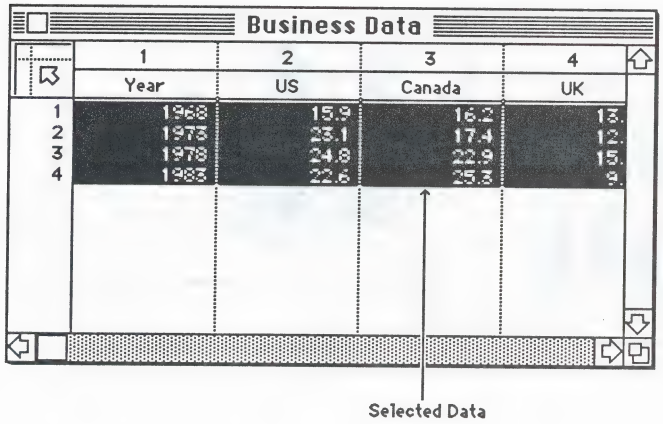
The **Paste** command replaces the current selection (usually the insertion point) in a data window with the current contents of the Clipboard. If the Clipboard contains graphic images instead of text, the **Paste** command is dimmed and inactive.

Clear

The **Clear** command removes the selected text from the data window. **Clear** also removes an optional item from a graph if the item is selected. Once **Clear** has been used on a selection, you cannot recover that selection.

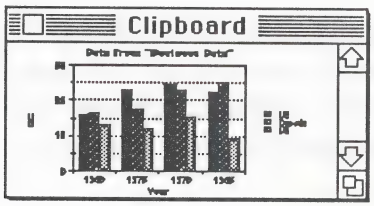
Select All

The **Select All** command selects all of the data in the active data window. This may be useful if you wish to move the entire contents of the data window to the Clipboard.

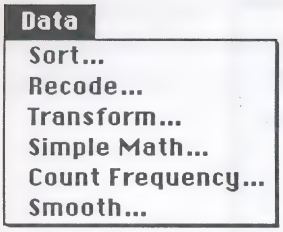


Show Clipboard / Hide Clipboard

Use the **Show Clipboard** command to display the current contents of the Clipboard. If the Clipboard is already visible, this command changes to **Hide Clipboard**.



The Clipboard is a temporary storage area for pictures, graphs and text. Anytime you use the commands **Copy** or **Cut** from the **Edit** menu, the items selected at the time are moved to the Clipboard. The most common form of importing and exporting data is by way of the Clipboard.

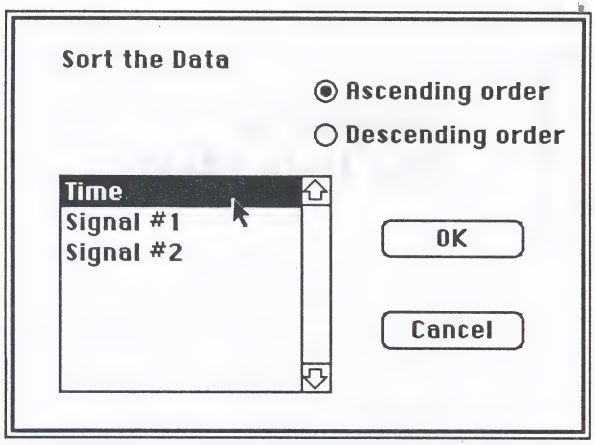


Chapter 6
The Data Menu

The **Data** menu provides commands to manipulate your data. You can sort, recode, or transform data. You can also get a frequency count of the number of times each category or number occurs. All **Data** menu commands apply to the frontmost (not necessarily active) data window. If there are no data windows on the desktop, this menu is inactive (indicated by the gray appearance).

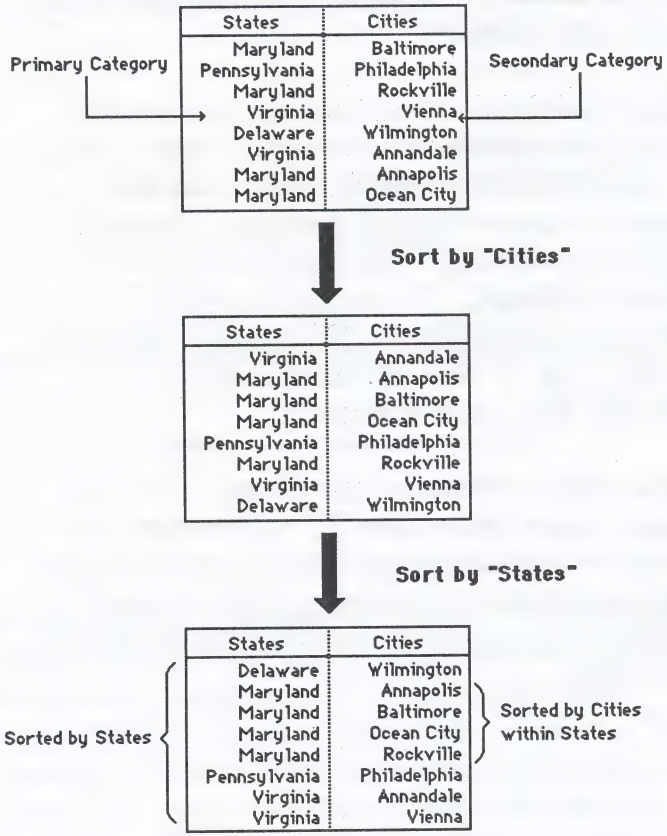
Sort...

Cricket Graph allows you to sort the rows in an entire data set according to the order of a particular column. Sorts may be done in ascending or descending order. All values in the same row as the element being sorted are moved along with that element. You can sort alphabetic as well as numeric data. Alphabetic sorts use normal alphabetic ASCII order (full details on sorting order can be found in Appendix B: Technical Details).



Simply choose the variable on which to sort and your choice of ascending or descending order. The sorting algorithm keeps tied values in their original order during ascending sorts, and reverses the order of tied values during descending sorts. Tied values are values that are equivalent to each other (the values may be numbers or alphabetic characters). Preserving the order of tied values allows you to order the data by several variables.

For example, to order a data set by cities within states you would sort first on the secondary category (cities) and then on the primary category (states).

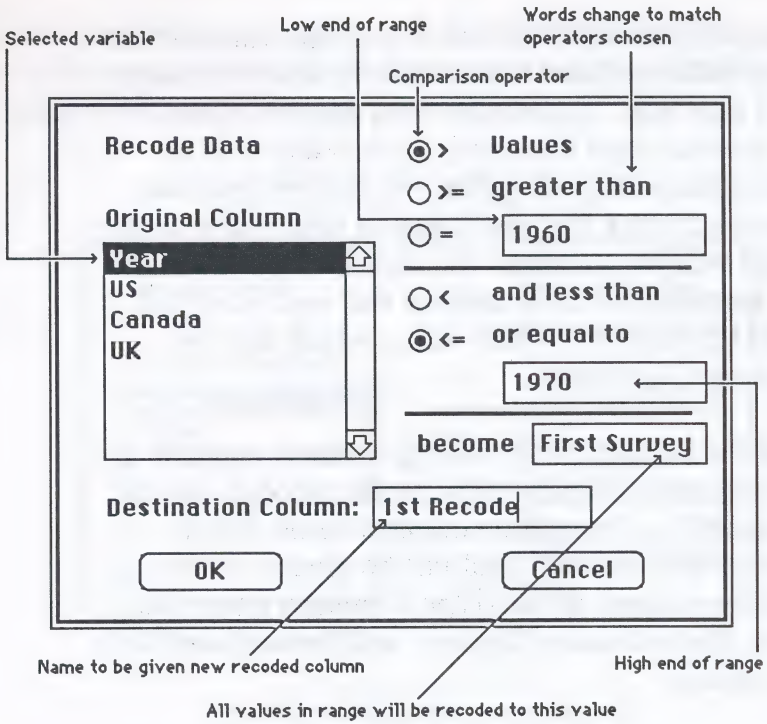


Recode...

You may use **Recode** to change one variable so that any cases with a value in a specified range are recoded into a single code. You are given great flexibility because the beginning and ending of a specified range may be either numeric or alphabetic. The specified recoded value (the value to replace all values in the designated range) may also be numeric or alphabetic.

If the minimum or maximum is alphabetic, the rules that apply to a sort (explained above) are used for making the comparisons. However, for recoding, lower case and upper case characters are viewed as the same. If one of the items specified in the range is alphabetic, they will both be treated as alphabetic. For example, if the minimum of the range is entered as "2" and the maximum is entered as "Red", the "2" will be treated as the alphabetic character and not as a number.

The order of alphabetic characters goes from "A" to "Z" with "A" having a lower value than "Z". Characters for numeric digits and most common punctuation marks have lower order than alphabetic characters (a list of the order used in deciding recode ranges can be found in Appendix B: Technical Details).

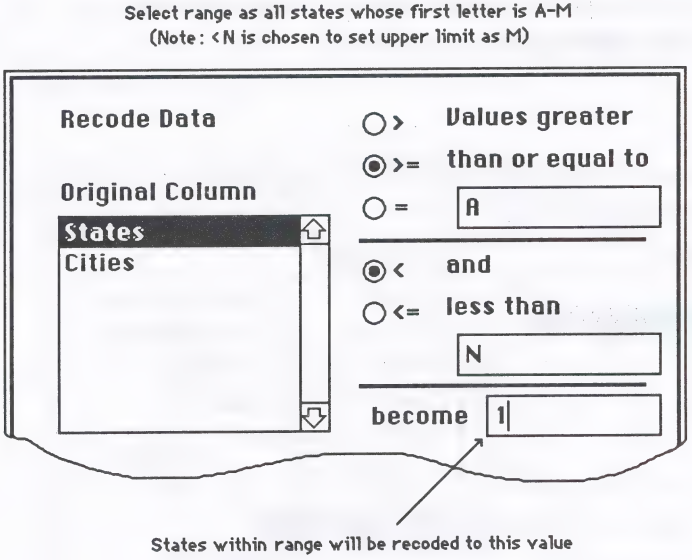


First select the variable you wish to recode. On the right hand side of the dialog box you will see three text boxes with mathematical comparison symbols beside them. Decide what interval of the data you wish to recode. The smallest number or label in the interval should be entered in the first text box. You must then decide whether the recode should occur if a data value is greater than, greater than or equal to, or equal to this minimum value of the interval. Select the comparison you desire.

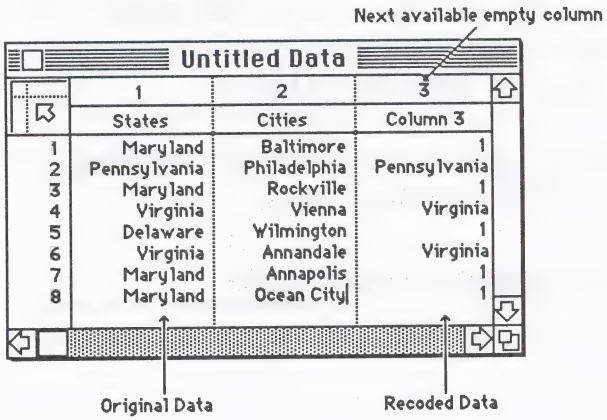
If you are recoding a range instead of a single value, enter the maximum value or label of the interval to be recoded in the second text box. Again you must decide which comparison is to be used for recoding data that is at or below the maximum interval value. Finally, in the third text box you must enter the new value to which data in the selected range will be recoded. All data falling within the interval and meeting the comparisons that you have just specified will be changed to this value, which may be either numeric or alphabetic.

A text box at the bottom of the dialog window requests the name of the column in which to place the recoded results. Unless you specify a destination column name that is already present, the recoded data will be placed in the next available empty column. If you type a column name that already exists, that column's contents will be replaced with the recoded values.

For example, if you wish to recode all states whose first letter is between A through M then you would answer the following dialog as indicated.

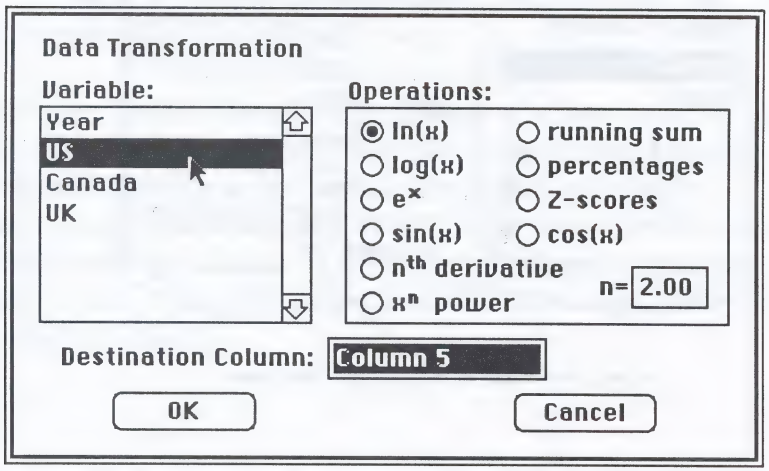


The recoded data will appear as follows...



Transform...

The **Transform** command allows you to perform a mathematical transformation on a column of your data and create a new column of data. The great flexibility in transformations provided can be very handy in both science and business applications.



Select the name of the variable to be transformed. You may then choose which of the listed transformations to perform by clicking the appropriate button.

The **ln(x)** transform computes the natural logarithm and **log(x)** computes the base 10 logarithm.

The e^x transform computes exponentials.

Sin(x) and **cos(x)** compute sines and cosines respectively. Both the sine and cosine transforms expect initial values expressed in radians. To convert degrees to radians you must first multiply all values by 3.14 (the value of "pi") and then divide by 180. You can accomplish the multiplication and division using **Simple Math** from the **Data** menu.

Running sum simply adds up all values from the beginning of the column to that point and uses the accumulated sum as a replacement for the actual value.

Values	Running Sum
3	3
5	8
7	15
4	19
6	25

Percentages are calculated using the sum of all values in the column as the denominator.

Values	Percentages
3	12
5	20
7	28
4	16
6	24

$$\frac{\text{Value}}{\text{Sum of Values}}$$

Z-scores are the number of standard deviation units each value is from the mean of the data. The mean and standard deviation of the data are calculated and the Z-score for each value (we'll call the value "x") is computed as follows...

$$Z = \frac{X - \text{Mean}}{\text{Standard Deviation}}$$

For instance, the Z-transform of a data value is 1.8, that means the value is 1.8 standard deviation units away from the mean.

If you click either the **n^{th} derivative** or the **x^n** transform, the text box to the right of these selections will become active and you may enter the value of n.

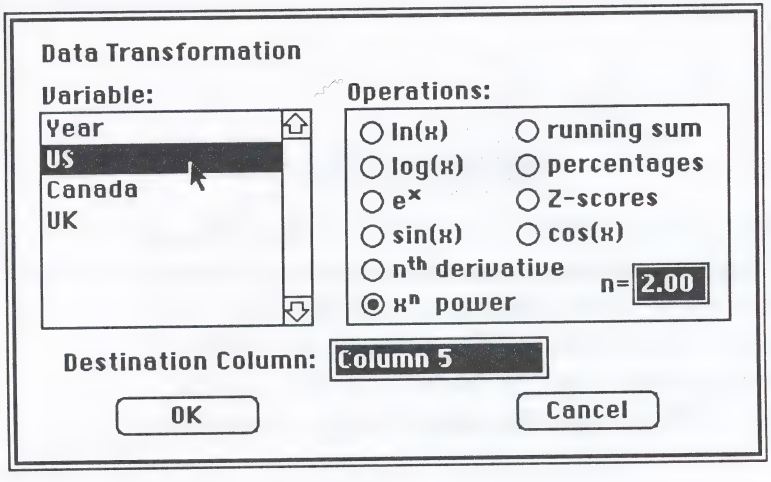
Values	First Derivative (X')	Second Derivative (X'')
3	–	–
5	2	–
7	2	0
4	-3	-5
6	2	5

Note that for each order derivative, you lose a value at the beginning of the series

$$X'_i = X_i - X_{i-1}$$
$$X''_i = X'_i - X'_{i-1}$$

A first order derivative is the slope at that point and is computed by finding the difference between each adjacent value. Second order derivatives are computed using the

difference between the first derivative values (in other words, the differences between differences). Each higher order derivative is computed in the same manner.



The x^n transform can be very valuable because of the wide range of transforms that can be obtained using this option. Values of this power do not have to be integers and may be either positive or negative.

In fact you can obtain roots or inverses with the x^n selection. For instance, suppose you wish to transform a data set to obtain the square roots of the data. The square root of x is equivalent to x raised to the 1/2 power. You would simply enter 0.5 to obtain this result.

$$\text{Square Root of X} = X^{1/2} = X^{0.5}$$

$$\text{Cube Root of X} = X^{1/3} = X^{0.33}$$

You may also obtain the inverse of the data, in other words, 1 divided by the data value. The inverse of a value, 1/x, is equivalent to x^{-1}. Therefore, you may obtain such a transformation by selecting $\mathbf{x^n}$ and entering -1 in the associated text box.

$$1 / X = X^{-1}$$

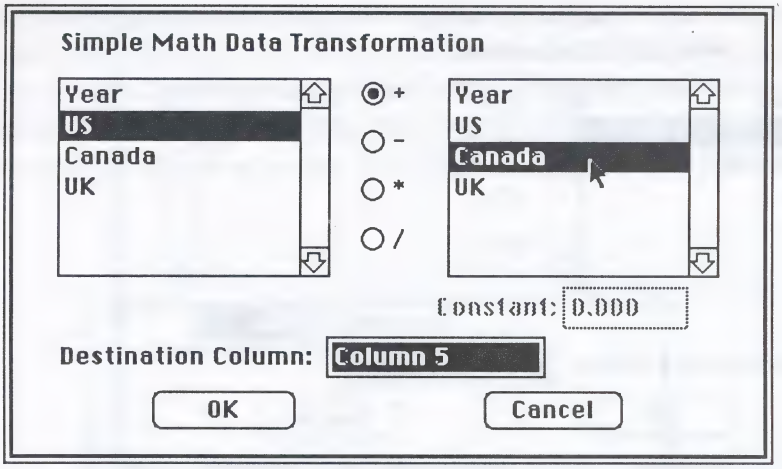
$$1 / X^2 = X^{-2}$$

After you select which column is to be transformed and which type of transformation to perform, the column containing the transformed data will automatically be placed in the next available empty column in the data window unless you specify the name of a column that already exists. In that case, the results will replace that column.

Simple Math...

With **Simple Math** you may add, subtract, multiply or divide one column by another column or a constant. This option is very handy if you have data with extremely large or small values. For example, suppose the data you are about to graph contains numbers ranging around 10,000,000. With numbers this big, the axis labels on the graph would look a little messy.

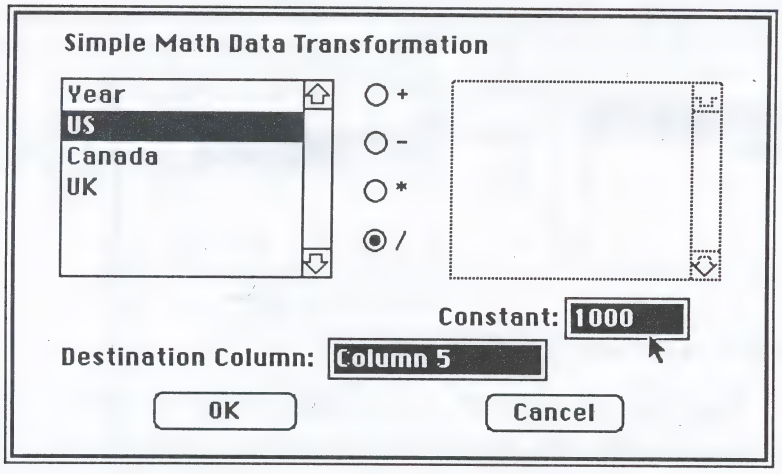
Scaling the data by dividing all values by 1,000,000 will make this graph look neater. You would then change the axis label to say that the values graphed are in units of one million.



Select the variables to be used in the mathematical operation. The order of selection is important in subtraction and division. The variable selected in the lefthand box will always be operated on by the variable in the righthand box.

For instance, if you choose subtraction, the variable in the righthand box will be subtracted from the variable in the lefthand box. The order of selecting variables for the mathematical operations is from left to right, just as you would write them on paper.

If you want to perform the same calculation with several variables, you can select more than one variable in the righthand box. If you chose both Canada and UK in the righthand box with the "+" operator selected, for example, the transformed result would be US+Canada+UK. If you chose the minus sign, the result would be US-Canada-UK.



By clicking the Constant text box, you indicate to Cricket Graph that you wish to use a constant value rather than another column.

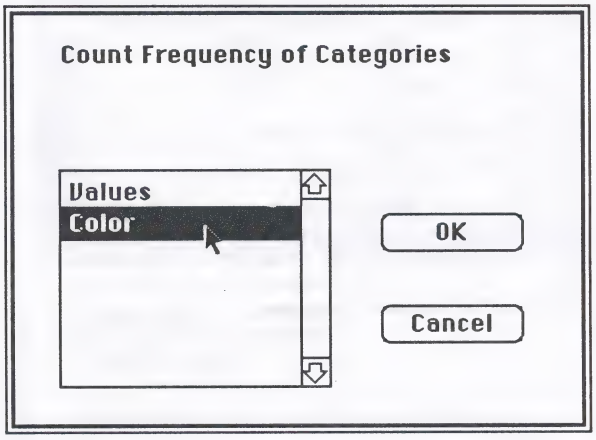
The righthand variable selection box will become gray and inactive and the Constant text box will darken and become active. Simply enter the constant that you wish to use. The order of operation is the same as above. The constant is a replacement for the variable that would normally be chosen in the righthand selection box.

The mathematical results will be placed in the next available (empty) column in the data window unless you specify the name of a column that already exists. In that case, the results will replace that column.

To get the average of four variables you could first perform one operation that adds the four of them together, and then perform a second operation to divide the sum by the constant 4.

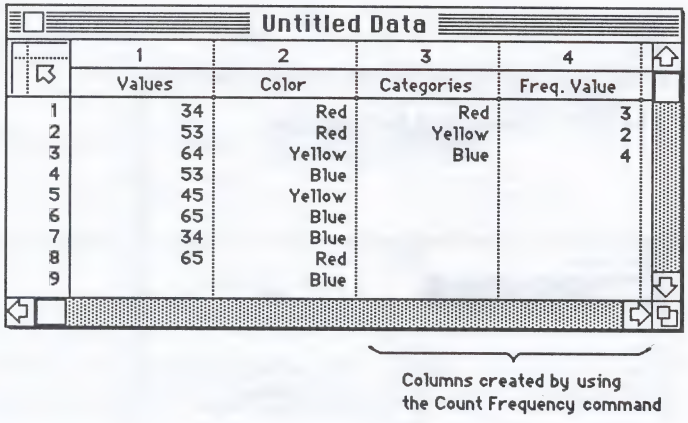
Count Frequency...

You can count the number of occurrences of a value or a category in a column by using the **Count Frequency** command. This is useful when you want to put raw data in a form from which you can draw bar or column graphs.



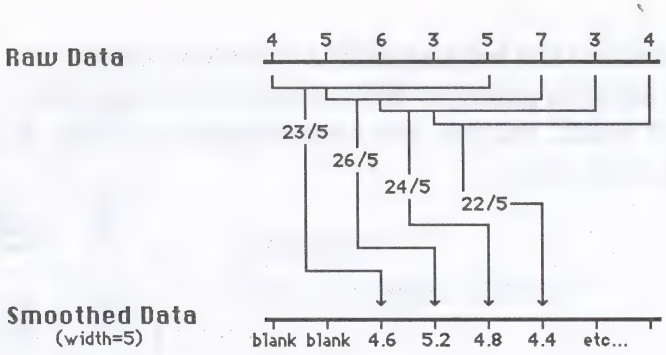
Select the column that contains the values of interest. The next two available columns (empty columns) in the data window will be used to store the results.

Cricket Graph creates one column with the unique names of the values or categories and a corresponding column containing the frequency of occurrences for each.

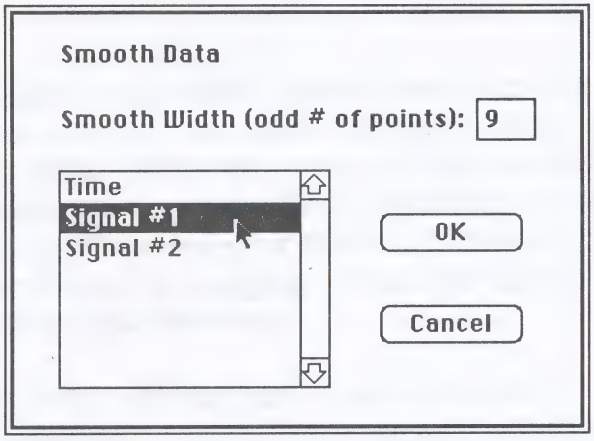


Smooth...

With the **Smooth** command, you can take very irregular data and average it out so as to make a graph of the data appear much smoother. The technique used here is a sliding or running average smooth.

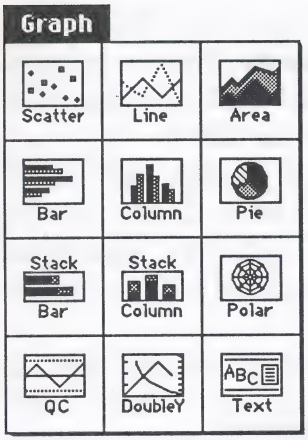


That means that if you performed a smooth with a smooth width of 5, for each group of 5 values, the 3rd value in the group will be replaced by the average of those 5 values.



To perform a smooth, it is only necessary to select the column containing the data and the smooth width. Smooth widths should be odd values. If you enter an even value, the next higher odd value will be used instead.

Results are stored in the next available (empty) column. An automatic name is given to that column indicating the chosen smooth width, but you are encouraged to change it to a name that suits you.



Chapter 7
The Graph Menu

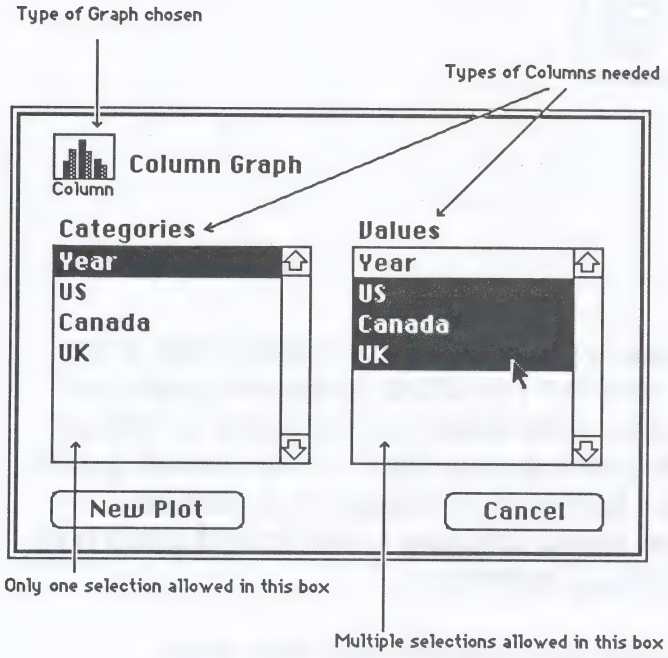
The **Graph** menu is probably the most used menu in the program. It is here that you select the type of graph that you wish to create. This menu contains icons, as well as names, to allow you to get the "feel" of the types of graphs you can choose. Selecting your graph is as easy as clicking over the menu, dragging to the desired graph type and letting the mouse button go.

There are twelve available graph types with many variations available for each. Some suggestions and hints for each kind of graph are discussed in this chapter. It is also advisable to refer to Appendix A for suggestions to keep in mind when creating graphs for presentations.

Examples for each kind of graph are also presented. The examples have been "enhanced" using facilities that are readily available in Cricket Graph (see Chapters 8 and 10). These illustrations serve as an example of how you can customize your own graphs.

Selecting Variables

After selecting a type of graph from the **Graph** menu, you will be presented with a dialog box requesting the variables to graph. You may choose one variable for the x or categorical axis and one or more variables for the y or value axis.



If you wish to have several sets of values overlaid with one another on the same graph, you may drag through the desired variables in the right hand scroll box (except for pie graphs). The variables you select do not have to be next to one another going down the column. You can drag through several variables, skip a couple of variables,

and then drag through some more variables. Clicking a selected variable (indicated by being highlighted in black) will toggle off that variable selection.

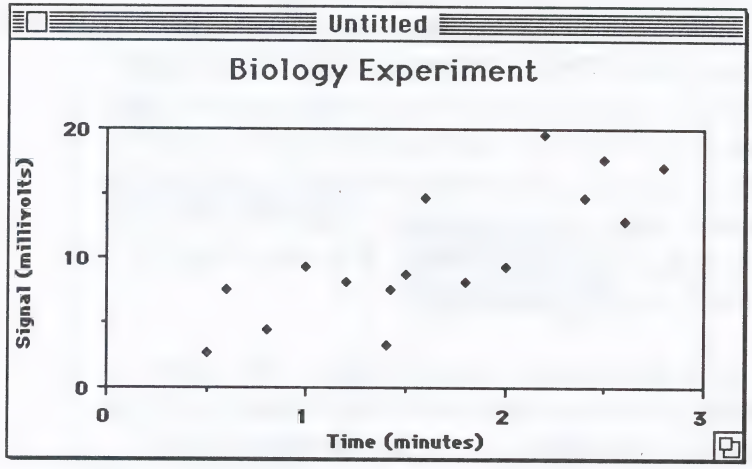
Remember though, if you choose to overlay graphs in this manner, the data sets must all have the same x-axis or categorical variable. Therefore, you can only select one variable in the lefthand scroll box.

Though the number of overlays you can create is theoretically limited only by the available memory, you have up to sixteen unique plot symbols or patterns to choose from in Cricket Graph. A graph containing more than sixteen sets of data would be confusing because some of the symbols or patterns would have to be used more than once. As a matter of practice, you would not want to overlay that many sets of data anyway. Refer to the section on "Do's & Don'ts of Creating Effective Graphs" in Appendix A for tips and suggestions.

If the active window contains a graph that is of a type compatible with your new selection (i.e., it is appropriate to overlay one over the other), then the **Overlay Plot** button becomes active. This is how you can overlay a set of data on a graph that already exists.

Scatter

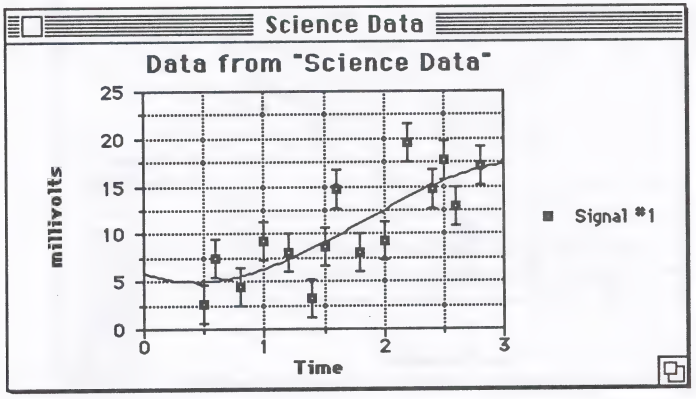
The scatter graph is typically used as an analytical tool to explore the relationship of one variable with another. Each plot symbol can represent a different set of data and many sets may be overlaid (placed on top of one another) on the same graph. Each new set of data will be represented by a new plot symbol (up to Cricket Graph's maximum of 16).



The variables need not be dependent and often are not. Large data sets (i.e., greater than 100 data points) are ideal candidates for scatter graphs. In fact, for very large data sets (i.e., greater than 1000) a small plot symbol (a simple dot) is available and is recommended so that the plot symbols do not become overcrowded on the graph.

The data representing the x-axis (horizontal axis) may be either numbers or categories. Cricket Graph will accept both. However, the y-axis (vertical axis) must always be represented by numbers. Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the y-axis that does not contain numbers.

Scatter graphs are usually the basis for best fit lines (using one of several regression equations) or placing an interpolated line (a form of electronic French Curve).

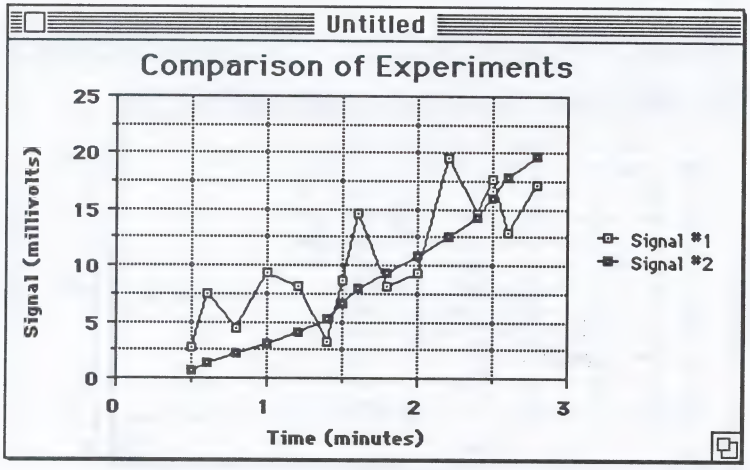


A regression line may be calculated and drawn through the data points or a Stineman interpolation may be used to draw a smooth line through each and every point. These options are available on the Curve Fit menu, which is described in Chapter 9.

