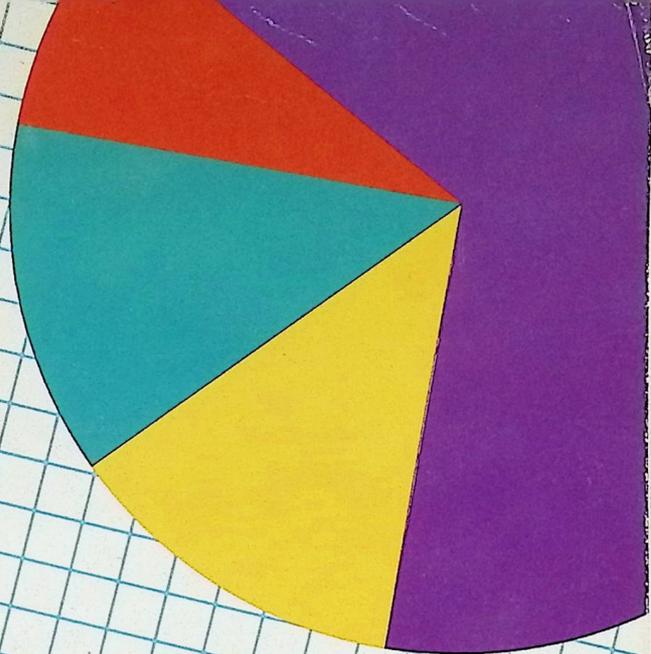


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Bravo Technologies, Inc.



# MacGRAPHX™

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CHARTING AND

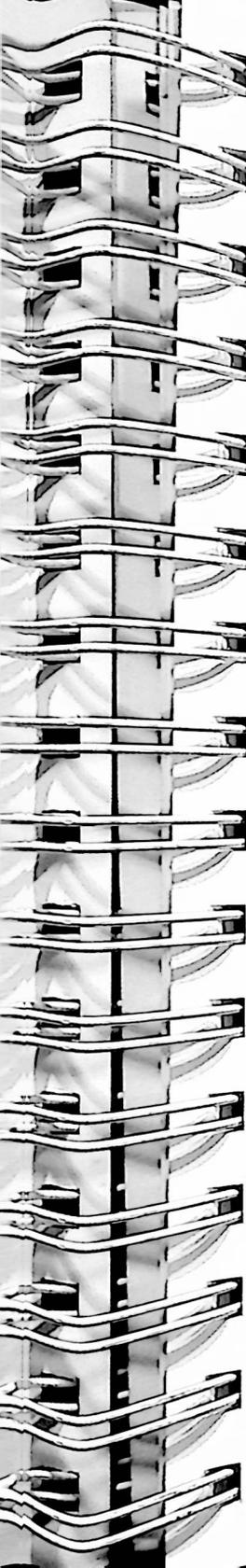
GRAPHICS TOOL

FOR BUSINESS

AND SCIENCE







# **MacGraphX™**

The essential charting and graphics tool for business and science

**Bravo Technologies, Inc.**

P.O. Box 10078

Berkeley, CA 94709-0078

415/841-8552

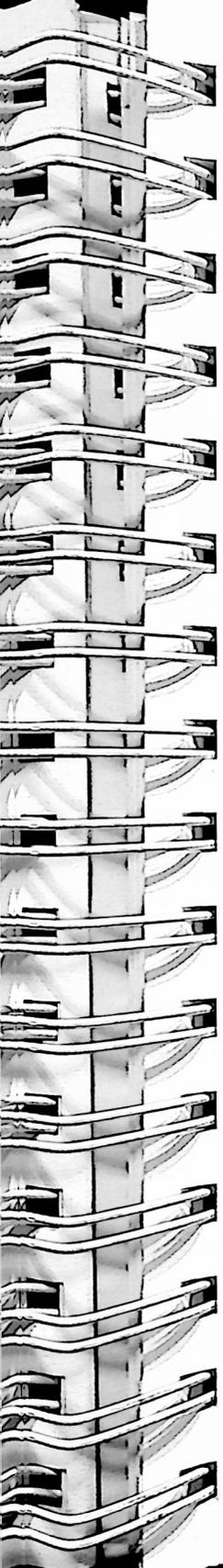
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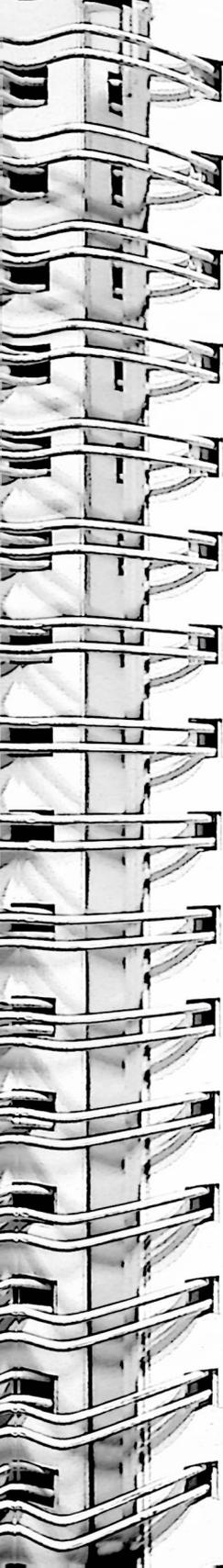
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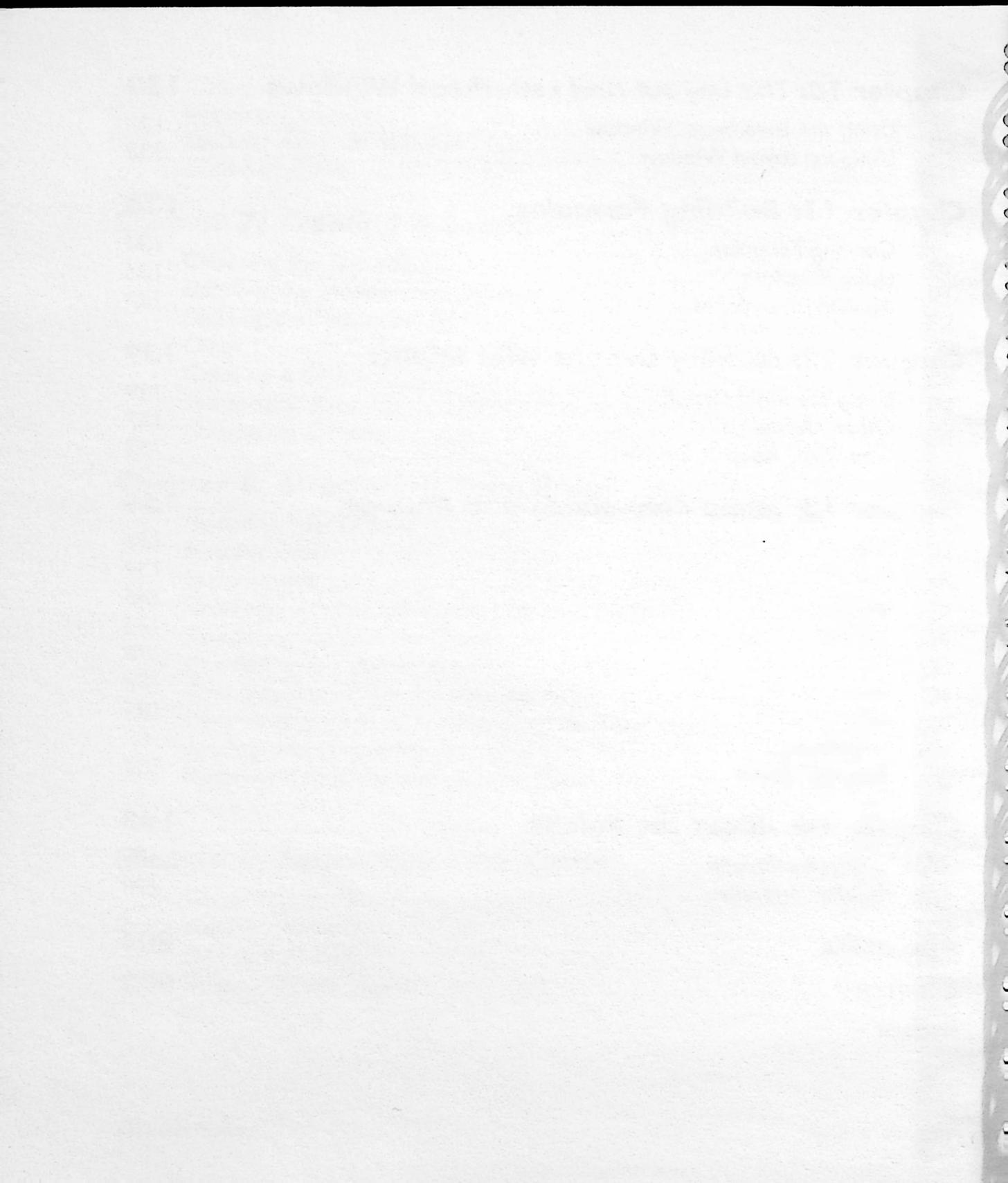
## Table of Contents

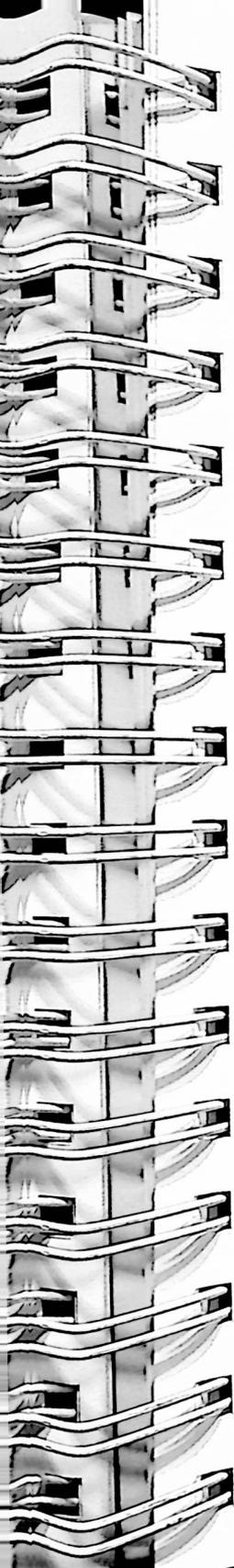
<b>Introducing MacGraphX</b> .....	<b>1</b>
<b>About This Manual</b> .....	<b>3</b>
<b>Chapter 1: MacGraphX Basics</b> .....	<b>4</b>
Minimum Requirements .....	4
Checking Your MacGraphX Package .....	4
Installing MacGraphX .....	4
Becoming a Registered User .....	5
About MacGraphX Documents and the "Desktop" .....	5
About the Data Window .....	7
About Graphs and the Graph Window .....	9
The Next Step .....	12
<b>Chapter 2: MacGraphX Quick Start</b> .....	<b>13</b>
<b>Chapter 3: Learning MacGraphX</b> .....	<b>18</b>
<b>Chapter 4: More Basics</b> .....	<b>51</b>
<b>Chapter 5: Additional Exercises</b> .....	<b>54</b>
<b>Chapter 6: Working in the Data Window</b> .....	<b>79</b>
About the Data Window .....	79
Getting Around in the Data Window .....	81
Selecting Cells, Fields, and Records .....	82
Manually Entering Data .....	83
Building Formulas .....	83
Recalculating Formulas and Transforms .....	84
Importing Data .....	84
Specifying Data Types .....	85
Renaming Fields .....	86
Cutting, Copying, and Pasting Records and Cells .....	86
Clearing and Deleting Records and Cells .....	87
Duplicating and Changing Records .....	87
Sorting, Finding, and Moving Records and Fields .....	88
Summarizing Records .....	89

Changing Text Formats.....	89
Resizing Columns.....	89
Resizing the Data Window.....	90
Exporting a File.....	90
<b>Chapter 7: Creating a Graph.....</b>	<b>91</b>
Choosing the Records.....	91
Defining the Independent (x) Field.....	91
Defining the Dependent (y) Field.....	92
Other Ways to Define the Fields.....	92
Creating a Graph.....	94
Transposing Axes.....	94
Overlaying Graphs.....	94
<b>Chapter 8: Structuring Your Graph.....</b>	<b>95</b>
Updating Your Graphs.....	95
Running Totals.....	95
Percentages.....	96
Working with Negative Numbers and Nulls.....	97
Reordering Fields in the Graph.....	99
Reordering Records in the Graph.....	99
Even Spacing on the Independent Axis.....	101
Preventing Data from Overlapping the Data Frame.....	101
Scaling and Formatting the Axes.....	101
Creating Curve Fits with Scatter Charts.....	102
Large Graphs.....	104
<b>Chapter 9: Formatting Your Graph.....</b>	<b>105</b>
Graph Window Basics.....	105
Moving and Resizing.....	109
Text and Numbers.....	116
Colors, Shapes, Patterns, and Lines.....	120



<b>Chapter 10: The Layout and Letterhead Windows.....</b>	<b>130</b>
Using the Letterhead Window.....	130
Using the Layout Window.....	132
<b>Chapter 11: Building Formulas.....</b>	<b>134</b>
Creating Formulas.....	134
Using Functions.....	136
Applying Transforms.....	137
<b>Chapter 12: Making Graphs with Impact.....</b>	<b>139</b>
Using the Right Graph.....	139
Other Guidelines.....	147
One Rule: Keep It Simple.....	153
<b>Chapter 13: Menu Commands and Dialogs.....</b>	<b>154</b>
File.....	154
Edit.....	159
Graph.....	165
Objects.....	176
Text.....	178
Lines.....	182
Areas.....	185
Windows.....	187
Special Menus.....	188
<b>Chapter 14: About the Palette.....</b>	<b>198</b>
Using the Palette.....	198
Palette Features.....	198
<b>Appendix.....</b>	<b>204</b>
<b>Glossary.....</b>	<b>212</b>
<b>Index</b>	





# ***Introducing MacGraphX***

MacGraphX is the essential Macintosh graphics, charting, and presentation tool for business and science. Using MacGraphX, you can load data from a wide range of sources, and graph any subset of records or fields. Create scatter, line, area, bar, stacked bar, table, and pie charts. Easily transpose or overlay charts, annotate them, change their colors, shade them, stretch them, or move them — with just a few mouse-clicks.

## ***Dramatic, Vivid Display***

MacGraphX's color capabilities offer the smoothest graduated fills around (from aqua to cobalt blue, for example). MacGraphX uses true colors, not dithered patterns, so your graphs are free of blotching, moire patterns, or banding. You can even impose patterns over graduated colors, to create customized visual effects.

## ***Open Data Architecture***

MacGraphX offers an underlying extensible, recalculating data architecture. Fields can be based on formulas. Whenever you revise your data, fields are recalculated and graphs are updated automatically.

Because MacGraphX is built on an open data architecture, you can extend the set of file types MacGraphX can load. Translate and download data from a mainframe or scientific instrument in one step. Add in your own curve fits, statistical analyses, and data transformation routines, for increased clarity and precision.

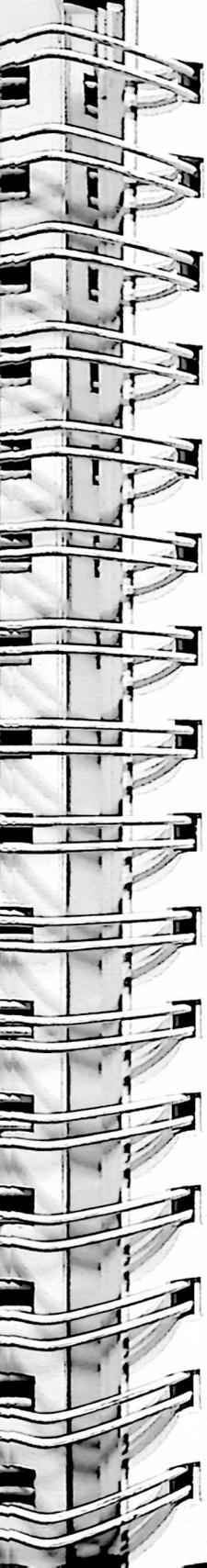
## ***One-Step Operation***

MacGraphX brings you an uncluttered interface, with most commands directly accessible from the menus; functions aren't hidden within a maze of dialog boxes. MacGraphX's interface provides speed of use for the power user along with ease of use and learning for the novice. Select records with one click and drag. Create a graph in one step. Change fonts, colors, and patterns, with lightning speed. You get complete control of what's on your screen, thanks to logical menu and floating palette commands.

## **Using MacGraphX**

Enter your data directly, using the familiar row-and-column layout in the Data Window; or import data from your favorite spreadsheet or database (such as Excel, MacCalc, Lotus 1-2-3, or FileMaker); or download data from a mainframe or scientific instrument.

To create your graph, with one click of the mouse select the records you want graphed. Click to select the X-axis, and click again to select the categories for the Y-axis. Choose the type of graph you want from the menu, and your graph is done. Once you've created a graph, you can use its format as a template for additional graphs. Arrange your graphs on MacGraphX's Page Layout window, and print them to your ImageWriter, laser printer, or film recorder.



## About This Manual

This manual contains everything you need to know about using MacGraphX. To learn how to install MacGraphX on your system and the basic concepts behind MacGraphX, read *MacGraphX Basics* first.

If you're ready to get started using MacGraphX with your own data, read *MacGraphX Quick Start*. Even if you *never* read manuals, look over these few pages to get up and running.

To learn how to use MacGraphX, work through the tutorials in *Learning MacGraphX* and *Additional Exercises*.

*Working in the Data Window*, *Creating a Graph*, *Structuring Your Graph*, and *Formatting Your Graph* describe in detail the common operations of MacGraphX. *Working in the Layout and Letterhead Windows* and *Building Formulas* discuss special features of MacGraphX. *About the Palette* and *Menus and Dialogs* illustrate the menu commands and dialog boxes.

The *Appendix* contains illustrations of parts of a graph, and the *Glossary* contains an explanation of terms used in this manual. The *Quick Reference* card contains a summary of shortcuts and keyboard use.

This manual assumes that you have a basic working knowledge of the Macintosh, including how to open and close files, use a mouse, and perform actions such as double-clicking and shift-clicking. If you do not have familiarity with Macintosh fundamentals, consult the owner's manual that comes with your Macintosh.

# Chapter 1: MacGraphX Basics

In this chapter, you'll learn the basic concepts of MacGraphX, as well as how to properly install it in your system. You should read this chapter before working through any of the tutorials.

## Minimum Requirements

Using MacGraphX requires the following:

- A Macintosh Plus with one megabyte of RAM
- Two 800K disk drives, or one 800K disk drive and a hard drive
- System 6.0.3 or later
- 32-Bit color QuickDraw for use with a color system if using system 6.0.3 or 6.0.4

## Checking Your MacGraphX Package

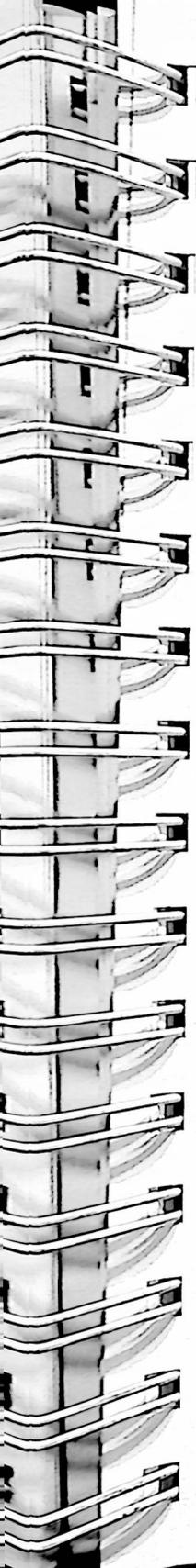
Your MacGraphX package should include the following:

- One MacGraphX disk containing the application; the file translation specification folder (MG.FSPECS.f); the transforms folder (MG.XFRMS.f); the help file (MacGraphX.Help); and the tutorial files (Tutorial and Tutorial II)
- One manual
- One Quick Reference card
- One registration card

If your MacGraphX package doesn't include all of the above, contact Bravo Technologies.

## Installing MacGraphX

Before doing anything, copy your MacGraphX disk to another floppy and store the MacGraphX original in a safe place. Use the backup copy for the installation. This way, if anything should happen to your working copy, you'll have the original disk intact.



### **Installing MacGraphX: On a Hard Disk**

To install MacGraphX on a hard disk do the following:

- Create a new folder on your hard disk to contain your MacGraphX files.
- Copy the MacGraphX application from the MacGraphX disk to your new folder.
- Copy MacGraphX.Help from the MacGraphX disk to your new folder.
- Copy the Tutorial files from the MacGraphX disk to your new folder.

If you're not sure how to copy from one disk to another, see your Macintosh owner's guide for help.