For each measured data value, there exists a known or computed error in that measurement. Many scientists use error bars in graphs to represent this error. Cricket Graph allows you to place error bars in both the horizontal (x) or vertical (y) directions. The method for doing so is described in Chapter 10 (The Goodies Menu).

Line

Line graphs are ideal for depicting trends over time or the distribution of one variable over another. Many points can also be represented in this type of graph, making it the ideal kind of graph if the number of data points makes other forms of graphs (e.g., column graphs) look too cluttered.



The data representing the x-axis (horizontal axis) may be either numbers or categories. Cricket Graph will accept both. However, the y-axis (vertical axis) must always be represented by numbers. Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the y-axis that does not contain numbers.

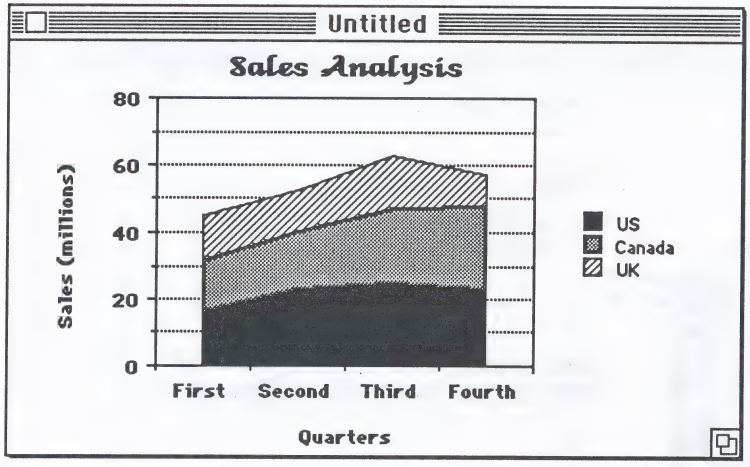
As with scatter graphs, you may add regression lines and error bars.

Area

An area graph with only one set of data being graphed is no more than a line graph with the area under the line filled in. Area graphs begin to take on a different perspective, though, when you add multiple sets of data to the graph. As different sets of data are added to the area graph, the line drawn for each set is successively added to the value of the previous set. This is useful for looking at large sets of data where a comparison is to be made about different sets of data over time or among categories.

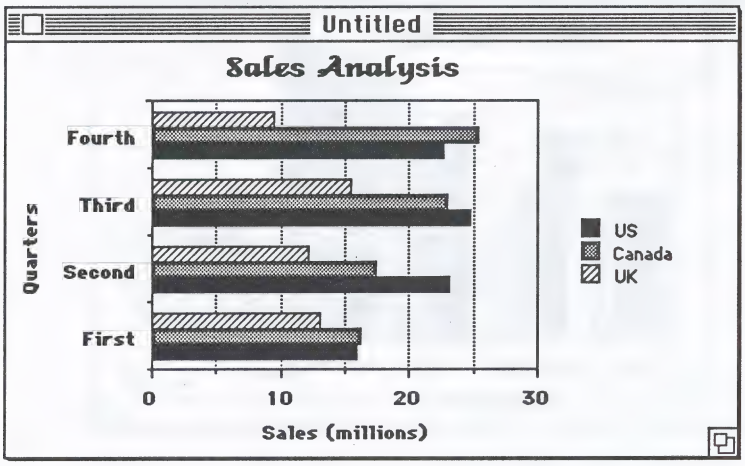
Area graphs consist of a series of data successively added together

The data representing the x-axis may be either numbers or categories. The y-axis must always be represented by numbers and Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the y-axis that does not contain numbers.



Bar

Bar graphs are ideal for representing comparisons of values collected for a number of categories. The categories may be months, years or just about anything that distinguishes one group from another. One axis is always a representation of numbers. Multiple sets of values for each category may be placed side by side, making comparisons and contrasts effective.



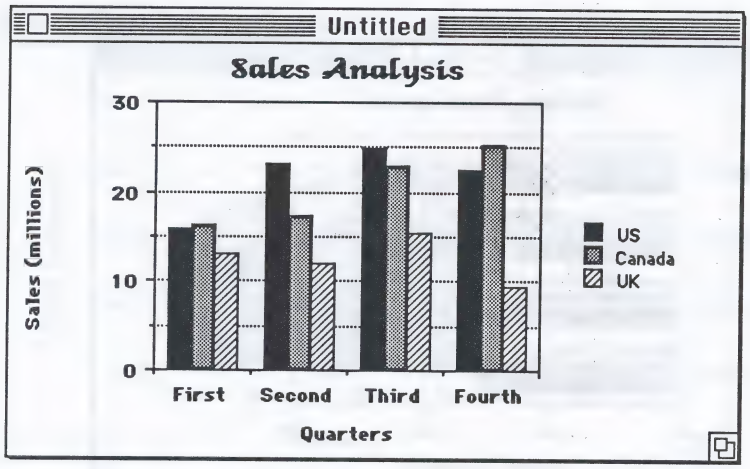
The bars in a bar graph are horizontal with the categories being grouped along the vertical axis.

The data representing the y-axis may be either categories or numbers. However, the x-axis must always be represented by numbers. Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the x-axis that does not contain numbers.

Error bars in the horizontal (x) direction may be placed on the bars for each set of data (more details in Chapter 10: The Goodies Menu).

Column

A column graph is like a bar graph except in its orientation on the page (in fact, many people confuse column graphs with bar graphs). The bars in a column graph are vertical with the categories being grouped along the horizontal axis and the values for each category along the vertical axis.

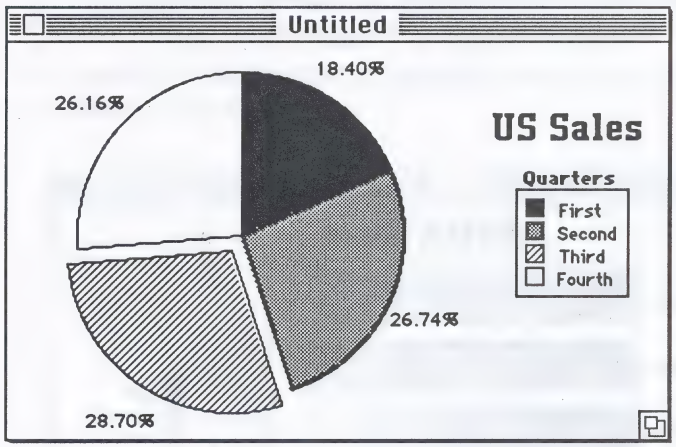


The data representing the x-axis may be either categories or numbers (but like bar graphs, the numbers will be treated as categories). The y-axis must always be represented by numbers and Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the y-axis that does not contain numbers.

Error bars in the vertical (y) direction may be placed on the bars for each set of data (more details in Chapter 10: The Goodies Menu).

Pie

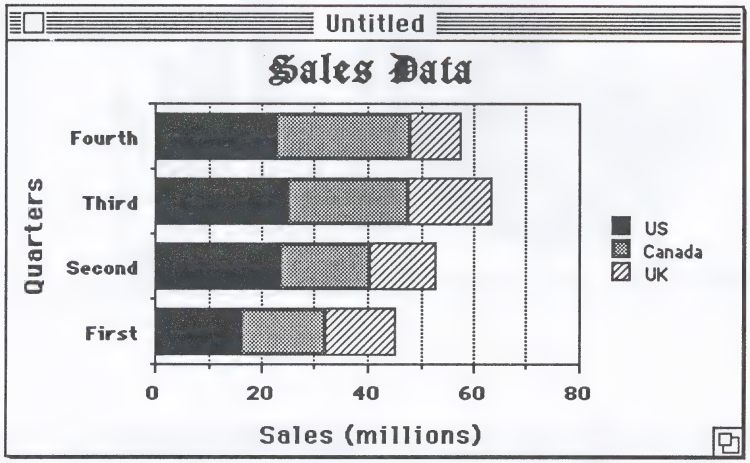
Pie graphs are ideal for comparing the relative sizes of various categories and the percentage that each category adds to the whole (the sum of all contributions). Often, one of the slices is dragged out from the pie to emphasize that category.



Typically, one variable contains the category names and one variable contains the associated values for each of the categories. Negative values cannot be represented with this type of graph and Cricket Graph will warn you if it encounters any values less than zero.

Stacked Bar

Stacked bar graphs are ideal for presenting comparisons of values for several sets of values and their contribution to the whole. Stacked bars are created for several categories and the categories may be months, years or just about anything that distinguishes one group from another. Multiple sets of values for each category may be placed end on end for each category, making comparisons and contrasts effective.



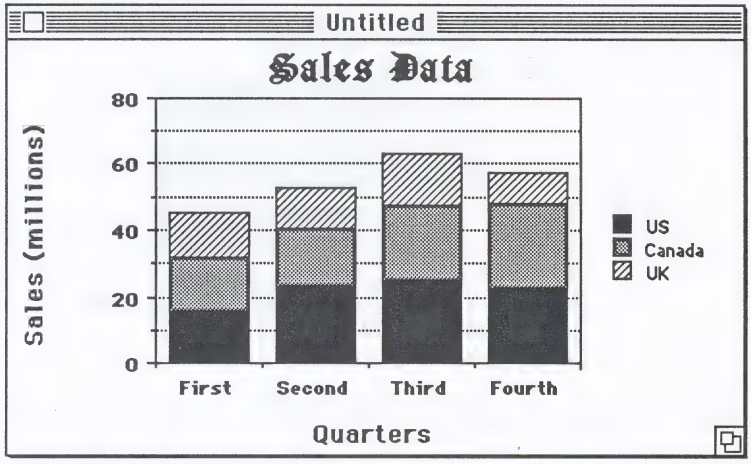
The bars in a stacked bar graph are horizontal, with the categories being grouped along the vertical axis and the values for each category along the horizontal axis.

Remember, though, each bar is laid end to end with the previous bars for each category. Negative values cannot be used in this type of graph. If Cricket Graph runs across a value less than zero, it will warn you that it cannot complete the graph.

The data representing the y-axis may be either categories or numbers (numbers will be treated as categories). However, the x-axis must always be represented by numbers. Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the x-axis that does not contain numbers.

Stacked Column

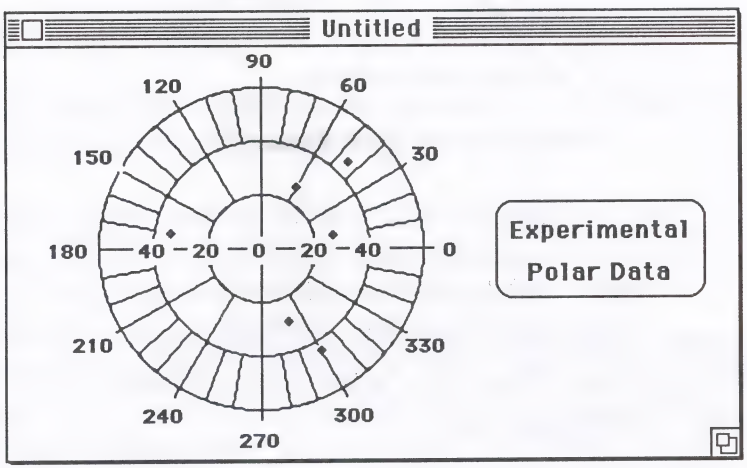
The bars in a stacked column graph are vertical with the categories being grouped along the vertical axis and the values for each category along the horizontal axis. Each bar is laid bottom to top with the previous bars for each category. It is very much like a stacked bar graph except for its orientation. Negative values cannot be used in this type of graph. If Cricket Graph runs across a value less than zero, it will warn you that it cannot complete the graph.



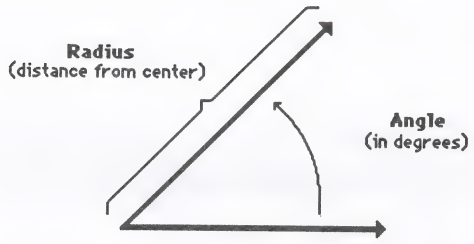
The data representing the x-axis may be either categories or numbers (numbers will be treated as categories). However, the y-axis must always be represented by numbers. Cricket Graph will warn you that it cannot complete the graph if you choose a variable for the y-axis that does not contain numbers.

Polar

A polar graph is an entirely different type of graph that is used quite frequently in science and engineering. The axes for this type of graph are drawn using the polar coordinate system (most other graphs are drawn on a rectilinear coordinate system).



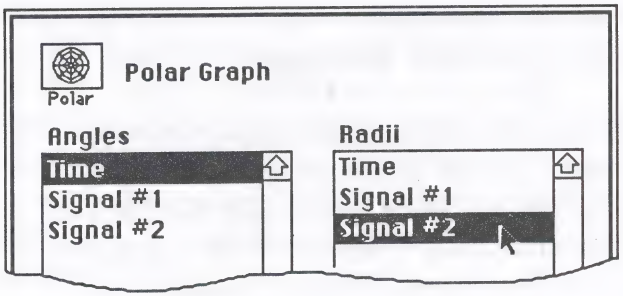
The graph is created by plotting data points that are described as the distance from the center of a circle (the radius) and their relative angle (in degrees) from a reference point. The reference point is typically at the 3 o'clock position if you were looking at a clock. The degrees increase from this point of reference as you go counter-clockwise.



Points described by Angle and Radius

The Polar graphs created in Cricket Graph can use a variety of plot symbols. Therefore, several sets of data can be overlaid on the same plot.

After you select the **Polar Graph** option in the **Graph** menu, you will be presented with a dialog requesting the variables to graph.



You can choose one variable for the measured radius and one variable for the measured angle.

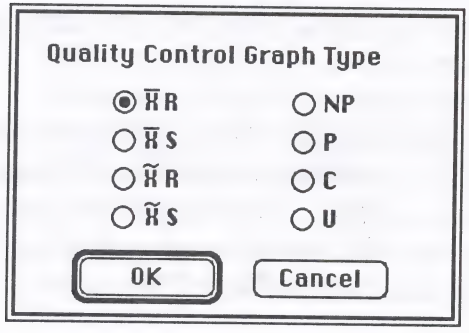
It is best to graph one set of data at a time in this case. Later on, after the graph is initially created, you may go back and lay another set of data on the graph. The reasoning for this is that each set of data may have different radii and different angles. Overlaying another set of data is accomplished by making sure the polar graph to be overlaid is the active window, selecting **Polar** from the **Graph** menu, picking the new variables and clicking the **Overlay Plot** button instead of the **New Plot** button.

QC

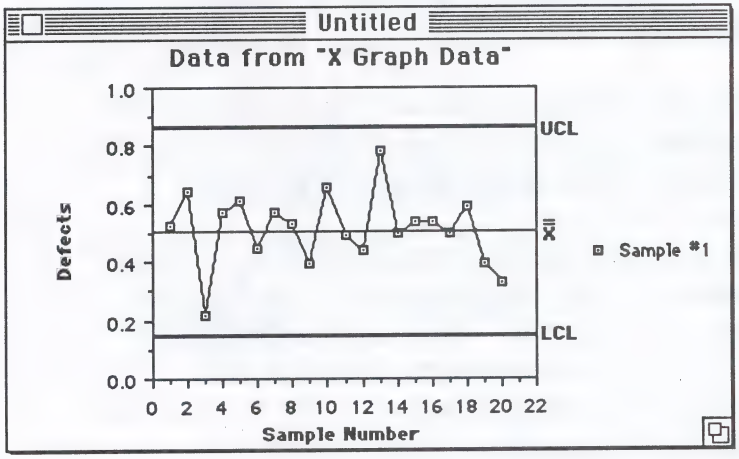
Quality control graphs are statistical devices used for the study and control of repetitive processes. The goal of quality control graphs may be summarized as follows:

(1) a method for defining and setting management goals
(2) an instrument for attaining and tracking those goals
(3) a way of judging whether those goals are being met

Cricket Graph offers eight varieties of quality control graphs. By no means can the theory behind these graphs be explained in this manual since it typically requires an entire textbook. However, the purpose for each graph and its expected input are briefly explained. You are encouraged to use the literature listed in the references at the back of this manual if you need further information on the theory behind these graphs.



You will find that all quality control graphs have certain common characteristics. The line plotted is usually either raw counts of the number of nonconformities encountered in a sample or a computed value taken from the sample. The average of these values is then graphed as a central line (in the case below, it is labeled X with a double bar above it). From the data, statistical computations are performed which compute an acceptable deviation from the average. The central line plus and minus this deviation determine the upper control limit (UCL) and the lower control limit (LCL), respectively, which are graphed as heavy lines. Sometimes a quality control graph will not have a lower control limit due to the fact that it was computed as being zero.



Any values falling outside these computed control limits are suspect and should be scrutinized. A number of other criteria can also be used along with control charts to measure and track control. A good book on statistical quality control will point these out.

The differences between the eight QC graph types basically lie in the kind of data expected and the computation of the midline and control limits (the computations for each of the QC types are listed in Appendix B: Technical Details).

The first four quality control graph types are simply variations on how the central line and control limits are determined. Two graphs are created when you choose any one of these first four control graphs.

In the first graph, the central line represents the average of sample means (denoted by an X with a double bar over it) or the average of medians (denoted by X with a tilde and a bar over it). The control limits may be based on the average of the sample ranges or the average of the sample standard deviations.

In the second graph for each of these four quality control types, the computed ranges or standard deviations for each of the samples are plotted along with control limits.

The NP graph is used to track the number of items found to be nonconforming. All samples must be of the same size to use this type of graph. The data expected is the actual count of nonconforming items found in each sample. A dialog will appear requesting you to select the column containing the number of items found nonconforming in each sample and the sample size.

The P graph is essentially a graph of the proportion of nonconforming items in a sample with samples being taken over a period of time. The samples may or may not be the same size but corrections must be made to the control limits if the sample sizes vary by more than 25%. Cricket Graph will continue to finish the graph if sample sizes do deviate by more than 25%, but a warning will be posted and the control limits should not be accepted.

A dialog box will appear requesting you to select the column containing the number of items found nonconforming and a column specifying the size of the sample from which these items were taken.

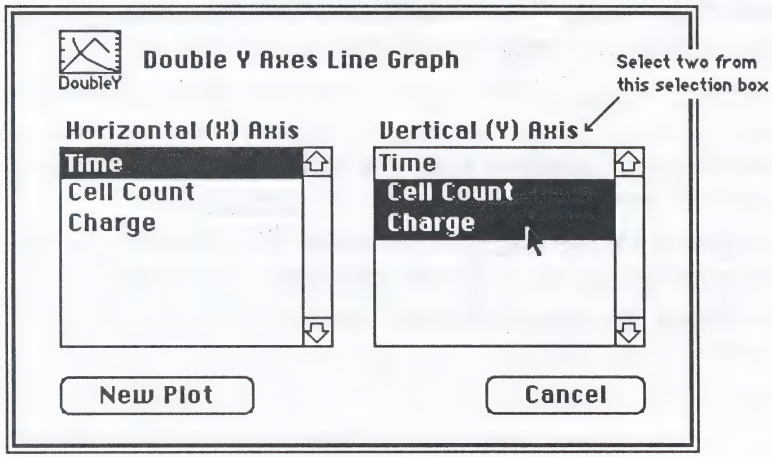
The C graph is essentially a graph of the number of nonconforming items per unit of constant size. A dialog box will appear requesting you to select the column containing the number of items found nonconforming per unit.

The U graph is like a C graph except that counts are the number of nonconforming items per unit of varying size. A dialog will appear requesting you to select the column containing the number of items found nonconforming and a column specifying the size of the unit used to obtain this number of nonconformities.

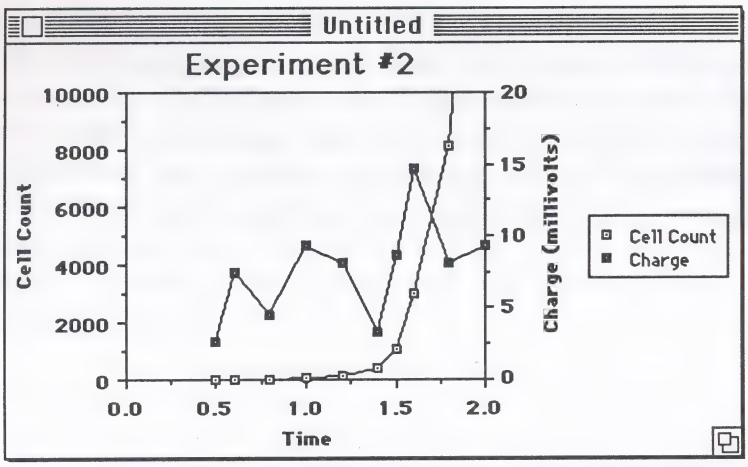
Double Y

The double Y axes graph allows you to graph two variables on the same graph that may be on entirely different scales. For instance, suppose you were running a biological experiment and wanted to graph the cell count of bacteria over time versus a measured charge over that same time period.

The horizontal axis must be equivalent for both sets of values but the two sets of values used for the vertical axis can be measured on entirely different units of scale. This kind of graph is especially useful for comparing combined trends when the two sets of data cannot be measured in the same units.



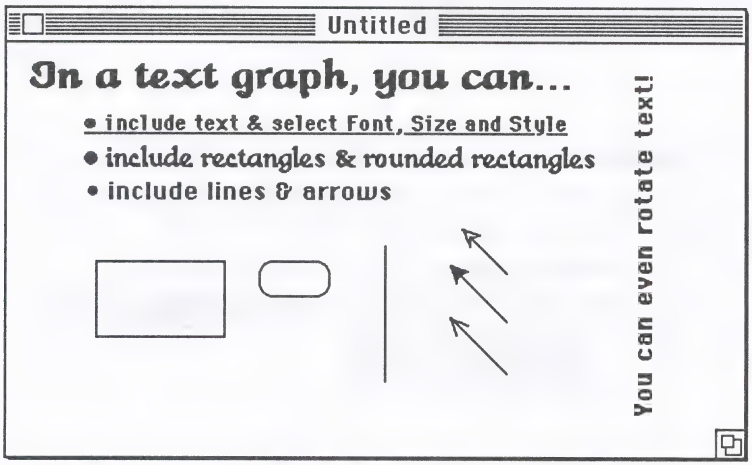
After selecting **DoubleY** from the **Graph** menu, a dialog box will appear. Select one variable for the horizontal axis and two variables for the vertical axes. Only two variables can be selected for the vertical axes.



One variable is graphed with its units of scale on the left and the other with its units of scale on the right. The two vertical axes can be switched using the **Switch Axes** command from the **Goodies** menu (more about that in Chapter 10). Each axis can be changed independently (e.g., min, max, etc.).

Text

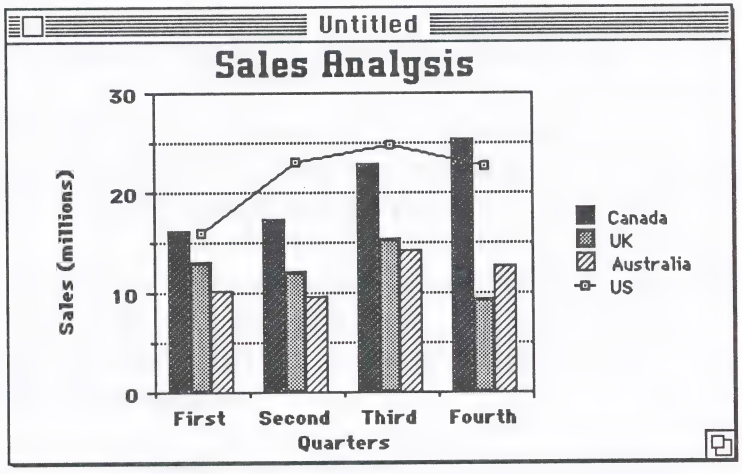
This type of graph is sometimes used when you wish to create a slide or image that contains only words. It is quite useful for creating blocks of text and then, using Cricket Graph's page layout capabilities, placing this block of text next to another graph in page layout before printing.



After you select the **Text** menu command, a blank window will appear. If the Tools window is not visible, it will be made visible. With the Tools window, you can place text, rectangles, lines and arrows in this empty window (the Tools window and its use are fully described in Chapter 10: The Goodies Menu).

Combination of Column and Line

You can create a graph that is a combination of column and line graphs. First graph one or more sets of values as a column graph. Then select **Line** from the **Graph** menu. You can choose one or more sets of values for the vertical axis. You must choose the same variable for the horizontal axis as you did for the column graph. By then clicking the **Overlay Plot** button, you will place the line on the column graph.



Chapter 8
Changing Items in the Graphs

Once you have created a graph, you can change almost anything on it easily and quickly by using one of three methods.

To **move** an object, just point to it and drag.

To **change** an object, just point to it and double-click. A dialog box will appear that lets you accomplish more complex changes.

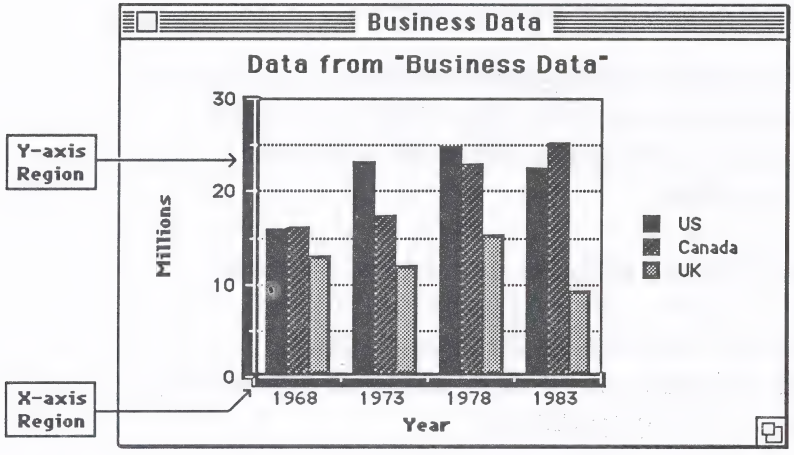
To **select** a part of the graph for changes, just point to it with the cursor and click. This is used for placing error bars, performing curve fits and selecting colors.

If you are not familiar with the methods of selecting, dragging, and double-clicking please refer to the Macintosh Guide that came with your machine. Everything on a graph can be customized or changed by just doing one of these operations.

This chapter describes how to change items on a graph. The next chapter describes how you can use additional tools to add text, rectangles, lines and arrows to your graph. To illustrate the areas where you can click to change various parts of the graph, they will be inverted (highlighted in black) in the illustrations.

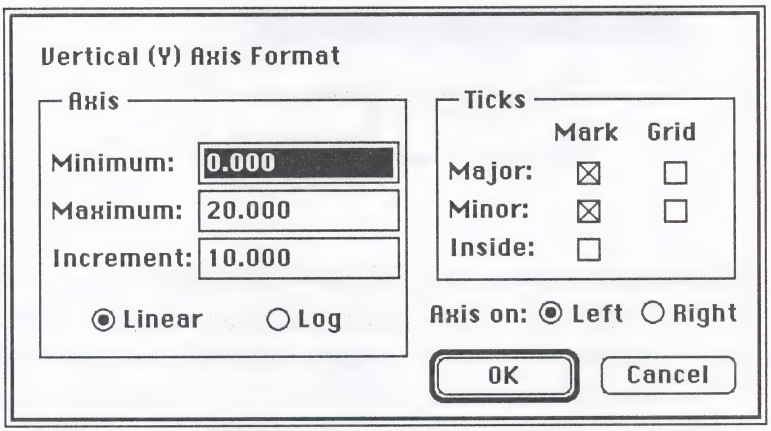
Changing an Axis

To change an axis, you simply point to the desired axis and double-click (Note: To change a polar axis, double-click the labeled horizontal line passing through the origin of the graph).



Depending on what type of axis was double-clicked, one of two dialog boxes will seem to zoom out. In these boxes are a number of items or details about that particular axis. Any one of these items can be changed.

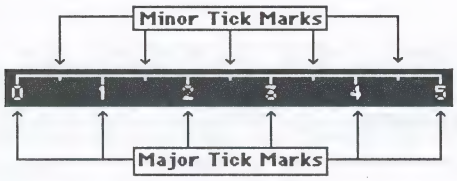
If the axis was a numerical axis then the following dialog will appear...

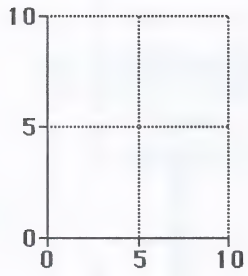


The minimum, maximum and increment items are text boxes that contain the current settings of these items. To change any one of them simply click the value you wish to change, then type in the new value. All the standard Macintosh editing features can be used to change or edit this value.

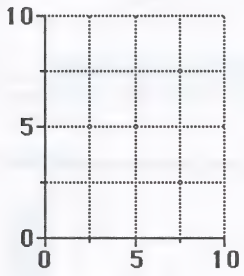
By clicking either the linear or log radio button (they are called radio buttons because only one of the two can be on at any given moment), you can choose whether that axis will have a linear scale or a logarithmic scale.

The check boxes for the tick marks and grid lines (both major and minor) can be turned on or off by clicking them. The tick marks can be placed on the inside of the axis by turning the **Inside** option on. An "x" appearing in the box indicates that it is on.





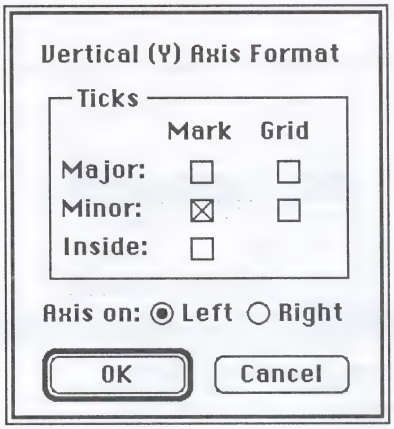
major
tick marks and grid lines



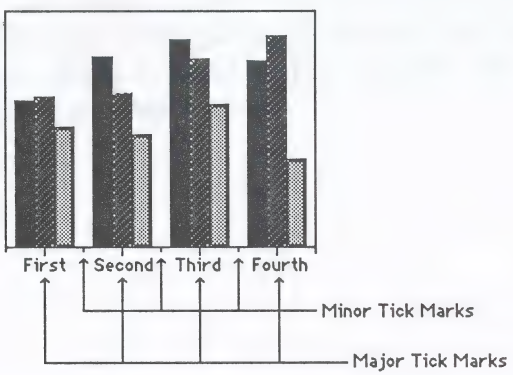
major and minor
tick marks and grid lines

If the axis you are changing is a vertical (y) axis, you may also use the radio buttons to choose whether it will appear on the left or right side of the graph.

If the axis was categorical then the following dialog will appear...



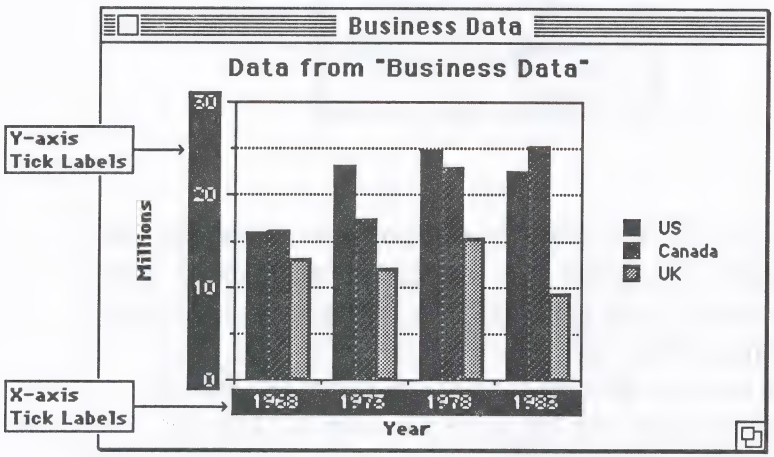
With a categorical axis, you have the option of turning on or off the major and minor tick marks and grid lines. You cannot (nor would it be appropriate to) change minimums and maximums or convert to log scales. Vertical categorical axes can also be placed on either the left or right. The tick marks can be placed inside the axis by clicking the **Inside** option.



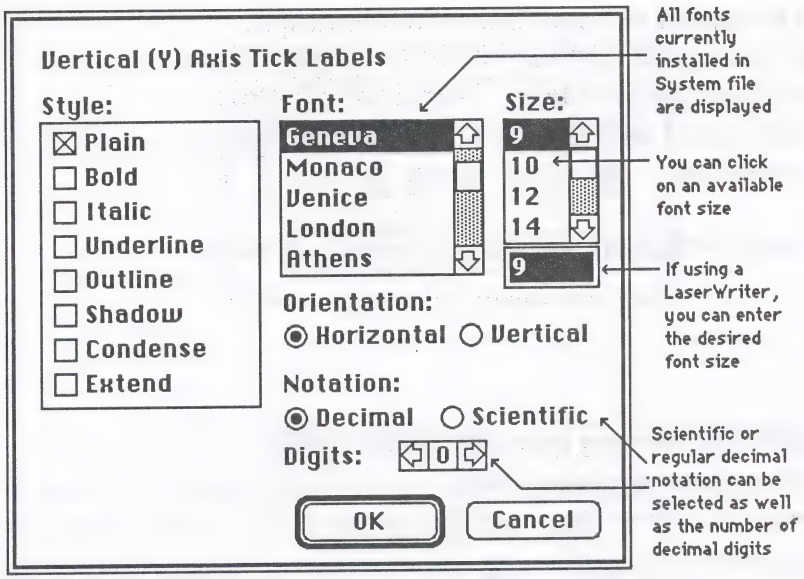
Major & Minor Tick Marks for Categorical Axes

Changing the Tick Labels

By double-clicking either one of the tick label regions, you can change the font, style and size of the tick mark labels.