### **On a Double 800K Floppy Setup**

To use MacGraphX on a double 800K floppy disk setup, do the following:

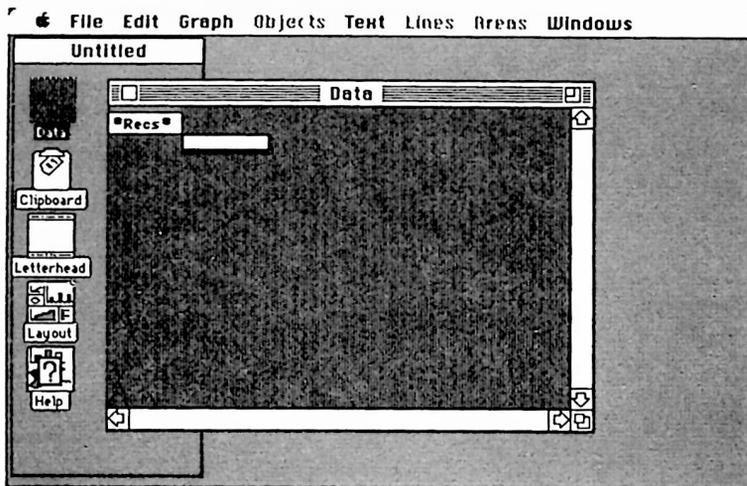
- Keep your System Folder containing the System, Finder, and printing resource on one 800K disk (do not use an original system disk).
- Copy the MacGraphX application and its accompanying files and folders from your MacGraphX disk to the second 800K disk. Make sure the Help file stays in the same folder as the application.

### **Becoming a Registered User**

To become a registered MacGraphX user, fill out and send in the registration card in the back of this manual. As a registered user, you can use Bravo Technologies' technical support line (415/841-8552, between 10 a.m. and 5 p.m. PST). You will also receive notification of product upgrades and new product releases.

### **About MacGraphX Documents and the "Desktop"**

When MacGraphX opens, it presents you with its own special "desktop." Several icons are located in an untitled docking window at the left of your screen. In the center of the screen, partially obscuring the docking window, is an open window entitled Data.



A MacGraphX document consists of both the data used to create graphs and the graphs themselves.

### ***Shrinking Windows and Icons***

Graphs and data comprising a MacGraphX document are contained in their own windows. These windows can be shrunk to icons contained in the docking window on the left side of the screen. When reduced to icons, inactive windows won't clutter the screen. You can open windows or shrink them into icons in the docking window at any time. Your data and graphs always remain intact when appearing as icons. Clicking in the close box of a window will shrink it to an icon. Double-clicking on an icon will open it to a window. You can also use commands on the Windows menu to open or close a window.

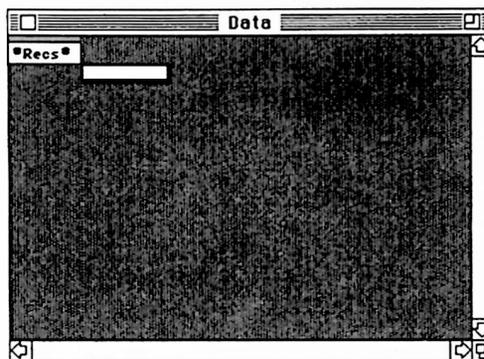
### ***About the Docking Window***

If the docking window is obscured by the data window, graph windows, or any other window, you can bring it to the front by clicking on the docking window title. When the docking window is in front, you can resize it by clicking and dragging its lower right corner.

To reorganize icons in a newly resized docking window so that they all appear in the window, hold down the Option and Command keys and double-click anywhere in the docking window, or use the Clean Up Icons command from the Windows menu.

## About the Data Window

Each time you launch MacGraphX from the Finder, you'll have a blank *data window* in which to enter your data or import data from another application.



Your data is always contained in this data window. The data window has three main components. Each individual piece of data is contained in its own *cell*. Data can be either numeric or alphabetic.

180 or East

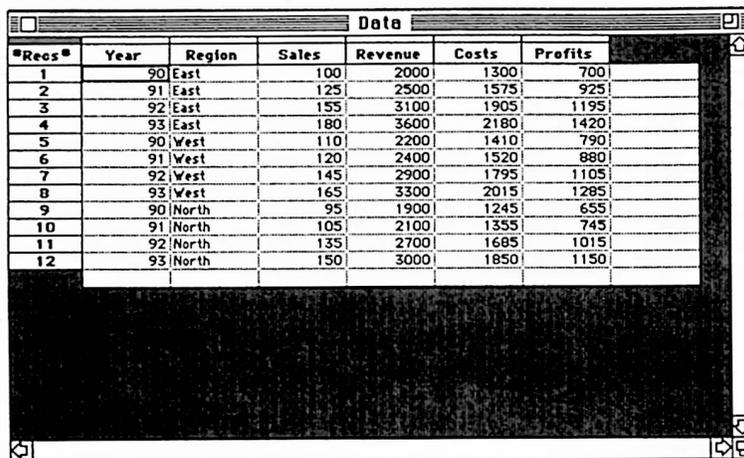
Each row of cells forms a numbered *record*.

4 93 East 180 3600

A *field* (column) is a set of information of one type vertically spanning all the records.

Revenue
2000
2500
3100
3600
2200
2400
2900
3300
1900
2100
2700
3000

The set of records and fields comprise the *dataset* for the file. Each record contains related numeric or alphabetic information organized by field and contained in cells. An entire dataset looks like this:



#Recs	Year	Region	Sales	Revenue	Costs	Profits
1	90	East	100	2000	1300	700
2	91	East	125	2500	1575	925
3	92	East	155	3100	1905	1195
4	93	East	180	3600	2180	1420
5	90	West	110	2200	1410	790
6	91	West	120	2400	1520	880
7	92	West	145	2900	1795	1105
8	93	West	165	3300	2015	1285
9	90	North	95	1900	1245	655
10	91	North	105	2100	1355	745
11	92	North	135	2700	1685	1015
12	93	North	150	3000	1850	1150

You select different combinations of records and fields—rows and columns—to generate your graphs.

### **Getting Data Into MacGraphX**

Your first step is always to get your data into MacGraphX's data window. You have two ways to do so: manually enter the data cell by cell, creating new rows and columns as you go along, or import it from other applications. MacGraphX can read in files created by MacCalc or Excel and can read files created in WKS or WK1 formats from Lotus 1-2-3, or tab-delimited ASCII or SYLK from a database or spreadsheet application. For a description of these file formats, see the Import Data command in the chapter *Menus and Dialogs*. You can also extend the set of file types that MacGraphX can recognize by using the small *CreateFFIX* application that is on your MacGraphX disk.

### **Selecting Fields**

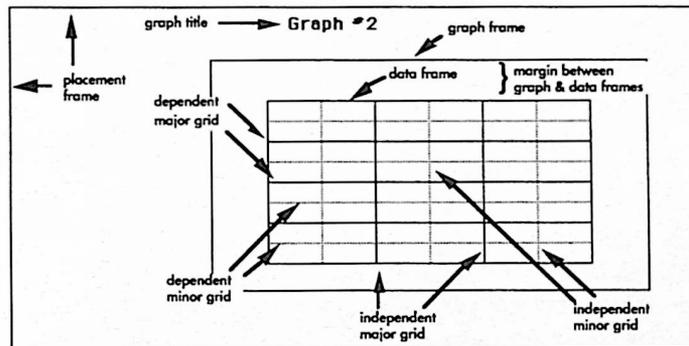
You'll select a field to define the data for the graph along the independent axis (in the horizontal or *x* direction), and one or more other fields to define the values that are measured on the dependent axis (in vertical or *y* direction).

You'll also need to select a range of records to graph. With both a range of records selected and the fields chosen, one command from the Graph menu will create the desired graph.

## About Graphs and the Graph Window

Every graph has two frames which define the positions of graph items, the *graph frame* and the *data frame*. Only the data frame is visible when you create a graph. The data frame encloses the data that make up the graph. All field elements such as bars, marks, lines, and areas are contained within this frame, as are grid lines.

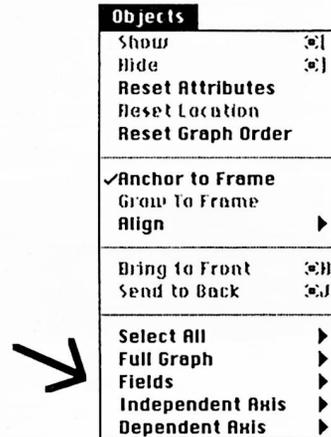
The graph frame contains the data frame and overlaps the axes. It can be enlarged independently of the data frame to create a margin around the graph. The graph frame can't be made smaller than the data frame, nor can the data frame be made larger than the graph frame.



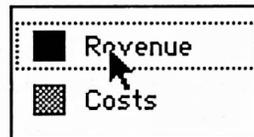
The largest frame in the graph window is the *placement frame*. This frame contains everything in the graph window. A graph object can't be moved outside of the placement frame. The placement frame is useful for placing your graph in the window or on the page. The placement frame can be enlarged to enclose an entire page or a number of pages. Enlarging the placement frame makes it possible to make the graph much larger, even by as much as several pages.

## Selecting Graph Objects

You select graph objects before you can give commands that affect those objects. An object is any part of a graph or any user-drawn graphic that appears in the graph window. To select an object that is part of the graph (frame, axis, tick, etc.), you can choose it from a submenu on the Objects menu.



You can also select an object by clicking on it with the mouse. Field elements (bars, lines, marks, areas, and pieces of pies) must be selected by clicking on their indicators in the legend. When selected, a field indicator is surrounded by a faint dotted line.

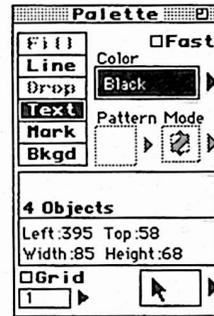


When labels or titles, grid lines, ticks, or axes are selected, a faint dotted line appears around them. Resizable objects such as frames, the legend, and user-drawn graphics have resizing handles at each corner and side. User-drawn lines have a resizing handle on each end. Click and drag these handles to resize an object.

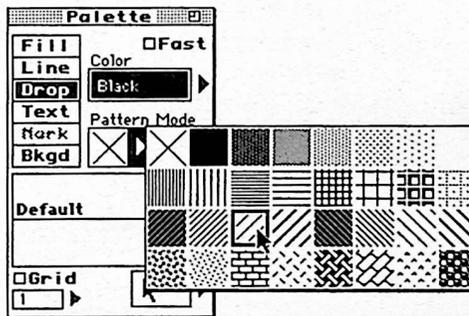
Also, you can select objects via special *power selection keys* that specify classes of object. For example, typing the letter “g” and a Return will select all grid lines on the frontmost graph.

## The Floating Palette

Graphs are contained in windows. Floating above a graph window, initially on the right, is MacGraphX's *palette*. The palette provides you with tools to change the appearance of objects in a graph window. The palette has three commands: Color (useful for those with a color system), Pattern, and Mode. There is a list of selectors such as Fill, Line, Drop, and so forth on the palette as well. These enable you to specify the aspect of a selected graph object to change when you give a command from the palette.



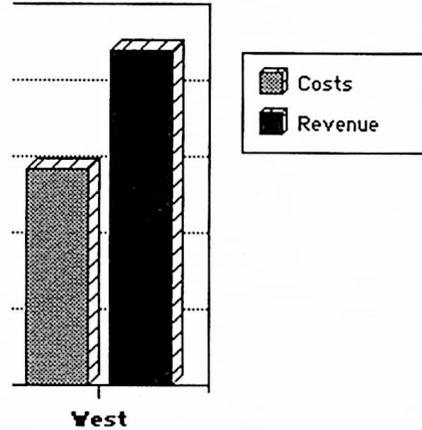
Using the palette is similar to using standard menus. First, select an object to change in the graph. Then choose the part of the object to modify (Fill, Line, Drop, etc.) by clicking on the selector in the palette. Finally, give a command by clicking on the arrow (next to a menu's current value indicator) and dragging the cursor to the desired new value on the menu. When you release the mouse, the selected object in the graph changes its appearance.



When you're not using the palette, you can roll it up by clicking in the *palette* zoom box in the upper-right corner of the palette's title bar. You can also move the palette anywhere on the screen by clicking and dragging the palette's title bar.

### **About the Legend**

Every graph has a *legend* (also called the *key*) which shows the correspondence between data elements and fields. The legend normally appears on the upper right side of the graph window. Field items such as bars, areas, marks, and lines can be selected by clicking on a field indicator in the legend.



The legend can be shown and hidden like any other graph object. It can also be moved anywhere in the graph window and resized.

### **The Next Step**

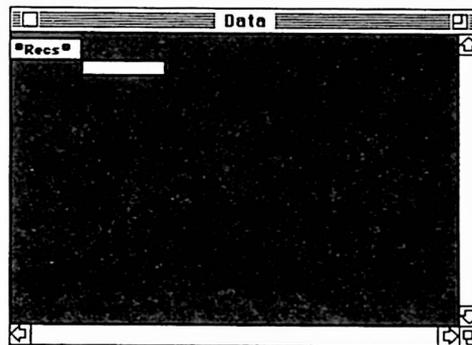
You've now installed MacGraphX and learned many of its basic concepts. Understanding the basics before starting either tutorial will make learning MacGraphX much easier. Move on to *MacGraphX Quick Start* if you want to get started with your work as quickly as possible, or turn to *Learning MacGraphX* for a more in-depth introduction to this program.

## Chapter 2: MacGraphX Quick Start

If you're ready to get started right away, keep reading. (For a more thorough introduction to MacGraphX see *Learning MacGraphX*.)

Launch MacGraphX by double-clicking on its icon in the Finder, or select the icon and choose Open from the Finder's File menu.

Before you can create a graph, you need to type in data, or import it into MacGraphX.

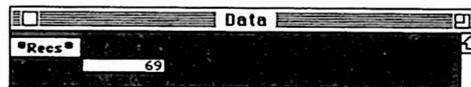


### To Manually Enter Data

You'll need to type in data for each record one cell at a time. (Because the empty top-left cell will be already selected, you won't need to select a cell to enter data.) Here's how to enter data, record by record:

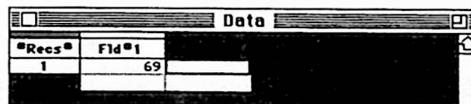
#### 1. Enter data for first cell

Type in the data for the first cell.



#### 2. Create new cell

Press the Tab key to create a new cell.

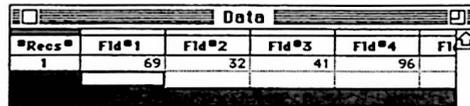


### 3. Enter data for first record

Continue entering data; use the Tab key to create new cells until you've finished entering the data for one complete record (row).

### 4. Start second record

When you've finished entering data for the first record (row), tab twice. Now, you're in the first field (column) of the second record.



Rec#	Fld#1	Fld#2	Fld#3	Fld#4	Fld#5
1	69	32	41	96	

### 4. Enter data for other records

Begin entering data for the new record.

Continue using the Tab key to create cells and records, making sure you enter cell data in the same sequence as you've entered data in preceding records.

You can create up to 2500 records and 125 fields in the data window. If you want to enter data field-by-field (filling one column with data before moving over to the next column), you can use the Return key to create a new cell and move down to the next record in the same field (column); press Return twice to end the current field and begin a new one.

## To Import Data

MacGraphX lets you import prepared data in many different file formats. (For a description of those file formats, see the Import Data command in the *Menus and Dialogs* chapter; you can define new file formats for MacGraphX to load and translate with the *CreateFFIX* utility.) Here's how to import data:

### 1. Select file format

From the File menu, choose Import Data; from the Import Data submenu, choose the desired file format, or choose All.

### 2. Open file

Locate the file in the dialog and click **Open**.

### 3. *Make dialog choices*

In the Load dialog, you have several choices. (See the Import Data command in the *Menus and Dialogs* chapter for an explanation of the options.)

Click **OK**.

You can import up to 2500 records and 125 fields into the data window.

## **Select Fields and Records**

With the data either manually entered or imported into the MacGraphX data window, you're now ready to create a graph. The procedure for defining a graph consists of four easy steps:

- Choose the records to graph.
- Define the independent (*x*) field.
- Define the dependent (*y*) fields.
- Choose the graph type.

### **Choose the Records to Graph**

Select the desired record numbers from the Recs# column.

- To select a single record, place the cursor on its number in the Recs# column and click.
- To select a range of records, click and drag the cursor vertically over the desired record numbers.
- To select several discontinuous records, click on the desired record numbers while holding down the Command key.
- To select all records at once, place the cursor at the top of the Recs# column and click. The cursor will look like this: .

### **Define the Independent (*x*) Field**

The independent field is the category against which your data will be plotted. The independent field usually is graphed along the horizontal (*x*) axis.

### 1. Select independent field

Place the cursor in the thin horizontal box just above the name of the desired field. When you do this, the cursor turns to: . (Note the horizontal shape of this cursor, to remind you that you're selecting the field for the horizontal axis.) Click to specify a field; this box turns gray.

Year	Region
90	East
90	North
90	West

### Define the Dependent (y) Field

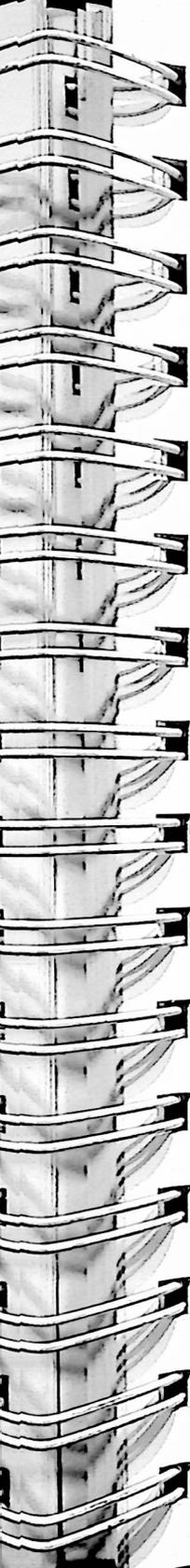
The dependent field, which is usually plotted along the vertical (y) axis, indicates the values of selected data.

### 1. Select dependent field

Choose one or more fields by clicking and dragging the cursor across the desired field names. The cursor will look like this: . (Note the vertical shape.)

To extend the selection of fields, click the mouse on a field name while holding down the Shift key. To select non-adjacent field names, or deselect fields, click on the field names while holding down the Command key.

Revenue	Costs
2000	1300
1900	1245
2200	1410



## Create the Graph

With one command, you create the graph.

### **1. Choose the desired graph type**

From the Graph menu, select New Graph; from the New Graph submenu, select the desired graph type. (For a list and description of available graph types, see Types of Graphs in the *Appendix*.)

Your first MacGraphX graph appears on-screen in a graph window. To specify formulas and formats for your data, make formatting and structural changes to your graph, or lay out and print your graph, see the relevant chapters in this manual.

## Chapter 3: Learning MacGraphX

In this chapter, we'll cover how to open a prepared MacGraphX file containing hypothetical financial data, select the desired information to graph, create three graphs, and make formatting and structural changes to two of these graphs.

Before you begin, you need to install MacGraphX and the Tutorial and Graphs files. To do so, see the *MacGraphX Basics* chapter. To get the most from this tutorial, read *MacGraphX Basics* first.

You'll use the sample Tutorial file included with MacGraphX. You'll learn how to create graphs, and how to make several basic formatting and structural enhancements to your graphs.

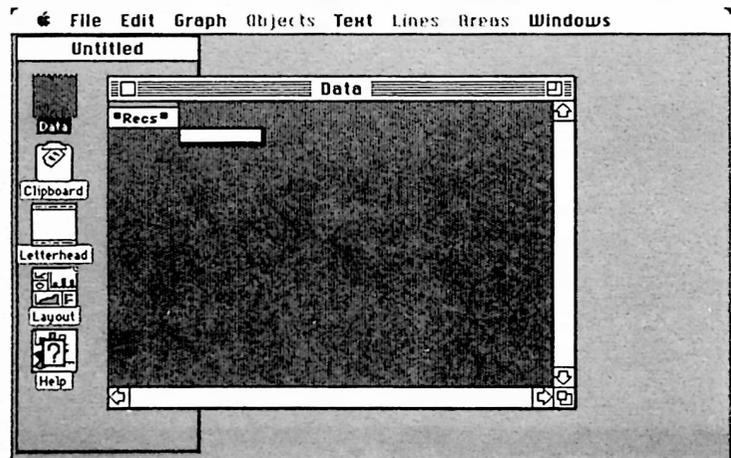
This tutorial takes about one hour to complete. If you want to take a break from the tutorial, you can save your changes to a file and quit MacGraphX at any time. To continue working later, just double-click on this saved file from the Finder to open it.

### Launch MacGraphX

First things first.

#### 1. Launch the program

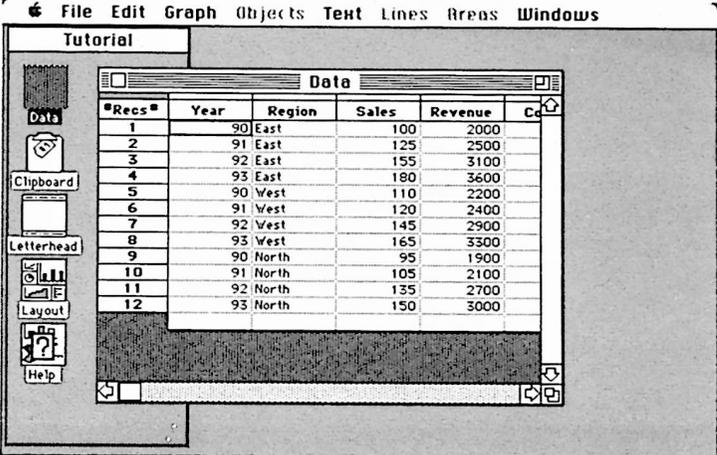
Launch MacGraphX by double-clicking on its icon in the Finder, or select the icon and choose Open from the Finder's File menu. The MacGraphX desktop and a blank data window will appear on-screen.



## 2. Open the Tutorial document

Select the Open command from the MacGraphX File menu. In the dialog, select the Tutorial file in the MacGraphX folder; open it by clicking on the **Open** button or by double-clicking on the file name.

The data window, displaying the financial information you'll use to create graphs, appears on-screen.



The screenshot shows a window titled "Tutorial" with a menu bar containing "File", "Edit", "Graph", "Objects", "Text", "Lines", "Areas", and "Windows". Inside the window, there is a "Data" window with a table of financial information. The table has columns for "#Recs#", "Year", "Region", "Sales", "Revenue", and "Costs". The data is as follows:

#Recs#	Year	Region	Sales	Revenue	Costs
1	90	East	100	2000	
2	91	East	125	2500	
3	92	East	155	3100	
4	93	East	180	3600	
5	90	West	110	2200	
6	91	West	120	2400	
7	92	West	145	2900	
8	93	West	165	3300	
9	90	North	95	1900	
10	91	North	105	2100	
11	92	North	135	2700	
12	93	North	150	3000	

## 3. Save a copy of the Tutorial file

You'll use a *copy* of the Tutorial file for your work. This will preserve the Tutorial file for future use, or in case you make a mistake and want to start over. From the File menu select Save As. In the dialog, give the file a different name of your choosing. Click **Save**.

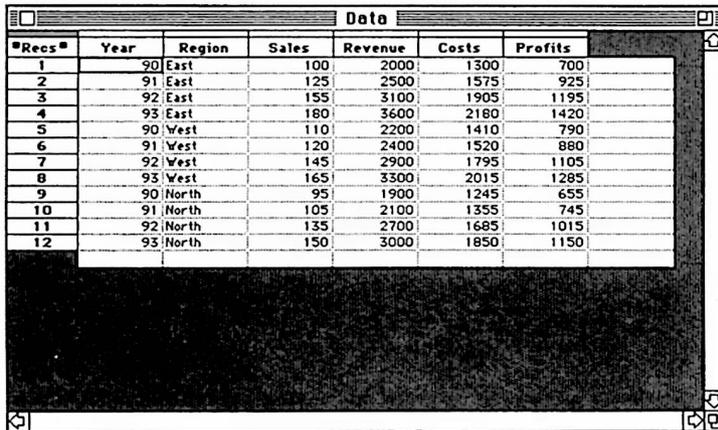
In the first part of this tutorial, you'll create a commonly used graph called a *bar graph*. Bar graphs display data as vertical or horizontal bars. The first graph you'll make will compare the value of two fields, Revenue and Costs, for the fiscal year 1990 in each of three regions.

The *independent axis*, usually appearing as the *x (horizontal) axis*, will plot the regions. The *dependent axis*, usually the *y (vertical) axis*, will display values for the Revenue and Costs fields.

## Creating a Bar Graph

### 1. Enlarge the data window

Click on the zoom box in the upper-right corner of the data window. The window now completely displays all the fields and records it contains.

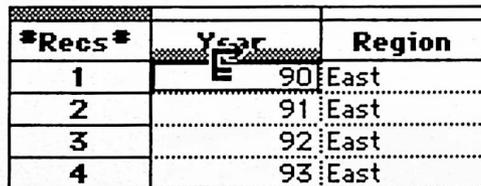


#Recs#	Year	Region	Sales	Revenue	Costs	Profits
1	90	East	100	2000	1300	700
2	91	East	125	2500	1575	925
3	92	East	155	3100	1905	1195
4	93	East	180	3600	2180	1420
5	90	West	110	2200	1410	790
6	91	West	120	2400	1520	880
7	92	West	145	2900	1795	1105
8	93	West	165	3300	2015	1285
9	90	North	95	1900	1245	655
10	91	North	105	2100	1355	745
11	92	North	135	2700	1685	1015
12	93	North	150	3000	1850	1150

### 2. Sort the records by year

Place the cursor over the name of the field "Year" while holding down the Option and Shift keys. The

cursor now looks like this: . (Note the shape of the cursor, which indicates moving or sorting rows.) To sort the records by year, click the mouse.



#Recs#	Year	Region
1	90	East
2	91	East
3	92	East
4	93	East

### 3. Select the records

Select the first three records in your newly sorted dataset by clicking and dragging on numbers 1, 9, and 5 in the Recs# column. Your cursor now functions as a record selector, and looks like this:



*Recs#	Year	Region
1	90	East
9	90	North
5	90	West

### 4. Define the independent field (x axis)

First, you'll define the field "Region" as the field to be plotted on the horizontal *x* axis. To do so, place the cursor in the thin box above the name of the field "Region"; the cursor turns to: . (Note the horizontal shape of this cursor, to remind you that you're selecting the field for the independent axis, which is usually horizontal.) Click once. The thin box above the field name turns gray.

Year	Region
90	East
90	North
90	West

### 5. Define the dependent fields (y axis)

Now define the fields that will be measured by values on the vertical *y* axis and will appear as the bars in your graph. Place the cursor over the name of the field "Revenue"; the cursor turns to: . (The vertical shape reminds you that you're selecting fields for the vertical axis.) Click and drag to the right over the "Costs" field.

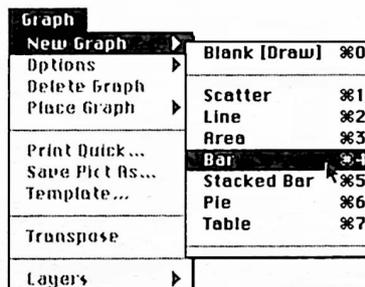
Revenue	Costs
2000	1300
1900	1245
2200	1410

Your data window now looks like this:

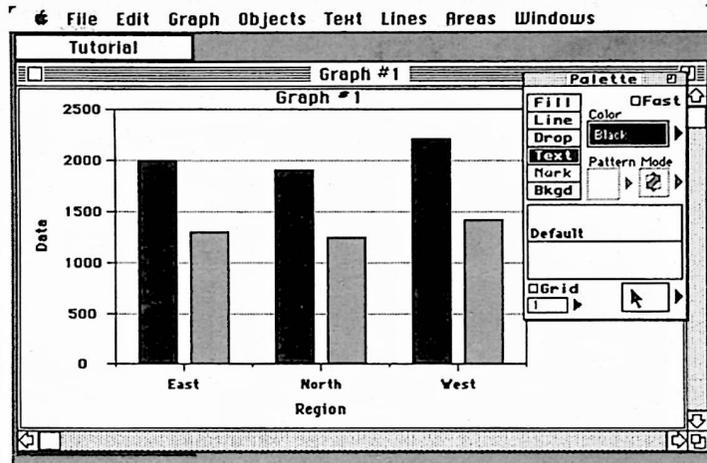
#Recs	Year	Region	Sales	Revenue	Costs	Profits
1	90	East	100	2000	1300	700
9	90	North	95	1900	1245	655
5	90	West	110	2200	1410	790
2	91	East	125	2500	1575	925
10	91	North	105	2100	1355	745
6	91	West	120	2400	1520	880
7	92	West	145	2900	1795	1105
3	92	East	155	3100	1905	1195
11	92	North	135	2700	1695	1015
8	93	West	165	3300	2015	1285
4	93	East	180	3600	2180	1420
12	93	North	150	3000	1850	1150

### 6. Create the bar graph

From the Graph menu, choose New Graph; from the New Graph submenu, choose Bar.



Your first MacGraphX graph appears on-screen and is automatically titled Graph #1.



## Format the Graph

In this part of the tutorial, you'll take the graph just created and change its appearance.

### Text Formatting

#### 1. Select the title

Select the graph title, "Graph #1," by clicking on it once. The graph title is now surrounded by a faint dotted line, which indicates that it is selected.

#### 2. Change font to New York

From the Text menu, choose Font; from the font submenu, choose New York.

#### 3. Make the text underlined

From the Text menu, choose Style; from the Style submenu, choose Underline.

#### 4. Highlight the title

Click again on the title "Graph #1," highlighting all of its text.

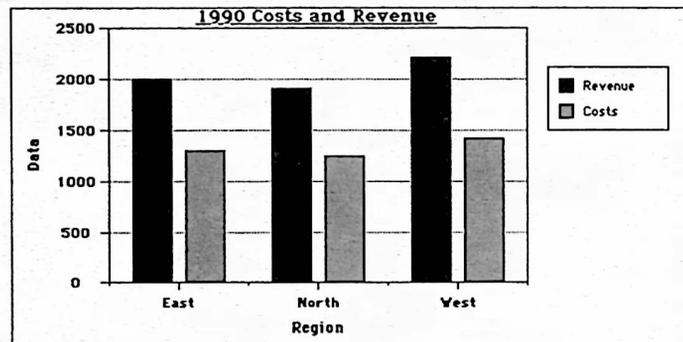
### 5. *Change the title*

Type in the new graph title: 1990 Costs and Revenue. To deselect the title, click once in a blank part of the graph window (click anywhere, but not on a graph object).

Click in the palette's zoom box in the upper-right corner of the palette's title bar to close it and clear it from view. Once you've closed the palette, it looks like this:



Your graph looks like this:



### **Reordering Bars**

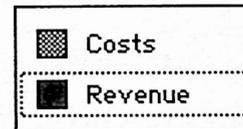
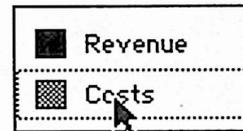
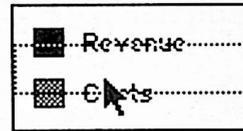
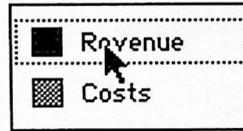
To see the data for "Costs" before the "Revenue" data in the graph, you can change the order of the bars in groups.

#### **1. *Select the Revenue field***

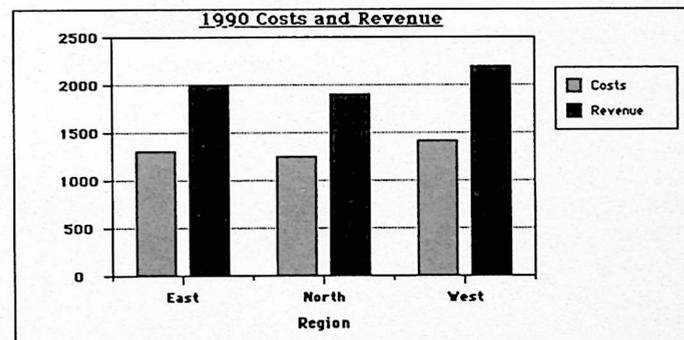
From the Objects menu select Fields; from the Fields submenu select Revenue. Or you may click on "Revenue" in the legend, to the right of the graph. Once you've selected the field, it's surrounded by a faint dotted line.

## 2. Reorder the fields

Click and drag Revenue over Costs in the legend and release the mouse. The field elements (bars) will be reordered in the graph. To deselect the fields, click once anywhere in the graph window, but not on a graph object.



Your graph now looks like this:



Notice that the Costs field now precedes the Revenue field in the graph.

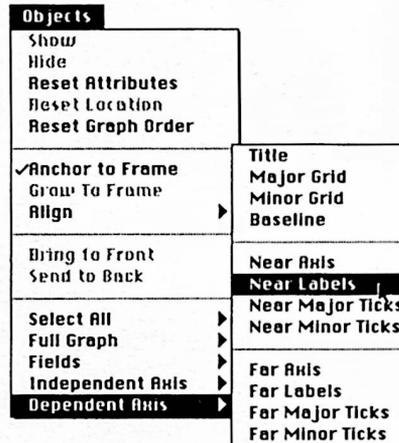
## Formatting the Dependent Axis Labels

To make it easier to read values along the dependent axis, you can reformat the axis labels.

Since the dependent axis represents large dollar amounts, you'll reformat it by giving it the "Currency 0" numeric format. This format places a dollar sign in front of each figure, leaves off decimals, and puts a comma before every three digits.

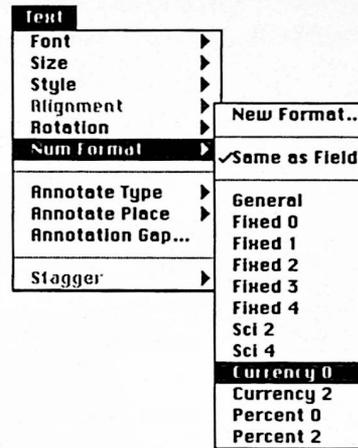
### 1. Select the dependent axis labels

From the Objects menu select, Dependent Axis; from the Dependent Axis submenu, choose Near Labels. Or you may click once on the dependent axis labels (the numbers along the vertical axis). Once you've selected them, the labels are surrounded by a faint dotted line.



## 2. Format the labels

From the Text menu, select Num Format; from the Num Format submenu, select Currency 0.



### **Hiding the Dependent Axis Title**

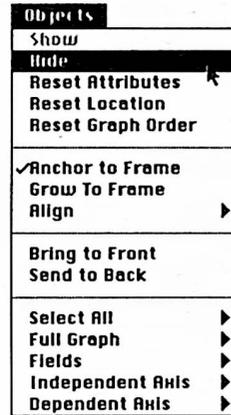
Since it's obvious to the viewer that the dependent axis displays data, you can hide the dependent axis title "Data." In addition, adding dollar signs and commas to the dependent axis labels with the Currency 0 format has placed the labels too close to the title, almost overlapping it. To rectify matters, do the following:

#### **1. Select the dependent axis title**

From the Objects menu, select Dependent Axis; from the Dependent Axis submenu select Title, or click on the axis title "Data" once. Once you've selected the dependent axis title, it's surrounded by a faint dotted line.

## 2. *Hide the dependent axis title*

From the Objects menu, choose the Hide command, which hides (but doesn't actually eliminate) the dependent axis title.



## **Drop Shadows**

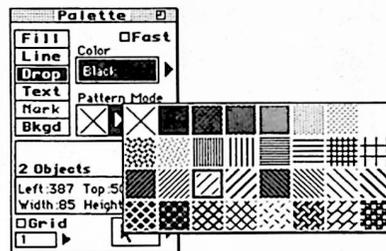
Now, you can enhance your graph's visual impact. You'll start by putting a drop shadow behind the field elements (bars) of your graph. To do so, you'll need the palette described earlier. To open the palette, click in the zoom box in the upper-right corner of the palette's title bar. If the palette now hides the legend (which it will on a small screen), click and drag the palette over to the left side of the screen.

### 1. *Select the fields*

Click once on the field name "Cost" in the legend, and then hold down the Shift key and click on Revenue. Once you've selected them, each field name will be surrounded by a faint dotted line when selected. (In MacGraphX, you can select multiple graph objects by clicking on them while holding down the Shift key.)

## 2. Specify the shadow pattern

Click on Drop in the palette, and then click on the black arrow next to Pattern, to open the Pattern menu. Drag the cursor to the following diagonal pattern (third row from top, third from left) and release the mouse:



## 3. Specify shadow color (optional)

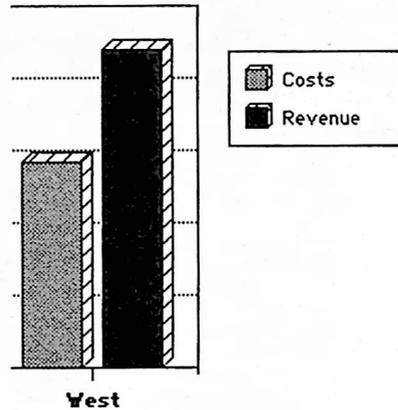
If you're using a color system, you can select a color (other than Black) from the Color menu on the palette. To open the Color menu, click on the arrow next to the Color status field. From the menu, select any color by clicking and dragging your mouse to the desired color, and then releasing it.

## 4. Give the shadow a 3-D effect

Select 3-D Shadow from the Areas menu.



Putting a 3-D drop shadow behind the bars makes the bars and legend look like this:

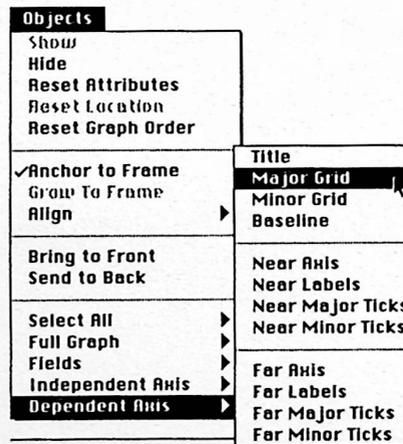


### Enhancing Grid Lines

You can further enhance your graph by making the major grid lines more visible, which makes interpreting the data easier.

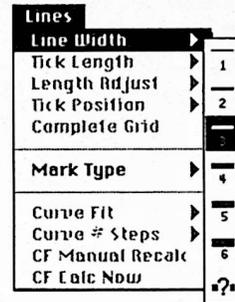
#### 1. Select the dependent major grid

Select the dependent major grid (the faint horizontal grid lines that correspond to the numbered ticks on the dependent axis) by going to the Objects menu and selecting Dependent Axis; from the Dependent Axis submenu, select Major Grid. You can also click once on a dependent major grid line to select the dependent major grid. Once you've selected the grid lines, they'll have faint dotted lines around them.



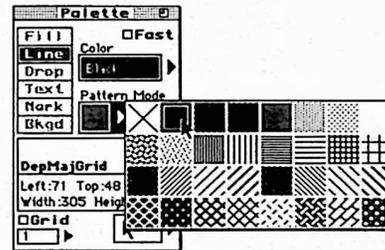
## 2. Widen the grid lines

From the Lines menu, choose Line Width; from the Line Width submenu, choose 3. These steps specify a line width of 3 points for the dependent major grid.



## 3. Pattern the grid lines

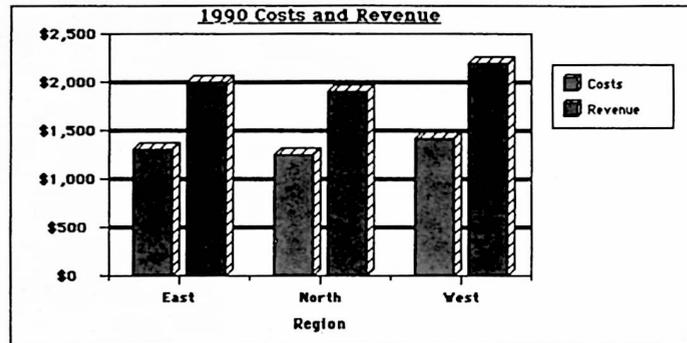
Choose this 100% black pattern from the Pattern menu on the palette (top row, second from left):



## 4. Color the grid lines (optional)

If you have a color system, you can color the grid lines. Choose a color (other than White) from the Color menu on the palette.

Roll up the palette by clicking in its zoom box, and then click once anywhere in the graph window, but not on a graph object. These steps deselect the dependent major grid lines you've been working on. Your graph now looks like this:



### ***Giving Yourself More Space***

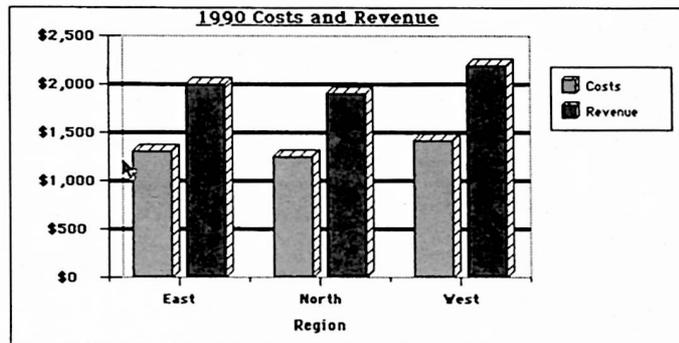
You can now separate the axes from the graph's *data frame* by shrinking the data frame in from the *graph frame* which overlaps it. Shrinking the data frame creates a margin between the data frame and the axes, giving the graph a clean and elegant look.