The following dialog will appear with the current settings pre-selected...

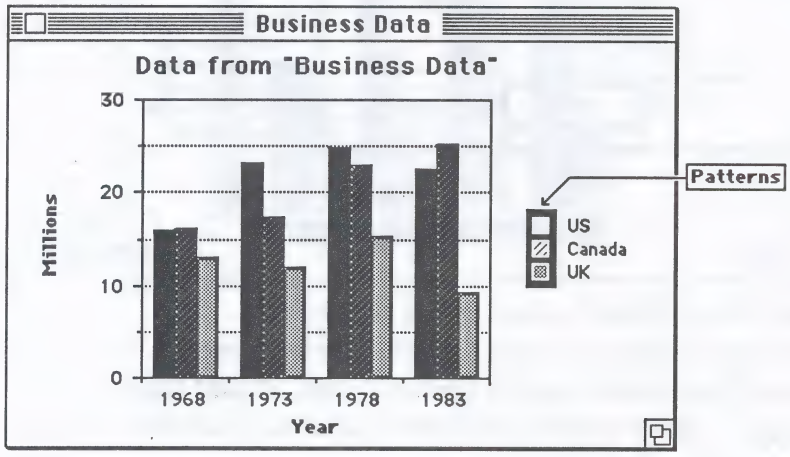


You can also choose either a vertical or horizontal orientation for the labels. A vertical orientation means that the text will be printed going up the graph, rather than across the graph. Both vertical and horizontal tick labels can have a vertical orientation.

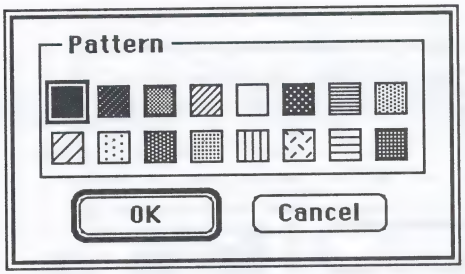
Changing Plot Symbols or Bar Patterns

All patterns and symbols are changed by double-clicking the symbol or pattern in the legend. Clicking the symbol or pattern in the graph itself will not allow you to change that symbol or pattern. The reason for this is that you might have a thousand or more points in the graph. Locating and distinguishing one symbol or pattern from another could present a problem. Therefore, Cricket Graph uses the legend as the control area for changing symbols and patterns.

To change, double-click the desired pattern or symbol.

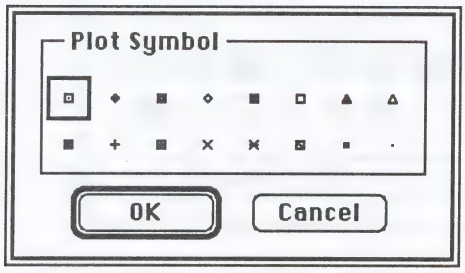


If the item you double-clicked is a pattern, then you will be presented with the following dialog box...



The pattern you clicked comes up pre-selected. This is indicated by the black box around the pattern. You have sixteen patterns from which to choose. Clicking a pattern will select that pattern. After you click the **OK** button, the pattern that was used in the graph will be changed to the new selection.

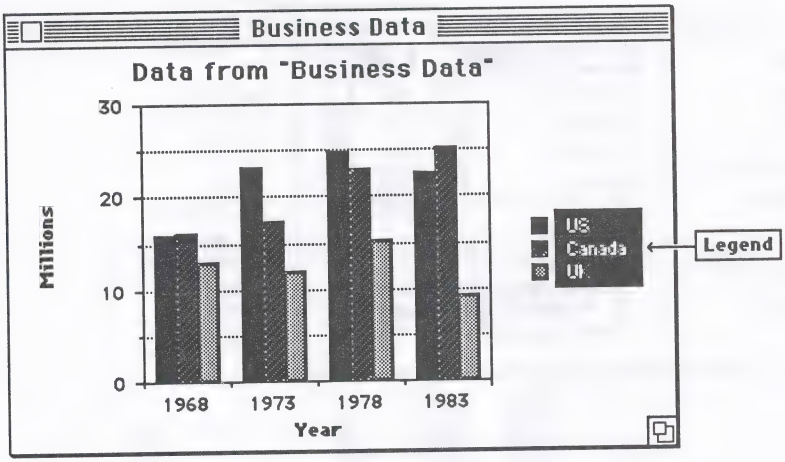
If the item you double-clicked is a plot symbol, the following dialog box will appear with that symbol pre-selected...



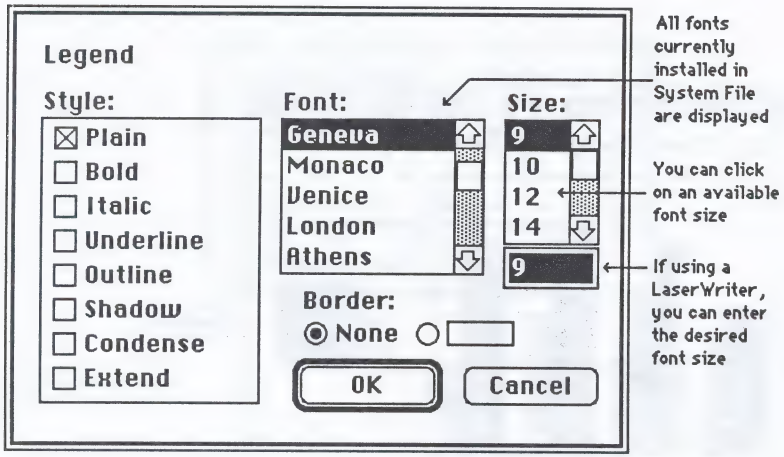
Notice that the last symbol is a simple dot. This is very useful if you have a very large data set and the plot symbols are overcrowded on the graph. Click the new symbol you wish to use and then click the **OK** button. The new selection will replace the symbol that was previously used.

Changing the Legend

By double-clicking the text in the legend, you can change the way the legend will appear.



The following dialog box will appear with all the current settings pre-selected...

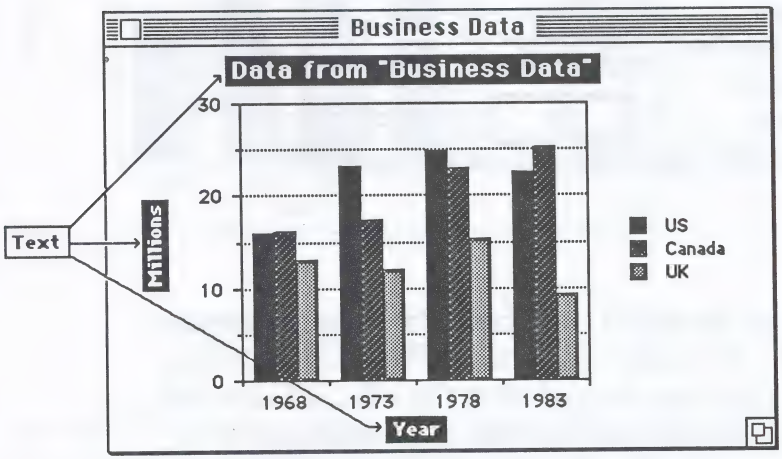


You can change the font, style and size used for the text in the legend. You can also choose to have a border surround the legend.

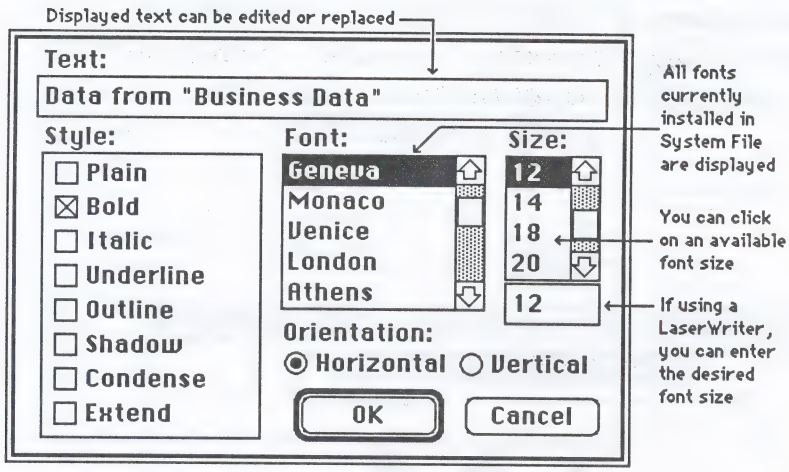
The legend can also be moved within the graph. Click in the legend area and drag the outline of the legend to the new location. After you release the mouse button, the legend will be redrawn at that location.

Changing Text

Each time a new graph is created, several text items are automatically placed on the graph. These include the graph title and labels for each of the axes. Cricket Graph tries to determine the best words to place in each line of text but you are encouraged to change them. In fact, after overlaying several sets of data in a graph, you will almost certainly need to change the vertical axis label - perhaps to indicate the units used in the measurement (e.g., "Millions of Dollars").



To change text, double-click it and the following dialog with the current settings for that text pre-selected will appear...

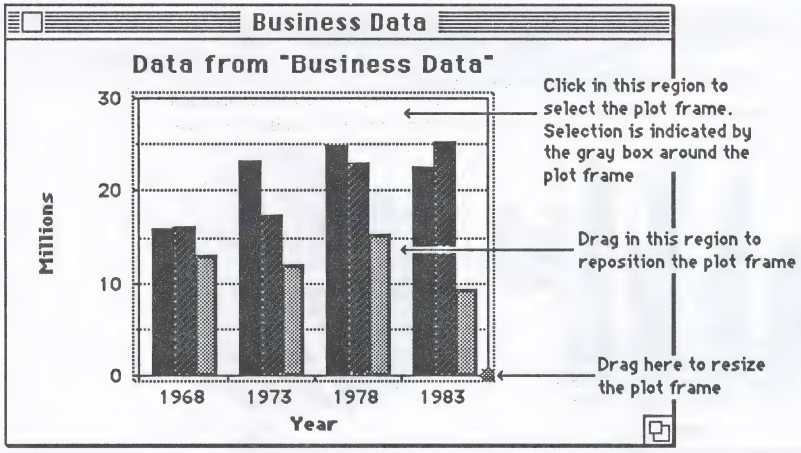


The text box at the top of the dialog contains the current text selection. By using the standard Macintosh editing conventions you may change what the selected text will say. You can also change the font, style and size to be used. Either a vertical or horizontal orientation may also be selected.

A set of tools are available in Cricket Graph, described in Chapter 10, that let you replace any labels or titles you have accidentally removed. These tools also allow you to add additional text to the graph.

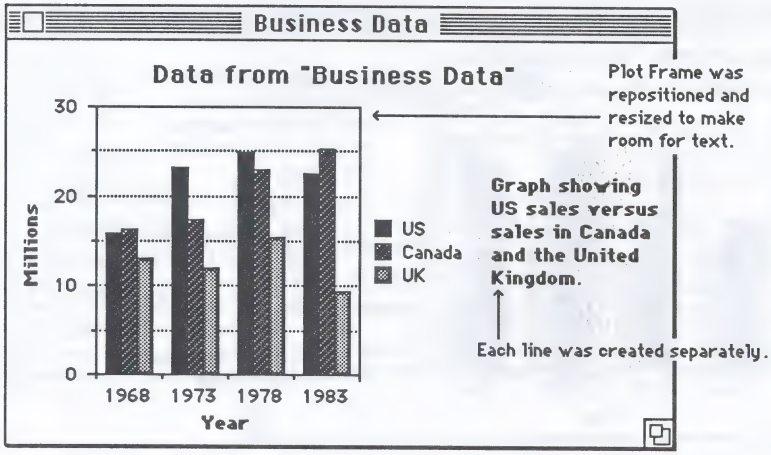
Resizing the Plot Frame

The area in the graph where the data values are drawn is called the "plot frame." The plot frame is a framed area within the window region which is usually bounded by axes.



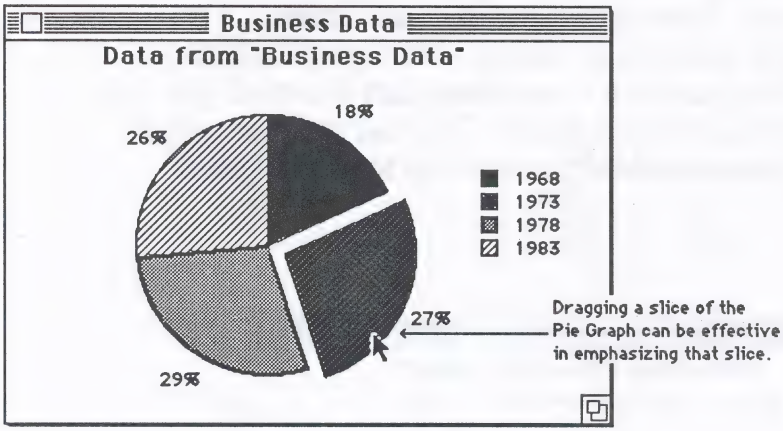
If you click the mouse within this frame, an outline will appear around the frame. You may move the frame around within the window by pressing the mouse button down inside the frame and dragging. Dragging the gray rectangle at the lower right corner of this frame will change the size of the plot frame within the window.

You may find this option useful if you would like to place a lot of text along one side of the graph and wish to drag the plot frame off to one side of the window to make room (as illustrated below).



Exploding a Pie Graph

In pie graphs, emphasis can be placed on one or more of the categories (each category comprising a slice of the pie) by dragging that slice or slices out from the center of the pie. This is referred to as "exploding" the pie.



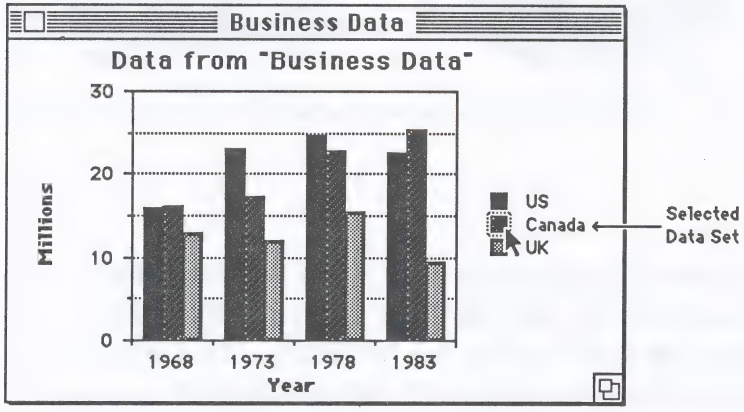
Simply click the slice you wish to explode and drag that slice. The wedge of the pie will only move along a line radiating from the center of the pie outwards. This will help you keep individual wedges of the pie aligned properly.

If you add depth (for a 3-D effect), you will still be able to explode individual slices of the pie.

Deleting a Set of Data

Cricket Graph allows you to overlay multiple sets of data on most types of graphs (pie graphs and quality control graphs are exceptions). There are a couple of ways to remove a data set from a graph once the graph has been created.

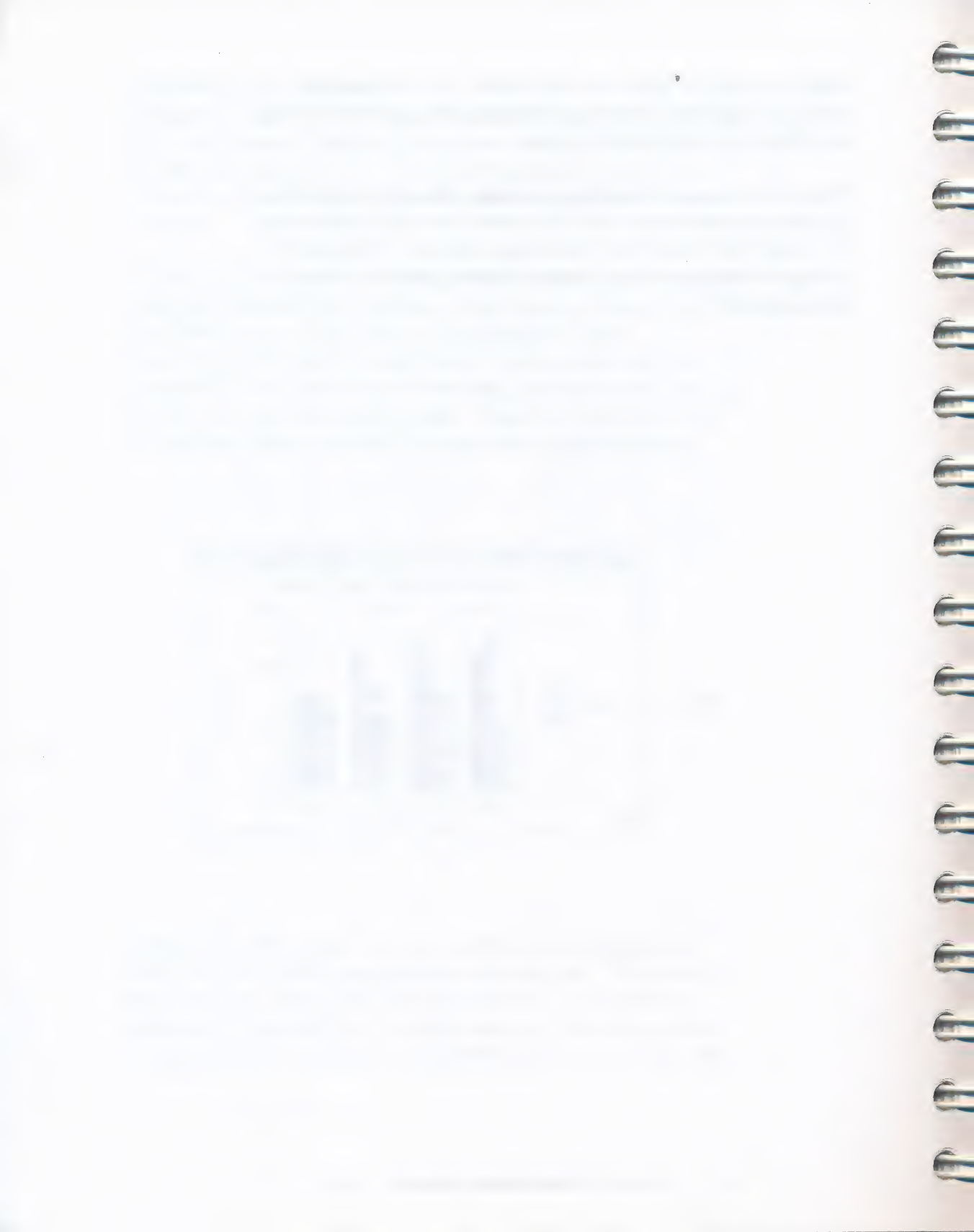
If you wish to remove the last data set drawn on the graph (last one listed in the legend), simply select **Undo** from the **Edit** menu. Each time you select the **Undo** command, the last data set drawn on the graph will be removed. You can keep on undoing data sets until you get to the last data set on the graph. This last data set cannot be undone (there wouldn't be any data to graph then!).

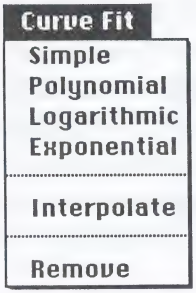


A more flexible way to remove data from a graph is to click its plot symbol or pattern in the legend. This selects that data set. Once the data set you wish to remove is selected (indicated by a gray box around the plot symbol or pattern), you can press the **Backspace** key or select the

Clear command from the **Edit** menu. If you have the optional Macintosh numeric keypad, you could also press the **Clear** key to delete the data.

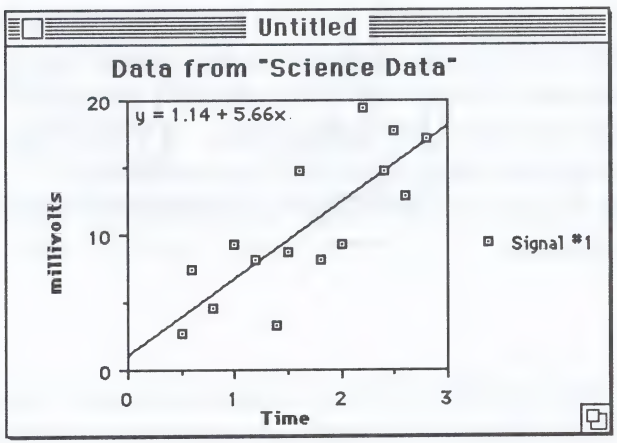
When you remove data from a graph, the axis parameters (minimum, maximum and increment) are not recalculated. You may find that after removing a data set, you need to change the minimum and maximum to present a better looking graph.





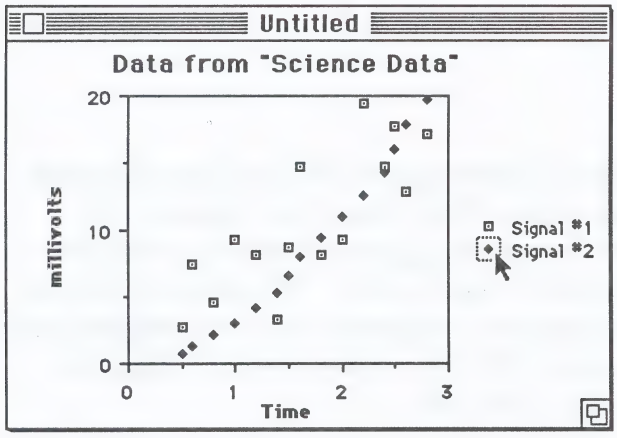
Chapter 9
The Curve Fit Menu

The **Curve Fit** menu allows you to fit a variety of curves to a scatter or line graph. Therefore, this menu is only enabled when the frontmost and active window contains a scatter, line or double Y axes graph . The curves you can select include four types of regression and an interpolation routine that fits curves through every point as though an artist had used a French Curve.



Selecting the Data to Fit

If you select a curve fit option for a graph that contains more than one set of overlaid data, the curve will be fitted automatically to the last set of data added to the graph. If you would like the curve fit to be performed on a specific set of data, click the data's plot symbol once in the legend.



A dotted rectangle will appear around the plot symbol to show that it is selected. Select the command for the curve fit you would like from the **Curve Fit** menu. If your data set is large, the computer may take a few moments to calculate the best fit line before it begins drawing the line through the data points.

The Various Regression Fits

You can select one of four types of regression: simple, polynomial, exponential, and logarithmic. The equation computed during the regression is placed on the graph. You can alter or move the equation exactly the same way as you can change any other text item placed on the graph (changing text is fully described in Chapter 8).

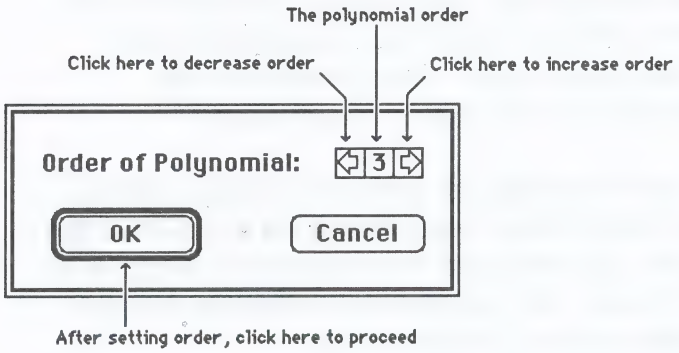
The equations used to fit the regression curves are as follows...

Simple: $Y_i = aX_i + b + \text{error}$

Polynomial: $Y_i = a_1X_i + a_2X_i^2 + ... + a_nX_i^n + \text{error}$

Logarithmic: $Y_i = a * X_i^{\,b} + \text{error}$

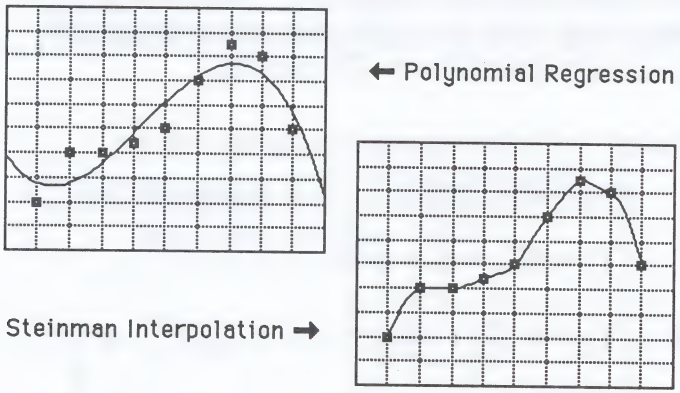
Exponential: $Y_i = a * 10^{(b*Xi)} + \text{error}$



If you selected the polynomial curve fit, a dialog box will appear where you can enter the order of the polynomial. The order of the polynomial can be as high as five.

Interpolation

An interpolation routine is also available in the **Curve Fit** menu.



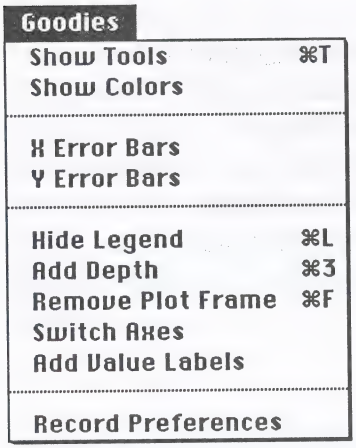
Regression fits try to obtain the "best" fit through the data points and summarize by describing the data with an equation. The regression line may or may not pass through all the data points. Interpolation differs from the regression fits in that the fitted line is required to pass through each and every point. Interpolation is the equivalent of using an electronic "French Curve".

There are at least four popular methods of interpolation. The Stineman interpolation was chosen for Cricket Graph because it is the "best behaved" (a reference is listed in the back of this manual). All interpolation routines can get messed up under certain circumstances.

The Stineman routine will perform better than other routines under a wider variety of conditions, but it can also get confused if the data points are difficult to fit. When the interpolation routine is unable to fit a good line, you will know because the fitted line will look absolutely awful. If this happens, your graph would probably look better if you try fitting a regression line instead.

Removing a Fitted Curve

By selecting a set of data, clicking in the legend on its plot symbol just as you would for placing a fitted curve, you can then choose the **Remove** command from the **Curve Fit** menu to remove any lines currently fitted through the selected data. Removing the curve does not remove the equation. To remove the equation representing a fitted curve, click it and then press the **Backspace** key.



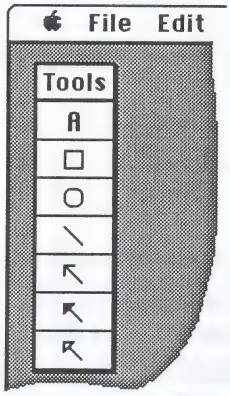
Chapter 10
The Goodies Menu

The **Goodies** menu contains a number of useful options for each of the graphs that you may create. These commands typically add something to the graph in addition to what is already there. Many of the commands simply toggle a feature on or off.

Several of the menu commands have keyboard equivalents. For instance, to toggle between "showing" or "hiding" the legend, you can press the combined key sequence **Command-L** that corresponds to that menu command (as illustrated on the right hand edge of the menu). After you learn these keyboard equivalents, you will no longer need to go to the menu to toggle a feature on or off; simply press the keyboard equivalent and watch your graph change right before your eyes.

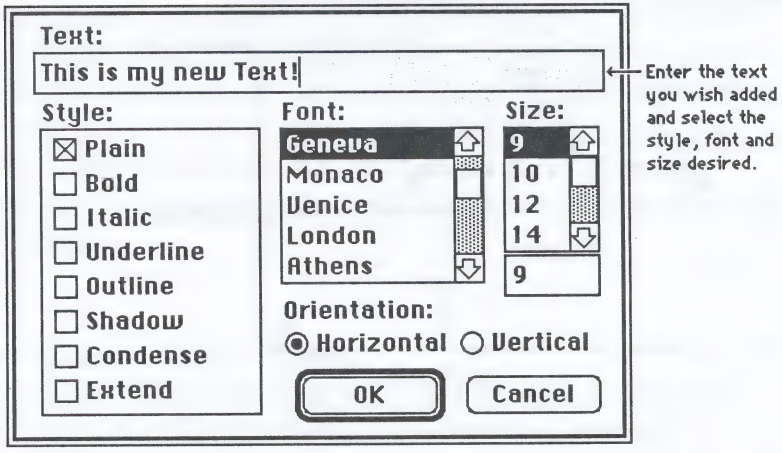
Show Tools / Hide Tools

The Cricket Graph Tools window allows you to place a number of items on a graph or in an empty window such as that created when you select **Text** from the **Graph** menu. Placement of these items is entirely up to you. You can also change their position or size. With added text, you can change the font, style and size as well as its placement.



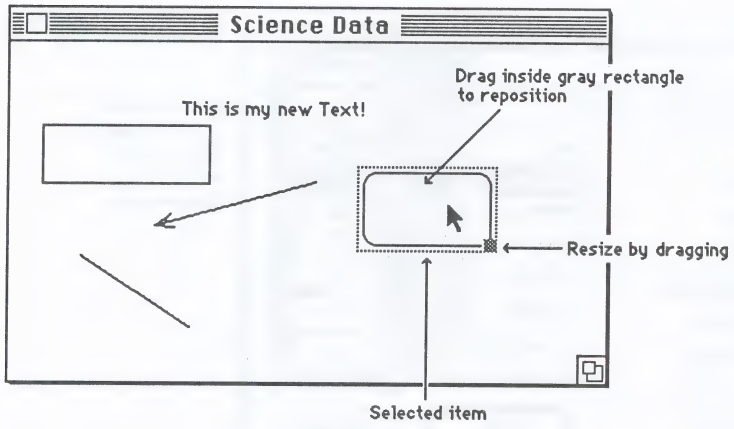
By clicking the **A** in the Tools window, you select alphabetic text as the next item to be added to the graph (the "A" will appear gray indicating that it is the tool that was selected). Simply click the location in the window where you wish to place this text. The location where you click will be considered the center point and the text you specify will be centered about this point.

Immediately after the click, a dialog box will appear (this is the same dialog used for changing text as described in Chapter 8). You can enter the text in the text edit box along the top of the dialog. All standard editing functions are available if you wish to change what you have entered. You can also select the font, style and size as desired as well as a vertical or horizontal orientation. After you click **OK**, the text will appear in the location that you originally chose.



After you place the item you selected from the Tools window on the graph, that tool becomes inactive. Each time you wish to add another item from the Tools window, you must select that item by clicking it in the Tools window.

Rectangles and rounded rectangles can be added by clicking the appropriate tool, moving the cursor to the desired location and clicking. While continuing to hold the mouse button down, drag the mouse. An outline of a rectangle will follow the movements of the mouse as long as you have the button down. Releasing the button will place the rectangle at the location indicated by the outline.



To change the position of the rectangle, click it to select it and then drag the object to the new location. By dragging within the gray square in the lower right corner of the selection rectangle, you can resize the rectangle. To remove the rectangle from the graph, click it to select it and press the **Backspace** key, press the **Clear** key on a numeric keypad, or choose **Clear** from the **Edit** menu.

Lines and arrows can be added by clicking the appropriate tool and then clicking the location of the graph where you wish to position one end of the line or arrow. In the case of arrows, this first point will be considered the head of the arrow. Dragging the cursor then positions the other end of the object. Note that the line or arrow tracks the position of the mouse as long as you hold the button down. Releasing the button fixes the line or arrow at its current position.

To move a line or arrow, click the object to select it. If you then click and hold the mouse button at one end of the line or arrow, you can drag that end while the other end stays fixed. Dragging on the center of the line or arrow moves the entire object without changing its orientation. To remove the line or arrow from the graph, click it to select it and then press the **Backspace** key, press the **Clear** key on a numeric keypad, or choose **Clear** from the **Edit** menu.

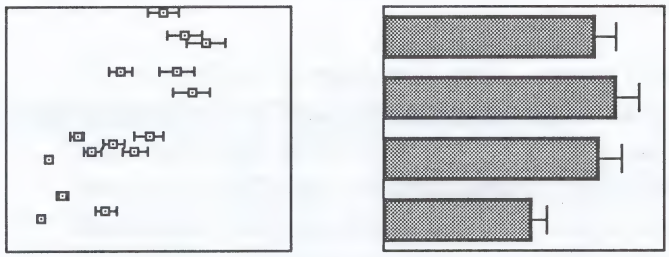
Show Colors / Hide Colors

Why color? The computer may not be able to display in color but a number of output devices (e.g., printers, plotters and film recorders) are available that allow you to use Cricket Graph to create color graphs.

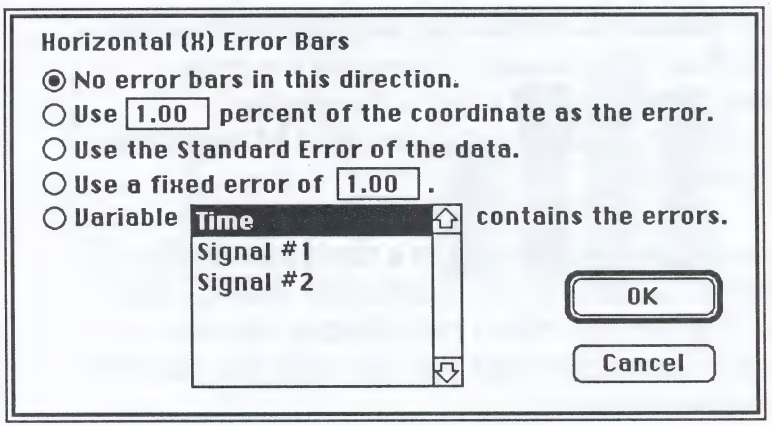
The colors command allows you to toggle a color palette visible or invisible. Eight colors are available and any item in the graph can be set to one of these colors. The next chapter deals entirely with color selection and the color palette. Please refer to it for details.

X Error Bars

Scatter, line and bar graphs in technical reports or journal articles often contain error bars to denote the error associated with that measurement.



By choosing **X Error Bars**, you can place horizontal error bars on your scatter or line graphs (if the horizontal axis is numerical in nature). X error bars can also be placed on bar graphs. The error bar for a bar plot extends past the bar and represents half the error.



Error bars are specified individually for each set of data on your graph. To select the data set which is to receive error bars, click that data set's symbol or pattern in the legend to select it. If you do not select a data set before choosing **X Error Bars** on the menu, the error bars will be drawn on the last set of data added to the graph.

The errors used in placing the error bars are determined in one of four ways:

(1) If you select the first option to use a percentage of the value for that point, the value you enter in the text edit box is divided by 100 and then multiplied by the value of each data point.

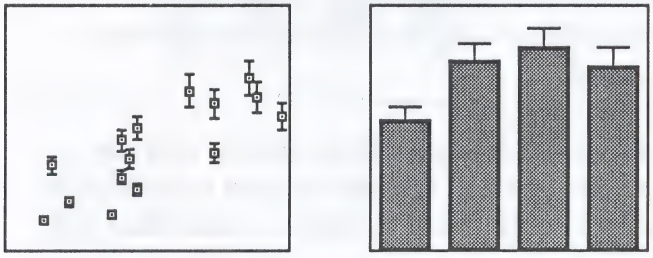
(2) If you select this option, the standard error of the of the data will be used to compute the error values. The standard error is the standard deviation divided by the square root of the number of data values.

(3) If you know that the error is a fixed amount for all data points, then use the fixed error option. After you click the associated radio button, the text box becomes active and you can enter the value of the known error.

(4) Each measured value (a data point) may have a unique error associated with it. Cricket Graph allows you to enter the error for each data point in an associated column (each error value must be in the same row as the data point with which it is associated). After you click the radio button for this option, you may then click the name of the column that contains these error values.

Y Error Bars

Error bars may also be graphed in the vertical (y) direction. In fact, error bars seen in the literature are mostly used to denote an error range about y values.



Y error bars can be placed on either line, scatter or column graphs. On column graphs, the error bar extends from the column and represents only half the error range.

You can select the way in which Cricket Graph determines error values to use in drawing the vertical error bars in the same way you make the selection for horizontal error bars.

Show Legend / Hide Legend

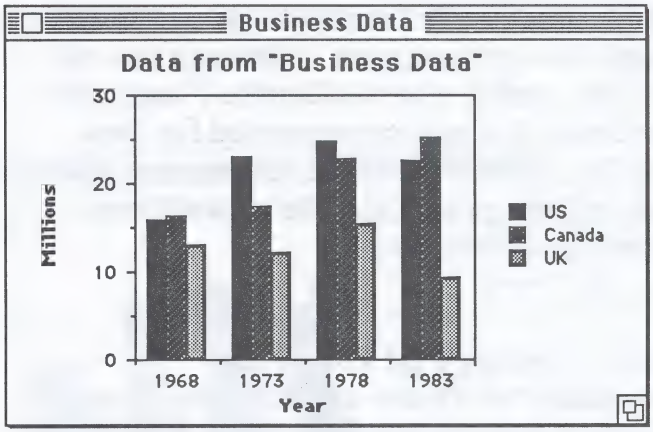
The legend is used by Cricket Graph as the control point for changing patterns and symbols in a graph. It is also good practice to label clearly each series placed or overlaid on the graph. There are times, however, when you may not wish to have a legend visible on your graph.

When you select **Hide Legend**, the legend will be hidden. If the legend is already hidden, the menu command will read **Show Legend** and selecting it will then show the legend.

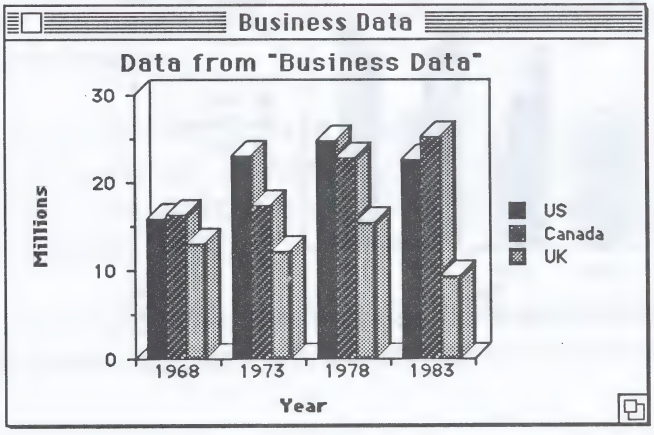
If you need to change a plot symbol or pattern and the legend is hidden, you can use this menu item to make the legend temporarily visible, change the item, and then hide the legend again.

Add Depth / Remove Depth

Any of the graphs created in Cricket Graph can be jazzed up by adding depth. Selecting the **Add Depth** command simply adds depth to the graph in the active window. If the currently active graph already has depth added, the menu command will read **Remove Depth** and, of course, will remove the depth and restore the graph back to its original flat appearance.



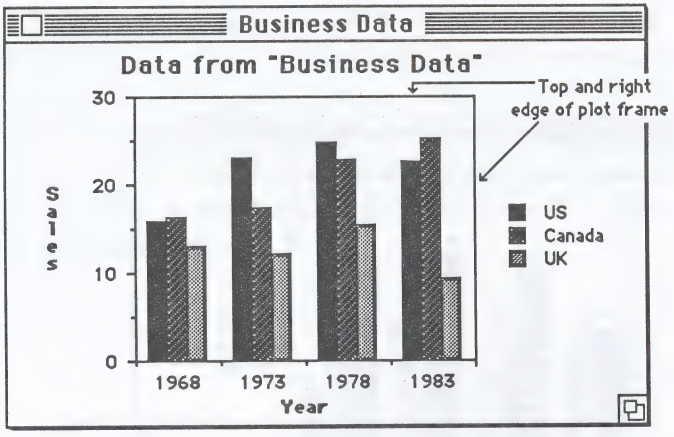
Adding depth to the graph above will cause this graph to change appearance as illustrated below.



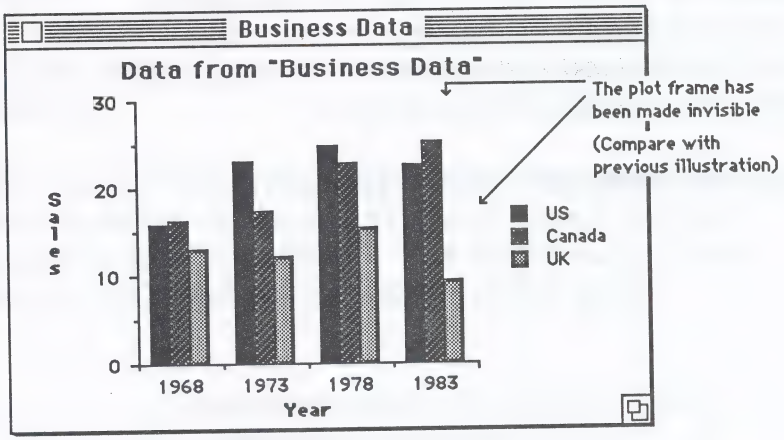
Notice how this feature can be used to advantage to add pizzazz to a graph for a presentation. Although you can change scatter, line, quality control, Double Y and polar graphs to show depth, it is not recommended for these graph types. In fact, there is no added information gained by adding depth to these graphs and the information content is only confused by doing so.

Add Plot Frame / Remove Plot Frame

You can use the **Add Plot Frame** and **Remove Plot Frame** commands to turn the frame around a plot on and off. Whether or not you should have the frame placed around the graph is strictly a matter of preference. The frame is the box drawn around the graph. It is usually bounded on two sides by the axes and tick marks.



Removing the frame will alter the graph to look like this...



Switch Axes

The **Switch Axes** command provides a quick way to switch between bar and column graphs. The command switches the vertical and horizontal axes of the graph in the active window.

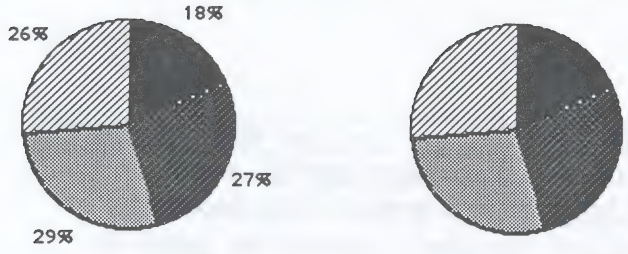
You can also switch the axes of scatter and line graphs as long as both axes are numerical, the graph contains no regression lines, and the graph does not have any column graphs overlaid on it.

If the active window contains a double Y axes graph, the **Switch Axes** command will switch the two vertical axes.

Add Value Labels / Remove Value Labels

You may add or remove value labels on bar, column or pie graphs. Value labels for bar and column graphs are the actual numerical values for each bar. For pie graphs, where you are interested in comparing the percentage contribution of each category to the sum of all categories, the value labels are expressed in percentages.

You can toggle the labels on or off by using this command.



With Labels Without Labels

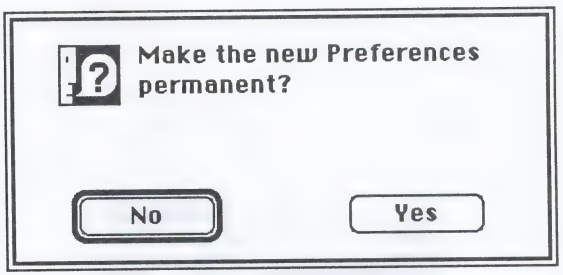
Record Preferences

The **Record Preferences** command allows you to change the way graphs look when Cricket Graph first draws them. Many hours went into determining the default (automatic) settings used to draw each of the graphs. Not everybody will agree, of course, and therefore you can reset the default values used by Cricket Graph.

To use this command, you must modify a graph with the appropriate fonts, tick marks, etc. The actual items set by this command are listed in Appendix B (Technical Details).

A graph must be in the active window to use this command.

After you select **Record Preferences**, the values for all default settings will be taken from this graph and will replace the previous settings. The default values from now on will be the current settings of this graph.



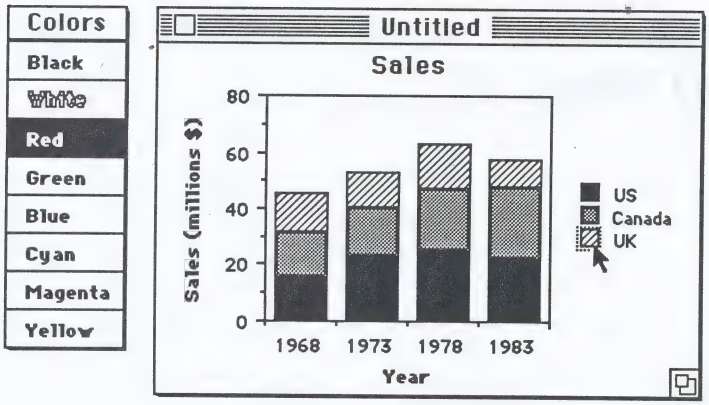
After selecting this command, you will also be asked whether you wish the default values to be changed permanently. If you answer **Yes**, the recorded values will alter the default values in the program and save these changes to the program on disk. The next time you start Cricket Graph, these newly recorded values will be used until you change them again.

Chapter 11
Selecting Colors

The Color Palette

The **Show Colors / Hide Colors** command from the **Goodies** menu will toggle the color palette visible and invisible.

The color palette is used to view current color settings of selected items in the graph and to reassign colors to these items.

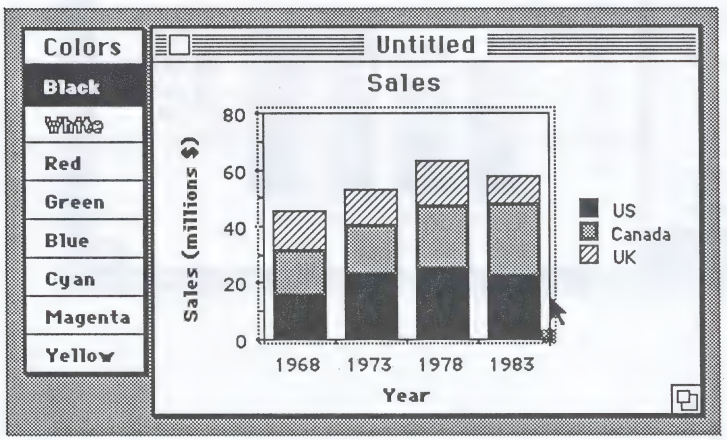


To view the current color setting of an item, click that item to select it. A gray line will appear around that item to indicate that it is selected. The palette will indicate the current color setting of this item by highlighting the color in black. For instance, to find the current color setting of the third pattern in the legend, click it and note that a color in the palette will become highlighted indicating that item's current color setting.

You can set the color for just about anything in a graph. The rest of this chapter breaks the items in a graph into logical blocks and shows exactly where you would click to select and set the color of the various items.

Changing Grid and Axis Colors

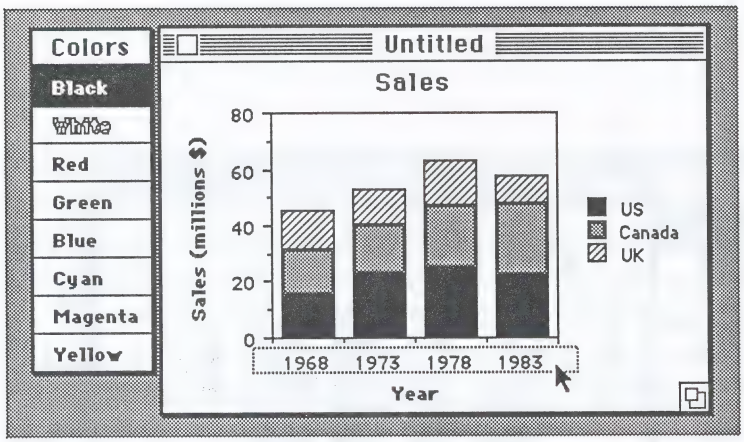
The axes, tick marks and grid lines are all set to the same color and can be reset to another color only as a group. To select the axes and grids, click anywhere on one of the axes. A gray selection rectangle will become visible around the plot frame (the rectangle enclosing the actual bars or plot symbols and bounded by the axes).



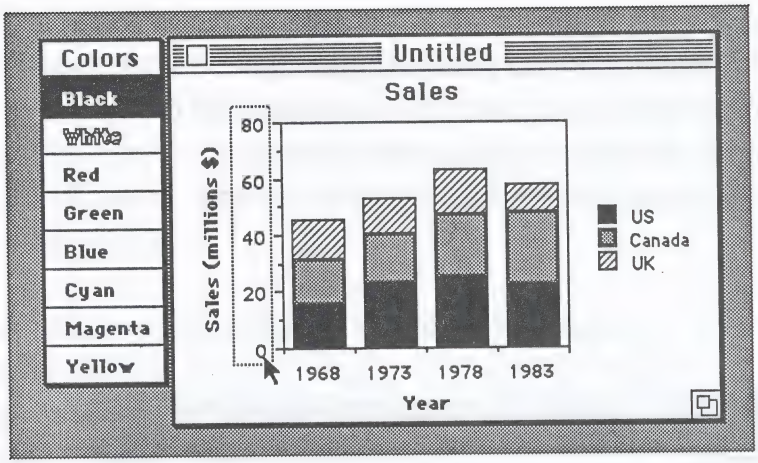
The gray rectangle indicates that the axes and grid lines are now selected. The current color setting of the axes and grid lines is highlighted in the color palette. By clicking another color, you can reset the color setting for these items.

Changing Tick Label Colors

Clicking the area containing the tick labels will place a gray rectangle around the labels indicating that they are selected. The labels for any given axis have to be set as a group.



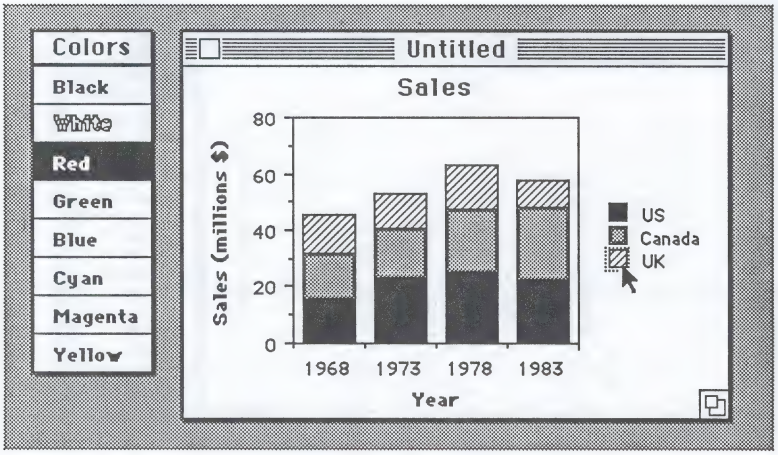
The current color of the selected labels is highlighted in the palette. Clicking another color will change the color settings of the labels.



The tick labels for vertical and horizontal axes can be set separately.

Changing Colors of Symbols and Patterns

The legend is always used as a control point for changing plot symbols and patterns. Setting colors is no exception. To change the color setting of a particular pattern or plot symbol, click that item in the legend.

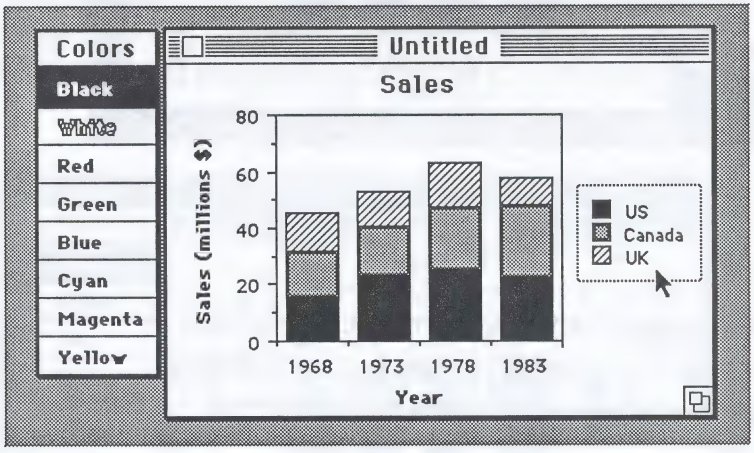


A gray rectangle will become visible around the pattern or symbol, indicating that it is selected. The current color setting of the symbol or pattern is highlighted in the color palette. Clicking another color will reset the color setting of the selected pattern or symbol.

Changing the Legend Color

The frame around the legend, if any, is set to the same color as the axes. Changing the color of the axes will change the legend frame color. Selecting the legend, though, will allow you to change the color of the text within the legend.

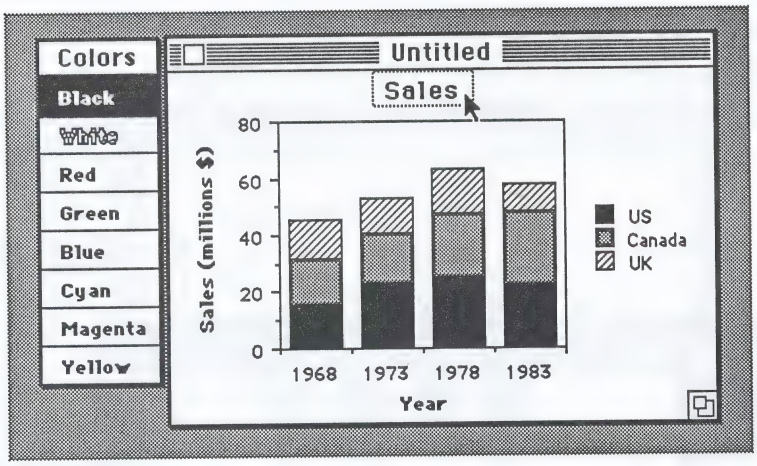
Clicking the area containing the text of the legend will select the legend as a whole. The gray rectangle that appears around the legend indicates that it is selected.



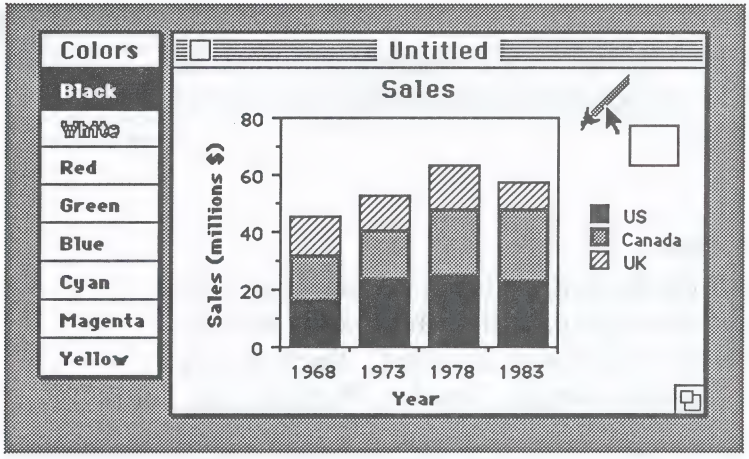
The current color of the legend text is indicated in the color palette by highlighting. Clicking another color will reset the color of the legend text.

Changing Colors of Text, Rectangles, Lines and Arrows

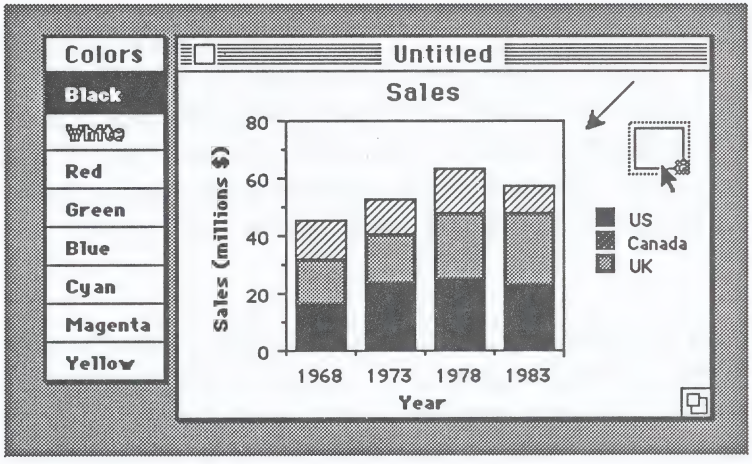
By clicking any of the text items within a graph, you can select that item. The selected item is indicated by a gray rectangle about that item.



After selecting a text item, the current color of that item is indicated in the color palette by highlighting. Clicking another color will reset the color of this item.



Any of the items that come from the Tools window (text, rectangles, rounded rectangles, lines and arrows) can be selected by clicking them. A gray rectangle will appear around the selected item indicating that it is selected.



The color palette will indicate the current selection of the selected item by highlighting that color in the palette. Clicking another color in the palette will reset the color of the selected item.

Printing in Color

If you are sending the graphs to an output device that currently supports color printing, the graphs will be produced with the colors you selected. Such devices include color plotters (Apple, Hewlett Packard, etc.) and the ImageWriter II with color ribbon. Special versions of the software are also available which operate high quality color film recorders and high quality printers.

Chapter 12
The Formats Menu

The **Formats** menu gives you a very powerful capability to recreate graph types with the selection of a single menu command. More importantly, you create new formats that are added to the menu. The term "macro" applied to computers means the bundling of a sequence of events into a command so that these sequences can be applied over and over by the selection of a single command. The **Formats** menu essentially allows you to create "graphic macros".

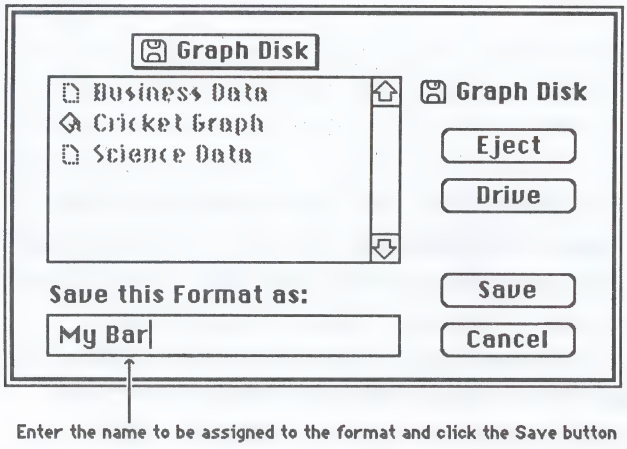
Creating a Format

A format is simply all the instructions necessary to recreate a graph (including everything such as extra text, lines and arrows), without the data or data-dependent items (such as an axis minimum or maximum). Refer to Appendix B for a list of the items that are being saved in a format.

To create a format, you simply use Cricket Graph to create a graph of the type you want. You can add arrows, lines and text. All fonts, sizes and styles for each group of text can be selected by you. You can also choose the patterns and symbols to use in the graph as well as the color selections. After you have designed the graph the way you would like, you select the **Save Format** command from the **Formats** menu.

Saving a Format

After choosing the **Save Format** command, you are presented with the following dialog box...

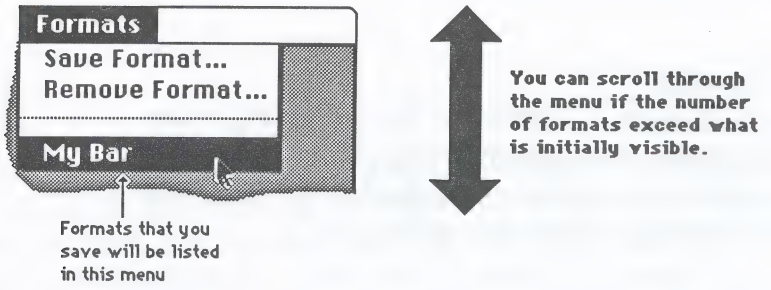


After you have typed in the name and clicked **Save**, the format is saved in a file on disk and added to the **Formats** menu.

Although you can save a format to any disk, the format will be added to the **Formats** menu only if you save it to the same disk from which you are running Cricket Graph. Use the **Drive** button to select the disk on which to save your format.

Recalling a Format

To recall a format, simply select its name on the **Formats** menu just as you select any of the other menu commands in Cricket Graph. However, this menu is a scrolling menu. If the number of formats exceeds the number that can be displayed due to screen limitations, you can scroll through the menu. As you drag through the menu items and near the end of the menu, the menu will begin to scroll so that you can access the remaining formats.



One of two things will happen if you select a format that you added to the menu, depending on what is in the active window or if there are no active windows at all.

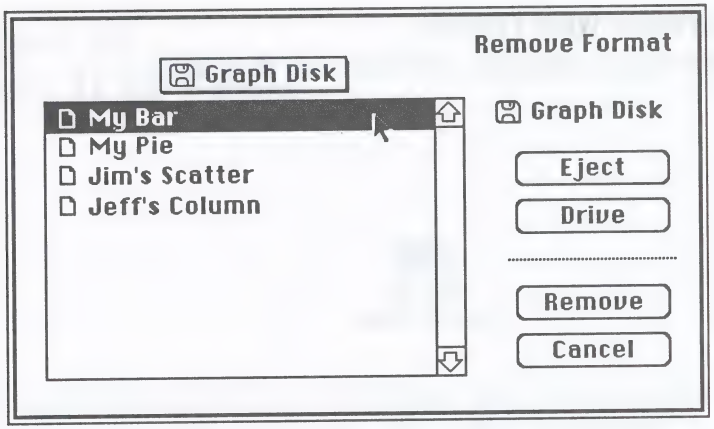
If the active window contains a graph, selecting a format forces this pre-existing graph to the format selected (if that is possible). Cricket Graph first checks to see if the kind of graph specified in the format is of a type compatible with this type of graph. If both axes of a scatter plot were numerical and you tried to force this graph to a format designed for a pie graph, Cricket Graph would warn you that the data in the scatter graph is not compatible for use in a pie graph.

If the active window is not a graph or there are no windows on the desktop, you will be presented with a dialog box to select the data to use in the new graph. After you have chosen the necessary variables, the graph will be created using the format that you selected from the menu.

Hint: It is suggested that you give names to your formats that are an indicator of the type of graph used in this format so that you will not later forget what types of graphs are specified in what formats.

Removing a Format

After adding a number of formats to the menu, you may decide you no longer need some of them. You can use the **Remove Format** command to erase the format from the disk and delete the name from the menu.



After you select **Remove Format**, all formats currently available on the disk will be listed in a scrolling window. This window is very much like the one encountered when opening files from the disk. You can scroll through the selection of formats available, change disks or even eject a disk to swap the disk in the drive (all the standard features available when opening files). Click the format you wish to delete and then click the **Remove** button.

The name of the format is removed from the **Formats** menu, and the disk file that contains that format will be erased from the disk.

Swapping Formats with Others

Formats are stored on the disk as files with this icon...

You can swap these formats with others. You can treat them like any other files and delete, move or rename them. When Cricket Graph is first started up, it determines what formats are currently on the disk and installs the names in the **Formats** menu.

Storing individual formats in separate disk files (with their own icon) has several advantages. You can treat these files as any other files (e.g., move, delete or rename them). You might even create standard formats to be used for certain types of graphs and pass them around to your friends and coworkers. Transferring formats to other disks is done in the normal Macintosh fashion by dragging the icons over to the other disk (refer to the guide that came with your Macintosh).

An example of creating a format and then using it to recreate a graph type is given in the examples section of the first chapter.

Chapter 13
Getting It on Paper

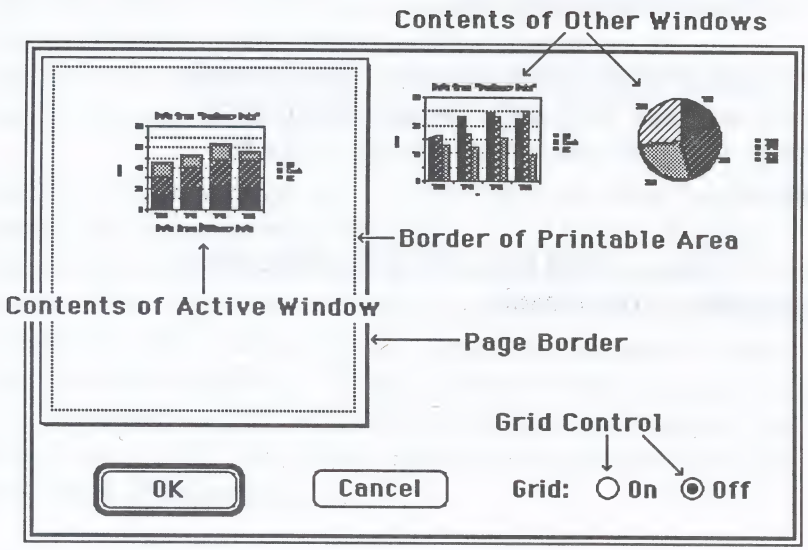
Graphics can be utilized to add impact and convey a lot of information in a very short time. But what good is a graph that you have created if you cannot effectively get it on paper? Control of the printed or plotted output is one of Cricket Graph's strongest features.

Remember that in Cricket Graph you can have multiple windows on the desktop with different graphs in each window. The number of windows is limited only by available memory.

After you select **Print** or **Plot** from the **File** menu, the page layout window is displayed.

Introducing the Page Layout Window

The page layout window contains a miniature image of a page. The size of this image is a scaled version of whatever page size you currently have selected in **Page Setup** (or **Plot Setup** if you selected **Plot**). If you had set the page to the rotated orientation in **Page Setup**, the image of the page would show the page rotated with the widest part of the page horizontal rather than vertical.