#### ***1. Select the data frame***

From the Objects menu, choose Full Graph; from the Full Graph submenu, choose Data Frame. Or you can click on the data frame which is visible on your graph. Once you've selected the data frame, it's surrounded by a faint dotted line, and has resizing handles which appear on each corner and side of the frame.

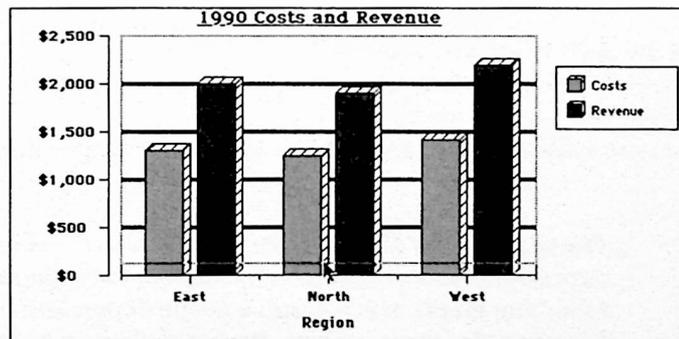
## 2. Reduce the data frame horizontally

Press the Command key and click on the resizing handle on the left side of the data frame. Drag it horizontally inward (to the right) about a quarter of an inch. Doing so shrinks the data frame in from the dependent axis and the (currently invisible) graph frame. (The command key tells MacGraphX to move or resize one frame without modifying any other frame; in this example, the data frame is reduced while the graph frame retains its size.) As you reduce the data frame, you see:

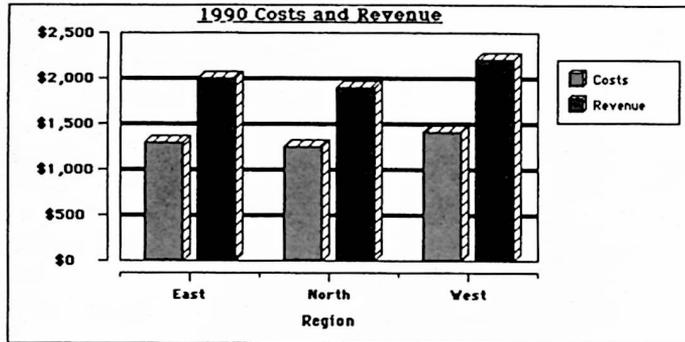


## 3. Shrink the data frame vertically

With the data frame still selected, press the Command key and click on the resizing handle on the lower edge of the frame. Drag it up a quarter of an inch. As you reduce the frame, you see:



Click once anywhere in the graph window but not on a graph object to deselect the data frame. Your graph now looks like this:



You've just finished formatting your first graph in MacGraphX. To recap, you've successfully done the following:

- selected fields and records
- created a bar graph showing Costs and Revenue by Region for 1990
- reordered fields (bars)
- reformatted the dependent axis labels to display large dollar values
- widened and patterned (and optionally colored) the grid lines
- put 3-D drop shadows behind the bars
- patterned (and optionally colored) the drop shadows
- separated the data frame from the  $x$  and  $y$  axes to create margins

The graph *1990 Costs and Revenue* shows Costs and Revenue, two dependent fields, organized by Region, the independent field. In the following graph, you'll graph a single dependent field, Profits, over four years for three regions. Region will again be the field displayed on the independent axis, but it will be subdivided into years. Year will be a *second* independent field. Note that this doesn't mean another independent axis line, but rather a subdivision of the independent axis.

## Bar Graph with Second Independent Axis

Close Graph #1 by clicking in the close box in the upper-left corner of the window. You can also select Close Window on the Windows menu. The data window is now on-screen. To create a bar graph with a second independent axis, do the following:

### 1. *Restore the sort order*

Hold down the Option and Shift keys and place the cursor over the field name "Recs#." The cursor now looks like this: . Click the mouse. The records will be sorted by record number, and will return to their original positions.

### 2. *Select the records*

Place the cursor on record 1 and click and drag the mouse down to record 12. The numbered record indicators will blacken.

### 3. *Define the independent field (x axis)*

The independent axis, Region, is still selected from the first graph. Leave it that way.

### 4. *Define the second independent field*

While holding down the Option key, place the cursor in the thin box above the name of the field "Year" and click once. The thin box turns a lighter shade of gray than that of the (primary) independent field, indicating that this is the secondary independent field.

### 5. *Define the dependent field (y axis)*

Place the cursor in the "Profits" field and click once. The field name will blacken. The two previously selected dependent field names are now deselected.

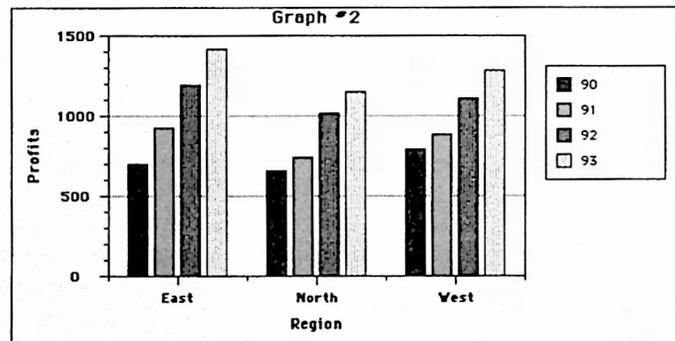
Your data window now looks like this:

#Recs#	Year	Region	Sales	Revenue	Costs	Profits
1	90	East	100	2000	1300	700
2	91	East	125	2500	1575	925
3	92	East	155	3100	1905	1195
4	93	East	180	3600	2180	1420
5	90	West	110	2200	1410	790
6	91	West	120	2400	1520	880
7	92	West	145	2900	1795	1105
8	93	West	165	3300	2015	1285
9	90	North	95	1900	1245	655
10	91	North	105	2100	1355	745
11	92	North	135	2700	1685	1015
12	93	North	150	3000	1850	1150

### 6. Create the bar graph

From the Graph menu, choose New Graph; from the New Graph submenu, choose Bar.

Your new graph looks like this:



Notice how each region is subdivided into four years with each bar representing profits for one year. In your first bar graph, no subgroups existed. You had only Costs and Revenue graphed by Region.

Make any formatting changes you like to this graph to enhance its appearance. You may want to experiment with changing patterns, colors, and line widths. When you're ready to proceed with the tutorial, close Graph #2. The data window reappears on-screen.

## Creating a Line Graph

For your third graph, let's try a *line graph*. This is a common graph useful for showing how one continuous variable (a variable that can take any value in a range) changes in relation to another variable, such as trends over time. In this line graph, you'll demonstrate how three fields, Revenue, Costs, and Profits, change over four years, '90—'93.

Follow these steps below to select the fields and records you'll use to create the graph.

### 1. *Select the records*

Select records 1 through 4 in the data window by clicking and dragging on them in a downward motion. Your cursor turns into the record selector, which looks like this: .

### 2. *Define the independent field (x axis)*

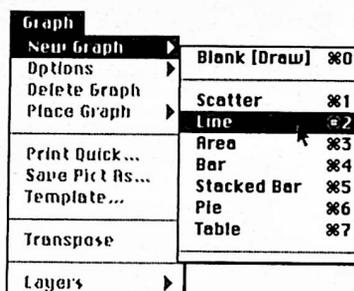
With the desired records selected, make Year the independent field. Place the cursor in the thin horizontal box above the name of the field "Year" (the cursor now looks like: ). Click. The box turns gray.

### 3. *Define the dependent fields (y axis)*

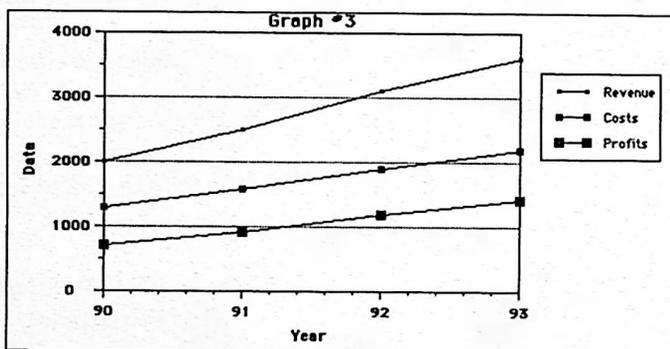
Select the dependent fields, Revenue, Costs, and Profits, by placing the cursor over the name of the field "Revenue" (the cursor now looks like this: ). Click in this field, and drag the cursor to the right across the Costs and Profits fields. The field names will blacken.

#### 4. Create the graph

From the Graph menu, choose New Graph; from the New Graph submenu, choose Line.



A window titled Graph #3 appears on your screen. The graph looks like this:



#### Text Formatting

##### 1. Select the title

Select the graph title, "Graph #3," by clicking on it once. Once you've selected it, the graph title is surrounded by a faint dotted line.

##### 2. Change font to New York

Select New York from the font submenu on the Text menu.

##### 3. Make the text underlined

From the Style submenu, choose Underline.

##### 4. Highlight the title

Click again on the title "Graph #3," highlighting the text.

### 5. *Change the title*

Type in the new graph title: Financial Totals: 90-93.

Click once anywhere in the graph window, but not on a graph object to deselect the graph title. Your graph title now looks like this:

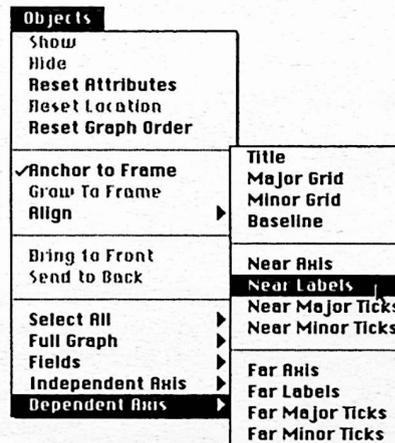
**Financial Totals: 90-93**

### **Number Formatting**

Because the dependent axis measures dollar values, as it did in the first bar graph, you will want to format the numbers along this axis appropriately.

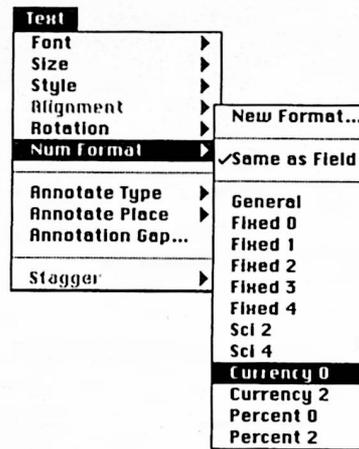
#### 1. *Select the dependent axis labels*

From the Objects menu, choose Dependent Axis; from the Dependent Axis submenu, choose Near Labels. You can also click once on the dependent axis labels to select them. Once you've selected them, the dependent axis labels are surrounded by a faint dotted line.



## 2. *Change the number formatting*

From the Text menu, choose Num Format; from the Num Format submenu, choose Currency 0.



As before, Currency 0 puts a currency sign in front of a number, leaves off decimals, and puts a comma before every three digits. Since the numbers along the dependent axis are large dollar amounts, this number format is most appropriate.

### ***Hiding an Axis Title***

The axis title "Data" isn't necessary, since it's obvious that the dependent axis displays data. When you reformatted the dependent axis labels, the labels came too close to the axis title, almost overlapping it. To solve this dilemma, do the following:

#### ***1. Select the dependent axis title***

From the Objects menu, choose Dependent Axis; from the Dependent Axis submenu, choose Title, or click on the axis title "Data" once in the graph window. Once you've selected it, the title is surrounded by a faint dotted line.

#### ***2. Hide the dependent axis title***

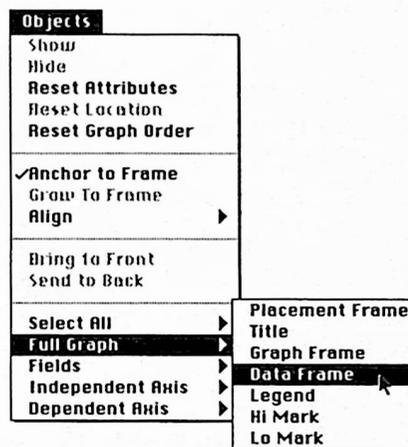
From the Objects menu, choose the Hide command. Doing so hides the dependent axis title.

## Changing Fill Patterns

You'll need to open the palette to perform the following formatting changes. If the palette is currently closed, click in its zoom box (in the upper right of the palette's title bar) to open it. You'll use the palette to add a light fill to the data frame.

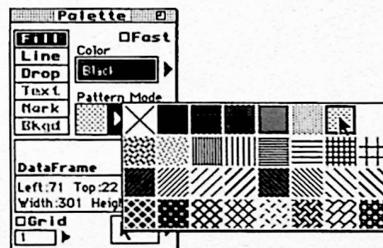
### 1. Select the data frame

From the Objects menu, choose Full Graph; from the Full Graph submenu, choose Data Frame. You can also click once on the data frame to select it. Once you've selected it, the data frame is surrounded by a faint dotted line. The data frame is the frame which surrounds the graph's field elements—lines, bars, marks, and the like—and overlaps the graph frame.



### 2. Change the fill to a light gray

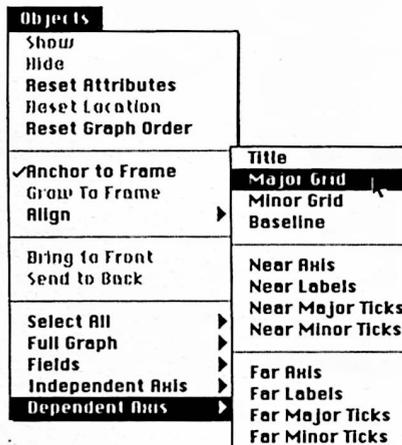
With Fill on the palette selected, choose the lightest gray pattern from the Pattern menu (top row, second from right):



## Formatting Grid Lines

### 1. Select the dependent major grid

Select the dependent major grid (the faint horizontal grid lines that correspond to the numbered ticks on the dependent axis) by going to the Objects menu and choosing Dependent Axis; from the Dependent Axis submenu, choose Major Grid. You can also click once on a grid line to select the dependent major grid. Once you've selected them, the grid lines are outlined by faint dotted lines.

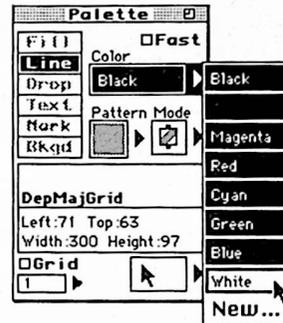


### 2. Widen the grid lines

From the Lines menu, choose Line Width; from the Line Width, submenu choose 3. These steps specify a line width of three points for the dependent major grid.

### 3. Color the grid lines

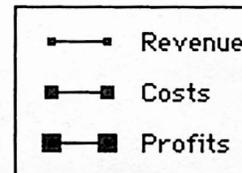
From the Color menu on the palette, choose White, or if you have a color system, any color other than Black.



### Adding a Drop Shadow

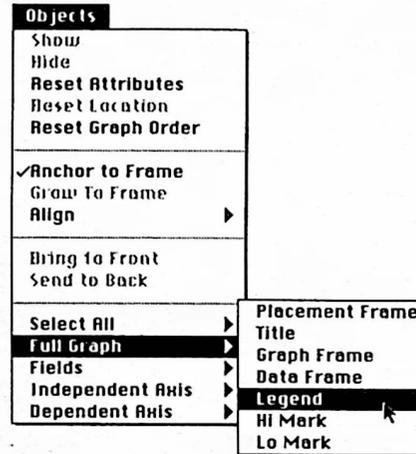
#### 1. Reveal the legend

If necessary on a small screen, move the palette to the upper left side of the screen by clicking and dragging the palette's title bar. Doing so reveals the graph's legend. The legend for this graph looks like this:



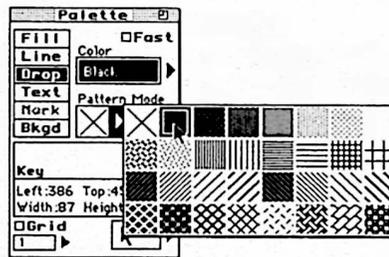
## 2. Select the legend

From the Graph menu, choose Full Graph; from the Full Graph submenu, choose Legend. You can also click once on the legend's border to select it. The legend's border is now outlined with a faint dotted line.



## 3. Specify the shadow pattern

With Drop selected on the palette (the Drop selector indicates the drop shadow attribute for the legend), choose the 100% black pattern indicated below on the Pattern menu (top row, second from left).

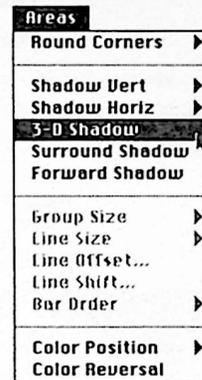


## 4. Specify shadow color (optional)

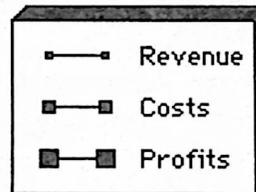
If you're using a color system, you can also select a color other than Black from the Color menu on the palette. Don't select White, which won't show up against the white background.

### 5. Give the shadow a 3-D effect

Select 3-D Shadow from the Areas menu.



Your legend now looks like this:



### Setting Line Widths

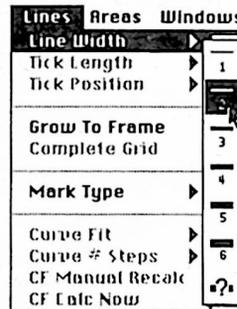
Follow the steps below to widen the field lines in your graph, which makes them appear more clearly.

#### 1. Select the fields

Select all the graph's fields by clicking on Revenue in the legend, and then holding down the Shift key while clicking on Costs and Profits. Field names are now outlined with faint dotted lines.

## 2. *Widen the lines*

From the Lines menu, choose Line Width; from the Line Width submenu, choose 2. These steps specify a width of two points for the field lines.



## **Line Patterns and Colors**

You can further enhance your graph via the following formatting changes.

### 1. *Deselect the fields*

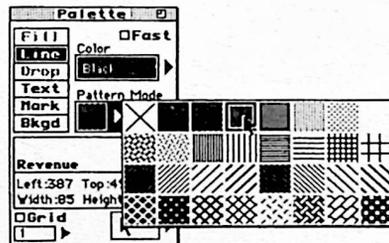
Click once anywhere in the graph window, but not on a graph object.

### 2. *Select the Revenue field*

Click on the field name Revenue in the legend. The field name Revenue is now outlined with a faint dotted line.

### 3. *Change the pattern*

From the palette's Pattern menu, choose this gray pattern (top row, fourth from the left):



### 4. *Change the line color (optional)*

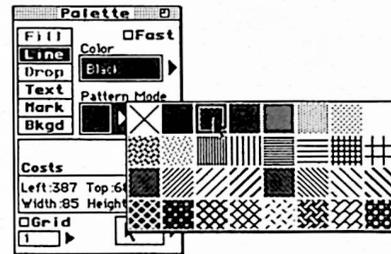
If you have a color system, you can also choose a color other than Black from the Color menu on the palette. Do not choose White.

### 5. *Select the Costs field*

Select Costs in the legend by clicking on it once. The field name Costs is now outlined with a faint dotted line.

### 6. *Change the pattern*

From the palette's Pattern menu, choose this gray pattern (top row, third from the left):



### 7. *Change the line color (optional)*

If you have a color system, you can also choose a color (other than Black) from the Color menu on the palette. Do not choose White.

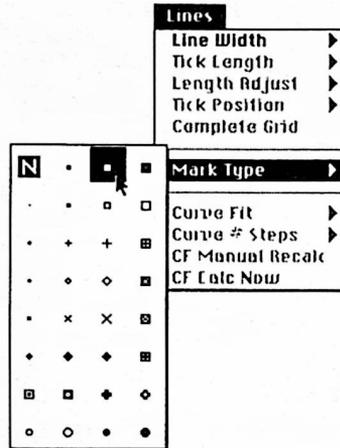
## **Changing Mark Types**

### 1. *Select the Revenue field*

Select Revenue in the legend, by clicking on it once.

## 2. Change the mark

From the Lines menu, choose Mark Type; from the Mark Type submenu, choose this mark (top row, second from right):

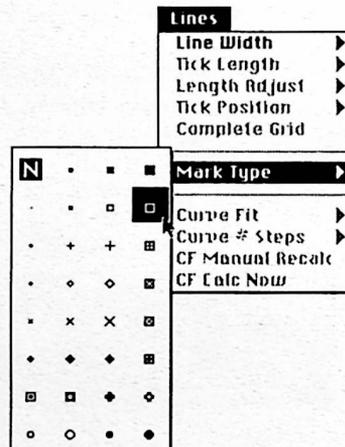


## 3. Select the Costs field

Click on the Costs field name in the legend to select it.

## 4. Change the mark

From the Lines menu, choose Mark Type; from the Mark Type submenu, choose this mark:

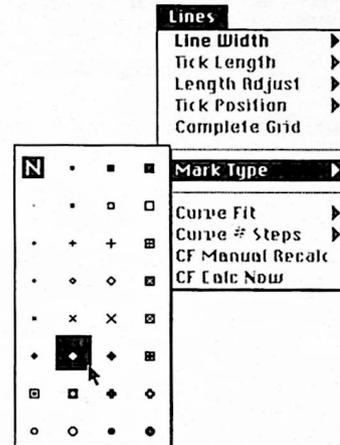


### 5. Select the Profits field

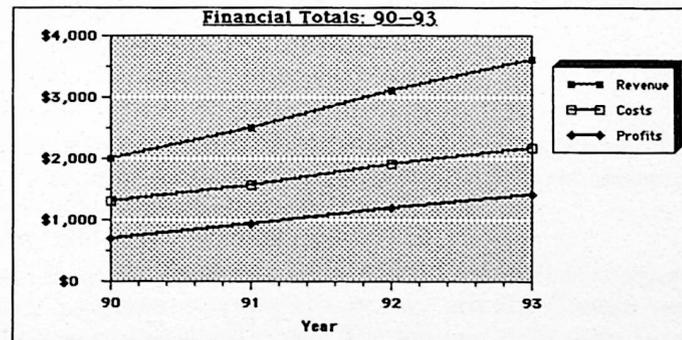
Select the Profits field from the legend, by clicking on the name of this field.

### 6. Change the mark

From the Lines menu, choose Mark Type; from the Mark Type submenu, choose this mark (third row from bottom, second from left):



Your graph now looks like this:



## Where to Go From Here

Congratulations! You've just finished creating one line graph and two bar graphs. You've also made several formatting and structural changes using menu commands and commands on the palette. You now know how to:

- select records and fields in the data window
- create a graph
- change patterns for filled objects
- change line widths
- reorder fields along the independent axis
- add margins to a graph
- add drop shadows to a graphic and give them a 3-D effect
- format axis labels

Now that you've mastered the basics of creating graphs, you're ready to use MacGraphX with your own data. For information about the other types of graphs you can create in MacGraphX, see the *Appendix*. For a complete explanation of basic graph terminology, see the *Glossary*. If you're already knowledgeable about graphs and would like more information about MacGraphX's formatting and structuring capabilities, read *Structuring Your Graph* and *Formatting Your Graph*. If you want to learn more about working in the data window, including sorting and grouping, see *Working in the Data Window*. If you're interested in calculating field values with formulas, or in using curve fits with scatter graphs, read *Building Formulas*.

## Chapter 4: More Basics

This chapter introduces more concepts and features that will help you use MacGraphX.

### Data Window

Two important capabilities MacGraphX gives you when you're working with data are *sorting* and *searching*. These two features make it easy for you to find and organize your data for graphing.

#### Sorting

MacGraphX lets you sort your data in the data window, to put your data in the order you want for selecting and graphing. You can order records in the data window by ascending record number, or by another ascending field value, with one mouse click. You can also use the Sort command on the Edit menu to sort with up to three fields as keys in ascending or descending order.

#### Searching

You can search your data for the right information to graph. The Search command gives you the ability to select records matching specified criteria. Records meeting the criteria are automatically selected, and can be immediately graphed. You can gather these records and move them to the top of the dataset with the Move To Top command, or move them as a group to any part of the dataset with a click of the mouse.

### Graph Window

When you create a graph, some parts of it are automatically visible. The graph has several elements, however, which aren't automatically shown, but which you can make visible.

For example, every graph has sides that are symmetric images of each other: top/bottom and left/right. The left and bottom sides are called the *near sides* of the graph. The top and right sides are the *far sides*. When MacGraphX creates a graph, it automatically shows the axis, axis labels, ticks, and axis title for the near sides only. The identical far-side objects remain hidden until you decide to show them.

Any part of a graph can be shown or hidden. A hidden graph object may be selected and made visible using commands from the Objects menu.

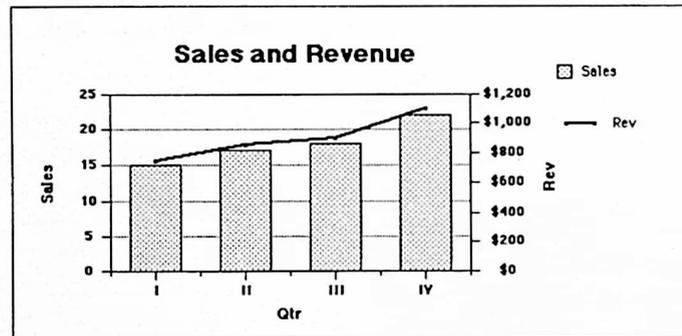
### **Transposing Axes**

MacGraphX usually produces graphs with the independent axis running horizontally (as the  $x$  axis) and the dependent axis running vertically (as the  $y$  axis). All values increase from left to right on the horizontal ( $x$ ) axis, and from bottom to top on the vertical ( $y$ ) axis.

You can, however, transpose the axes when you create a graph, or transpose them in the graph window. You'll learn how in *Creating a Graph* and *Formatting Your Graph*.

### **Overlaid Graphs**

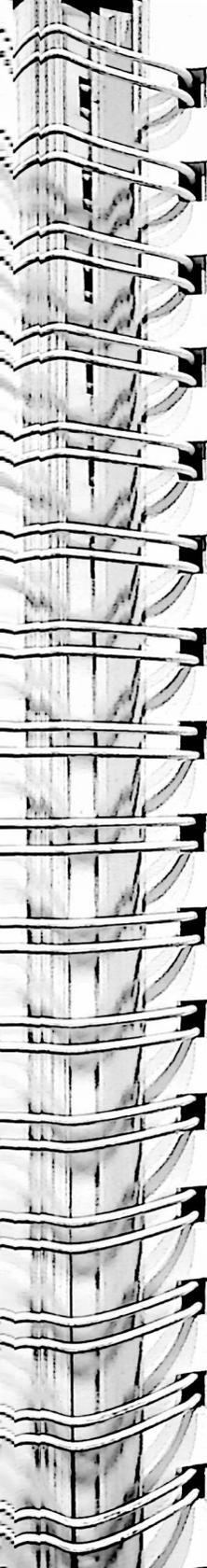
MacGraphX lets you create two graphs from the same dataset and overlay them. It's often useful, for example, to create a bar chart to emphasize individual quantities, and lay a line chart over it to show a trend over time as well. You can even graph different fields and records in each of the two graph layers.



### **On-line Help**

MacGraphX provides on-line help. To access it, double-click on the Help icon in the docking window, or by select Help from the Open Window submenu on the Windows menu.

When Help appears, scroll through topics until you come to one that relates to what you're trying to do, and select it. Topics are organized by heading and subheading. If there's another topic closely related to one you select, it will appear on the See Also pop-down menu. To open this menu, click on the arrow next to "See Also."



General introductory information is first, pertaining to the desktop, the data window, and so forth. The second part of Help is a reference section devoted to menus. All MacGraphX menu commands are described in detail there. (Dialog boxes are described in *Menus and Dialogs*). Step-by-step how-to information follows. Finally, Help provides you with suggestions for getting the most out of MacGraphX, with Hints, Tips, and Tricks, and an explanation of error messages.

You can move and resize the help window as you would any window. Size and position the help window for easy access while doing something unfamiliar in MacGraphX. Click on the help window to activate it when you need help, and then return to the task you were working on. This way, you can easily alternate between your work and the on-line help without opening and closing the help window.

If Help and this manual should fail to answer a question, call Bravo Technologies' Help Line Monday through Friday from 10 a.m. to 5 p.m. Pacific Standard Time. The number is 415/841-8552. Have your disk's registration number handy.

## **Preferences**

MacGraphX lets you set a few basic parameters for how the program works. For example, by changing settings in a Preferences dialog, you can tell MacGraphX to alert you when you're performing an operation that can't be undone (such as modify or delete a field).

The Preferences dialog also lets you specify the minimum distance between ticks on the axes of your graphs, and lets you name the dependent axis. If you do not enter a name of your own, "Data" will be used.

## Chapter 5: Additional Exercises

In this chapter, we've provided you with additional formatting practice using two of the graphs you finished in the *Learning MacGraphX* chapter. (Copies of the completed graphs are contained in a second tutorial file, Tutorial II, located in the MacGraphX folder.) To further refine your graph formatting skills, read on.

### Open Tutorial II

Begin by opening Tutorial II. This file contains duplicates of the same graphs you created and formatted in the *Learning MacGraphX* chapter.

#### 1. Open the file

From the MacGraphX File menu select Open. In the dialog, select the Tutorial II file in the MacGraphX folder, and open it by clicking on the **Open** button or by double-clicking on the file name.

#### 2. Save a copy of the file

So that you will have the original Tutorial II file for later use, choose Save As from the File menu. Rename the file as you wish, and select **Save**.

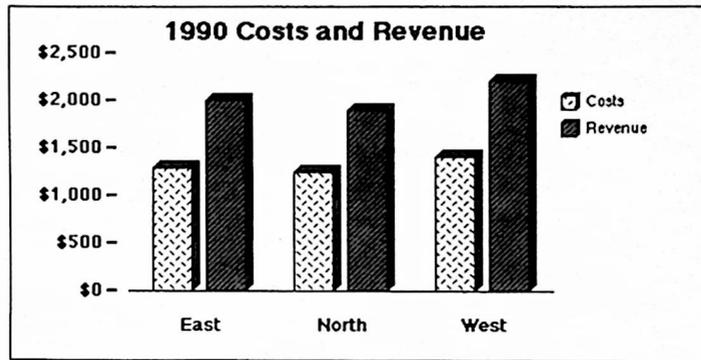
### Open the Bar Graph

Bar Graph is a duplicate of the first bar graph you created and formatted in the Tutorial file.

#### 1. Open Bar Graph

Open Bar Graph by double-clicking on its icon in the docking window, or by selecting it from the Open Window submenu on the Windows menu.

Your mission: to reformat Bar Graph so that it looks like this:



### **Create More Room**

You'll want to enlarge the graph's title, which requires you to move the graph down to create more space for the title. First, you'll hide the independent axis title (at the bottom of the graph) to make some room. Next, you'll move the graph down to make room for the title. Follow these steps below to do so:

**1. Select independent axis title**

Click on the independent axis title "Region."

**2. Hide axis title**

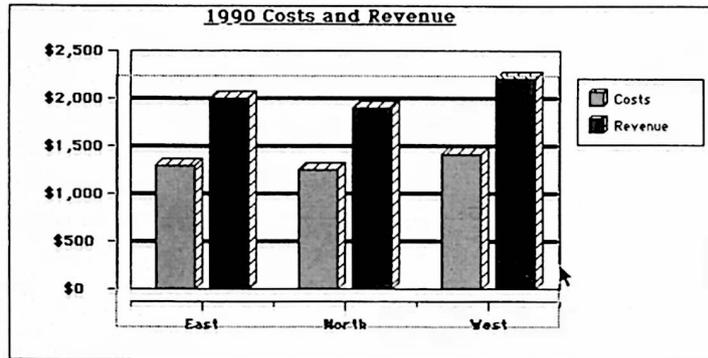
Choose Hide from the Objects menu.

**3. Select graph frame**

Click on the data frame. It appears outlined with a faint dotted line and with resizing handles on each side and corner.

#### 4. *Move graph down*

Click and drag the data frame down toward the bottom of the placement frame (about a quarter of an inch on your screen). Do not push the independent axis labels into the surrounding placement frame, or allow the labels to touch the frame (otherwise you may accidentally force the labels to be pushed up into the graph).



The entire graph (except for the graph title) moves with the data frame. Objects such as axis titles, labels, and the legend are automatically anchored to the graph frame, which is linked to the data frame. When you move or resize the data frame, the graph frame usually moves or grows with it, which causes anchored objects to move. (The graph title isn't automatically anchored.)

#### 5. *Move graph title down*

Because you're going to enlarge the graph title, first make more space for it by clicking and dragging the graph title down halfway between the graph and the top of the placement frame.

### **Reformat the Graph Title**

#### 1. *Enlarge point size*

With the graph title still selected, go to the Text menu and choose Size; from the Size submenu, choose 18.

#### 2. *Change font*

From the Text menu, choose Font; from the Font submenu, choose Helvetica.

### **3. Eliminate underline**

From the Text menu, choose Style; from the Style submenu, choose Underline to toggle off the underline.

## **Reformat the Axis Labels**

Follow the steps below to give the graph's axis labels new text formatting.

### **1. Select dependent axis labels**

Click on the dependent axis labels.

### **2. Enlarge font size**

From the Text menu, choose Size; from the Size submenu, choose 12.

### **3. Change font**

From the Text menu, choose Font; from the Font submenu, choose Helvetica.

### **4. Change alignment**

From the Text menu, choose Alignment; from the Alignment, submenu choose Right.

### **5. Select independent axis labels**

Click on the independent axis labels.

Now repeat steps 1 through 3 above for the independent axis labels. Leave the independent axis labels center-aligned.

## **Widen the Ticks**

To widen the dependent axis ticks (which makes them more visible), do the following:

### **1. Select ticks**

Click on a dependent axis tick.

### **2. Widen ticks**

From the Lines menu, choose Line Width; from the Line Width, submenu choose 2. These steps increase the width of the ticks to 2 points.

Click once anywhere in the graph window, but not on a graph object, to deselect the ticks.

## **Clean Up the Graph**

To give the graph a clean, uncluttered look, you can now hide many of its components.

### **1. Select data frame**

Click on the data frame (the visible frame which surrounds the bars and grid lines).

### **2. Hide data frame**

Choose Hide from the Objects menu.

### **3. Select other objects**

Select the independent axis by clicking on it once. Next, with the Shift key pressed, select the dependent axis, independent major and minor ticks, and dependent major grid lines.

### **4. Hide objects**

Choose Hide from the Objects menu.

## **Reformat the Bars**

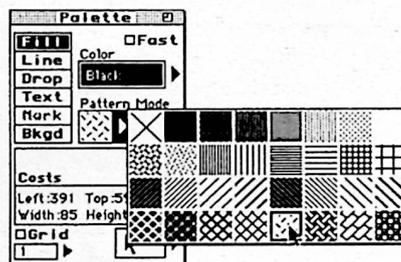
Now let's give the bars new fill patterns and change their drop shadows. If you have a color system, you can give the bars new colors as well. If your palette isn't currently open, open it by clicking in the zoom box on the palette's title bar.

### **1. Select Costs**

Click on Costs in the legend.

### **2. Change bar pattern**

With the Fill selector chosen on the palette, choose this pattern from the Pattern menu (bottom row, fourth from right):



### **3. Change bar color (optional)**

If you have a color system, select a color of your choice from the Color menu.

#### 4. *Change drop shadow*

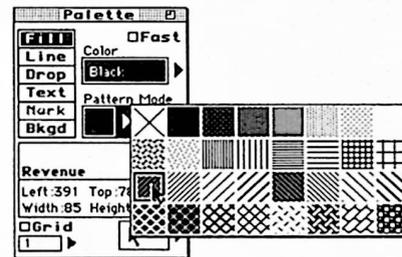
With the Drop selector chosen on the palette, choose the black solid pattern from the Pattern menu.

#### 5. *Select Revenue*

Click on Revenue in the legend.

#### 6. *Change bar pattern*

With Fill selected on the palette, choose this diagonal pattern from the Pattern menu (third row, on the left):



#### 7. *Change bar color (optional)*

If you have a color system, you may select a color of your choice from the Color menu.

#### 8. *Change drop shadow pattern*

With Drop selected on the palette, choose the black solid pattern from the Pattern menu.

### **Reformat the Key**

Your final step in formatting this graph will be to reformat and move the legend closer to the graph, which makes the legend easier to see.

#### 1. *Select legend*

Click once on the legend boundary to select it.

#### 2. *Change font in the legend*

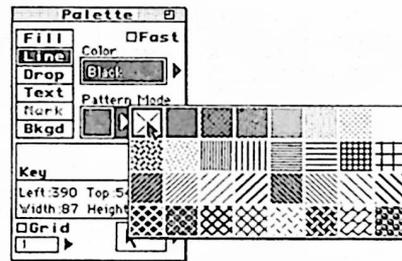
From the Text menu, choose Font; from the Font submenu, choose Helvetica.

#### 3. *Enlarge point size*

From the Text menu, choose Size; from the Size submenu, choose 10.

#### 4. *Hide legend boundary*

With Line selected on the palette, choose the clear pattern from the Pattern submenu (top row, on left):



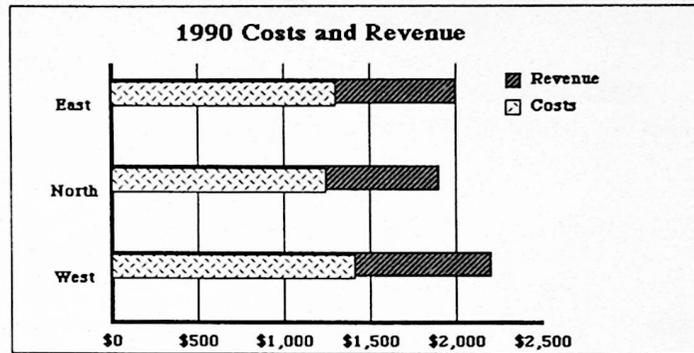
#### 5. *Move legend closer to graph*

Click and drag the legend leftward, closer to the graph. (When you click on the legend, make sure that you click on the edge, and not on a black resizing handle.)

You have now finished reformatting your bar graph.

You can now change your newly formatted bar graph into a *horizontal* bar graph by transposing the axes: the independent axis will change from the horizontal orientation to the vertical. Horizontal bar graphs are useful for displaying non-sequential or discrete data (such as East, North, and West regions) on the (vertical) independent axis. A (normal) horizontal independent axis, since it reads from left to right, often implies a progression of continuous values. Because the vertical axis doesn't suggest a sequence as strongly, it lends itself most readily to such discrete data as geographical regions.

The horizontal bar graph you're going to create will look like this:

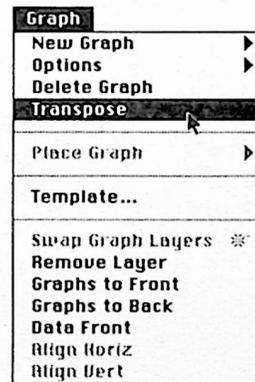


### **Transpose Axes**

With Bar Graph active (the frontmost window), you'll first transpose the axes. All it takes is a single command:

#### **1. Transpose axes**

From the Graph menu select Transpose.



### **Show and Hide Graph Objects**

For a cleaner-looking, more dramatic graph, you'll want to show and format some graph objects currently hidden (grid lines and axes), and then hide the dependent ticks.

#### **1. Select grid lines**

From the Objects menu, choose Dependent Axis; from the Dependent Axis submenu, choose Major Grid.

#### **2. Show grid lines**

Choose Show from the Objects menu.

**3. Give grid lines a solid pattern**

With Fill selected on the palette, choose the black solid pattern from the Pattern menu.

**4. Select independent axis**

From the Objects menu, choose Independent Axis; from the Independent Axis submenu, choose Near Axis.

**5. Show axis**

Choose Show from the Objects menu.

**6. Widen axis**

From the Lines menu, choose Line Width; from the Line Width submenu, choose 3.

**7. Select dependent axis**

From the Objects menu, choose Dependent Axis; from the Dependent Axis submenu, choose Near Axis.

**8. Show axis**

Choose Show from the Objects menu.

**9. Widen axis**

From the Lines menu, choose Line Width; from the Line Width submenu, choose 3.

**10. Choose dependent axis ticks**

Click on a dependent major tick (a tick with a label by it), and then hold down the Shift key and click on a minor tick (a smaller tick between labelled ticks).

**11. Hide ticks**

Choose Hide from the Objects menu.

**Format Text**

To change the font for all the text associated with this graph, and rotate the independent axis labels so they're positioned horizontally, follow these steps:

**1. Select graph title**

Click once on the graph title.

## 2. *Change font*

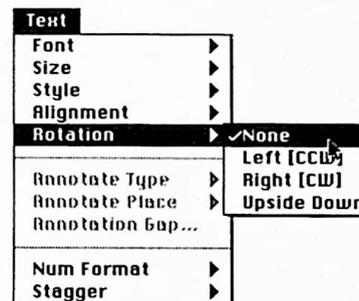
From the Text menu, choose Font; from the Font submenu, choose Times.

## 3. *Select independent axis labels*

Click on the (vertical) independent axis labels.

## 4. *Rotate labels*

From the Text menu, choose Rotate; from the Rotate submenu, choose None. (In this menu, “Left [CCW]” means counter-clockwise, turning to the left; “Right [CW]” means clockwise rotation, or turning to the right.)



## 5. *Select dependent axis labels*

With the Shift key pressed, click on the dependent (horizontal) axis labels on the bottom of the graph.