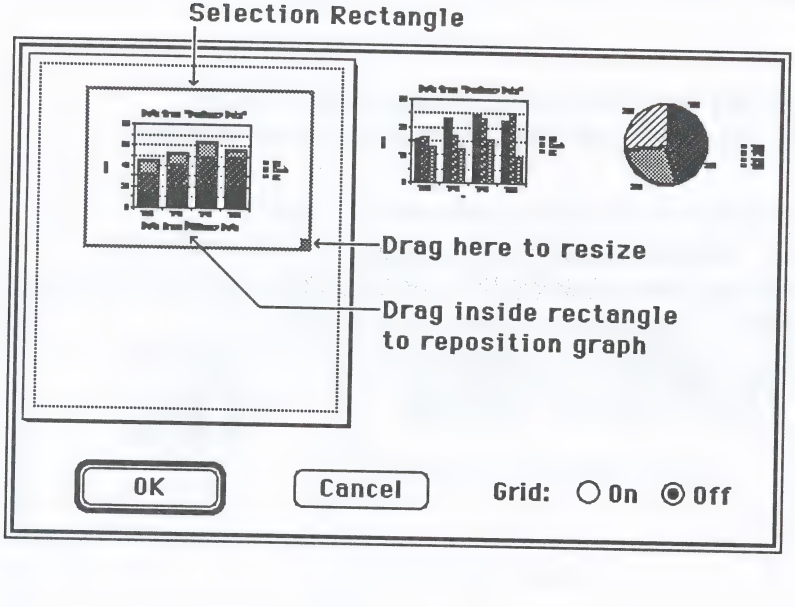
The first time you select the **Print** command after having started Cricket Graph, the contents of the frontmost window containing a graph will be automatically placed on the page. Other graphs that are in open windows will be positioned on the righthand side of the page layout window, off the page. Although you may have as many graphs as memory will allow, only the contents of the front 10 graph windows will appear in the page layout window.

With the page layout window, you can resize a graph, position it on the page, and overlay one graph on another.

The location and size of each graph on the page is "remembered". If you modify the graphs and select **Print,** the layout window will display the page as you had previously left it. However, creating new graphs or closing windows that contain graphs will cause the layout window to "forget" the prior layout.

Selecting a Graph for Moving or Resizing

Clicking the scaled image of a graph will select it. This is indicated by a gray outline that will appear around the edge of the graph.

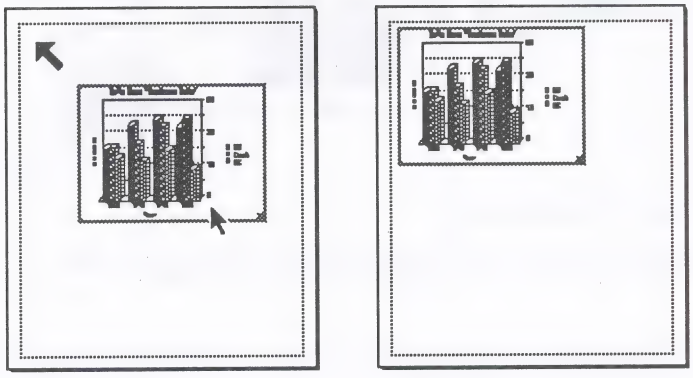


By clicking the grid buttons, you can turn a grid on or off on the page. This grid is to assist you in positioning and aligning graphs on the page. The grid is not visible on the page when sent to a printer.

Moving a Graph

You can place the graph anywhere on or off the printed or plotted page by dragging it around after clicking it. The graph may also be on the page only partially.

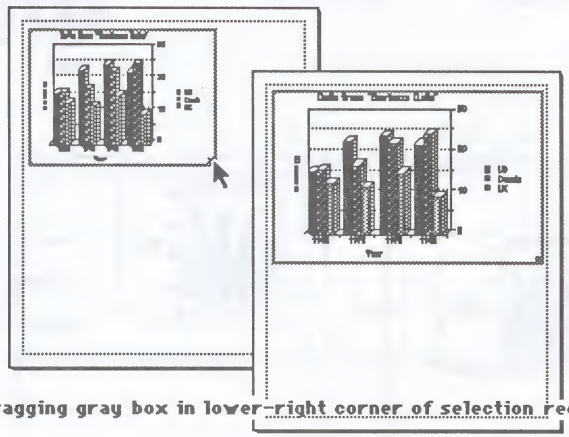
A gray rectangle around the edges of the image of the page denotes the border of the printable area (this is due to mechanical limitations of the various printers). Only the portion of a graph which is within this border will be printed.



Move by dragging inside selection rectangle

Resizing a Graph

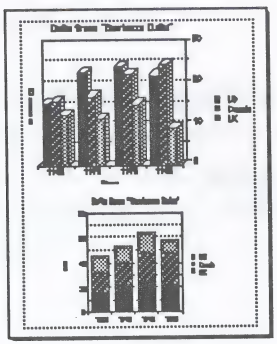
You can resize a selected graph by dragging the little gray box in the lower right corner of the gray rectangle. The graph can be made any size. A portion of it may even be off the page. What you see is very close to what you will get after printing. You can make a graph occupy the entire paper by moving it to the upper left corner of the paper and resizing it.



Resize by dragging gray box in lower-right corner of selection rectangle

Arranging the Graph(s)

By resizing and moving the scaled images of the graphs in this window, you can arrange the way the printed output of a page will appear. You can place graphs side by side for comparisons, or you may even overlay one graph on another for special effects. Each of the graphs is transparent, and overlaying them will still allow the graph in the background to show through.



Arrange page by repositioning and resizing one or more graphs on the page.

Page layout is extremely versatile because it allows you full control of what the printed (or plotted) output will look like.

Working with Color Plotters

Page layout is the same, whether you are sending the output to a printer or to a color plotter. Prior page layouts are not "remembered" when you switch from **Print** to **Plot**. Appendix F describes how to use a color plotter with Cricket Graph.

Appendix A
Do's & Don'ts of Creating Effective Graphs

Cricket Graph allows great versatility in creating presentation graphics -- so much versatility, in fact, that you may be tempted to over-use many of the features in your graphs. It must always be remembered that the primary goal of the graph is to convey a message. Here are a few good rules of thumb that can assist you in reaching this goal.

The following suggestions are not original and in fact are guidelines used by many artists when creating graphs for clients. You should always keep in mind the thought, "What meaning am I trying to convey to my audience in this graph?"

Rule #1: Simplify
With software developers stumbling over each other to give the consumer literally hundreds of options while creating graphs, this is probably the most important rule to remember.

Try to limit the number of elements used in a graph. Adding too much to a graph can confuse the audience and tends to lessen the impact of the intended message.

The number of slices in pie graphs, for instance, should be five or fewer. You can include more, but after eight slices the message begins to get muddled.

Bar graphs, column graphs, and their stacked counterparts should also contain as few sets of data as possible (hopefully never more than 5 sets of data per graph). If you need to, you might wish to group data (the Recode command in Cricket Graph is for this purpose). Quite possibly, graphing the differences between multiple sets of data might be more effective.

Overlaying set after set of data on scatter and line plots can create a confusing picture. Three or four intersecting lines should be considered a practical limit for this type of graph.

Cricket Graph allows up to 16 categories, but graphs should never include anywhere near that many.

You can also overdo things when adding text labels, lines and arrows. Use the minimum number necessary to emphasize your message.

If you find yourself overcrowding a graph, try designing a sequence of simpler graphs. If the number of categories is greater than eight, perhaps grouping several categories into one would produce a better result.

Rule #2: Emphasize

If you want one element to stand out to the audience, then emphasize it! Explode the most important section of a pie graph. Add an arrow pointing to the most significant value in the graph. Perhaps in bar and column graphs you could shade the most important bar in black with all other bars shaded in white.

Rule #3: Use Balance

Use balance when placing things in the graph. Usually this means centering titles and axis labels. If you wish to add text off to the side, you may want to try to balance it by adding something to the other side or, better yet, shifting the plot slightly over to the opposing side.

Rule #4: Space Carefully

The elements of a graph should expand to fill the dimensions of the graph. Try not to crowd objects on the graph. Space can often be used very effectively in a graph.

Rule #5: Maintain Scale

Trends and patterns can be distorted if you are not careful to maintain scale. The vertical height of a graph to its horizontal width should be approximately a 3 to 4 ratio (this is the most pleasing visually). Try to keep the same increments on both x and y axes. Very often, you should force the vertical axis minimum to be zero (at the expense of losing resolution) so that the audience can gain a greater insight into the magnitude of the numbers.

Rule #6: Watch Pattern & Color

Patterns and their shades should get lighter from left to right. Don't use similar shades or patterns next to one another if the two are difficult to distinguish. Some patterns look awful in graphs. Try to select the best patterns that do not look garish next to one another.

Rule #7: Choose Data & Tick-Mark Location

With the vertical axis, you are given the choice of left or right placement. Typically you should use the left edge of the plot for the vertical axis. One exception: when depth (3-D) is added to column graphs, the vertical axis looks better on the right because of the angle of the depth.

Rule #8: Place Numbers & Labels Carefully
Numbers and labels should be easily seen from a distance. Crowding too many numbers on an axis makes the numbers difficult to see at all.

Rule #9: Use Consistent Font Size & Style
The important point to remember in selecting fonts, sizes and styles is to be consistent. With the variety of fonts available on the Macintosh, it is easy for anyone to get carried away. All axis labels should be a consistent font and size. The title may be one exception to the rule. A graph title should be in slightly larger and bolder type than other labels in the graph. Do not use a dozen different fonts strung out in the graph without rhyme or reason.

Rule #10: If it doesn't feel right, redo it!
Redoing a graph with Cricket Graph is easy. If for some reason you feel uncomfortable with the results, try graphing the data in another fashion. Remember, you can create a new graph with the same data in another window and compare.

The better the graphics package, the more tempted you will be to overindulge in all its features. Rule #1 is the one to watch most. Remember, **KEEP IT SIMPLE!**

Appendix B
Technical Details

This appendix describes some of the technical details behind Cricket Graph's operation. It includes specifics about the numeric computation environment, quality control computations, handling of pictures, memory management, and sorting order.

Contents of Saved Formats

The formats saved by Cricket Graph include all the items necessary to recreate that graph less any data dependent items. When you select a format that had been saved, the data dependent items are computed and then the graph is drawn. An example of data dependent items is the axis parameters (e.g., min, max, etc.).

The format record that is saved includes...

(1) The plot frame location and size
(2) The number of overlaid data sets
(3) A list of all the information for each of the overlays (e.g., plot symbol, pattern, plot type, color, etc.)
(4) The settings for the legend (less the labels, since these are data dependent)
(5) Whether or not to draw the plot frame
(6) Whether or not to add depth
(7) If a quality control graph, what type it is
(8) If appropriate, whether value labels are on the graph
(9) Color of the value labels
(10) Color of the plot frame, axes and grid lines
(11) The format of each axis (e.g., linear, log, ticks and grids)
(12) A list of all the extras on the graph (this includes text with size andfont information, rectangles, lines and arrows as well as the color settings of each item)

What does Record Preferences Set?

The **Record Preferences** command from the **Goodies** menu allows you to reset the default values used by Cricket Graph for drawing the various graph types. The default values are reset to the settings currently used in the active graph window.

The default values which are affected by this command are...

(1) The plot frame location and size
(2) The location of the legend and whether it is visible or not
(3) Whether or not the plot frame is drawn
(4) Whether or not depth is added
(5) If appropriate, whether value labels are automatically added to the graph
(6) The tick and grid line formatting for each axis
(7) A list of all the font information for the first three text items in the graph (these are reserved for the x-axis label, the y-axis label and the graph title)
(8) Default color settings for the standard items in the graph (color settings for extras such as rectangles, lines and arrows are not kept)

Numeric Computation Standards in Cricket Graph

All computations performed in Cricket Graph utilize the Standard Apple Numeric Environment (SANE). The core features of SANE are taken from Draft 10.0 of Standard 754 for Binary Floating-Point Arithmetic. For further details refer to:

Floating-Point Working Group 754 of the Microprocessor Standards Committee, IEEE Computer Society. "A Standard for Binary Floating-Point Arithmetic." Proposed to IEEE, 345 East 47th Street, New York, NY 10017.

Cricket Graph uses extended precision variables in all computations to avoid round-off errors. The extended precision variable type has the following characteristics:

precision:	80 bits (19-20 digits)
minimum representable value:	- 1.1 E+4932
maximum representable value:	1.1 E+4932

The extended type is also able to handle infinities and classes designated as Not-a-Number (NANs). You may encounter infinities and NANs when trying to perform transformations on data. The following table will assist you in interpreting these occurrences:

NAN'1'	Invalid square root, such as sqrt(-1)
NAN'2'	Invalid addition, such as adding infinity to -infinity
NAN'4'	Invalid division, such as 0/0
NAN'8'	Invalid multiplication, such as 0 * Infinity
NAN'33'	Invalid argument to a trigonometric function
NAN'34'	Invalid argument to an inverse trigonometric function
NAN'36'	Invalid argument to a logarithmic function
NAN'37'	Invalid argument to x^n
++++	Positive infinity
----	Negative infinity
???	Not enough room to display answer

Computations in Quality Control

The equations used in computing the central line and the control limits for the eight types of control charts are as follows...

$$\bar{\bar{X}} \pm A_2 * \bar{R}$$

$$\bar{\bar{X}} \pm A_3 * \bar{s}$$

$$\tilde{\bar{X}} \pm A_2 * \bar{R}$$

$$\tilde{\bar{X}} \pm A_3 * \bar{s}$$

$\bar{\bar{X}}$ is the mean of combined sample means
$\tilde{\bar{X}}$ is the mean of combined sample medians
$\bar{R}$ is the mean of all sample ranges
$\bar{s}$ is the mean of sample standard deviations
A_2 and A_3 are obtained from Duncan (see reference)

$$n\bar{p} \pm 3\sqrt{n\bar{p} * (1-\bar{p})}$$

$$\bar{p} \pm 3\sqrt{\bar{p} * (1-\bar{p}) / \bar{n}}$$

n is the sample size
$\bar{n}$ is the average sample size
$\bar{p}$ is the average nonconformities

$$\bar{c} \pm 3\sqrt{\bar{c}}$$

$$\bar{u} \pm 3\sqrt{\bar{u}}$$

$\bar{c}$ is the average of the number of nonconformities per constant unit size

$\bar{u}$ is the average of the number of nonconformities per varying unit size

For $\bar{R}$ and $\bar{s}$ graphs the control limits are...

$$LCL = D_3 * \bar{R} \qquad LCL = B_3 * \bar{s}$$
$$UCL = D_4 * \bar{R} \qquad UCL = B_4 * \bar{s}$$

Handling Pictures

When you use the **Copy** command in the **Edit** menu and the active window contains a graph, Cricket Graph places a picture of the graph on the Clipboard. Although a scaled version of the picture is displayed in the Clipboard window, the actual dimensions of the picture are the dimensions of the window from which it came. You determine the picture's size and shape by changing the window before using the copy command.

The Clipboard can handle pictures of any size. Some applications, however, cannot. MacPaint, for example, rejects any picture larger than about 5 inches wide and 3.5 inches tall. The Scrapbook desk accessory centers each picture. If your picture is larger than the Scrapbook's display area, it may look like part is missing even if it is not.

Memory Management

Cricket Graph uses dynamic memory management. This allows the program to make the most effective use of the available computer memory without placing arbitrary limits on you. The program itself is heavily segmented, and data areas are allocated only when you need them.

The result of dynamic memory management is that whenever you open a window, Cricket Graph allocates storage space for a copy of the data displayed in that window. In addition to the space for the data, Cricket Graph also requires space to store the segment of program code that draws the window. The total memory used for these purposes can be substantial if you have a lot of windows open. You may need to take special care to close unneeded windows to free up memory space when you use large data sets in a small machine (or a small Switcher partition).

If your requirements do exceed available memory, you should be aware that Cricket Graph cannot control the amount of space the Macintosh operating system takes for disk directories and other operations. You will have the maximum amount of memory available when you turn the Macintosh on and start Cricket Graph immediately without intervening operations.

Sorting Order

In case you need to know the exact precedence that standard ASCII characters can take in sorting, the list is presented here. The characters increase in sorting value going across a row from left to right and then down to the next row (same as reading).

!	"	#	$	%	&	'	(	)	*	+
,	-	.	/	0	1	2	3	4	5	6
7	8	9	:	;	<	=	>	?	@	A
B	C	D	E	F	G	H	I	J	K	L
M	N	O	P	Q	R	S	T	U	V	W
X	Y	Z	[	\	]	^	_	‘	a	b
c	d	e	f	g	h	i	j	k	l	m
n	o	p	q	r	s	t	u	v	w	x
y	z	{	|	}	~					

Recoding Order

The exact precedence of standard characters for recoding is presented here. Notice that the order is very similar to the order for sorting, except that capital and small characters from A - Z are treated as the same character.

!	"	#	$	%	&	'	(	)
*	+	,	-	.	/	0	1	2
3	4	5	6	7	8	9	:	;
<	=	>	?	@	A(a)	B(b)	C(c)	D(d)
E(e)	F(f)	G(g)	H(h)	I(i)	J(j)	K(k)	L(l)	M(m)
N(n)	O(o)	P(p)	Q(q)	R(r)	S(s)	T(t)	U(u)	V(v)
W(w)	X(x)	Y(y)	Z(z)	[	\	]	^	_
‘	{	|	}	~				

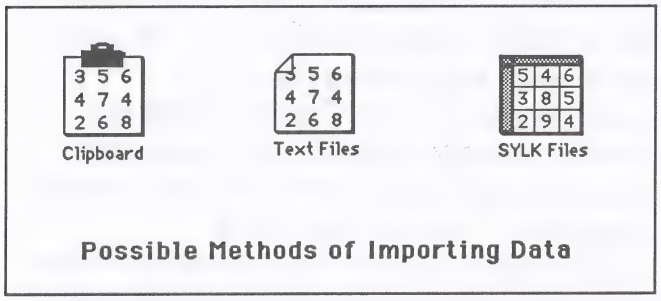
Appendix C: Importing & Exporting with Other Applications

It is not necessary to retype your data from the keyboard if the data is already in some computerized form. You can transfer data from another application (such as a spreadsheet or word processor) into Cricket Graph by using the Macintosh's versatile ability to cut and paste. Cricket Graph can also read TEXT or SYLK files created by many other programs. You can also use a communications application (such as MacTerminal™) to receive data from a mainframe computer. Transferring data in this way can save considerable time and expense.

A few examples of how data or graphs may be transferred between applications are presented in this section. Remember, these are only a few examples of the wide range of data transfer possibilities.

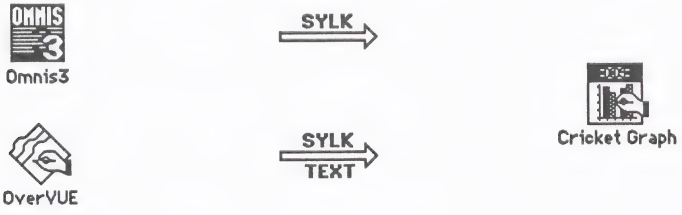
Methods for Importing and Exporting

Most Macintosh applications allow you to cut or copy data from within the program and place it on the Clipboard (Refer to each application's manual for instructions). Once on the Clipboard, data can be imported from another application into Cricket Graph. This works well with small sets of data, but it is more desirable to read data files created by other applications for large data sets.



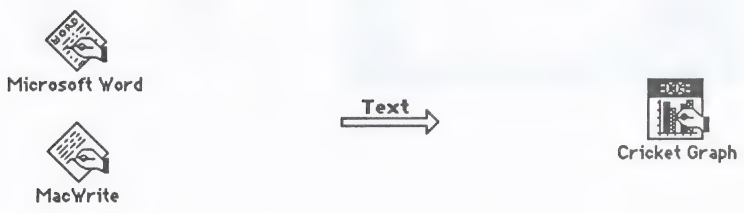
Possible Methods of Importing Data

Many of the Macintosh databases have the capability of saving data sets (usually referred to as reports) in either TEXT or SYLK file format. Some even allow both. SYLK is a file format devised and used by Microsoft in its products.

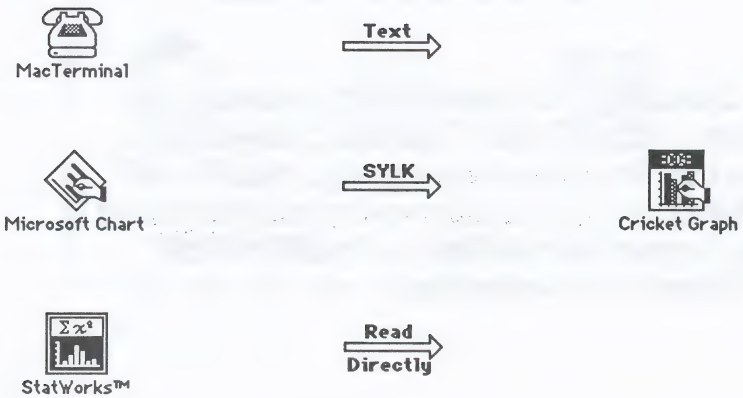


Like the data bases, spreadsheets typically allow you to save your data sheets in SYLK format.

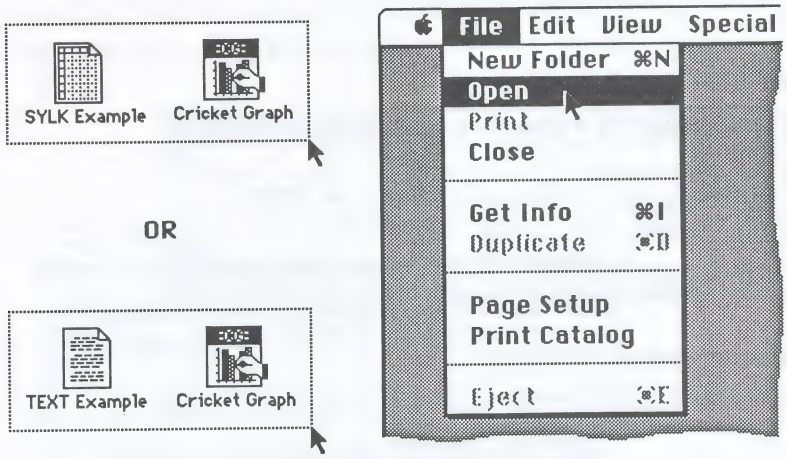
The text files created by Macintosh word processors can also be read into Cricket Graph. You must, however, make sure that the file is saved as text only. MacWrite™, for instance, saves data files in its own internal file format or in **text only** formats but you have to specify which format to use when you save the file.



Most other applications save data either in TEXT format or in SYLK format as an option. Remember though, if the program from which you wish to bring data does not support one of these formats, you can transfer data through the Clipboard (Note: data files from StatWorks™ can be read directly).



To read either a TEXT file or SYLK file created by another application, you must "force" that file to be opened by Cricket Graph. Forcing is the term used to refer to a technique used on the Macintosh to read files created by other programs. To force a file to open, drag over the file icon and the Cricket Graph icon and then select Open from the File menu while in the Finder. Alternatively, you can click the file icon, shift-click the Cricket Graph Icon and then select **Open** from the **File** menu.



When you force a text data file open in this way, you must be sure that the information in the text file conforms to the proper format.

Text File Format used by Cricket Graph

Cricket Graphs's text file format consists of a standard text file that contains **Tab** characters and **Return** characters. **Tab** characters separate data items within a row. **Return** characters separate rows.

If the first character stored in the disk file is an asterisk (*), the first row of data contains column names. When the file is read by Cricket Graph, these names are placed in the column headings. This is a matter of convenience, though, and it is not necessary that files contain the asterisk and store column names with the data (in fact, most applications do not).

The following data ...

Business Data

	1	2	3	4
	Year	US	Canada	Column 4
1	1968	15.9	16.2	
2	1973	23.1	17.4	

would be stored on disk as...

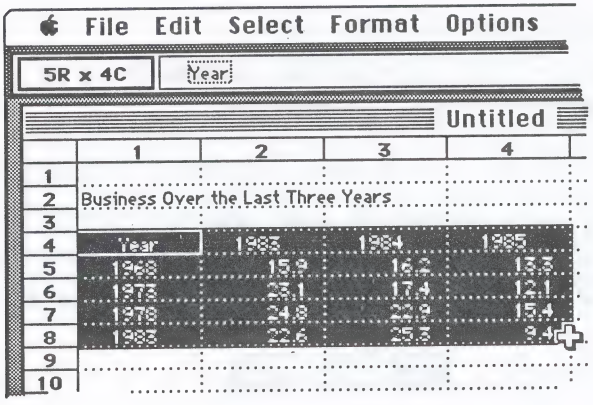
*[CR]Year[T]US[T]Canada[CR]1968[T]15.9[T]16.2[CR]1973[T]23.1[T]17.4[CR]

Where [CR] represents a Carriage Return & [T] represents a TAB character.

By using a simple text file format, you can write small applications in a programming language to create custom data sets (for example, you may wish to write a simulation program for an experiment and then use Cricket Graph to graph the results). At the end of this Appendix you will find two Macintosh Pascal programs that can be used as guides for writing your own programs. Similar programs may be written in BASIC or other languages available for the Macintosh.

Example: Reading a SYLK file

In this example, a SYLK file created in Multiplan™ will be read into Cricket Graph.



Selecting Data in Multiplan

(1) While in Multiplan, select **Save** from the **File** menu. When the dialog appears asking you to name the file, click the SYLK option to save this data in the SYLK format.

(2) **Quit** the Multiplan program.

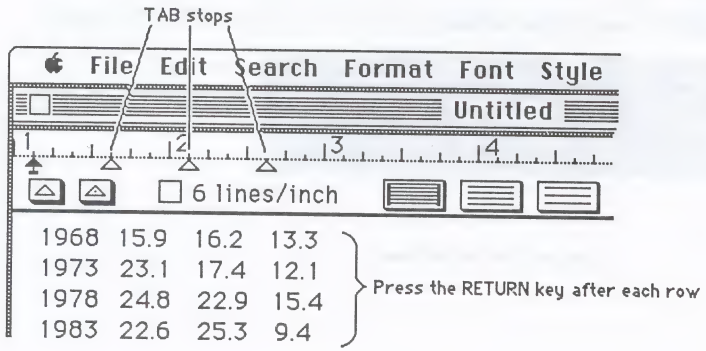
(3) Select the Cricket Graph icon and the icon of the file that you just saved. You can select multiple icons by holding the **Shift** key while you click the objects.

(4) Select **Open** from the **File** menu.

(5) The Cricket Graph program will start up and the SYLK file that you selected will automatically be loaded into a Cricket Graph data window.

Example: Reading a Text File

The following example illustrates how standard text files can be imported into Cricket Graph. The example uses MacWrite to create the text file. It could just as easily be a report generated by a database.



Entering Data in MacWrite

(1) Set the **Tab** stops in MacWrite.

(2) Enter the data, pressing the **Tab** key after each value until you have entered the entire line. Then press the **Return** key.

(3) Select **Save As** from the **File** menu.

(4) Enter a name for the file in the dialog box that is presented. Make sure that the **text only** option is selected (this saves the data, tabs and carriage returns without the extra information , such as font or size, used by MacWrite)

(5) **Quit** the MacWrite program.

(6) Select the icon of the file you just saved and the Cricket Graph icon. You can select multiple icons by holding the **Shift** key while clicking the icons.

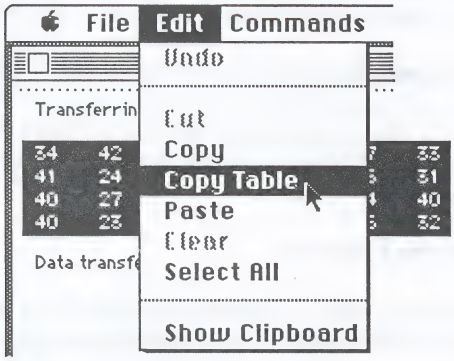
(7) Select **Open** from the **File** menu.

(8) The Cricket Graph program will open and the data from the file (or files) selected will be placed in a Cricket Graph data window.

If you are having trouble getting data transfer between applications by reading files, try transferring the data through the Clipboard. In most cases this will solve any problems.

Data from Mainframe Computers

If you wish to transfer data from a mainframe computer to Cricket Graph, you will need a terminal emulation program for the Macintosh.



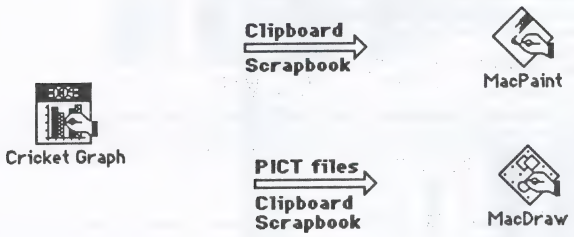
Obtaining Data with MacTerminal

For instance, you may transfer data from another computer to the Macintosh by using MacTerminal™. By dragging the mouse over tabular data received in MacTerminal and then using **Copy Table** from the **Edit** menu, you can transfer the data to the Clipboard. Once on the Clipboard, the data can then be pasted into Cricket Graph.

If the data coming from the mainframe is not in columnar format, you can transfer the data first to MacWrite. In MacWrite you can add the **Tab** characters to create the needed columns from the data. You can then transfer the data into Cricket Graph as explained previously.

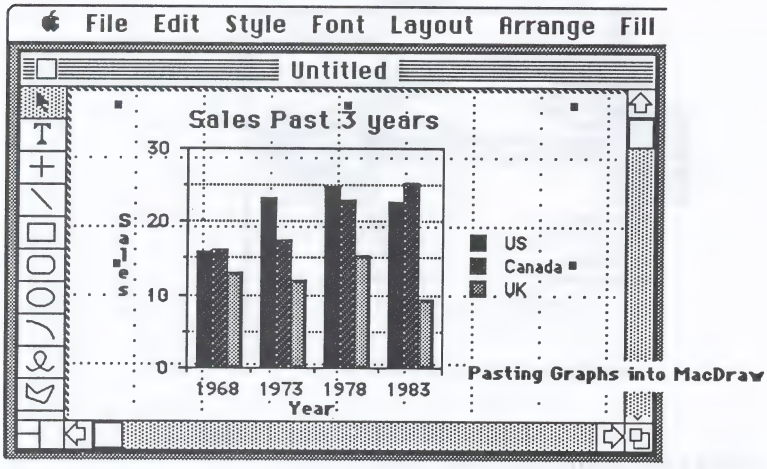
Exporting Graphs to Other Programs

Graphs created in Cricket Graph can be exported to several other Macintosh programs. For instance, by using the **Copy** command on Cricket Graph's **File** menu, you can transfer the graph in the active window to the Clipboard and then paste into MacPaint™. By using MacPaint, you can add to or customize a graph with MacPaint's versatile drawing capabilities.

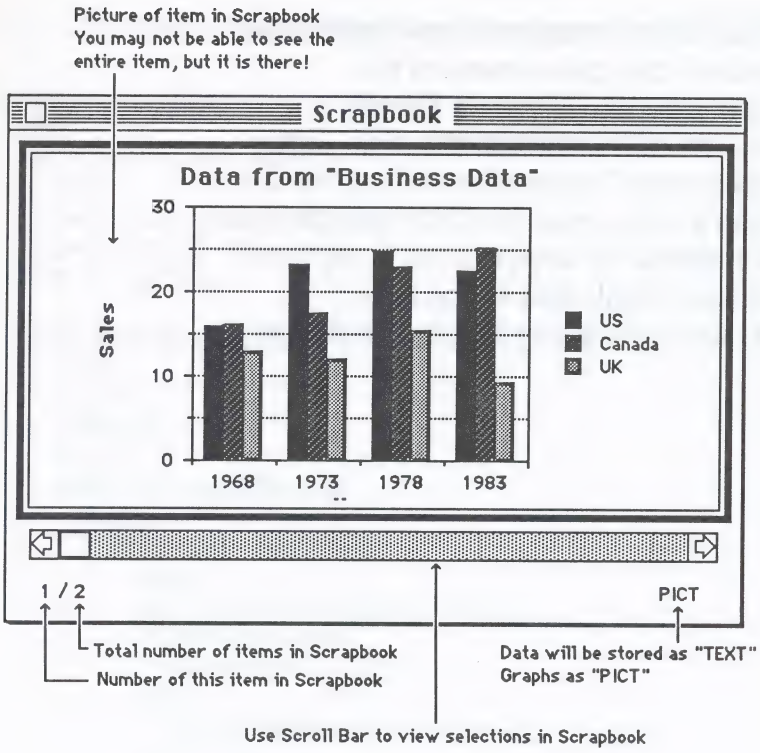


You might even wish to import graphs created in Cricket Graph into FileVision™ or another data base that accepts pictures.

There are basically two methods for exporting graphs to other programs. Applications like MacPaint that use bit maps to store pictures must have the picture transferred via the Clipboard. Word processors, such as Microsoft Word or MacWrite, would also fall into this category.



MacDraw™ and MacDraft™, on the other hand, can read PICT files. The PICT file is just a format for storing pictorial information. Cricket Graph allows you to save graphs in PICT format and therefore you can read these type files directly from programs that use PICT files (Appendix D illustrates using MacDraw with a graph from Cricket Graph).



Transferring Multiple Pictures

Remember that pictures may also be stored in the Scrapbook. The Scrapbook is similar to the Clipboard in that data or pictures can be stored in it. The difference is that multiple items can be stored in the Scrapbook at one time, whereas the Clipboard can hold only one item at a time. If you have several data sets to transfer into Cricket Graph, store the data sets in the Scrapbook. Then transfer each data set from the Scrapbook via the Clipboard into a separate Cricket Graph data window.

A word of caution: If you move to a new application, you must make sure it can gain access to the Scrapbook you just created. If there's already a scrapbook icon on the new application's disk, either rename it and move your Cricket Graph Scrapbook to the new application's disk, or just replace it with your Cricket Graph Scrapbook by copying the Scrapbook icon from the Cricket Graph disk to the new application's disk and responding **Yes** to the dialog box.

Sample Macintosh Pascal Program to Read Files

```
program Readfile;
   var
   ch, cOld, row, col : integer;
   f : text;
   colname : array[1..10] of string[15];
   values : array[1..10] of real;
   line, str : str255;

   procedure Scanline (ItsAName : Boolean);
      begin
      col := 1;
      cOld := 1;
      ch := 1;
      while ch < length(line) do
         begin
            if line[ch] = chr(9) then
               begin
               str := copy(line, cOld, ch - cOld);
               if ItsAName then
                  colname[col] := str;
               else
                  ReadString(str, values[col,row]);
               cOld := ch + 1;
               col := col + 1;
               end;
            ch := ch + 1;
         end;
      str = copy(line, cOld, ch + 1 - cOld);
      if ItsAName then
         colname[col] := str;
      else
         ReadString(str, values[col, row]);
      end;
```

```
begin
   reset(f,'Sample File');
   readline(f, line);
   if line = '*' then
      begin;          {there will be column names}
      readln(f, line);
      Scanline(TRUE);
      end;            {of reading column names}
   else
      reset(f);       {reread from start if no column names}
   row := 1;
   while eof(f) = false do
      begin
      writeln('Reading line',row);
      readln(f,line);
      ScanLine(FALSE);
      row := row + 1;
      end;
   close(f);
end.
```

Sample Macintosh Pascal Program to Write Files

```
program WriteFile;
   const
      nCols = 10;
      nRows = 8;
   var
      row, col : integer;
      f : text;
      colname : array[1..nCols] of string[11];
      values : array[1..nCols, 1..nRows] of real;

begin
   rewrite(f, 'Sample File');
   writeln(f, '*');          {there will be column names}
   for col :=1 to nCols - 1 do
      write(f, colname[col], chr(9));
   writeln(f, colname[nCols]);
   for row := 1 to nRows do
      begin
      for col := 1 to nCols - 1 do
         write(f, values[col, row] :1 : 1, chr(9));
      writeln(f, values[nCols, row] : 1 : 1);
      end;
   close(f);
end.
```

Note: The two Pascal programs are only to be used as guides for writing your own programs.

Appendix D
Working with MacDraw

Apple's MacDraw program is a very versatile package. By creating graphs in Cricket Graph and then transferring to MacDraw, you have a wealth of tools for customizing graphs. A few brief suggestions are provided in this chapter on using MacDraw but it is highly recommended that you refer to MacDraw's manual for more details.

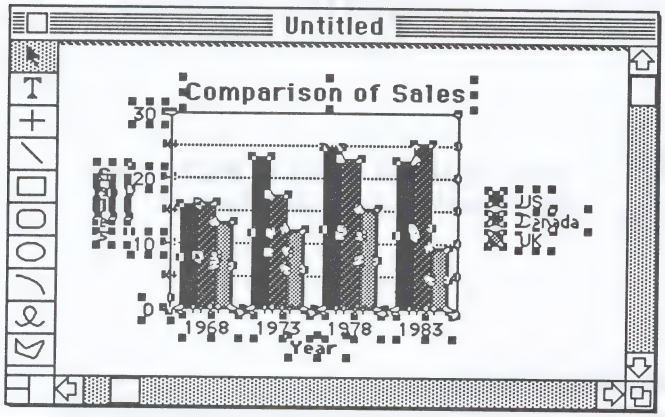
Example Graph

Icon for Graph saved in PICT format. MacDraw can read this format.

Getting Graphs into MacDraw

A graph created by Cricket Graph can be transferred to MacDraw through the Clipboard or as a PICT file.

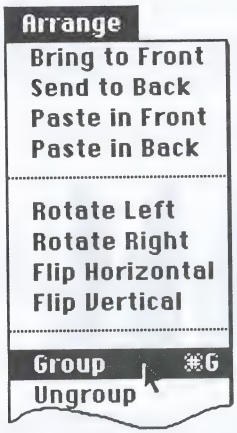
Using the command **Copy Picture** on the **Edit** menu in Cricket Graph places a picture of that graph on the Clipboard. You can then start up MacDraw and paste this picture directly into MacDraw. Remember, multiple pictures can be stored in the Scrapbook before you transfer over to MacDraw. Better yet, save the graphs in PICT format with the **Save Graph** command in Cricket Graph's **File** menu. Start MacDraw and select **Open** from MacDraw's **File** menu. This type of file is listed along with other MacDraw files and you will be able to read the file directly.



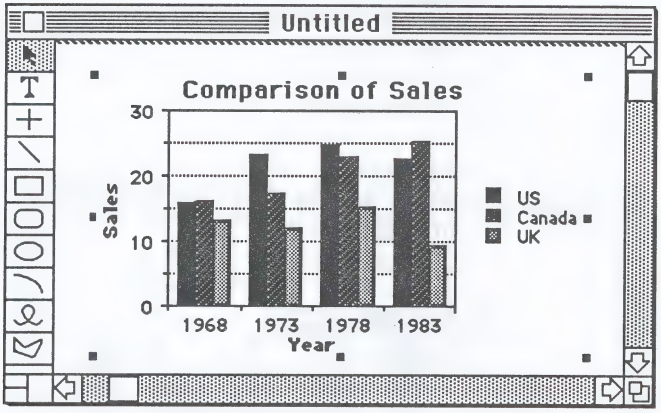
After the picture from Cricket Graph is loaded into MacDraw, it will appear something like above. All those little black squares are called handles and each object has its own set of handles. When Cricket Graph draws a graph each line segment, string of characters and filled polygon is considered a separate object. That's why so many handles appear when the picture file is first loaded into MacDraw.

Grouping Objects

A convenient feature of MacDraw is that you can group multiple objects together so that they can be treated as one object. To do this, select the **Group** command from MacDraw's **Arrange** menu.



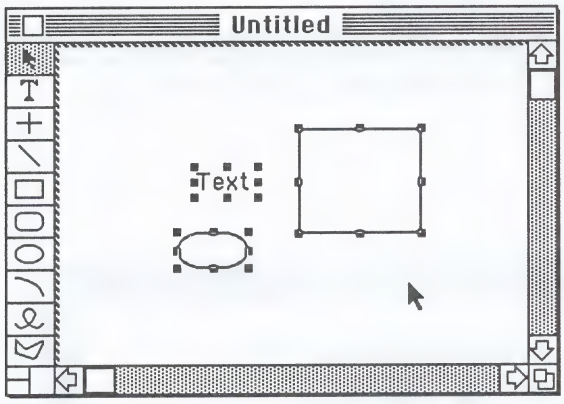
All the individual objects originally in the graph are now grouped together and can be treated as one object. Observe that only 8 handles around the object are now visible. These handles can then be used as controls for moving and resizing this one object (the graph as whole).



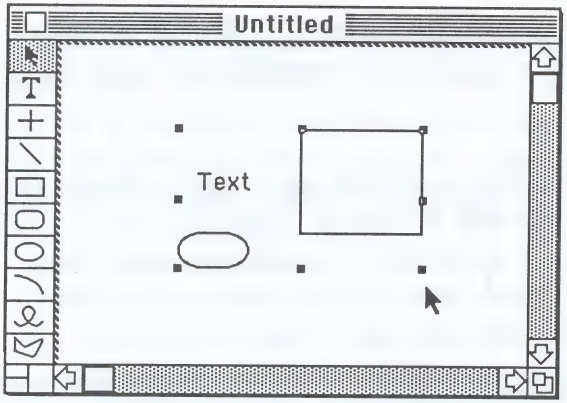
Multiple objects that have been grouped can also be ungrouped as well so that they can be treated or modified individually.

Grouping is a very important feature of MacDraw (and also very convenient) so a simple example will help clear up any confusion.

Suppose that our picture contained only three objects: text, a rectangle and a rounded rectangle. Clicking any one of these objects selects it and handles appears around that object. If you hold down the Shift key and click more objects, they too become selected. This is known as shift-clicking and is a method for selecting multiple objects at a time.

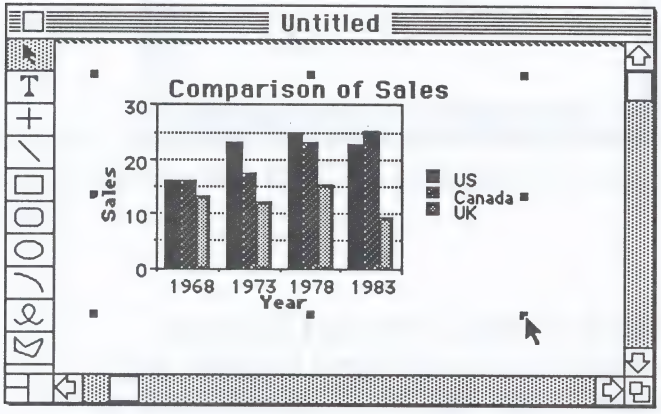


After you then use the **Group** command from the **Arrange** menu, the objects are grouped together and treated as one object. Only one set of control handles appears about the grouped objects (note how the handles form a rectangle about the object).

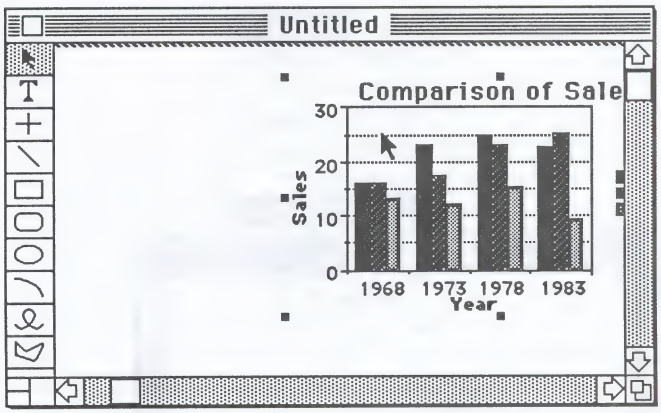


Resizing and Moving Objects

Dragging any one of the handles resizes the object (it effectively stretches or shrinks that object) with the exception of text.

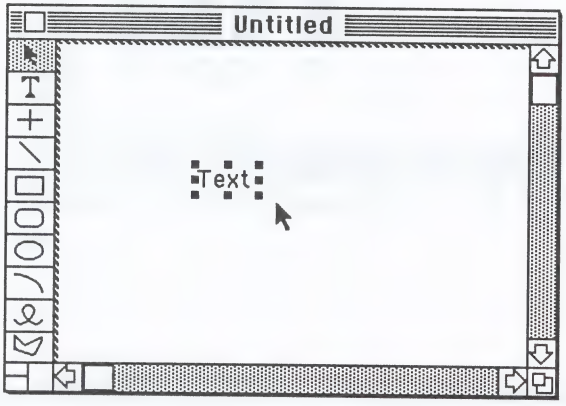


Dragging at a location somewhere within the rectangle formed by the handles allows you to move the object about the drawing area.

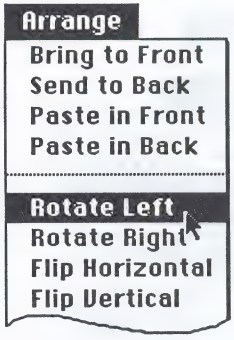


Rotating Objects

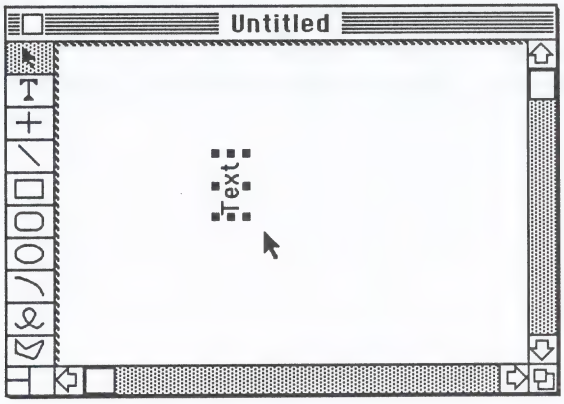
After selecting an object in MacDraw, you can also rotate it. This can be very handy if you would like to rotate the entire graph on the page or perhaps rotate text so that it is printed vertically up or down the page.



After clicking the object, select the **Rotate Left** (or **Rotate Right**) command from MacDraw's **Arrange** menu.



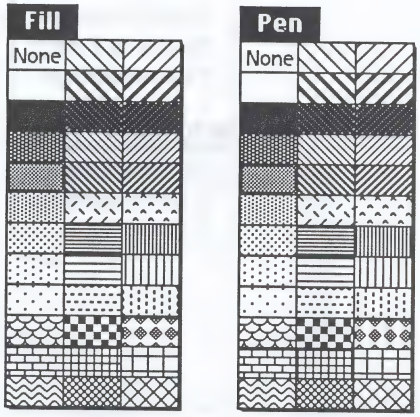
The object will be rotated in the direction that you chose.



Selecting Patterns

MacDraw is very versatile in allowing you to choose the pattern used to fill objects and the patterns used for drawing lines, rectangles, etc.

Patterns available for filling & drawing.



Selecting Line and Arrow Types

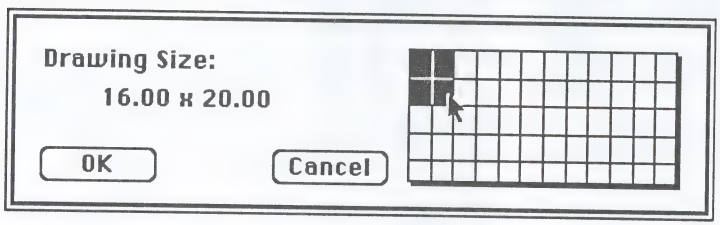
A variety of line types are available when you draw an object. Arrow types are also available.

Lines and arrows that are available

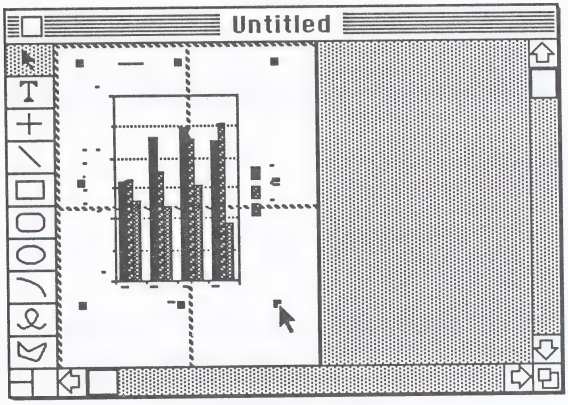
You do not have to preselect these patterns or line types. By selecting an object and then picking a fill pattern or line type, the object is redrawn using the newly selected fill or pen width. Therefore, any of the objects in a picture brought in from Cricket Graph can be changed at any time by selecting it and then choosing the proper menu command.

Setting the Drawing Size

A unique feature of MacDraw is the ability to choose your drawing area and then work with the object over that entire area. The drawing area can be as large as 96 by 48 inches. Each 8 by 10 inch section will be printed out separately. You can then trim the edges and tape the sections together.



After choosing **Drawing Size** from MacDraw's **Layout** menu, the above dialog box will appear. In this window is a block of little squares. Each square represents an 8 by 10 inch area. To select the drawing size you would like to work with, drag over the appropriate squares. Each square that is highlighted in black is now part of the drawing surface.



After selecting the drawing size, you can now see how the object (in this case, the graph) appears in that drawing area. Choose **Reduce to Fit** from the **Layout** menu. A window will appear showing you the entire drawing area with a scaled down version of your object on the drawing surface. You can then select objects, drag them around, and even resize them using the handles.

The combination of Cricket Graph with MacDraw provides versatility beyond compare. In fact, the two work so well together that it is recommended that you consider bundling the pair using Switcher (a 512K Macintosh is required for this to work). Switcher is included on your Cricket Graph System disk and you are encouraged to use it. Appendix E discusses the use of the Switcher program.

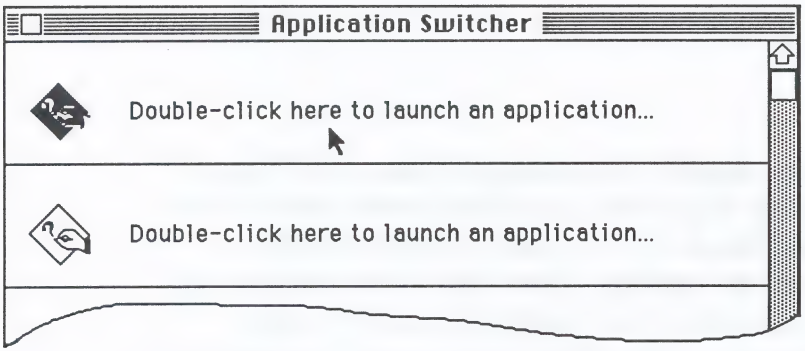
Appendix E
Using Cricket Graph with Switcher

By combining Apple's Switcher program with Cricket Graph and your most often used Macintosh applications (MacDraw or Excel, for instance), you can create a custom integrated package. Switcher is included on the Cricket Graph System & Utilities disk and you are encouraged to use it (requires 512K or more of memory). Also included on the Cricket Graph System & Utilities disk is a preconfigured Switcher document that has Cricket Graph already installed and configured. If you double-click the icon of this document, Switcher is automatically started with Cricket Graph installed.

This chapter describes the very basics that you will need to know in order to bundle Cricket Graph with other applications and use those applications in the Switcher environment. Full documentation on Switcher available and if you don't already have it, you may want to ask your local Apple dealer how to get it. You will need this documentation if you really want to use the more advanced features of Switcher.

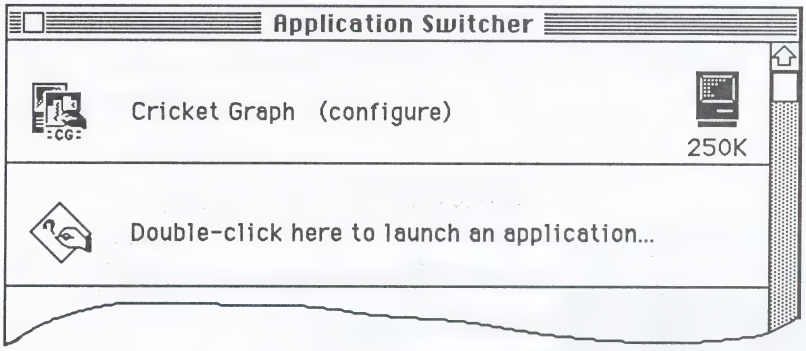
Double-click the Switcher icon from the Finder to start the program.

Installing Applications

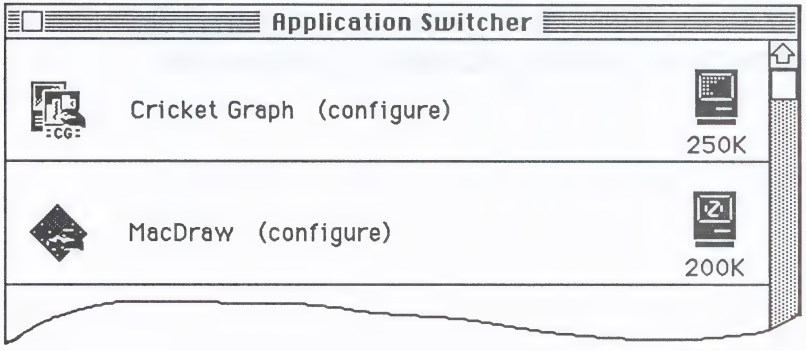


The above screen will be the first item you see after the Switcher program has begun. To use one or more applications in Switcher, you must first install these applications. To do so, you can simply double click where indicated to install an application (they refer to it as "launching"). A dialog box will appear that will let you select the program you wish to install.

Cricket Graph will set the needed memory configuration automatically when installed (the amount of memory set aside for Cricket Graph may not match the illustration below).

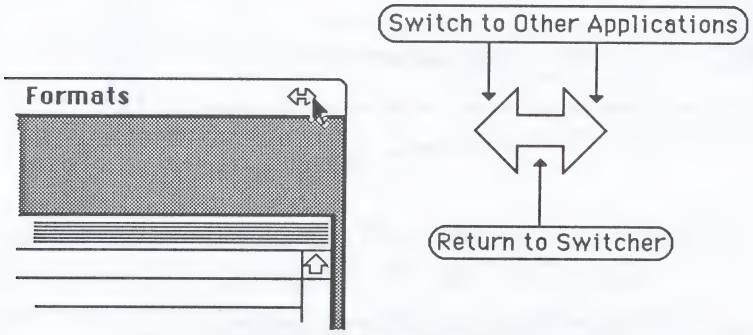


You can follow the same procedures for installing other applications. You might seriously consider bundling Cricket Graph with MacDraw from Apple Computer (the advantages are explained Appendix D).



Switching Between Programs

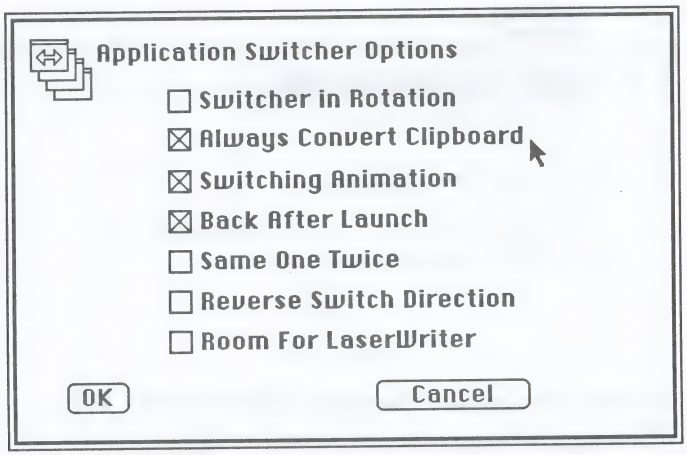
Once you have installed the applications that you wish to bundle together, you can easily switch from one application to another instantly. Switching is accomplished by using the arrow control that appears in the upper righthand corner of your screen. This control is available at all times.



Using the Switching Control

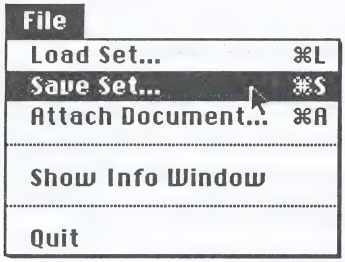
Clicking either the right or left side of the control switches you to the next application. At any time you can return to the Switcher desktop by clicking the center portion of the control.

The **Switcher** menu contains an **Options** command. It will be very helpful for you to check and make sure that the **Always Convert Clipboard** option is turned on (indicated by an "x" in the box) if you wish to transfer information from program to program through the Clipboard. For example, this option will allow you to copy a graph from Cricket Graph onto the Clipboard, switch to MacDraw or MacPaint and paste the picture into that application.

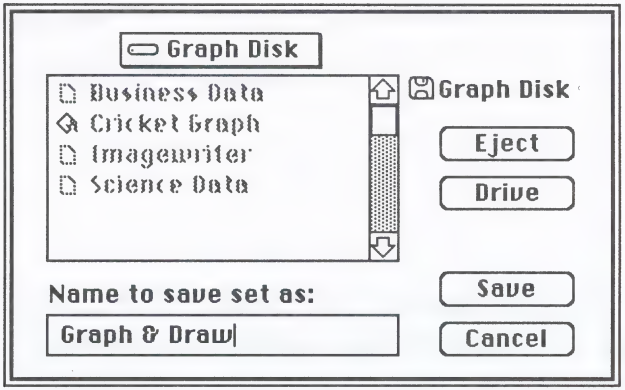


Saving a Bundled Set

After you have installed one or more programs with Switcher, you may want to bundle these applications as one (this is how the preconfigured Switcher document on the Cricket Graph System & Utilites disk was created). This allows you to create your own custom integrated package, a package which includes your favorite and most often used functions (e.g., word processing, drawing, etc.).



Choose the **Save Set** command located in Switcher's **File** menu. You will be asked to enter a name for this set of applications (like saving files).



After entering the name of the bundled set and clicking the **Save** button, the set is saved to disk under an icon of its own.

Bundled Set of Applications

Graph & Draw

You can now open this set by double-clicking the icon from the Finder desktop (just as you can any other program). The applications bundled within this set will automatically be opened and ready to run.

In essence, by using Switcher you have created a custom integrated environment tailored to suit your needs.

Quitting Switcher

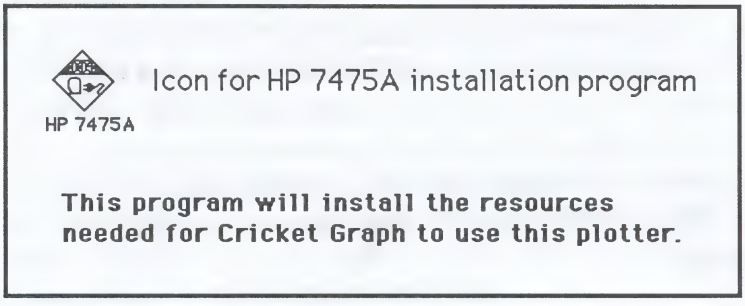
To quit Switcher, you must first switch to each application and quit that application. Switcher will not let you quit if an application is still open.

Appendix F
Using Color Plotters

Cricket Graph can plot graphs on a number of color plotters that can be connected to the serial ports on the back of the Macintosh. Either serial port can be used.

Installing the Plotter Resources

You will need to install the necessary resources to configure Cricket Graph for the type of plotter that you wish to use. Several small icons representing different plotters are on the Cricket Graph System & Utilities disk. If your plotter is not represented by an icon, you may want to contact Cricket Software to see if an installer has become available.



Choose the icon which represents the plotter that you will be using. Copy this file to the Cricket Graph disk (the disk that the program is located on) by dragging the icon from one disk to the other. The installation program **MUST** be on the same disk as the Cricket Graph program.

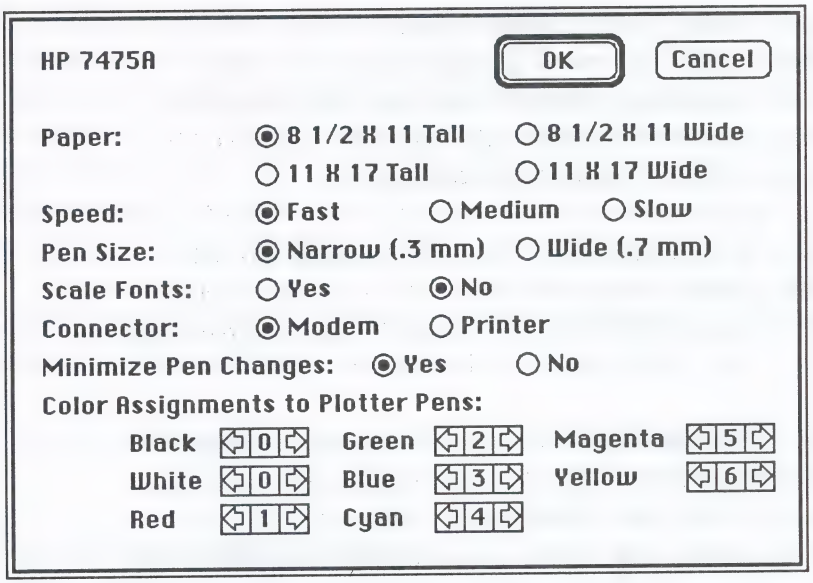
After you have copied the installation program for your plotter onto the Cricket Graph disk, double-click the installation program's icon. The resources for the plotter you selected will be installed into the Cricket Graph program. That's all there is to it.

After the installation is finished, you will have the option of starting Cricket Graph immediately or returning to the Finder.

Only one plotter can be installed in Cricket Graph at a time. However, at any time, you can replace the resources for the current plotter by installing the resources for another plotter.

Plot Setup

The first thing you need to do after installing the plotter is select the **Plot Setup** command from Cricket Graph's **File** menu. Each dialog is specific for the plotter you have chosen. In this example, the installation was done for an HP 7475. Therefore, the exact details for setting the parameters for the plotter you are using may vary slightly from the example.



The most obvious thing to select first is the paper size you wish to use. Notice that you can choose whether the image appears in the tall or wide direction on the paper. When you put paper into the plotter, insert it as specified in your plotter manual. If a rotated image is selected, Cricket Graph will rotate the image before plotting. You do not need to turn the paper.

Select the desired pen speed. Fast is fine for new pens. As your pen wears down, you can reduce the pen speed for a better image. The pen speed should be set to Slow if you are going to make transparencies.

Cricket Graph also needs to know what the width of the pen tip is. Set the appropriate size.

You may wish to turn on the **Scale Font** feature. If **Scale Font** is on, the fonts will be scaled to the same proportion as the scaling necessary to draw the graph in the size you select in the plotter page layout. In most cases, you may wish to leave this feature off.

The plotter can be connected to either serial port on the back of the Macintosh, but you must set the appropriate button in this dialog to tell the software which port you are using.

You can also set the feature for minimizing pen changes. If you have this feature on, the plotter will finish drawing all objects in a certain pen color before changing pens. This will save a great deal of time since pen changestake a considerable amount of time on some plotters.

Setting Pen Colors

The number of pens available is specific to the type of plotter you are using. Cricket Graph supports the use of eight colors (including black and white). After setting colors in the graph itself, you must then set the pen colors in this dialog. Usually, plotter pens are referred to by number and are not a fixed color. You can set the color when you put the pens in the plotter's penholder.

Next to the name of each color supported by Cricket Graph is a number representing a plotter pen. You can reduce the pen number by clicking the left arrow of the control. Likewise, clicking the right arrow will increase the pen number. The pen number can be increased up to the largest pen number that your plotter allows.

Plotters do not have a pen number zero. You can turn a color off by setting the pen number to zero. Go ahead and select the desired pen numbers that will represent each of the eight colors. Notice that you can specify that two or more colors be drawn by the same pen. Also, note that most plotters do not have a pen for white so you probably will want to turn this color off by setting to zero.

Install the color pens in the plotter as you set these controls. This will help you avoid confusion later on.

When all options have been set, click the **OK** button.

Page Layout with the Plotter

After creating graphs in Cricket Graph, you can send output to the plotter by choosing **Plot** from the **File** menu. A page layout window will appear. You can drag, resize and place multiple graphs on the page just as you can with the **Print** command.

After you have arranged your page, click the **OK** button and if all goes well, the plotter will begin to draw your graphs.

Graphs that have depth added to them may or may not look fine on the plotter. The reason is that lines drawn in the background are not hidden and may show through a foreground color.

Technical Details on the Serial Interface

The plotter is connected to the Macintosh through one of the two serial ports on the back. The standard ImageWriter cable can be used to make the connection for many plotters.

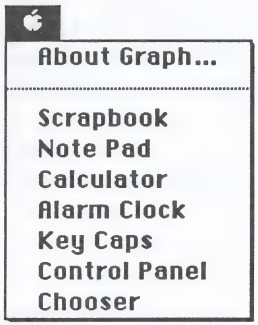
The communication protocol used for most plotters is...

9600 Baud
8 Data bits
1 Stop bit
No Parity

If your plotter requires settings different from these, a message will appear just under the plotter's name in the Plot Setup window.

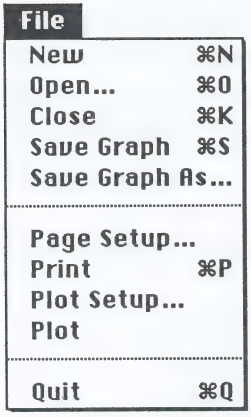
You do not have to set any of these parameters in Cricket Graph. The necessary parameters were set when you install the plotter resources. You may find the protocol information useful if you find you must reset the switches that are typically found in each plotter. If you are having problems getting the plotter to work, check your plotter's manual and make sure that the switches are set for the correct protocol.

Appendix G
A Quick Tour of the Menus...



About Graph...
Displays information about program and publisher.

Desk Accessories
All the traditional desk accessories are available and fully functional. The Scrapbook is very handy for storing one or more graphs created in this program. The graphs can then be pasted into other Macintosh applications.



New
New opens a new, untitled data window.

Open...
Opens and retrieves an existing data set or a graph that has been previously saved.

Close
Closes the active window.

Save Graph / Save Data
The Save command will reflect what is currently in the active window (a graph or a data set). Save Graph will save the graph in the active window on disk for later recall. Save Data will save the data set on disk. The data set can then be recalled later.

Save Graph As... / Save Data As...
Save As allows you to save the contents of the active window on disk under a new name.

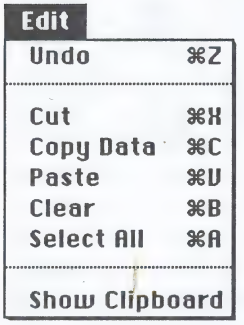
Page Setup...
Page Setup lets you specify the paper size and other printer characteristics.

Print
The Print command prints a copy of the active window using the settings specified by Page Setup. If the active window contains a graph, a page layout window will appear allowing you to position and size one or more graphs on the page.

Plot Setup...
The Plot Setup command is similar to Page Setup. The specified settings affect devices connected to the serial port of your Macintosh.

Plot
The Plot command sends commands to a serial output device for drawing on that device. This command can only be used to draw graphs. Before the actual drawing is done, you will be presented with a page layout window that will allow you to place and size one or more graphs on the page.

Quit
Quit leaves Cricket Graph and returns to the Finder.



Undo
The Undo command can be used to remove data sets from a graph that contains more than one set of data. The last set of data to be drawn on the graph is removed using this command.

Cut
The Cut command removes selected text in the data window and places the selection on the Clipboard.