## 6. *Change font*

From the Text menu, choose Font; from the Font submenu, choose Times.

## 7. *Select legend*

From the Objects menu, choose Full Graph; from the Full Graph submenu, choose Legend.

## 8. *Change font*

From the Text menu, choose Font; from the Font submenu, choose Times.

## 9. *Change style*

From the Text menu, choose Style; from the Style menu, choose Bold.

## Format Field Elements

Formatting changes to this graph's field elements (bars) consist of eliminating the drop shadows and overlapping the Revenue bar with the Costs bar.

### 1. Select field elements

Click on Revenue in the legend, and then, with the Shift key pressed, click on Costs.

### 2. Hide drop shadows

With Drop selected on the palette, select the clear pattern from the Pattern menu (top row on left, indicated with an "X" in the menu).

### 3. Deselect fields

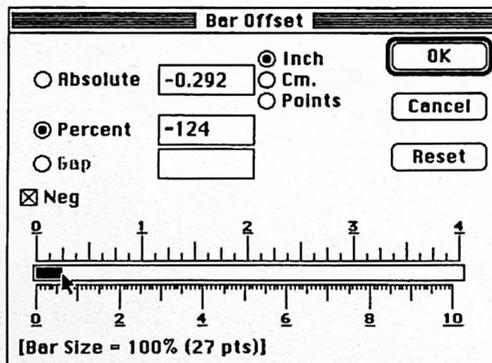
Click once anywhere in the graph window but not on a graph object.

### 4. Select Costs field

Click on Costs in the legend.

### 5. Overlap Revenue with Costs field

Choose Bar Offset... on the Areas menu. In the Sizes dialog, click in the "Neg" check box. Click and drag the black bar to the right along the ruler until -124 appears in the "Percent" window. The Bar Offset dialog should look like this:



Click **OK**. (The options in this dialog are fully explained in *Menus and Dialogs*. You'll see this dialog when you want a special size, such as for line width or bar size.)

## Move the Legend

The last step in reformatting the graph is to move the legend closer to the graph.

### 1. Select legend

From the Objects menu, choose Full Graph; from the Full Graph submenu, choose Legend.

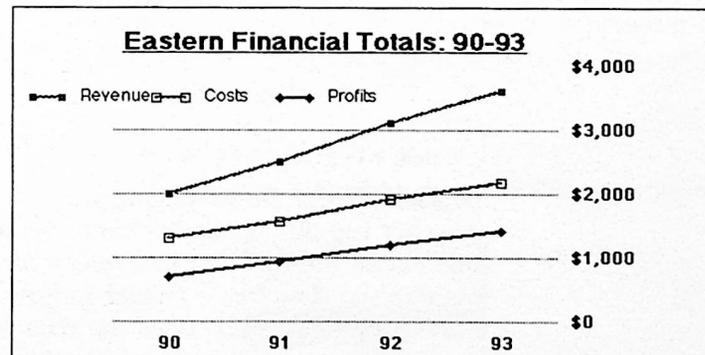
### 2. Move legend

Click and drag the legend leftward, closer to the field elements, so that the field names in the legend are positioned within a half an inch of the right-most grid line.

You've now reformatted your bar graph for the second time. If you wish to further modify the graph, make any formatting changes you like. When you are ready to proceed, close Bar Graph.

## Open the Line Graph

Open the line graph you created in the *Learning MacGraphX* chapter, by double-clicking on the Line Graph icon in the docking window. You can also select it from the Graph Window submenu on the Windows menu. Your next mission: to reformat the graph to make it look like this:



## Hide Graph Objects

One of the most obvious differences between the graph you'll format now and the one you originally made is the absence of several graph objects—namely, the data frame, the axes, and all ticks. To hide these components of your graph, follow these steps:

### 1. Select data frame

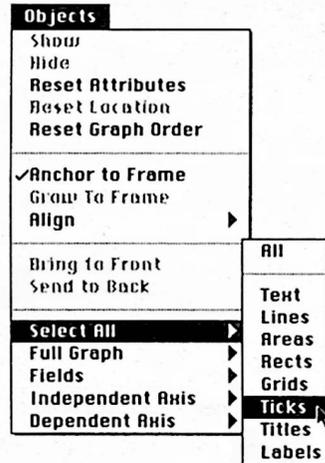
Click on the data frame.

## 2. *Hide data frame*

Choose Hide from the Objects menu.

## 3. *Select ticks*

From the Objects menu, choose Select All; from the Select All submenu, choose Ticks.



## 4. *Hide ticks*

Choose Hide from the Objects menu.

## 5. *Select dependent axis*

Click on the dependent (vertical) axis.

## 6. *Hide dependent axis*

Choose Hide on the Objects menu.

### ***Indent Field Data (Zones)***

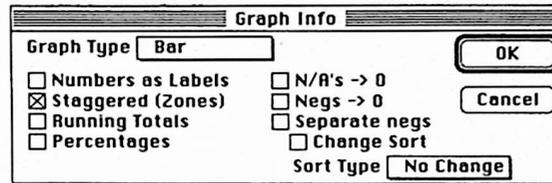
Another big difference between this graph format and the original one is that the first and last values for each dependent field don't overlap the data frame (which is now hidden). The field data (lines) have been "indented" from the data frame, by an amount equal to the size between minor ticks. Here's how to make this formatting change.

### 1. ***Open Graph Info dialog***

From the Graph menu, choose Options; from the Options submenu, choose Graph Info.

## 2. Select setting

In the Graph Info dialog, click in the “Staggered (Zones)” check box.



Click **OK**. (We call this option “Staggered (Zones)” because it staggers the data inward from the data frame. This option is the default for bar and stacked bar graphs. When in effect, the field data are not flush against the data frame, but are centered within “zones” which the independent axis is divided into; the independent major ticks and grids are located in the center of each zone.)

## Reformat Grid Lines and Independent Axis

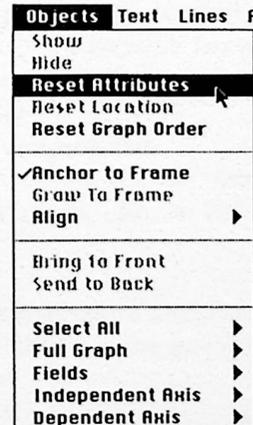
Below, we'll tell you how to return your grid lines to their default formatting, and then you'll reformat the independent axis to make it look the same as the grid lines.

### 1. Select grid lines

From the Objects menu, choose Dependent Axis; from the Dependent Axis submenu, choose Major Grid.

### 2. Reformat grid lines

Choose Reset Attributes on the Objects menu.

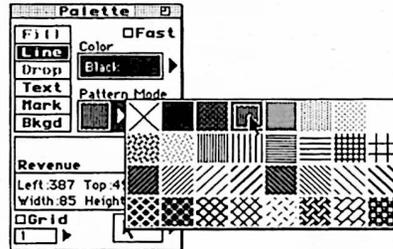


### 3. *Select independent axis*

Click on the independent (horizontal) axis.

### 4. *Reformat independent axis*

Choose this gray pattern from the Pattern menu on the palette (top row, third from left):



### **Show Far Labels**

(Every graph has sides that are mirror images of each other: top/bottom and left/right. The left and bottom sides are called the *near sides* of the graph. The top and right sides are the *far sides*. When MacGraphX creates a new graph, it automatically shows the axis, axis labels, ticks, and axis title for the near sides only. The identical far-side objects are hidden until you decide to show them. When you overlap one graph on another, the far-side objects are shown for the top graph layer.)

The graph you're creating will have its dependent (vertical) axis labels displayed on the opposite side from where they are now. You'll need to hide the near dependent axis labels that are currently showing, and show the far dependent axis labels that are currently hidden. Here's how to do so:

#### 1. *Select near dependent axis labels*

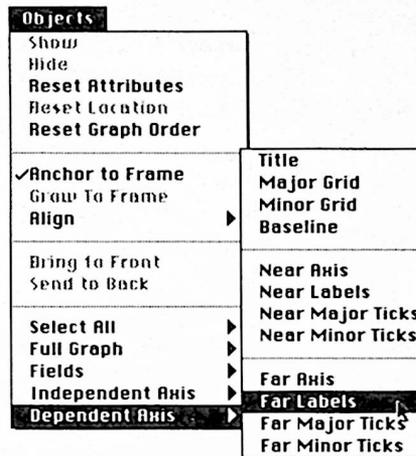
Click once on the dependent (vertical) axis labels.

#### 2. *Hide dependent axis labels*

Choose Hide from the Objects menu.

### 3. *Select far dependent axis labels*

From the Objects menu, choose Dependent Axis; from the Dependent Axis submenu, choose Far Labels.



### 4. *Show far dependent axis labels*

Choose Show from the Objects menu.

At this point, your far dependent axis labels, though visible, are partially hidden behind the legend. In due time, you'll move and reformat the legend.

But first, since you have a new set of dependent axis labels, you'll need to give them the same numeric formatting that the near-side labels had. You will also left-align these far dependent axis labels.

#### 1. *Give axis labels new numeric formatting*

With the axis labels still selected, from the Text menu, choose Num Format; from the Num Format submenu choose Currency 0.

#### 2. *Change alignment*

From the Text menu, choose Alignment; from the Alignment submenu, choose Left.

### **Lower the Graph**

You'll need to first hide the independent axis title to make more room for the graph. Then, you'll lower the graph to make room for a larger graph title. Here's how:

**1. Select independent axis title**

Click on the independent axis title, "Year."

**2. Hide independent axis title**

Choose Hide on the Objects menu.

**3. Select graph frame**

From the Objects menu, choose Full Graph; from the Full Graph submenu, choose Graph Frame.

**4. Move graph down**

Click and drag the graph frame down toward the bottom of the placement frame about a quarter-inch. Don't push the independent axis labels into the surrounding placement frame, or allow them to touch the frame, or you might accidentally force them up into the data frame.

The entire graph except for the graph title moves with the graph frame; objects such as axis titles and labels, and the legend, are automatically anchored to the graph frame. (The graph title isn't normally anchored.)

**Format Text**

**1. Move graph title down**

Click and drag the graph title down about a quarter of an inch.

**2. Change font**

From the Text menu, choose Font; from the Font submenu, choose Helvetica.

**3. Enlarge point size**

From the Text menu, choose Size; from the Size submenu, choose 18.

**4. Select other text**

Click on the dependent (vertical) axis labels, and then, with the Shift key pressed, click on the independent (horizontal) axis labels and the boundary of the legend.

**5. Change font**

From the Text menu, choose Font; from the Font submenu, choose Helvetica.

## 6. *Enlarge point size*

From the Text menu, choose Size; from the Size submenu, choose 12.

To deselect all objects, click once anywhere in the graph window, but not on a graph object.

## ***Move and Format the Key***

Here's how to move the legend to the opposite side of the graph window and reformat it:

### 1. *Select legend*

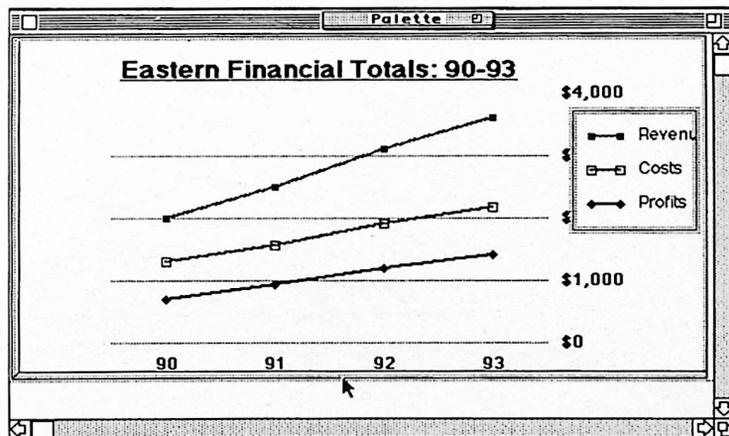
Click on the boundary of the legend.

### 2. *Hide 3-D shadow*

With the Drop selector chosen on the palette, choose the blank pattern from the Pattern menu (top row, far left).

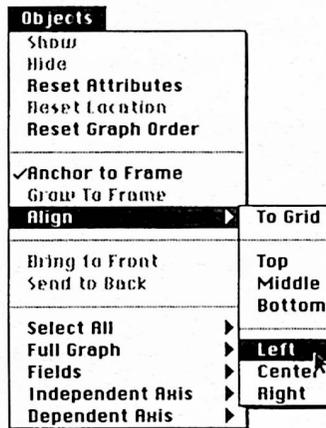
### 3. *Select placement frame*

With the Shift key pressed, click on the placement frame, the outermost frame which surrounds the contents of the graph window.

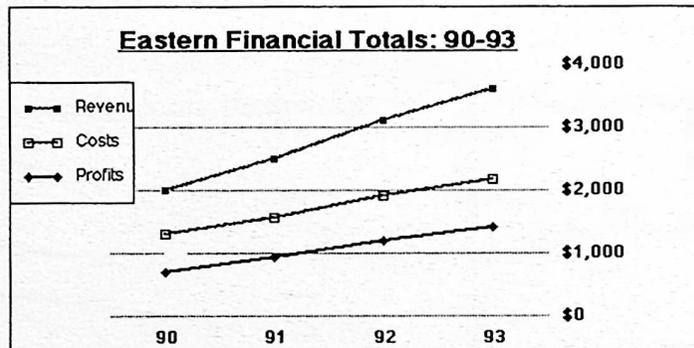


#### 4. Left-align legend

From the Objects menu, choose Align; from the Align submenu, choose Left.



To deselect the placement frame and legend, click once anywhere in the graph window, but not on a graph object. Your legend now appears on the opposite side of the graph, and in the same vertical position.



### 5. *Widen legend*

Double-click on the legend boundary. Or, from the Graph menu, choose Options; from the Options submenu, choose Legend Info. In the Legend Info dialog, click on the "Row Major" radio button. Doing so will put the field names into a wide row rather than a column.

Legend Info

Layout  
 Row Major  Column Major  
# Majors   
 Show Hidden Fields

Margins  
Left   
Top/Bot   
 Inch  
 Cm  
 Points

Hi-Lo  Show Hi-Lo  
Hi  +   Percentage  
Lo  -   Absolute  
 Std Dev's

Click **OK**.

### 6. *Give legend a clear background*

With Fill selected on the palette, choose the blank pattern from the Pattern menu (top row, far left).

### 7. *Give legend a clear boundary*

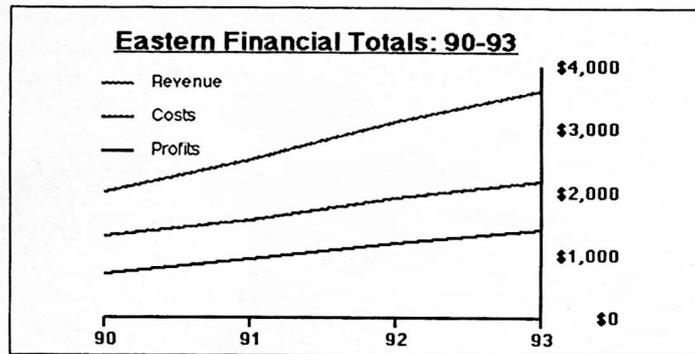
With Line selected on the palette, choose the blank pattern from the Pattern menu (top row, far left).

### 8. *Move legend up*

Drag the legend up slightly to move the field names away from the nearest grid line.

That's it... you've finished reformatting your line graph.

For the final graph in this exercise, you will take the graph you have just finished formatting and, through paring it down, create this graph:



### **Show the Far Dependent Axis**

Your first step will be to show the far dependent axis, which is currently hidden.

#### **1. Select far dependent axis**

From the Objects menu choose, Dependent Axis; from the Dependent Axis submenu, choose Far Axis.

#### **2. Show far dependent axis**

Choose Show from the Objects menu.

### **Format the Axes**

With both axes now visible, you'll reformat them by making them wider, and give the independent axis a solid pattern.

#### **1. Select independent axis**

With the Shift key pressed, click on the independent axis. Both axes are now selected.

#### **2. Widen axes**

From the Lines menu, choose Line Width; from the Line Width submenu, choose 2.

#### **3. Give independent axis a solid pattern**

Select the solid black pattern from the Pattern menu on the palette.

## Hide Field Marks

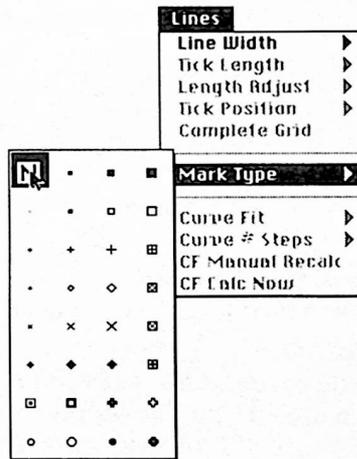
Because the graph you're formatting will emphasize trends in the data rather than specific field values, you'll want to hide the marks. To do so, follow these steps:

### 1. Select field marks

Click on Revenue in the legend, and then, with the Shift key pressed, click on Costs and Profits.

### 2. Hide field marks

From the Lines menu, choose Mark Type; from the Mark Type submenu choose "N" (which indicates no mark).



## Hide Grid Lines

To give your graph a cleaner look, you'll hide the dependent major grid lines.

### 1. Select dependent major grid

Click on a dependent major grid line.

### 2. Hide dependent major grid

Choose Hide from the Objects menu.

## Show and Format Independent Major Ticks

### 1. Select independent major ticks

From the Objects menu, choose Independent Axis; from the Independent Axis submenu, choose Near Major Ticks.

### **2. Show independent major ticks**

Choose Show from the Objects menu.

### **3. Widen independent major ticks**

With the ticks still selected, from the Lines menu, choose Line Width; from the Line Width submenu, choose 2.

## **Overlap Data Frame with Field Values**

Next you'll turn off the "Staggered (Zones)" formatting option that shifted the field data in from the data frame.

### **1. Open Graph Info dialog**

From the Graph menu, choose Options; from the Options submenu, choose Graph Info.

### **2. Turn off "Staggered (Zones)"**

In the Graph Info dialog, click in the "Staggered (Zones)" check box, to turn off the option.

Click **OK**.

## **Reformat the Legend**

You'll now return the legend to its default columnar configuration.

### **1. Open the Key Info dialog**

From the Graph menu choose Options; from the Options submenu choose Legend.

### **2. Select columnar formatting**

Click on the "Column Major" radio button in the Legend Info dialog.

The image shows a dialog box titled "Legend Info". It has several sections:

- Layout:** Two radio buttons: "Row Major" (unselected) and "Column Major" (selected). Below it is a text box for "# Majors" containing the number "1".
- Show Hidden Fields:** A checked checkbox.
- Margins:** A text box for "Left" containing "0" and a text box for "Top/Bot" containing "4". To the right are three radio buttons: "Inch" (unselected), "Cm" (unselected), and "Points" (selected).
- HI-Lo:** A checked checkbox for "Show HI-Lo". Below it are two rows of controls:
  - Row 1: "Hi" label, a text box containing "Costs", a "+" sign, a text box containing "0", and a radio button for "Percentage" (selected).
  - Row 2: "Lo" label, a text box containing "Revenue", a "-" sign, a text box containing "0", and a radio button for "Absolute" (unselected).

Buttons for "OK" and "Cancel" are located on the right side of the dialog.

Click **OK**.

### 3. *Select data frame*

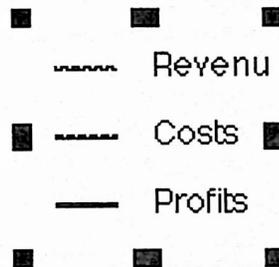
With the Shift key pressed, from the Objects menu, choose Full Graph; from the Full Graph submenu, choose Data Frame.

### 4. *Align legend to data frame*

From the Objects menu, choose Align; from the Align submenu, choose Left.

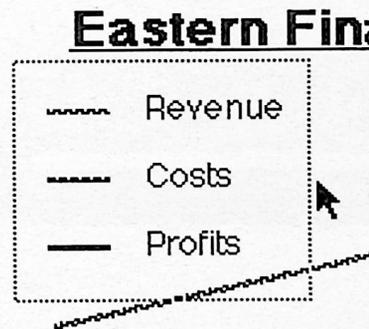
### 5. *Select legend*

Click on the boundary of the legend. A set of resizing handles will appear on the corners and sides of the legend.



### 6. *Enlarge legend*

Click and drag the right-side handle outward (to the right), enlarging the legend so that all the text in the legend will be visible. Release the handle.



### **Right-align Dependent Axis Labels**

Your final formatting step will be to right-align the far dependent axis labels.

**1. *Select far dependent axis labels***

Click on the far dependent axis labels (on the right side of the graph).

**2. *Right-align far dependent axis labels***

From the Text menu, choose Alignment; from the Alignment submenu, choose Right.

To deselect the far dependent axis labels, click once anywhere in the graph window, but not on a graph object.

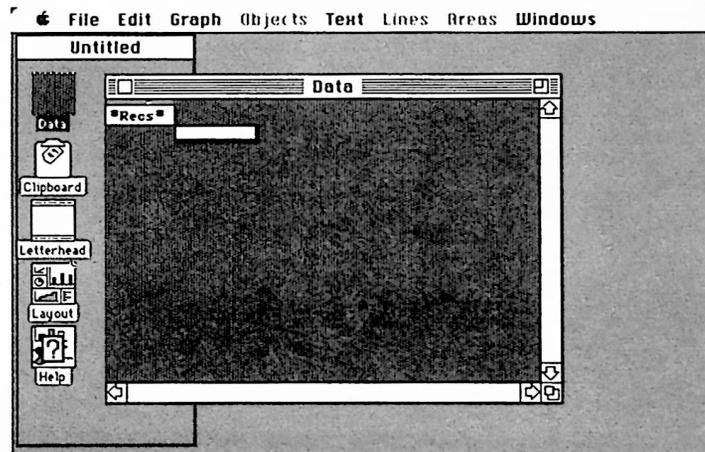
You've now finished formatting four variations on two of the graphs you created in the previous tutorial. As you learn more about working with MacGraphX, you may want to come back to these graphs and practice your new skills.

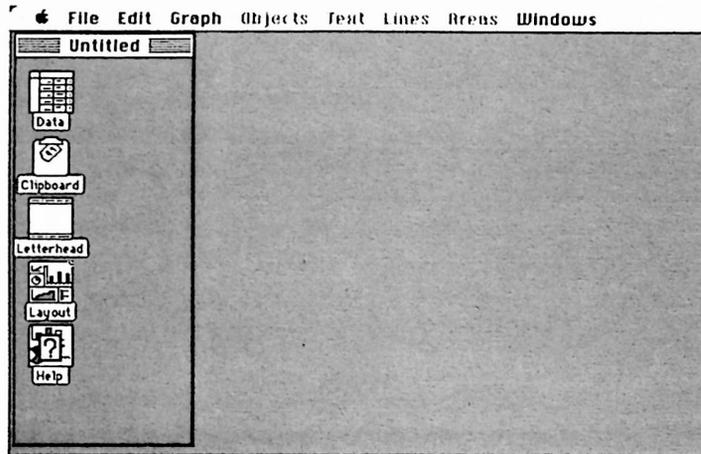
## Chapter 6: Working in the Data Window

The first step in using MacGraphX is to create a dataset containing the numeric and alphabetic data from which to generate your graphs. You do this in two ways: by typing data into an empty MacGraphX data window or by importing data into the data window. The imported data can come from spreadsheet (such as MacCalc, Excel, or Lotus 1-2-3), or from your favorite database or accounting application. No matter how you create your dataset, the data window will always hold your data.

### About the Data Window

When you open a new MacGraphX document, you're presented with an empty data window. You can close the data window by clicking in the close box in the upper left corner of the window or choosing Close Window from the Windows menu. Your window will shrink to an icon in the docking window. To open the data window, either double-click on the data window icon from the docking window at the left of your screen, or select Data from the Open Window submenu on the Windows menu.





The data window has three major components: records, fields, and cells. A cell contains one unit of numeric or alphabetic information. A record (row) is a set of cells. A field (column) is information of one type spanning all the records in a dataset, e.g., name, date, amount, or year. Each record is seen to contain related numeric or alphabetic information presented in cells and organized by field.

Data							
#Recs#	REGION	QTR	YEAR	ADMINS	ADV\$	SALES	REV
1	East	I	81	7	100	15	750
2	East	II	81	8	110	17	850
3	East	III	81	8	120	18	900
4	East	IV	81	7	150	22	1100
5	East	I	82	8	130	19	950
6	East	II	82	9	140	20	1000
7	East	III	82	9	170	25	1250
8	East	IV	82	9	190	29	1450
9	East	I	83	10	150	21	1050
10	East	II	83	10	150	21	1050
11	East	III	83	10	140	19	950
12	East	IV	83	11	140	20	1000
13	East	I	84	11	140	21	1050
14	East	II	84	12	130	21	1050
15	East	III	84	12	130	17	850
16	East	IV	84	11	120	16	800
17	West	I	81	7	100	18	900
18	West	II	81	8	110	17	850
19	West	III	81	8	120	15	750
20	West	IV	81	7	150	22	1100
21	West	I	82	7	150	22	1100
22	West	II	82	6	140	20	1000

### The Entry Cell

The current cell in which data may be entered or edited is the *entry cell*. The entry cell is part of the current selected range. The entry cell is distinguished by a black border around a white cell. If the current selected range is bigger than one by one, this range (without the entry cell) will be black. When you begin typing, the entry cell opens up for editing, indicated by a flashing insertion bar.



When creating a graph with a range selected in the dataset (instead of the usual way of selecting records and fields separately), the field which contains the entry cell becomes the independent ( $x$ ) field in the new graph.

To edit data previously entered in a cell, click once on the cell to make it the entry cell, and then click again to open the cell for editing and create an insertion point (indicated by the flashing insertion bar). You can use the arrow keys to move within a cell when editing. The enter key, tab or return end editing and will enter the new value in the dataset. The escape or clear key cancels editing without changing the dataset. New data entry will cause MacGraphX to recalculate fields based upon formulas and update graphs which include changed data.

## ***Getting Around in the Data Window***

You can move the entry cell to the right by pressing Tab or using the right arrow cursor key. Move the entry cell to the left by pressing Shift-Tab or using the left arrow cursor key. When you reach the last field(column) in a record (row), which is empty, pressing tab or right arrow will place the entry cell in the first field of the next record.

Similarly, you can move the entry cell up or down, to the same field in a record directly above or below, by using the up or down arrow cursor keys, or by pressing Return to move down and Shift-Return to move up. When you reach the last record (row) in a dataset, which is empty, the entry cell will continue to move to the first record of the next field.

The entry cell's movement can be confined to a range of selected cells. Select the range by clicking and dragging across cells. The entry cell will then move through only those selected cells.

## Selecting Cells, Fields, and Records

To work with your dataset, MacGraphX gives you many ways of selecting cells, fields, and records. They are:

To select a single cell	Place the cursor over a cell and click.
To select a group of contiguous cells	Place the cursor over a cell, click, and drag to other cells.
To extend the range of a selected group of cells	Hold down the Shift key, click, and drag the cursor over adjacent cells.
To select a single field	Click on a field name.
To select several contiguous fields	Click and drag the cursor over field names.
To extend the range of a selected group of fields	Hold down the Shift key, click, and drag the cursor over adjacent field names.
To select or deselect several discontinuous fields	Hold down the Command key and click on the field names.
To select a single record	Place the cursor on the record's number in the Recs# column and click.
To select a range of records	Click and drag the cursor vertically over record numbers.
To extend the range of selected records	Hold down the Shift key, click, and drag the cursor over contiguous record numbers.
To select or deselect several discontinuous records	Click on the record numbers while holding down the Command key.
To select all records at once	Place the cursor at the top of the Recs# column and click. Your cursor will turn to:  .

## Manually Entering Data

The most direct way of putting data in the data window is to enter it manually.

### **One Record at a Time**

Enter the data for your first cell. Press Tab to create a new cell in the same record. Continue using the Tab key to create new cells until you have finished entering the data for one complete record. With the cursor in the final cell with data, Tab twice. Begin entering data for a new record. At this point MacGraphX has titled your fields "Field#1," "Field#2," and so on. You can change these names at any time.

Continue using the Tab key to create cells and records, making sure you enter cell data in the same sequence as you've entered data in preceding records, so that field values correspond. You can create up to 2500 records and 125 fields in the data window.

### **One Field at a Time**

Enter the data for your first cell. Press Return to create a new cell in the same field. Continue pressing the Return key after entering each cell until you finish a complete field (column). With the cursor in the final cell with data, press the Return key twice. The cursor will appear at the top of the next column. Begin entering data for the second column as you did for the first. You can create up to 2500 records and 125 fields in the data window.

### **In a Preset Dataset**

You can arrange all the fields and records in your dataset before entering any data. Select Fields from the Data submenu on the Edit menu. In the Define Field dialog, name a field by typing the name in the "New Name" field and clicking **Add**. (While you are setting up your fields this way, you can also specify data types. For more information about doing this, see *Specifying Data Types*, this chapter.) Use the Insert or Duplicate command on the Edit menu to create as many records as you need. You can then start entering data. You can create up to 2500 records and 125 fields in the data window.

## Building Formulas

When you create fields in the data window, you may want some of them to contain values from a formula based on data in other fields. Building a formula is performed in the Define Field dialog. Using formulas is discussed in *Building Formulas*.

## **Recalculating Formulas and Transforms**

Normally, MacGraphX automatically recalculates formulas and transforms when data are changed or added. If you wish to turn off this automatic recalculation for the entire dataset, you can use the Manual Recalc command from the Edit menu. If you later want to recalculate for new or changed values, use the Recalc Now command from the Edit menu.

To turn off recalculation for selected fields only, select the field names and use the Fld No Recalc command from the Edit menu. You can also disable recalculation when initially defining a field, by selecting the "Constant" option in the Define Field dialog.

## **Importing Data**

The other method you use to get your data into the MacGraphX data window is importing it from other applications. MacGraphX can read files created by MacCalc or Excel for Macintosh or IBM PC, and files output in WKS or WK1 formats from Lotus 1-2-3 for the IBM PC, or tab-delimited ASCII or SYLK from a database, spreadsheet, or accounting application. For a description of these file formats, see the Import Data command in the *Menu Commands and Dialogs* chapter.

To import a file into MacGraphX, select Import Data from the File menu and choose the desired file format from the submenu, or choose All. Locate the file in the resulting dialog and click **OK**. In the Load dialog, you have many choices. See the Import Data command in the *Menu Commands and Dialogs* chapter, for an explanation of the options.

When you have finished making your choices, click **OK**. When you open the data window, you will see your data. You can import up to 2500 records and 125 fields into the data window.

### **Adding Fields and Records**

MacGraphX allows you to add imported data to an existing dataset. New data can be added as records or as fields, depending on the data. Use the "Add New Fields" and "Add New Records" settings in the Load dialog to make your choice. For an explanation of these settings, see the Import Data command in the *Menus and Commands* chapter.

### **Tab-delimited Files**

Many Macintosh or PC applications can output tab-delimited files. Tab-delimited files are text-only files in which each field is separated from the next by a tab character, and each record is separated from the next by a carriage return.

The first line of a tab-delimited file may contain the names of each field separated by tabs. If formulas are involved, they are placed immediately under the field names and preceded by a "#". For example ("`<tab>`" indicates a tab separator; "`<ret>`" indicates a carriage return):

Year<tab>	Rev<tab>	Exp<tab>	Profit<ret>
#Profit = Rev - Exp<ret>			
<ret>			
1990	100	70<ret>	
1991	120	80<ret>	
1992	118	83<ret>	

In the above example, the first line contains field names. The next line contains a formulas for the Profit field. The last lines are tab-delimited data for the fields not defined by formulas, with each column corresponding to the appropriate field name.

### **Specifying Data Types**

MacGraphX can treat field data as numeric or alphabetic information. When you create a new field by typing in the data window, or by importing data in from a file, MacGraphX will choose between numeric or alphabetic data types automatically, depending on whether numbers or letters are first entered in a field. If a cell contains both, e.g., 123 Main St., MacGraphX will use the alphabetic type. Alphabetic data can never be entered in a numerically formatted field, but numeric data may be entered as text in a text field.

To change the type of a field, select the Fields command from the Data submenu. In the Define Field dialog, select the desired field name. When chosen it will appear in the name box. You may also open the Define Field dialog by double-clicking on the field name. When you do this, the chosen field name will automatically appear in the name box. Click in the "Number" or "Text" radio button, then click **Reset**. Note that if you change a field type, all data in it will be lost.

### **Changing and Creating Numeric Formats**

MacGraphX defaults to the General display format for numeric data. For special business or scientific purposes, however, you may want to create your own custom numeric format, or choose from among several preset options. MacGraphX can format numeric data with a specified number of decimals, for example, or put numbers into a scientific format. It can also define date fields.

To change numeric formats, highlight a field name and select a preset format from the Num Format submenu on the Text menu. To create a new numeric format, use the New Format command from the Num Format submenu on the Text menu to bring up the New Format dialog. Make the desired settings and click **Add** when finished. Any new format is appended to the submenu and can be selected there. For an explanation of your choices on the Num Format submenu and in the New Format dialog, see the Num Format command in *Menu Commands and Dialogs*.

### **Renaming Fields**

To rename your fields, select Data from the Edit menu; from the Data submenu, select Fields. In the Define Field dialog, select a name from the list of field names. It will appear in the name box. You may also open the Define Field dialog by double-clicking on the field name in the data window. When you do this, the field name will automatically appear in the name box. Type in the new name and click the **Rename** button.

### **Cutting, Copying, and Pasting Records and Cells**

To cut records in the data window, select the desired record numbers from the Recs# column and give the Cut command from the Edit menu. When cutting records, MacGraphX collapses the dataset and renumbers the remaining records accordingly. You can also cut a single cell or range of cells by selecting them and giving the Cut command. In the selected cells, numeric values will be deleted and will be replaced with null values (often formatted to appear as "N/A"), and alphabetic cells will be deleted and left blank (the empty text string).

To copy records, select the desired record numbers and give the Copy command from the Edit menu. To copy cells, select the cell or range of cells, and give the Copy command.

To paste records into the data window, use the Paste command on the Edit menu. Pasted records are entered at the end of the dataset.

Cut or copied cells which are pasted back into the dataset replace a range of cells of equal size as the original cut or copied range, starting at the entry cell.

## **Clearing and Deleting Records and Cells**

The Clear command under the Edit menu turns cells with numeric values to null values, and turns cells with an alphabetic text type to blank. The Clear command is like Cut, except that it doesn't change the clipboard. You can clear a record or range of records by selecting the desired record numbers Recs# column and giving the Clear command. You can clear a single cell or range of cells by highlighting them and giving the Clear command.

The Delete command on the Edit menu only deletes records. Select the desired record numbers Recs# column and give the Delete command. Unlike the Cut command, Delete does not change the Clipboard, so you cannot paste records or cells back into the dataset. You must use Undo *immediately* after using Delete to return deleted records to the dataset.

## **Duplicating and Changing Records**

You have the ability to duplicate records and enter blank records at the end of your dataset using the Duplicate command under the Edit menu. When duplicating selected records, you can specify how many times you want them duplicated. You can also change the value of one field by a percentage, an absolute value, or according to a formula. This capability allows you to do what-if analyses with your data by enabling you to methodically change it, then graph it out to see the what your changes mean.

Begin by selecting the record or range or set of records to duplicate. Give the Duplicate command. Make your choices in the Duplicate dialog. For a list and explanation of the choices, see the Duplicate command in the *Menu Commands and Dialogs* chapter.

If you selected the Fill Field option, you will get another dialog with several choices. For a list and explanation of the choices, see the Fill Field command in the *Menu Commands and Dialogs* chapter.

After finishing with the Duplicate and Fill Field dialogs, you will return to the data window with the duplicated records appended to your dataset.

## Sorting, Finding, and Moving Records and Fields

Sorting, finding, and moving records and fields are helpful operations enabling you to graph the data you want. You can sort records in the data window by record number or any field. When you hold down the Option and Shift keys while the cursor is over the record numbers, the cursor changes to the sort cursor: . Use this tool to:

Sort all records by record number	Press Option and Shift, then click at the top of the Recs# column.
Sort all records by a field in ascending order	Press Option and Shift, then click on the field name that you want to sort by.
Move several selected records elsewhere in the dataset	With several records selected, press Option and Shift, then click on the desired destination record in the Recs# column.

Note that you can only sort by one field with this method (which is called a “direct sort”). You cannot “cascade” your sorting to sort by more than one key (field), as you can using the Sort command, below.

### Multiple Sorting

You can use the Sort command to sort your dataset by more than one field simultaneously. This command allows you to sort a dataset by up to three fields. Give the Sort command from the Edit menu's Data submenu. In the Define Sort dialog, specify the data fields to sort by and their order by entering their names in the sort fields. You can type in the names or select them from the Fields menu. Specify a descending sort order for the field by selecting the “Desc” check box for any field.

### Searching

To search your dataset for records that meet desired criteria, use the Search command on the Data submenu. In the Define Search dialog, specify the field to search by typing the field name into the first field or selecting it from the Fields menu. Enter the value or text string to search by in the second field. (The Define Search dialog will automatically display the name of the field containing the entry cell and the entry cell's contents.) Click on the appropriate radio buttons or check box to define the search. (For a complete list of choices in the Define Search dialog, see the Define

Search command in *Menu Commands and Dialogs*.) Found records will appear in the data window and will be selected. You can coalesce these records and move them to the top of the dataset with the Move To Top command on the Data submenu, or you can move them anywhere in the dataset by using the option-shift click method.

## **Summarizing Records**

You can determine the total, average, maximum, or standard deviation for all fields in selected records. Select a set of records, and use a command from the Summarize submenu on the Edit menu. The result is entered in a new record at the end of the dataset. The new record will have a "T", "V", "M", or " $\Sigma$ " next to the record number to indicate whether the result is a total, average, maximum, or a standard deviation.

MacGraphX's intrinsic statistical functions are total, average, maximum, and standard deviation. MacGraphX allows the programmer or sophisticated user to add in other statistical functions for calculations. Geometric mean and sum of squares are two examples of these add-on statistics that are included with MacGraphX in the "MG.XSTTs.f" folder. For more information about how to program your own add-in statistics for MacGraphX, contact Bravo Technologies.

## **Changing Text Formats**

When working in the data window, you may want to change typefaces, fonts, sizes, and text alignment for a particular field. Working with text in the data window is similar to working with text in any standard Macintosh application. MacGraphX changes the text formatting for entire fields; you cannot change the attributes of individual cells or records.

To change text formats or alignments in the data window, select the desired fields and give one of the Font, Style, Size, or Alignment commands from the Text menu. You cannot rotate text in the data window.

## **Resizing Columns**

Columns can be resized to enable you to see all your data clearly. When you place the cursor directly on a vertical line separating two fields, the cursor turns to: . Use this to move the line either to the right or left to widen or narrow the field, as needed.

## **Resizing the Data Window**

To view all your data or focus in on a certain part of it you may want to resize the data window. As in any standard Macintosh window, you can click and drag in the window's grow box (in the lower right-hand corner) to resize the window, or click in the window's zoom box (in the upper right) to enlarge the window to the full size of the Macintosh screen.

## **Exporting a File**

To share data with other applications, MacGraphX lets you export your data in a variety of standard formats. For example, you may want to load you data into the MacCalc spreadsheet for finer analysis, or share a MacGraphX file with someone who has Excel or Lotus 1-2-3. MacGraphX gives you the capability to output documents as WKS, tab-delimited text, or SYLK files.

To export a file, use the Export Data command from the File menu. From the dialog, choose the desired file format, and select the options. For an explanation of options, see the Export Data command in *Menu Commands and Dialogs*.

## Chapter 7: Creating a Graph

You use the data you have created in or imported to the data window to generate graphs. MacGraphX was created to make this process simple and quick. The procedure for defining a graph consists of four easy steps:

- Choose the records to graph
- Define the independent ( $x$ ) field
- Define the dependent ( $y$ ) fields
- Select the desired graph type

### Choosing the Records

To choose the data to work with in creating your graph, first select the desired record numbers from the Recs# column.

To select a single record	Place the cursor on its number in the Recs# column and click.
To select a range of records	Drag the cursor vertically over the desired record numbers while holding down the mouse.
To select or deselect several discontinuous records	Click on the desired record numbers while holding down the Command key.
To select all records at once	Place the cursor at the top of the Recs# column and click. The cursor will appear as:  .

### Defining the Independent ( $x$ ) Field

The independent field is generally used as the measurement of some continuous interval (such as time) or discrete categories (such as geographic regions). It is usually the horizontal ( $x$ ) axis in a graph.

Place the cursor in the thin horizontal box just above the field name. When you do this, the cursor turns to . (Note the shape of the cursor, indicating the horizontal axis.) When you click to specify a field, this box above the field name turns gray. That field will become the independent field for the graph.

### **Defining a Second Independent Field**

Selecting a second independent field enables you to group data by a second field. For example, if you select Year as the first independent field, you might want Quarter (a part of a year) as the second. This will group each quarter within the year.

To specify a second independent field, follow the same procedure as selecting the primary one, but also hold down the Option key while clicking in the thin horizontal box above the field name. The bar will turn a lighter shade of gray (than the independent field) to distinguish it. Note that you may have only one dependent (*y*) value when you select a second independent field.

### **Defining the Dependent (*y*) Field**

The dependent field, usually the vertical axis, indicates the values of selected data. Choose one or more fields by clicking and dragging the cursor across the desired field names. The cursor will look like: . (Note the vertical shape of the cursor, indicating the dependent, vertical, axis.)