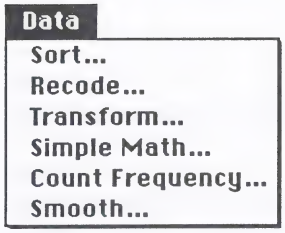
Copy Graph / Copy Data
The Copy command reflects the contents of the currently active window. Either a graph or a selection of data can be placed on the Clipboard using this command.

Paste
The Paste command replaces the current selection in a data window with the current contents of the Clipboard (if the Clipboard contains text).

Clear
The Clear command removes selected text from a data window or objects selected in a graph.

Select All
Select All can be used to select the entire contents of a data window.

Show Clipboard / Hide Clipboard
The Show clipboard command opens or closes a window that displays the current contents of the Clipboard.



Sort...
The Sort command sorts the rows of data in order according to the column you specify.

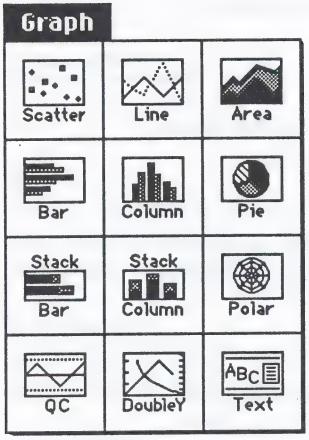
Recode...
You may use Recode to group a range of data into a single code (numerical or categorical).

Transform...
The Transform command performs mathematical transformations on a column of data.

Simple Math...
The Simple Math command allows you to add, subtract, multiply or divide a column of data by another column or a constant.

Count Frequency...
Using the Count Frequency command, you can take raw categorical data (i.e., a list of unordered or grouped categories) and create two columns. One column contains the unique category names encountered and the other column contains the frequency of occurrence for each category.

Smooth...
The smooth command allows you to perform a sliding average smooth on a specified column of data. You are allowed to choose the smooth width.



Scatter
Scatter graphs allow you to specify one variable for the horizontal axis and one or more variables for the vertical axis.

Line
Line graphs are similar to Scatter graphs except that a line is used to connect each of the data points. Also, either a categorical or numerical variable may be used for the horizontal axis.

Area
An Area graph is used to graph multiple sets of values along the vertical axis. Each set is added to the values of the previous set before graphing. Either categorical or numerical data can be used along the horizontal axis.

Bar
A Bar graph can be used to compare one or more sets of numbers among a specified set of categories. The bars are graphed in a horizontal fashion. The horizontal axis is numerical and the vertical axis lists the categories.

Column
A Column graph is very similar to a Bar graph, except that the bars are drawn in a vertical fashion. Therefore, the horizontal axis lists the categories and the vertical axis is numerical.

Pie
A Pie graph is used to show the proportion contributed by each category to the sum of all the categories. Only one categorical and one numerical variable are used in this type of graph.

Stack Bar
A Stacked Bar is very similar to a Bar graph. Instead of placing the various values for each category side by side, they are stacked end to end.

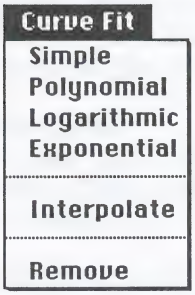
Stack Column
A Stacked Column graph is like a column graph except that the various values for each category are stacked one on top of another instead of side by side.

Polar
A Polar graph uses a polar coordinate system where each data point is specified by a radius from the center and an angle from a reference point. Multiple sets of radii and angles may be overlaid with one another.

QC
By using the QC command, you have the choice of creating a number of different types of graphs used quite frequently for tracking Quality Control.

DoubleY
With the DoubleY graph, you can plot two sets of data on the same graph even if different vertical axis scales are used for each set of data. The horizontal axis can represent either numerical or categorical data.

Text
A Text graph can be created using words. This may be a very good way to emphasize a message very simply. A number of tools are available so that you can add lines, boxes and arrows.



Simple
Simple regression will draw the "best fit" straight line through the data on a scatter or line graph. If multiple sets of data are on the graph, you can select which data values are to be used in the computation.

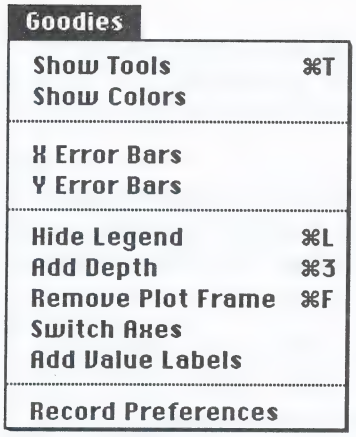
Polynomial
The Polynomial command will fit up to a fifth order polynomial through the selected set of data. The graph must be a scatter or line graph.

Logarithmic
The Logarithmic command will perform a logarithmic regression on the selected data and draw the computed curve.

Exponential
The Exponential command will perform an exponential regression on the selected data and draw the computed curve.

Interpolate
With the Interpolate command, you can draw a curve for the selected data that will pass through each and every point (unlike the regression fits). This is very similar to using an electronic "French Curve".

Remove
You can use the Remove command to delete a fitted curve from the selected data set on a graph.



Show Tools / Hide Tools
The Tools command will make the toolbox visible or invisible. The tools can be used to add such things as text, lines and arrows to a graph.

Show Colors / Hide Colors
The Colors command will make the color palette visible or invisible. With this palette you can change the color of any selected item in a graph.

X Error Bars
The X Error Bars command allows you to add error bars to each data value in a scatte,line or bar graph. You have the option of specify one of three ways to obtain the error to be used. The bars are drawn in a horizontal fashion corresponding to the x axis.

Y Error Bars
The Y Error Bars command is very similar to the X Error Bars command. The bars, in this case, are drawn in a vertical fashion corresponding to the vertical axis. Y error bars can be placed on scatter, line or column graphs.

Hide Legend / Show Legend
The Legend command can be used to make the legend in a graph visible or invisible.

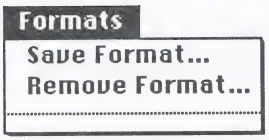
Add Depth / Remove Depth
Using the Depth command removes or adds a three dimensional appearance to a graph. Depth really adds character to bar and column graphs.

Remove Plot Frame / Add Plot Frame
The Plot Frame command will cause the graph to be redrawn with or without the plot frame.

Switch Axes
On many graphs, the Switch Axes command can be used to swap the horizontal and vertical axes. On the Double Y graphs, the two vertical axes are swapped.

Add Value Labels / Remove Value Labels
Labels in column and bar graphs can be added or removed for each bar using the Value Labels command. Likewise, the wedges of a pie graph can also be labeled.

Record Preferences
Record Preferences looks at the graph in the currently active window and uses all the parameters set in the graph as the default values for all further graphing. With this command, you can reset all the default values either temporarily or permanently.



Save Format...
The Save Format command can be used to save all the data-independent information of the graph in the currently active window. You will be given the chance to name this format. The format is then added to this menu under the name that you assigned it. Selection of that format will cause the graph to be recreated except that you will be given the opportunity to specify a new data set and a new selection of variables. The graph used to specify this format will be created using the new data. This command gives you the capability to create "Graphic Macros".

Remove Format...
The Remove Format command allows you to remove a previously saved format from the disk and from the menu. This command is only active if there are formats currently saved and listed on this menu.

All Formats currently saved will be listed.

References

Apple Computer, ***MacDraw: Owner's Guide*** (Cupertino: Apple Computer, Inc., 1985).

Duncan, A. J., ***Quality Control and Industrial Statistics*** (Illinois: Richard D. Irwin, Inc., 1955).

Hertzfield, Andy, ***Switcher Manual*** (Cupertino: Apple Computer, Inc., 1985).

Meilach, D.Z., "The Do's and Don'ts of Presentation Graphics", PC Week, Vol. 2 No. 31, pp. 4747-50, 1985.

SAS Institute, ***SAS Views: SAS Color Graphics*** (North Carolina: SAS Institute, 1983).

Schmid, C.F., ***Statistical Graphics: Design Principles and Practices*** (New York: John Wiley & Sons, 1983).

Stahr, Lisa B., "Graphically speaking", Personal Computing, November 1984, pp. 80-89.

Stineman, R. W., "A Consistently Well-Behaved Method of Interpolation", Creative Computing, July 1980, pp. 54-57.

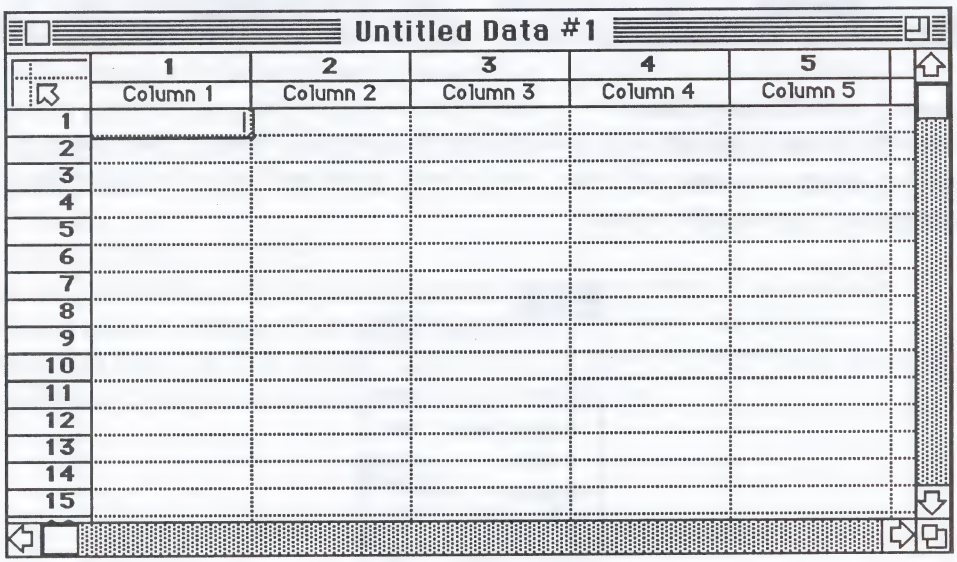
Wilcox, D.L., "The Boom in Business Graphics", PC World, August 1984, pp. 54-61.

Index

Addendum:
Version 1.1 and 1.2 Updates

The New Data Window

The data window has been improved to give it more of the feeling of a spreadsheet program—though be aware that it is not a spreadsheet. You may notice when you start up the program that all the columns are now pre-assigned default names. There is a predefined grid of 2700 rows by 100 columns. You may enter data anywhere in the sheet . (Of course, memory restrictions limit the portion of the total spreadsheet you can use at any one time.)

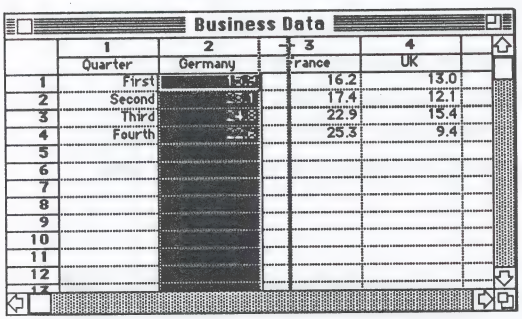


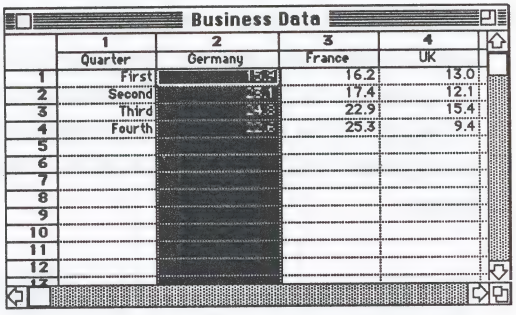
Cell Size

The number of characters that may be entered in a cell is now 31. However, the maximum number of digits supported in a decimal number is 19 or 20, depending on the value of the number. If you enter a number with more than 19 or 20 digits, the trailing digits are stored as zeroes.

Adjusting Column Width

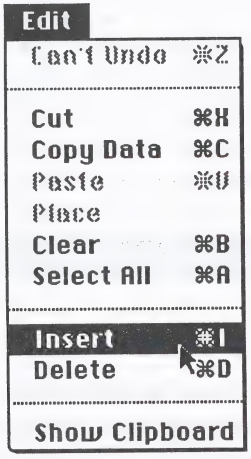
You may now adjust the width of individual columns. To do so, move the cursor to the righthand part of the cell where the column number is located. The cursor changes from an arrow into a double-headed arrow. Click and drag, and you can make the column wider (up to 31 characters) or narrower (down to 2 characters). A dotted line indicates the changing column border as you drag. Changing the width of one column does not affect any other column.





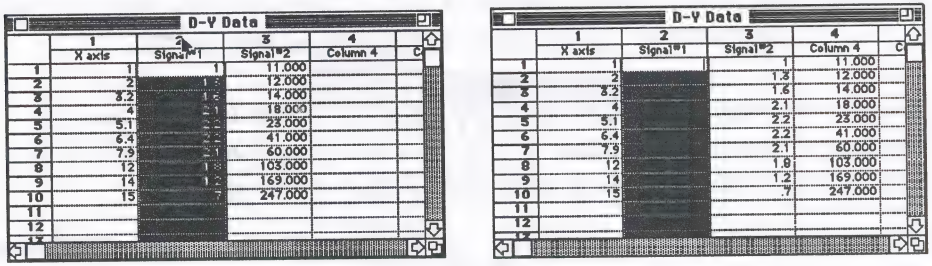
Inserting and Deleting Data

Under the **Edit** menu are two new entries, **Insert** and **Delete**. You may insert or delete columns and rows, or you may insert and delete within any rectangular range on the screen.



Inserting Columns or Rows

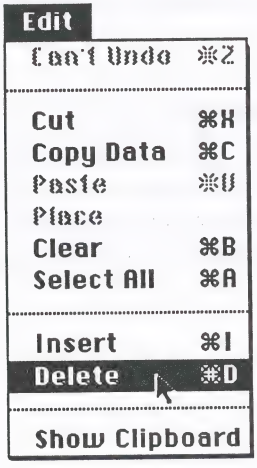
To insert a new column or row of data, click the number of the column or row at which you want to insert data. All the cells in that column (or row) are now selected. Then select **Insert** from the **Edit** menu. If it is a column, all the data in the current column moves to the right, as do all columns to its right. If you insert a row, all the data in the current row shifts down, as do all rows below it. The program warns you if you are about to push data off the edge of the sheet. You are asked to confirm or cancel the operation.



Column headers behave rationally in an insert operation. A user-entered column name ("Quarter") shifts with the data to which it is connected. A default column name ("Column 4") remains with the column whose number it represents.

Deleting Columns or Rows

Deleting columns and rows works in much the same way. You click the column and row number to select that range. Then select the **Delete** command from the **Edit** menu. The column or row disappears, and the other columns and rows shift automatically, up or to the left.

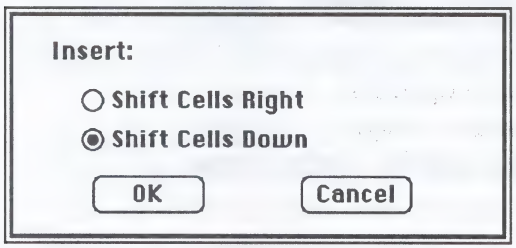


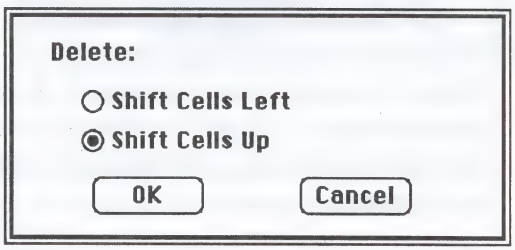
Be aware that **Delete** is different from **Cut** or **Clear**. With **Cut** or **Clear**, the data in the column or row disappears, but the column or row remains in the same place and no shift takes place. Unlike **Cut** or **Clear**, however, you cannot **Undo** a **Delete**.

You may also select several columns or rows and delete them at the same time.

Inserting and Deleting Areas
You may also insert or delete within any rectangular area in the spreadsheet, ranging from one cell to a large number of cells. Click and drag from a corner cell in your designated area, until all the cells you want are selected.

If you want to insert, you are asked if you want the contents of the current cells shifted down or to the right. If you want to delete, you are asked if you want the contents of the adjacent cells shifted up or to the left.



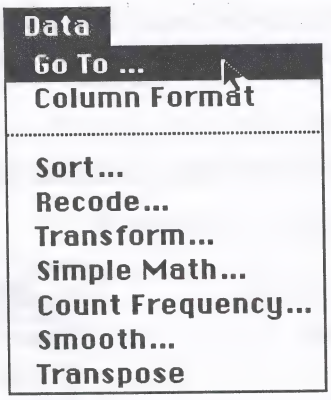


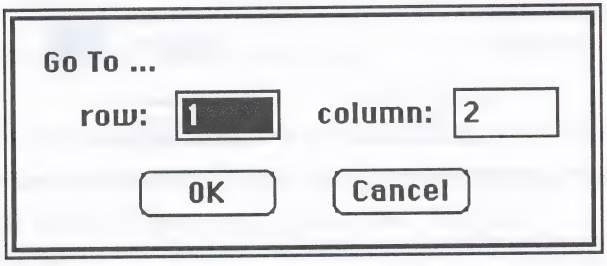
Column headers are not affected by inserting or deleting in this way.

The Data Menu

The Go To Function

Under the **Data** menu, the new **Go To...** function allows you to select a specific cell to which to move in the window. You give the coordinates of the cell by row and column number. The cell you have designated is displayed on the screen and it is selected. The initial row and column values in the dialog box are for the current cell. To go to the current cell (in cases where you have scrolled it off the screen), you need only enter the **Go To...** command and press **Return**.





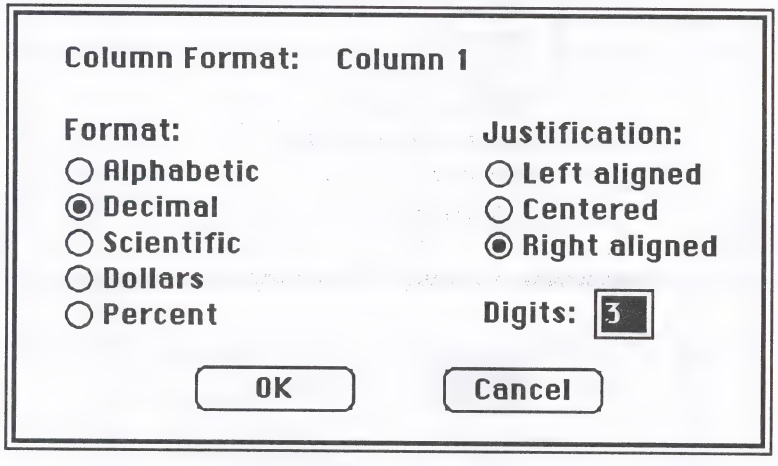
The Column Format Function

Under the **Data** menu, the new **Column Format** function allows you to select specific data types and formats for each column. This allows you not only to set the data type of the data you enter, but also to adjust the appearance of the column as you wish. Probably the most important feature of this command is to prevent the entry of non-numerical data into numeric fields.

The formats are defined as follows:

Format	Definition
Alphabetic	Any character
Decimal	Numbers, leading & trailing spaces, period (decimal point), comma, +, -, e, E
Scientific	As Decimal
Dollars	As Decimal but with $
Percentage	As Decimal but with %

By default, all columns are set as *Decimal*. If you want to change a column to another format, you must change it through the **Column Format** dialog box.



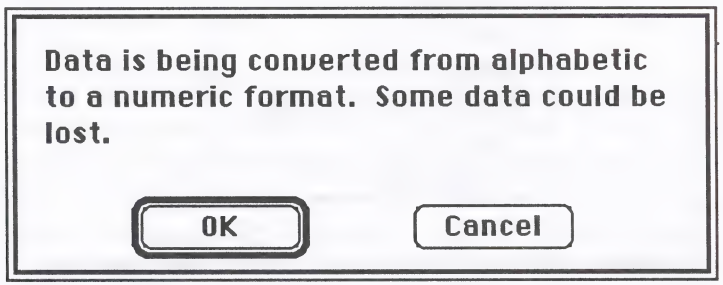
Here are some samples of data presented in each of the formats, left-aligned, with digits set at 3:

Entered as	Alphabetic	Decimal	Scientific	Dollars	Percent
ABC	ABC	----------	----------	----------	----------
1.00	1.00	1.000	1.00e+0	$1.000	100.000%
.003	.003	0.003	3.00e-3	$0.003	0.300%
2000	2000	2000.000	2.00e+3	$2000.000	2000.000%
1.53e-1	1.53e-1	0.153	1.53e-1	$0.153	15.300%

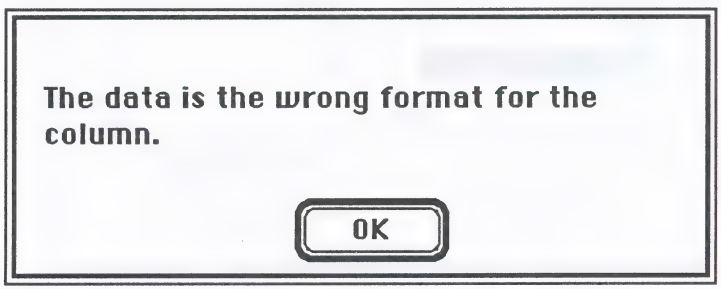
If you want to use simple integers, specify Decimal format type with 0 digits.

The column format is for external (visible) representation only; any number you enter will be preserved in its entirety for calculation. You can verify this by entering more digits of precision than are specified in the column format. After you press **Return** or click off the cell, the digits shown will be the number specified in the column format. If you click on the cell again, the total number of digits you entered will be shown while that cell is selected.

If you change the format of an alphabetic column containing numeric data to any of the other formats, you are shown the dialog box below. This message indicates that the conversion may cause some loss of precision in your data. You may choose to continue, by clicking **OK**, or cancel the operation.



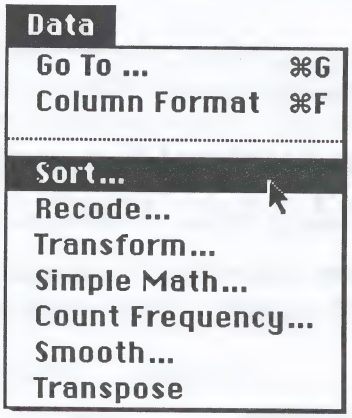
If you try to enter alphabetic (non-numeric) data in a numeric column, or use otherwise inappropriate characters, the cell into which you entered data is blanked. You then get the following message.

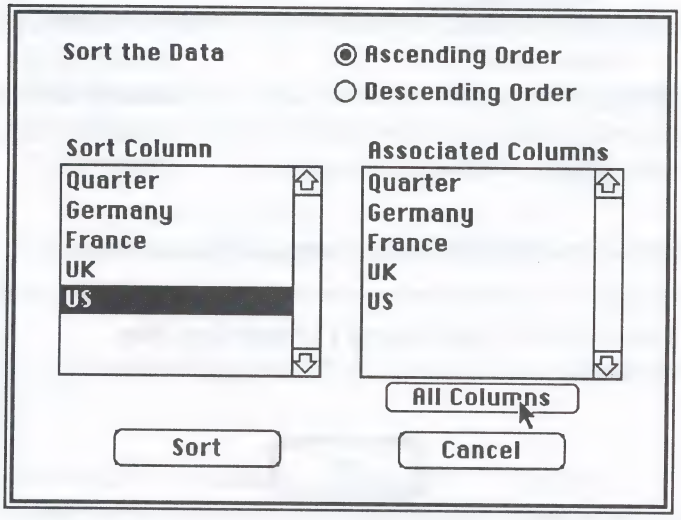


Cricket Graph now accepts (and ignores) commas and leading or trailing spaces in numeric data.

The Sort Function

The **Sort** command under the **Data** menu has changed. The dialog box for the sort has two new fields: a listbox containing all the column names ("Associated Columns") and a button labeled "All Columns" combining all the columns together.





If you choose to sort a column and no associated columns are selected, the other columns are not "carried along" with the sort—they remain as they were. This default is different from the default sorting method in version 1.0.

If you want to carry all other columns along, click the **All Columns** button before clicking the **Sort** button. If you want only selected columns to be changed by the sort, you may do it in one of two ways:

- You can pre-select a column or a number of columns by **Option**-clicking column numbers before issuing the **Sort** command. In this case, the columns are sorted based on the contents of the leftmost selected column, and they are displayed as selected in the list of **Associated Columns**.

- You can choose them by clicking items in the list of **Associated Columns** before clicking the **Sort** button.

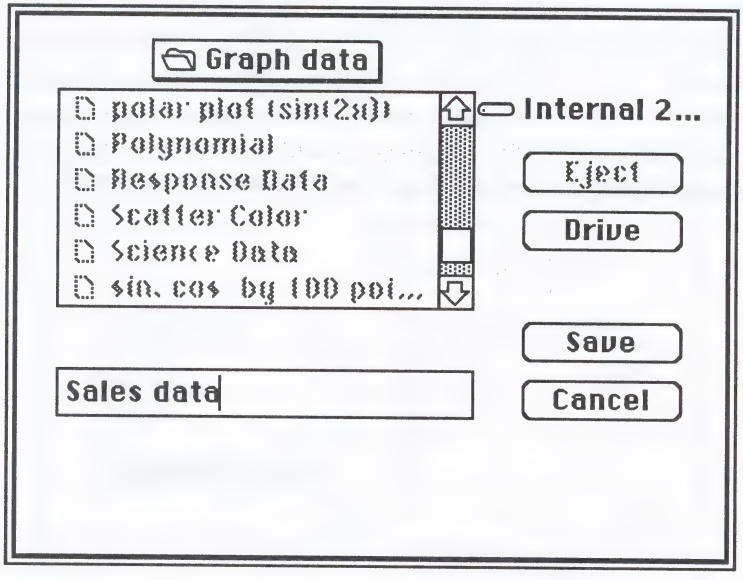
The Transpose Function

The **Transpose** command has been added to the **Data** menu. Selecting this command causes the rows and columns to be switched. This is useful if the data were brought in from a spreadsheet and was row-oriented instead of column-oriented as Cricket Graph expects. If the data being transposed is not compatible with the format of the column in which it will be placed, the column format is changed to "alphabetic" to accommodate the data.

The File Menu

Saving Data Files
Since the data window now has complex formatting characteristics associated with it, including column width, data type, significant digits, and so on, the Cricket Graph file format in which a data window is saved now contains this information. The data is no longer saved in a simple String-Delimiter-String arrangement.

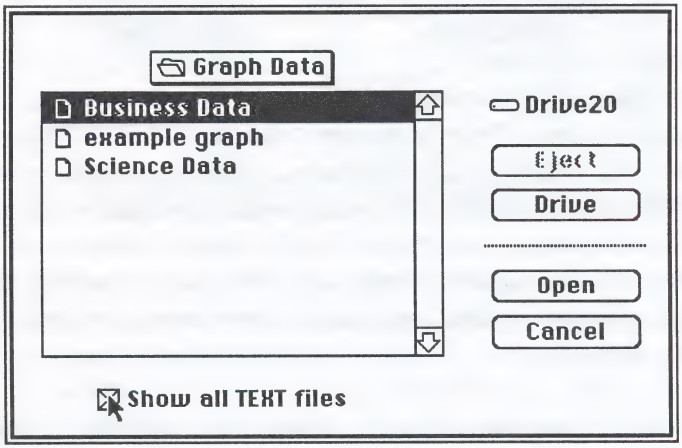
As a result, other programs that in the past have been able to read Cricket Graph files may no longer be able to interpret them. Cricket Graph, of course, can still read its old file formats, along with tab-delimited text files from other programs.



Saving Graph Files
When you select the **Save Graph** option in the **File** menu, you are offered the choice of saving your graph in Cricket Graph format or in PICT (picture) format. You should be aware that PICT format is for exporting only, in the sense that Cricket Graph reads PICT files in only as objects as explained in the section on the **Place** command in the **Edit** menu. A PICT object is not treated as a graph.

Opening Data Files

When opening data files by selecting **Open** from the **File** menu, Cricket Graph data files are listed. A new addition to this dialog is a check box, **Show all TEXT files**. By clicking this box and turning it on, all text files are listed as well. Thus, if a file is in a format that Cricket Graph is capable of importing, it can be selected and read into Cricket Graph.



Text, SYLK, WKS and JWKS Files

Cricket Graph can read data files in standard tab-delimited format, as well as the MicroSoft SYLK format. You can also import data from Lotus' Jazz™ using the JWKS format.

You can also import Lotus WKS files that were created on an IBM PC or compatible system. WKS files are generated by LOTUS 1–2–3™ and other programs. The WKS files from an IBM PC or compatible system can be accessed through a networking package such as TOPS™ from Centram, or through non-network file converters, such as MacLink Plus™ from DataViz.

WKS files generated by Macintosh programs are not necessarily compatible with Lotus WKS files.

Plotting Columns of Data

Row Numbers

Row Numbers are now treated as a variable (a column of data). Therefore, each time a dialog box appears allowing you to select a column of data for plotting or other data transformation, the variable name "Row Numbers" appears at the top of the list when appropriate.

Dollars and Percent Formats

Data in dollars and percent formats is different in nature from other numerical data and from each other. You may not mix data in dollars and percent column formats with other data formats when graphing. For example, if you have three columns of data in the data window and the column formats are decimal, dollar, and percent, you might plot the decimal column on the X-axis versus the dollar column on the Y-axis. If you then try to overlay the percent data set onto the plot just created, you get an error message and you are prevented from doing so.

On the other hand, if you have a fourth, dollars-formatted data column, you can overlay it on the plot just created. Other legal combinations include, for instance, a dollar X-axis and a percent Y-axis, or a double-Y graph with one Y-axis as a dollar format and another Y-axis as a percent format.

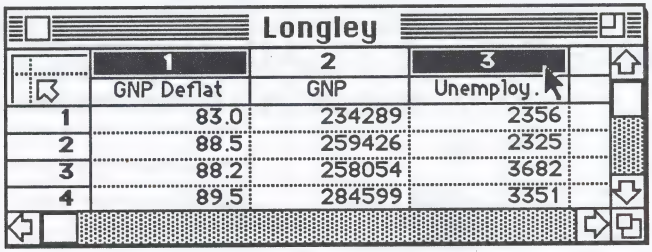
Furthermore, you may not set a dollar or percent formatted axis to log type gradations.

Number of Categories in a Graph

The number of categories that can be placed along an axis has been increased from the 16 mentioned in the manual to 64. This will allow, for instance, sales for each month in a five year period to be graphed. However, try not to stuff too much information into one graph. Placing 60 months worth of sales data in one graph could very easily distract from the purpose of the graph.

Pre-selecting Columns

Columns of data may be selected for graphing before you request a new graph to be created. This is done by holding down the **Option** key and clicking in the column number field of the columns you wish to select. The column number field is highlighted in the selected columns.

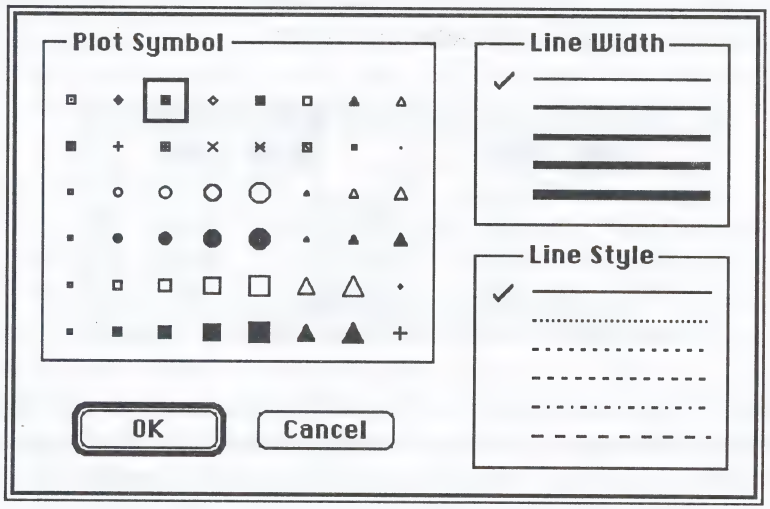


When a graph is then requested, the pre-selected column names are already highlighted in the listboxes for that graph type, and the user need only click the **OK** button or press the **Return** key to proceed with the plot. The leftmost column selected is the one highlighted in the left listbox, and any others are highlighted in the right listbox, up to the limit allowed for that graph type.

New Plot Symbols and Line Types

32 new plot symbols have been added, for a total of 48. These symbols can be used for line, scatter, double-Y, polar, and Quality Control graphs. In addition, a set of alternate line styles and widths has been added. These can be used for line-type graphs (line, double-Y, and Quality Control) and for tools like lines and arrows.

If you double-click a legend symbol in a line graph, you see the following dialog box, enabling you to make your choices:



Double-clicking a legend in a scatter graph causes a dialog box containing only the symbol types to appear. Double-clicking a straight line (created using the line tool) brings up a dialog box with only the line widths and styles.

The new line styles (other than solid) are recognized by some, but not all, other applications which can read Cricket Graph PICT files or Clipboard images. A few programs were sampled and the results are listed below.

MacDraw™ and SuperPaint™ (Draw layer) can read Cricket Graph PICT files. Both programs reproduce the Cricket Graph lines without the styles.

Of the programs that can read Clipboard images, MacDraw and Cricket Draw™ cannot reproduce the line styles. MacPaint™, MacWrite™, WriteNow™, PageMaker™ 2.0 (using Apple's LaserPrep™), SuperPaint™ (Bitmap layer), and Microsoft Word™ 3.01 can reproduce the line styles. SuperPaint and MacPaint reproduce the styles at screen resolution only, so that some distortion may occur.

If you use line styles other than solid, and print on a plotter, the resolution is similar to that obtained by the ImageWriter—some distortion may result. Horizontals, verticals, and lines at a 45 degree angle work best; lines at other angles are less smooth. All line widths are drawn as 1 unit wide on plotters.

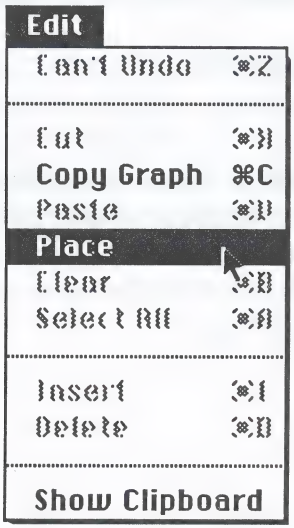
PictureBase™ Files

You can now import images into your graphs from PictureBase™ by Symmetry, Version 1.2. Access to PictureBase-formatted files is possible through a desk accessory supplied with PictureBase, called PBRetriever. Select the **Place** command from that desk accessory to place a PictureBase image in your graph. The point where you click on the graph window specifies the center point of the imported image.

For further information about PictureBase and PictureBase files, consult the PictureBase documentation.

Importing PICTS from the Clipboard

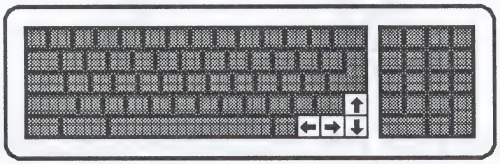
A new **Place** command in the **Edit** menu allows you place a PICT file image from the Clipboard into a graph. The image is centered on the point in the graph where you click. This option is enabled only if a picture is currently in the Clipboard. You can use this to paste pictures, such as a corporate logo created in MacPaint or a chemical symbol created in MacDraw, into a graph.



Once you place the picture into the graph, you can click on the picture to drag it around in the graph, or drag on the gray size box in the lower right-hand corner of the selection rectangle to resize it.

Moving Objects in a Graph

Cursor Keys
The cursor keys on a Macintosh Plus (or later model) can be used to move a selected object in the graph four pixels in the direction of the arrows on the cursor keys, each time the key is pressed. This can be used to position items in a graph precisely.



The Shift Key
The **SHIFT** key can now be used to constrain a number of items or changes. The list of actions and effects of holding the **SHIFT** key are listed below.

• creating rectangles	creates squares
• creating ovals	creates circles
• creating lines	constrains to horizontal, vertical, or 45° angles
• creating arrows	constrains to horizontal, vertical, or 45° angles
• resizing an object	maintains the same aspect ratio (also works in Page Layout)
• moving objects	constrains movement to horizontal, vertical, or 45°

Tick Marks and Labels

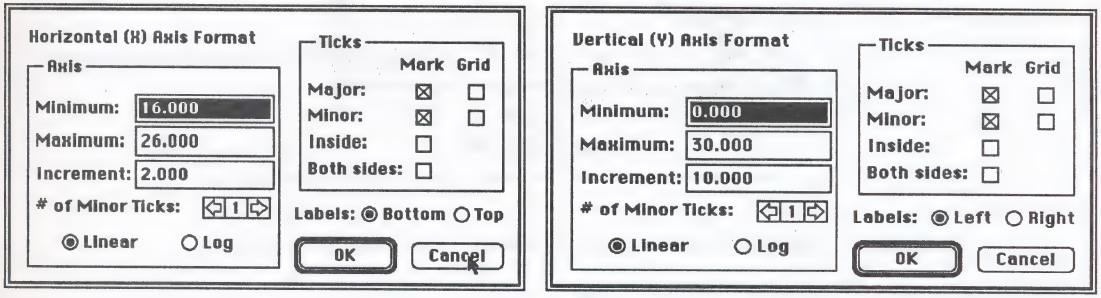
Log Axis Tick Labels
The tick labels on a logarithmic axis can now be set to decimal notation or scientific notation. On a linear axis, the number 1000 might be represented in decimal as "1000.00"; in scientific notation as "1.00e+3". On a logarithmic axis, the number 1000 in decimal would be the same as on a linear axis, and in scientific notation would be "10^3"

Ticks on All Sides

Tick marks may now be placed on all or any of the four sides of a (rectangular) graph. Tick labels may be placed on top or bottom, as well as right or left. New entries in the Horizontal and Vertical Axis Format dialog boxes allow you to specify the location of tick marks on left, right, top, bottom, or any combination, and labels on bottom or top, left or right.

Minor Ticks

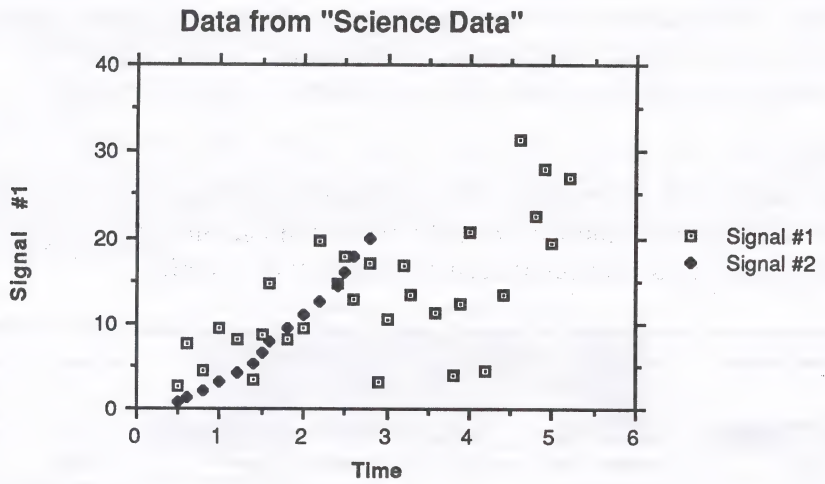
You can now specify the number of minor tick marks (from 1 through 9). This allows you greater control, not only in tick marks, but in grid lines as well, since minor grid lines are placed along minor tick marks.



The "Inside" option in the Ticks selection box means that tick marks will be placed along the inside of the graph rectangle, as opposed to the outside of the rectangle (default). The "Both sides" option means that tick marks will be placed along both the left and right sides, or on both the top and bottom of the graph, depending on whether you are setting ticks for the X or Y axis.

User beware: the flexibility of changing the axis parameters can give unfavorable results if the numbers chosen are not reasonable. For instance, if you increase the Maximum for an axis by orders of magnitude, and you neglect to increase the Increment by a similar scale, the program will attempt to draw an axis with many, many tick marks and may eventually fail, depending on memory limitations.

The example below shows a graph with tick marks on all four sides. This format is required for certain scientific publications.



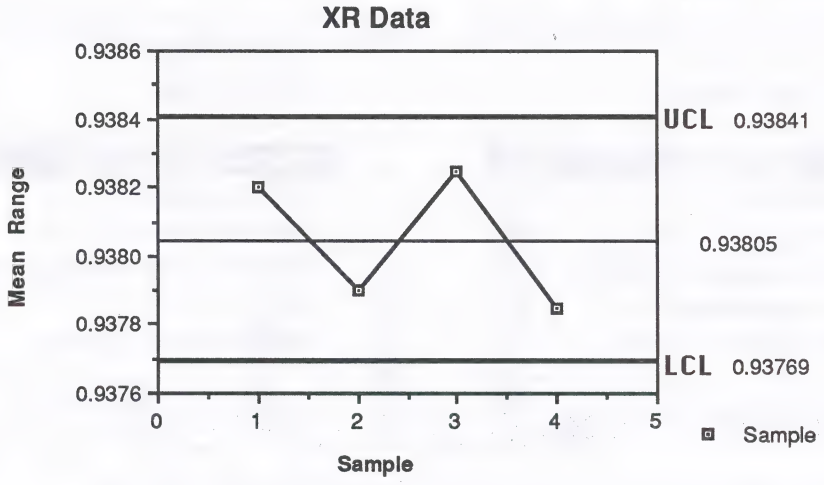
Quality Control Plots

Control Limit Values

Quality Control graphs now have an additional feature. The UCL (upper Control Limit), LCL (Lower Control Limit), and mean values have been shown on the appropriate types of QC graphs as bold lines through the graph. Now, the numeric values are also displayed as text strings. Like other text on the graph, you can double-click these strings and edit them. While you can change the font setting for these strings, be aware that certain special characters may not appear in some fonts. Most notably, the x-double-bar symbol:

$\bar{\bar{x}}$

appears only in the Chicago font.



The decimal precision of the control limit numbers shown on the graph is one digit greater than the precision of the Y axis tick labels. If you want the control limit precision to be greater, increase the number of decimal places in the Y axis value in the data window, then recreate the graph.

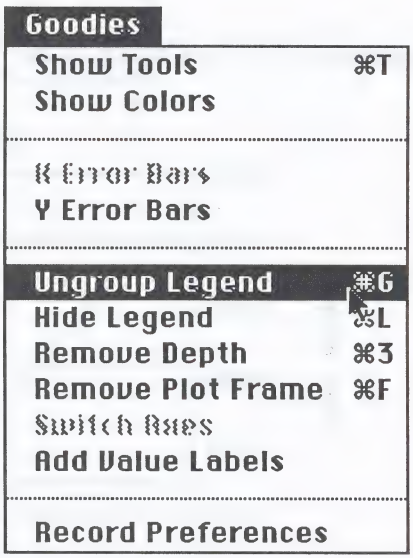
The Goodies Menu

Error Bars

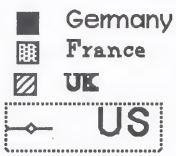
There is an additional method of specifying an error bar when you select either **Y Error Bar** or **X Error Bar** from the **Goodies** menu. The standard deviation of all values in the series can now be specified as the error.

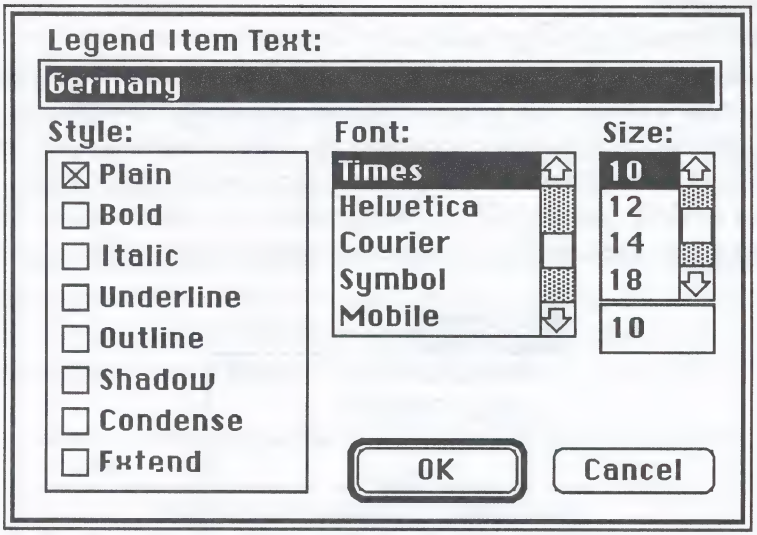
Ungrouping Legends

The legend area is now treated as a group of related items. A **Group/Ungroup Legend** command is now available under the **Goodies** menu.

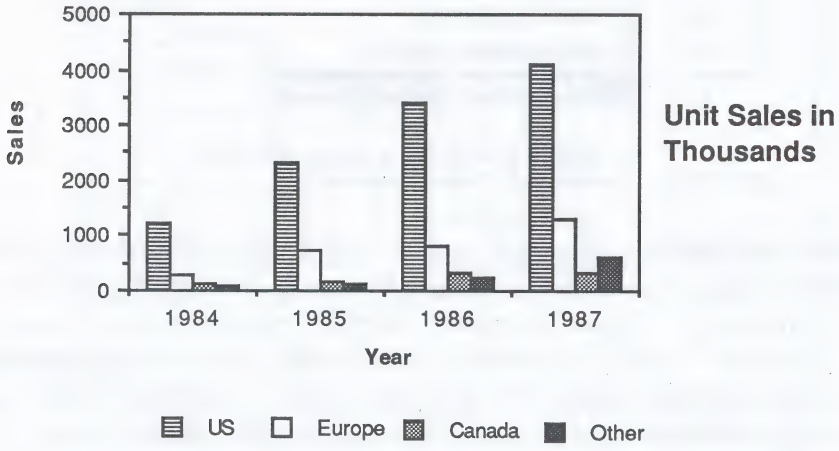


You can ungroup the legend, and edit the text of each legend item individually, setting content, size, style, and font. The text for each legend item may now contain up to 255 characters. You can also move the items of the legend individually, then regroup them. The regrouped items are then treated as one item.





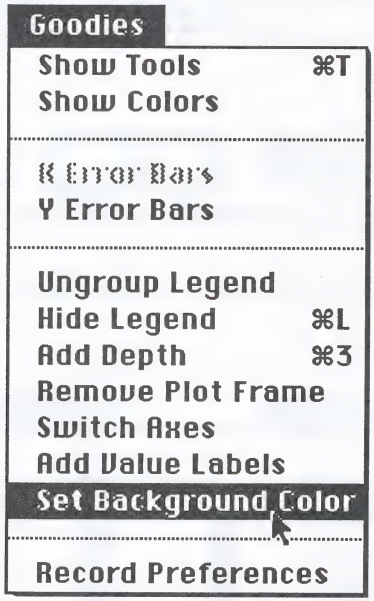
It is now possible, for example, to place a legend across the bottom of a graph.



The legend area in previous versions of the program was transparent by default. Now it is opaque when grouped, transparent when ungrouped. In other words, objects behind a grouped legend are not visible. Objects behind an ungrouped legend can be seen. The legend area is defined by an imaginary rectangle that encloses all the legend elements. Therefore, if you ungroup, rearrange, and regroup a legend, you could create a large opaque area behind the new legend.

Background Color

A command for setting background color for graphs is now found in the **Goodies** menu. The background defaults to white, but may be set to any of the eight standard colors. On a color monitor, the graph windows are displayed with the background color selected. On a black-and-white monitor, the background is displayed in white if the color is white, black if the background is black, and gray if the background is any other color. Dark background colors are usually used when sending output to film-type devices.

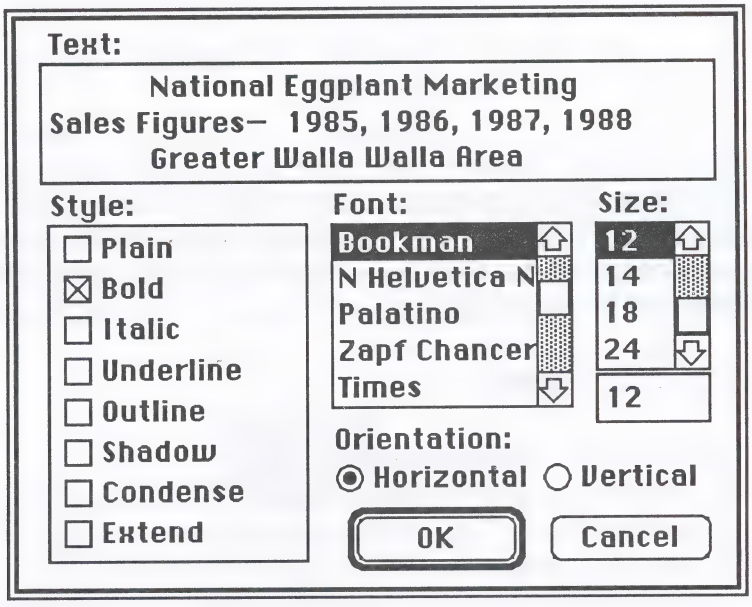


Background color applies to the program as a whole, not to individual graphs. Background color is not saved with a graph file nor is it recorded when you "Record Preferences." It must be set each time the program is run. If you create a graph with a dark background and with white lines, text, and patterns, then the graph may appear empty the next time its file is opened, due to a different current background in Cricket Graph. You must change the background to something other than white to see the contents of the graph.

Multiple Line Text

Text editing, either by using the text tool or by double-clicking, now supports multiple lines. Only 255 characters in total are allowed in any text box, but they can be spread over several lines as required.

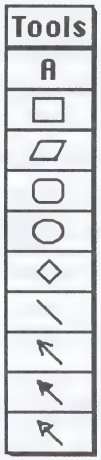
A new text box allows you to view three lines at a time. You can use this box to position text in one line relative to another line. Adding a new line is accomplished by pressing the **Return** key. To scroll up and down in text that has more than three lines, click and drag in the direction you wish to go.



Time and Date

When adding text to a graph, you can enter "@D" in the text and the current date is inserted when you print the graph. If you enter "@T", the current time is inserted. Therefore, you can insert either the current time, date, or both into text that you place on the graph. Remember, though, this will change the length of the text on the graph and you will need to keep this in mind when positioning the text.

Additional Drawing Tools
The Tools window contains a number of new tools that can be added to a graph.



Ovals, rhomboids, and diamonds can now be created. The rhomboids and diamonds are useful for making flow diagrams in a presentation. Creating an oval, diamond, or rhomboid is done in exactly the same manner as defining a rectangle (explained in the manual).

The Curve Fit Menu

Correlation Coefficients
The calculation of fitted curves in Cricket Graph produces an equation along with a correlation coefficient. This correlation coefficient was formerly designated by R=*X.XX*, where *X.XX* is a number between 0 and 1. We now use the more significant R^2 (R squared). In brief, the closer this number is to 1.00, the more reliable (for purposes of extrapolation or interpolation) is the curve fit equation generated. A more detailed explanation of the correlation coefficient is available in the Cricket Software Technical Notes, published several times a year.

Polynomial Curve Fits
When selecting a curve to be plotted for a set of data, it is important to realize that a curve cannot always be calculated for a given set of data. For instance, there must be at least 3 data points in order to calculate a second-order polynomial; at least 4 data points for a third-order polynomial, and so on.

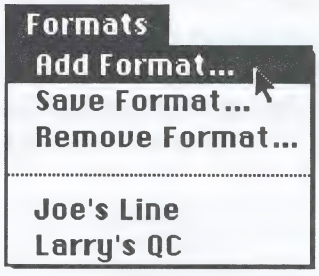
If the equation for a curve cannot be calculated, a message is presented saying that "The data is singular. A curve fit cannot be completed." The term

"singular" applies to the method by which the terms of the equation are derived. A matrix of cross products is calculated to come up with the terms of a polynomial curve fit. If certain matrix operations fail, the matrix is said to be singular.

Removing Curve Fits from a Graph
When you remove a curve fit from a graph, the text of the equation is not removed. This is because the equation, once placed on the screen as a text object, is changeable by the user and is not associated with the curve in any way. The user may wish to try different curves to see which is the best fit, and for that reason would want to leave the equation string intact. To remove the equation, click on it to select it, then press the **Backspace** key.

The Formats Menu

Adding a Format
The **Formats** menu has a new option, **Add Format**. By selecting this menu command, you can add a format to the formats already listed in this menu. You are given the opportunity to select the format name from the proper HFS folder. Previously, you had to keep your formats on the disk where Cricket Graph was located. Now the formats can be in any folder or volume.



Formats are now listed in alphabetical order in the **Formats** menu.

Saved formats now include the graph's size and location on the screen when the format was created.

Formats Containing Error Bars
The rules for imposing a format containing error bars on a graph have been made more precise. The situation arises when you have an existing graph and want to apply a format to redefine it. The new implementation is as follows:

If the error bar type in the format differs from the error bar type in the graph to which the format is being applied, then a dialog box is presented asking what type of error bars the user wants. The dialog box is presented for each data set where the error bar types differ between the graph and the format, and each data set is identified at the top of the dialog box.

Additionally, if the error bar type in the format is a fixed value or a percentage value or values from a column, the dialog box is also presented, even if the user already has error bars of the same type in the graph. This approach is taken because the fixed, percentage, and column values are not saved in the format.

If the user selects the **Cancel** option when the dialog is presented, the current error bar setting for the indicated data set in the existing graph is not changed.

Quality Control Formats

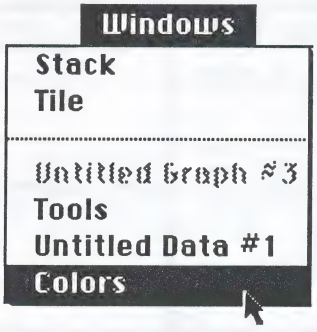
When you save a Quality Control graph as a format, the control limit strings are saved with the format, as with all other strings and objects. In general, when you apply any format to a graph, the strings and objects from the format replace the strings and objects in the graph, except for the current graph axis labels and title, which are retained.

When you apply a QC format, the control limit values, having been saved in the format as strings, are written on the graph, along with other text and objects. However, the graph will have new control limit values calculated for it to match the data in the graph. Therefore, you will see new control limit values placed in the graph at their appropriate locations, as well as old control limit values from the format. It is the user's responsibility to delete the old control limit strings.

The Windows Menu

Access to Hidden Windows

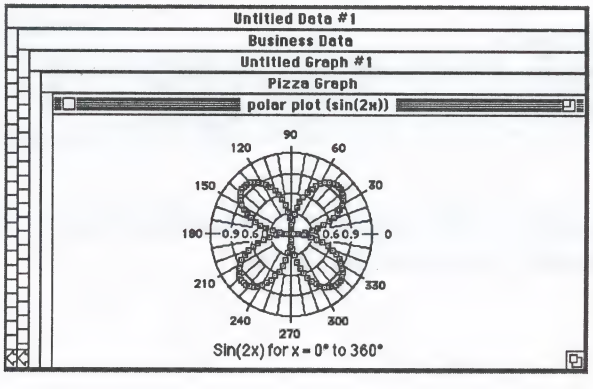
A new **Windows** menu lists all open windows, both Graph and Data. You can bring any listed window to the front by clicking the name in this list. The Tools window and Colors palette are also listed here, making these often-hidden windows easy to bring to the front and access.



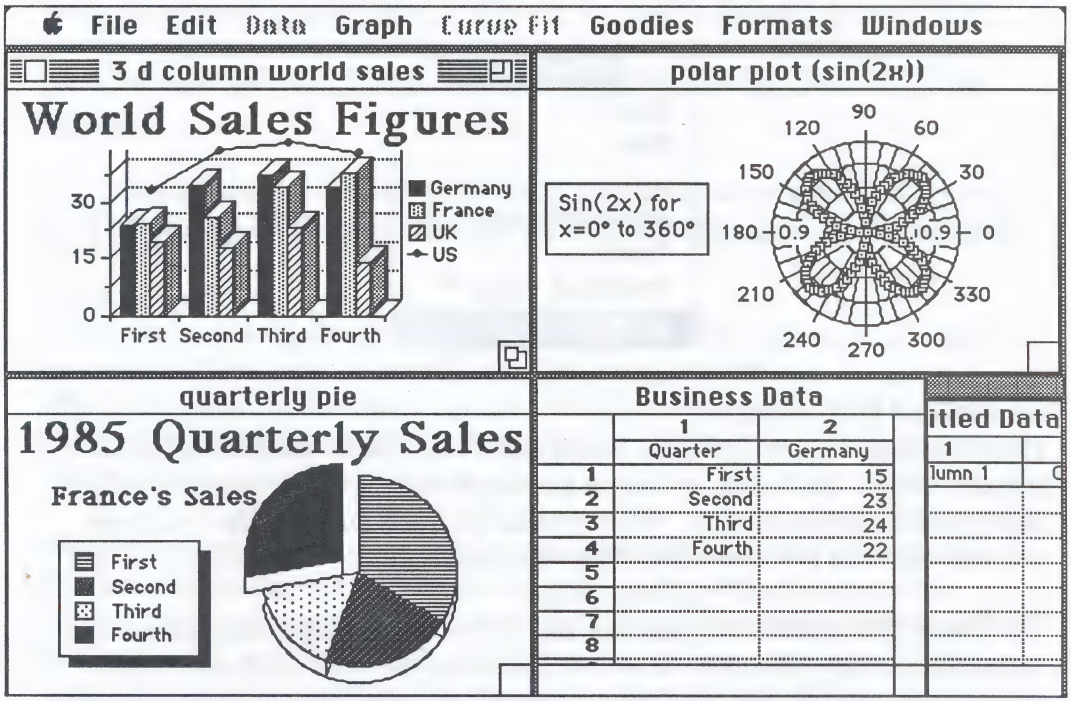
Stacked and Tiled Windows

The menu also has two options: **Stack** and **Tile**. These functions affect all open windows. As before, windows are simply piled one on top of the other under normal circumstances. When you select **Stack** or **Tile**, the windows are rearranged on the screen for better visibility.

The **Stack** option takes the windows and places them along a diagonal path, starting at the top left corner. It offsets each window a pre-set distance from the previous one. In this way, you can see all the open windows and easily pick one to move to the front.



The **Tile** option splits the screen into equal or near-equal portions and places the open windows into these parts. Although you can see a number of windows at a time, you can edit in only one active window. You can make a window active by clicking on it. As with other Macintosh programs, holding down the **Command** key allows you to move a window without making it active.



Other Changes

Terminating the Program
You can now press the **Command-Q** key combination to quit the application, even if you are currently in a dialog box.

Preferences
The command **Record Preferences** in the Goodies menu now also sets the default graph size and location on the screen.

Preserving Changes
Any time you create an untitled graph or make a modification to a titled graph, you will be asked if you wish to save the graph before the graph can be closed. This was done for your protection in response to a number of users who had problems with losing graphs.

Undo
Many users found the use of the **Undo** command in the **Edit** menu to be unclear. This command now reads **Can't Undo** when "undo" is not implemented for the action taking place. Where appropriate, **Undo** is enabled for the specific action just performed, as in **Undo Cut**.

Regression Curves
The plotting of regression curves has been improved, resulting in considerably smoother curves on the LaserWriter.

Zero-range Data
Cricket Graph now handles a set of data with no variation (for example, if all cells in a column have the value 1.0).

Zero-height Bars and Columns
Zero height bars and columns are no longer drawn.

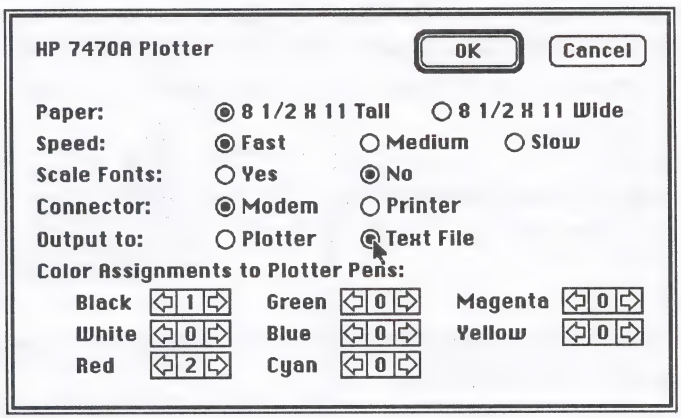
Disk Space vs. ImageWriter
If your output device is an ImageWriter, a lot of disk space is used by the Macintosh to create an image for printing on this device. Consequently, if you attempt to put several graphs together on a page of output, and you do not have a hard disk, you may run out of space on your floppy disk.

"Dumb" Plotter Support
On plotters that are not capable of filling objects (such as the Apple plotter), bar, column, pie wedge, and legend frames are now plotted in the color selected for the data set rather than in the color selected for the frame.

Plotters

Plotter Command Files

You can now save a text file containing the graphic commands for a plotter to disk by clicking the **Text File** button in the Plotter Setup dialog. This feature is convenient if you wish to modify the plotter commands before sending to the plotter.



Plotter files saved in this manner can later be transmitted to the plotter by a small application entitled "GraphSender™", which is now included on your disk.

Using GraphSender™

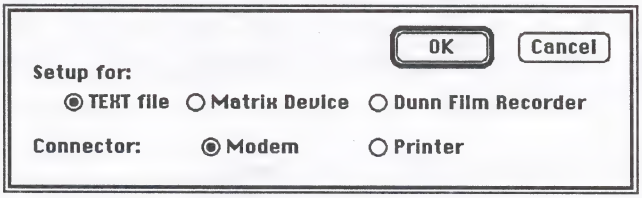
The GraphSender™ program is provided so that plotter files that have been saved to disk can quickly and easily be sent to a plotter without having to use Cricket Graph.

After you double-click the icon of the GraphSender™, the program starts. Only three menus are available.

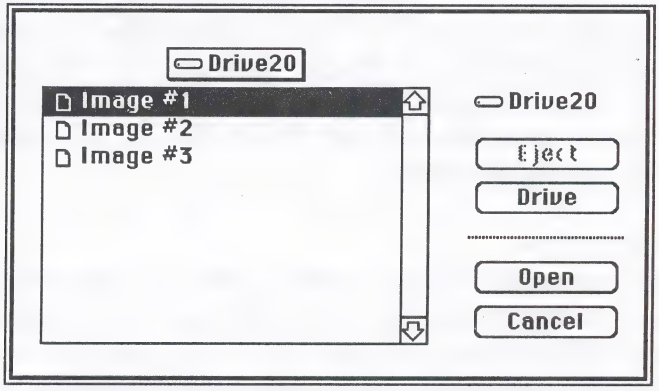
The **Apple** menu contains the usual About box which lists the author and publisher of this program. All the desk accessories you have installed in your System file will also appear on this menu.

The **File** menu contains three commands with which you will primarily be concerned. The **Send** command is used to send files to the plotter. The **Setup** command is used to select the port to which you wish to send these files. You may select either the **Modem** or **Printer** port. The **Quit** command exits the program and returns to the Finder.

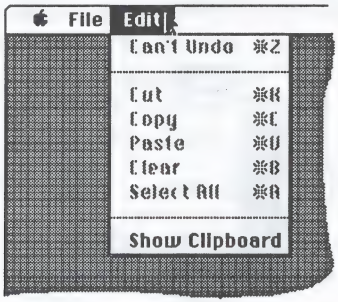
If you select the **Setup** command, the following dialog will appear. Click the **TEXT file** button if it is not already chosen, and select the port connected to the plotter.



If you select the **Send** command from the **File** menu, you will be presented with a dialog allowing you to choose which file you wish to transmit to the plotter. This dialog is the same as the dialogs with which you are already familiar for selecting and opening files.



All the items in the **Edit** menu, except for **Show Clipboard**, are disabled. They are not used by GraphSender, and will become active only if you open a desk accessory.



The **Show Clipboard** command allows you to look at the current contents of the Clipboard.

If you have several files to send to the plotter, you can select them all at once in the Finder before you double-click to start GraphSender™. In that case, GraphSender™ will send all the files automatically, pausing between files to allow you to change the paper.

Using the HP 7550A Plotter with Cricket Graph
The HP 7550A plotter is now supported by Cricket Graph. An installer utility is provided on your disk for this plotter. Follow the directions in the Cricket Graph User's Guide to install the driver for this plotter.

Cable Connection
Like other plotters, the HP 7550A requires the same Macintosh cable connection as the ImageWriter I printer. There is one major difference, however. The connector on the HP 7550A is a male DB-25 connector instead of the female DB-25 connector that is used on the ImageWriter I and other plotters. This means that you need to obtain a DB-25 male/female adapter connection in order to plug the cable into the HP 7550A. A suitable adapter is available from Radio Shack stores.

Setting up the HP 7550A
Most plotters let you establish the parameters governing communication between the computer and plotter by setting DIP switches on the back of the plotter. Instead of DIP switches, the HP 7550A has a small message screen and keys on its front panel that let you execute a setup sequence. This provides more flexibility than DIP switches, at the cost of slightly more complexity.

If you are already using your HP 7550A with other microcomputer software, you will probably not need to change your front-panel settings. Cricket Graph uses fairly standard settings, which are the same settings used by other software such as ChartMaster and Plot-It. Here is a brief summary of the proper settings:

- "Computer"
- "Remote" data flow
- "Hardware" handshake
- "Bypass" is OFF
- Full Duplex
- 9600 Baud
- 8 data bits, no parity

Trademarks

PictureBase is a trademark of Symmetry, Inc.
Microsoft Word is a trademark of MicroSoft Corporation.
SuperPaint is a trademark of Silicon Beach Software.
Macintosh, LaserWriter, ImageWriter, MacPaint, MacDraw, and MacWrite are trademarks of Apple Computer, Inc.
PageMaker is a trademark of Aldus Corporation.
WriteNow is a Trademark of NEXT, Incorporated.
Jazz and Lotus 1-2-3 are trademarks of Lotus Development Corporation.
TOPS is a trademark of Centram Systems, Inc.
MacLink Plus is a trademark of DataViz.
Cricket Draw is a trademark of Cricket Software.

Authors

The original Cricket Graph authors are James Rafferty and Richard Norling. Contributors to this update include Joseph Zglinicki, Lawrence Greenley, Barbara Sieg, Martin Fisher, and Dennis McFerren.

Anything Less Isn't Quite Cricket

Great Valley Corporate Center
40 Valley Stream Parkway
Malvern, PA 19355
(215) 251-9890