### **Other Ways to Define the Fields**

MacGraphX gives you two additional ways to select the fields and records that will comprise your graph.

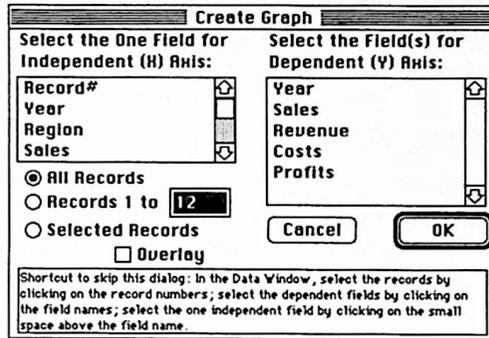
#### **Contiguous Range**

If the fields and records you wish to graph are a contiguous rectangular range, you can define independent and dependent fields by simply clicking and dragging across that range. By dragging the cursor both horizontally and vertically, you specify both the graph fields and the records. The entry cell defines the independent field. You may move the entry cell by clicking in a new cell while holding down the Command key. You may also use the cursor keys or Tab and Return keys to move the entry cell around. See *The Entry Cell in Working in the Data Window*.

Note that selecting a range of cells takes precedence over previously selected fields. This means that if you highlight field names to define fields and records, as described earlier, then use the range-click and drag technique to select a range to graph, the latter selection (the range) will be used to generate your graph.

### By Dialog

If you attempt to create a graph without having fields properly selected in the data window, MacGraphX will produce a dialog that allows you to select fields from a list.



The settings in this dialog are:

"Independent Axis"	Selects one field to define the independent axis for the graph you are creating.
"Dependent Axis"	Selects one or more fields to define the dependent axis for the graph you are creating.
"All Records"	Use all the records for graphing.
"Records 1 to"	Use a records from 1 to a number you type in the edit field.
"Selected Records"	Use of records selected in the data window for graphing.
"Overlay"	Overlays the graph you are creating on one that already exists.

If you attempted to create a graph, and this dialog appeared instead, look carefully at your data window. Make sure you have indicated a set of records to graph by selecting their numbers from the Recs# column. Make sure you have chosen an independent field and at least one dependent field, which is different from the independent field.

## Creating a Graph

When you have chosen one or two independent fields, and one or more fields for the dependent axis, and selected your records, choose the graph type you desire from the New Graph submenu on the Graph menu. MacGraphX can create several types of graphs. For a list and description of graph types, see the New Graph command in the *Menu Commands and Dialogs* chapter.

## Transposing Axes

To switch the independent and dependent axes from their normal horizontal and vertical orientations when creating a graph, hold down the Option key while choosing the graph type from the New Graph submenu. The independent axis will appear as the vertical ( $y$ ) axis, and the dependent axis will appear as the horizontal ( $x$ ) axis. You may also switch the axes after you have created the graph, by using the Transpose command from the Graph menu; see *Formatting Your Graph*.

## Overlaying Graphs

You can overlay two graphs of different types in one graph window. For example, you can create a bar chart, and then overlay a line chart or scatter chart. To do this, create your first graph in the normal manner. Then for the second graph, select the data window again and choose a new graph type from the New Graph submenu while holding down the Shift key. The second graph will be laid over the front-most graph.

You can graph new records and fields over the first graph, if you wish, or leave the same records and fields selected in the data window.

When you have two overlaid graphs, the far axes, ticks and labels (at the top and right) are used for the second graph. These are across from the (near) axes, ticks and labels of the first graph (at the left and bottom of a graph).

## Chapter 8: Structuring Your Graph

MacGraphX gives you the ability to change your graph in many ways, customizing it down to the smallest detail. This chapter covers how to make structural changes to your graph. In the chapter after this one, you will learn how to make formatting changes to enhance the visual impact of your data.

Making structural changes to your graph means making changes that alter the way your data is arranged in the graph. MacGraphX gives you many choices on how to sort the order of data points, handle negative values, and so forth. You can also add fitted curves to scatter charts that help show overall trends in your data.

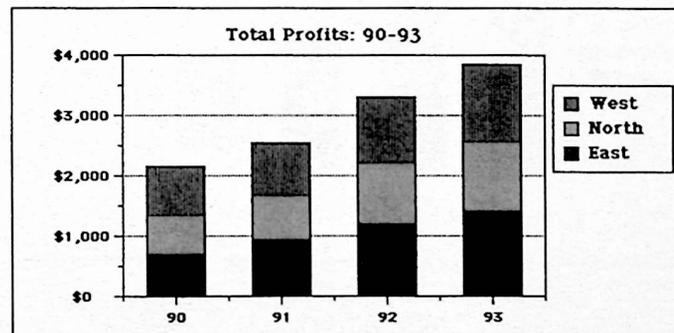
You can bring up the dialogs discussed in this chapter in two ways. All dialogs are accessible from menu commands or through double-clicking on specific graph objects.

### Updating Your Graphs

In MacGraphX, as you make changes to information in the data window using the keyboard or editing commands, all formulas are recalculated and changes propagated to any graphs you have created. Curve fits will also be updated with the new information. (See also Recalculating Formulas and Transforms in *Working in the Data Window*.)

### Running Totals

You may wish to show running totals for your data. Running totals show all objects in a field of your data as the accumulated total of the field. This feature is the default with stacked bar, area, and pie charts.

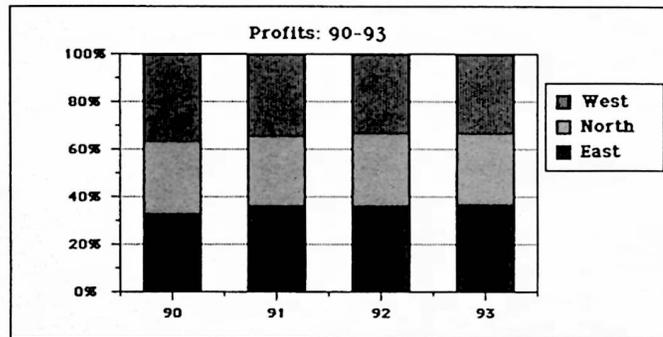


To use running totals, from the Graph menu select Options; from the Options submenu select Graph. In the Graph Info dialog, click on the "Running Totals" check box.

The Graph Info dialog is also accessed by double-clicking on the graph frame or the data frame of the graph.

## Percentages

You can show each value on your graph as a percentage of the total or maximum value. This setting is a default with a pie chart. The graph below is a stacked bar graph with with running totals and percentages:



To show values as percentages, from the Graph menu select Options; from the Options submenu select Graph. Click in the "Percentages" check box in the Graph Info dialog. The dependent axis will show a scale of 0 to 1 (0 to 100 percent).

The Graph Info dialog is also accessed by double-clicking on the graph frame or the data frame of the graph.

## Working with Negative Numbers and Nulls

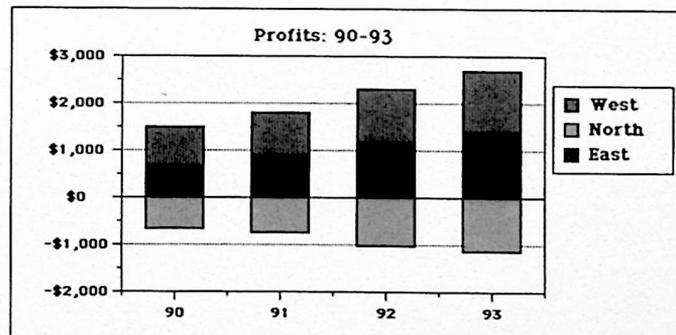
MacGraphX gives you three options for handling negative values in a graph to make it easier to display them or leave them out when they are not useful. The choices are:

"Negs-> 0"	Treats all negative values in a graph as zero.
"Separate Negs"	Default setting for bar, stacked bar, and area graphs, and running totals, showing negative values as values less than zero. Deselecting "Separate Negs" causes negative values be added in with the values of other fields, lessening the total.
"N/A's -> 0"	Treats any null value in the dataset as 0 for graphing.

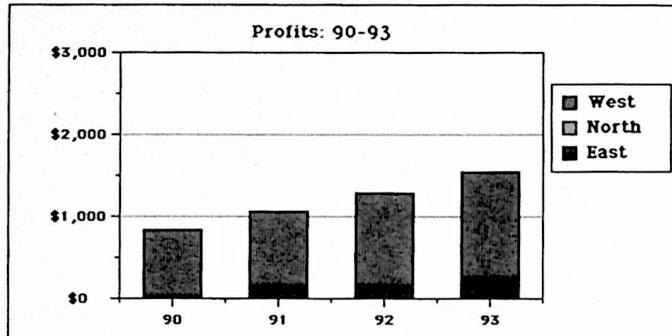
"Negs-> 0" and "Separate Negs" should not be used together. To use any of these options, from the Graph menu select Options; from the Options submenu select Graph. In the Graph Info dialog, click on "Negs -> 0", "Separate Negs", and/or "N/A's ->0".

The Graph Info dialog is also accessed by double-clicking on the graph frame or the data frame of the graph.

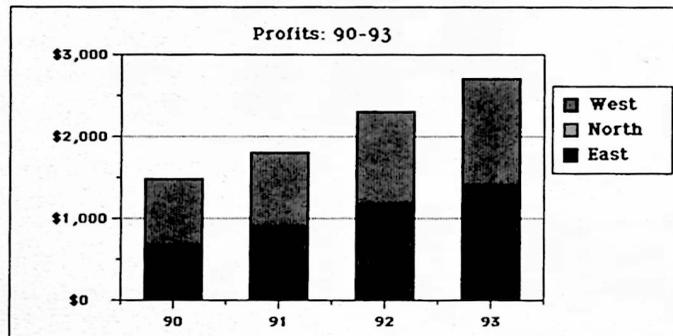
This graph has the "Separate Negs" setting selected. Negative values are shown as bars extending below zero.



This is the same graph with "Separate Negs" deselected. Negative values are added in with the positive values of the other fields, decreasing the total.



With "Negs -> 0" active, negative values are treated as zero, and don't affect the total.



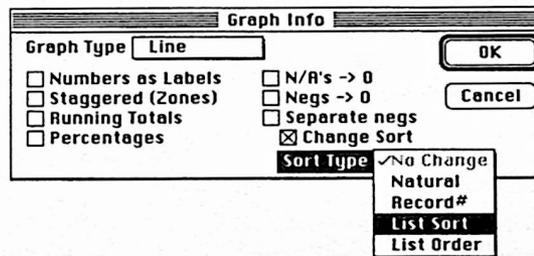
## Reordering Fields in the Graph

You can reorder the fields in a graph to change the relative position of bars, stacked bars, pie wedges, and areas. As demonstrated in *Learning MacGraphX*, you can click on the field name (in the legend) and drag the field name up or down to reorder fields in the graph. The last field in the legend is usually plotted at the bottom of a stacked bar chart or area graph, and at the right within a group of (parallel) bars.

## Reordering Records in the Graph

Reordering data points for line graphs determines how field marks will be connected, and determines the right-to-left positions of groups of bars in a bar chart.

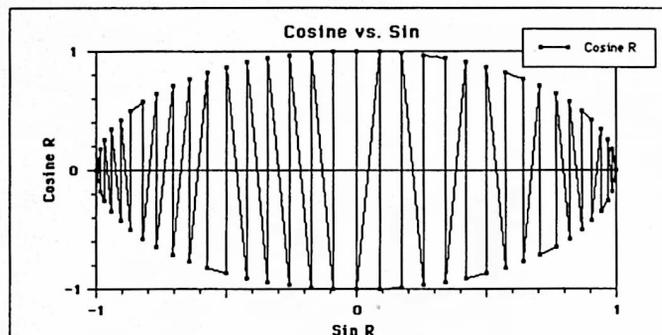
You can change the sort order of records (data points) in the graph in several ways. Select Options from the Graph menu; from the Options submenu, select Graph.



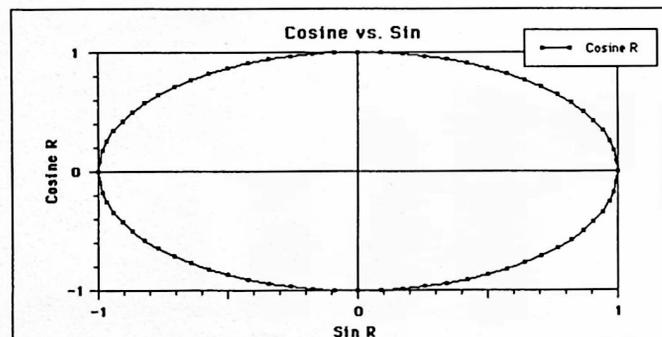
Under the “Change Sort” check box, select a new sort type from the pop-up menu.

The Graph Info dialog is also accessed by double-clicking on the graph frame or the data frame of the graph.

In the first graph, data points are connected by lines that follow the ascending order of values on the independent axis. This is Natural order.



In the next graph, marks are connected in ascending record number order. This is called Record# order.



You can choose the "List Order" option to connect the marks in the order that the records are currently listed in, as shown in the data window. The "List Sort" option uses the order of the last direct sort chosen (that is, when you last used option-shift-click to sort by a field in the data window).

You can also change the sort order for records (groups of bars) on a bar graph. Bars are ordered along the independent axis according to the order of records in the graph, as marks are connected in a line graph based on the order of graph records.

## **Even Spacing on the Independent Axis**

MacGraphX can create regular spacing between intervals on the independent axis even when the independent field is numeric (which would normally have uneven spacing between record values). The "Numbers as Labels" option in the Graph Info dialog guarantees even spacing between data points regardless of the numeric value of the independent field. This setting is a default for bar and stacked bar charts. Deselecting "Numbers as Labels" with numeric independent field may cause bars to be spaced unevenly on bar charts.

To select or deselect "Numbers as Labels," from the Graph menu select Options; from the Options submenu select Graph. In the Graph Info dialog, click in the "Numbers as Labels" check box.

The Graph Info dialog is also accessed by double-clicking on the graph frame, a frame overlapping the data frame of the graph.

## **Preventing Data from Overlapping the Data Frame**

When you create a graph, some points of the data may overlap the data frame. If you wish to move the position of the major grid and ticks for your data in from the data frame, by an amount equal to the minor tick spacing, use "Staggered (Zones)." Bar, stacked bar, and pie charts default to this setting.

From the Graph menu, select Options, from the Options submenu, select Graph. In the Graph Info dialog, click in the "Staggered (Zones)" check box.

The Graph Info dialog is also available by double-clicking on the graph frame or data frame.

(We call this option "Staggered (Zones)" because it staggers the data inward from the data frame. When in effect, the field data are not flush against the data frame, but are centered within "zones" which the independent axis is divided into; the independent major ticks and grids are located in the center of each zone.)

## **Scaling and Formatting the Axes**

MacGraphX gives you many ways to scale and format a graph's axes. You can determine where to start the baseline, where to put labels, how many intervals to have, how many minor ticks to have between intervals, and what range of values the axes will represent. For more information about formatting a graph's axes, see Scale in *Making Graphs with Impact*.

To use any of these options, from the Graph menu select Options; from the Options submenu select either Independent Axis or Dependent Axis and make your choices. For a list and explanation of the choices, see the Independent/Dependent Axis command in the *Menu Commands and Dialogs* chapter.

You can also access the Independent and Dependent Axis dialogs by double-clicking on the axis labels or axis titles.

## **Creating Curve Fits with Scatter Charts**

You will often want to show trends or examine mathematical models in your data with a curve fit, that is, a line that closely approximates your data. To generate a curve fit with a scatter chart, you must first define the curve fit by a formula that includes the transform and its parameters. You then apply the curve fit to the field data by selecting the field and choosing the curve fit from the Curve Fit submenu of the Lines menu.

To define a new curve fit, select Curve Fit from the Lines menu. From the Curve Fit submenu, choose Define Curve Fit. The dialog that appears has these choices:

"New Curve Fit"	Names a new curve fit.
"Formula"	Define a formula for the curve. To build the formula, use the transforms from the Curve Fits menu.
"Delete"	Deletes a named curve fit.
"Add"	Adds a new curve fit.

The standard transforms shipped with MacGraphX (in the MG.XFRMs.f folder) that may be used as curve fits are cubic spline (for interpolation), linear, logarithmic, and polynomial.

You can specify the number of curve steps, that is, the number of line segments the curve is made of. Give the Curve # Steps command on the Line menu. From the submenu that appears, make the desired choice. The options are:

Same Points As Graph	Same number of points in the curve as data points on the graph.
Use Major Count	Same number of points in the curve as major ticks.
Use Minor Count	Same number of points in the curve as minor ticks.
Use Size	Same number of points in the curve as pixels in the width of the graph.
1,10, 20, 25, 50...	Specifies a number of points.

You can change the number of curve steps at any time by using the Curve # Steps command.

If you change data in your graph, MacGraphX will automatically recalculate the curve fit for the new data. If you want to disable this automatic recalculation and recalculate manually, select CF Manual Recalc on the Lines menu. To recalculate, give the CF Recalc Now command on the same menu.

### **More About Curve Fits: Technical Details**

Technically, a curve fit is a specific instance of a general transform class, and is specified by the input parameters to the transform functions.

For example, a quadratic curve fit is an instance of the more general polynomial transform, specified with a degree (input parameter) of two. The polynomial approximation transform, called "PolyFit," takes one parameter, the degree of the polynomial for approximation. To define the quadratic curve fit, you'd enter the formula "PolyFit(2)" in the curve fit dialog box.

Other transforms may be simpler, and take no parameters. For example, the least-squares straight line transform needs no parameters, and so the linear curve fit is defined by the formula "LinearFit()." For general information about using transforms in formulas, see *Building Formulas*.

In addition to the transforms that came with MacGraphX, other developers may supply transforms and curve fits to work with MacGraphX; if you're a programmer, you can also create your own add-in transform. The parameters required to specify a curve fit depend on the transform being used.

Except for the polynomial fit, the transforms supplied with MacGraphX that may be used as curve fits (cubic spline, linear, logarithmic) take no parameters.

## **Large Graphs**

To enlarge graphs beyond one page, you will need to specify the number of vertical and horizontal pages that your graph will occupy. You can use the options available in the Window Info dialog to specify the largest possible size for the placement frame of your graph. From the Graph menu select Options; from the Options submenu, select Window. In the Window Info dialog, make your choices. For a list of choices, see the Window command in the *Menu Commands and Dialogs* chapter.

You can also open the Window Info dialog by double-clicking on the graph title or anywhere in the window other than on a graph object.

## Chapter 9: Formatting Your Graph

You can control the appearance of items in your graph window with commands on the palette and menus. You can hide or show an object, resize parts of the graph or the whole graph itself, change colors and patterns, change outlines, create drop shadows, and add text. You can create custom colors. If you find settings you particularly like and want to transfer to future graphs, you can save them as a template.

### **Graph Window Basics**

You can open a graph window by selecting it from the Open Window submenu on the Windows menu, or by double-clicking on the graph window icon in the docking window. You can have up to 16 graph windows.

To bring an open graph window to the front, either select the window by name from the Open Window submenu on the Windows menu; click once on the desired window; or double-click on the graph window's icon in the docking window.

To close a window, click in the close box in the upper left corner of the window. It will shrink to its icon in the graph window. You can also use the Close Window command on the Windows menu.

### **Naming a Graph Window**

You can name or rename a graph window with the Window command from the Graph menu's Options submenu. In the Window Info dialog, type in the desired name in the title field. (Doing this will not change the title for the graph itself, but will change the title of the graph window icon in the docking window.) You can also open the Window Info dialog by double-clicking on the graph title, or anywhere in the window other than on a graph object.

### **Deleting a Graph Window**

If you create a graph and then decide you don't want it, you can delete it. Open the window and select the Delete Graph command on the Graph menu. Deleting a graph window cannot be undone.

### **Selecting Objects**

A graph object (such as a frame, axis, tick, or field element) can be selected via a submenu on the Objects menu. Selecting an object is necessary prior to giving menu or palette commands that change the object.

An object may also be selected by clicking directly on it, or by clicking and dragging out an area which completely surrounds the object. Field elements (bars, lines, marks, areas, and pieces of pies) must be selected by clicking on their indicators in the legend (at the right of the graph), or by selecting the field from the Fields submenu of the Objects menu.

When labels, titles, grid lines, ticks, axes, or field indicators are selected, a faint dotted line appears around them. Resizeable objects, such as frames, the legend, and user-drawn graphics, have resizing handles that appear at each corner and side. User-drawn lines have a resizing handle on each end.

To select all graph objects in the graph window, or all objects of one kind, choose one of the following from the Select All submenu:

All	Selects all graph objects.
Text	Selects all text.
Lines	Selects all lines.
Rects	Selects all rectangles.
Grids	Selects all grid lines.
Ticks	Selects all ticks.
Titles	Selects all titles.
Labels	Selects all labels.

The Independent Axis and Dependent Axis submenus on the Objects menu let you select:

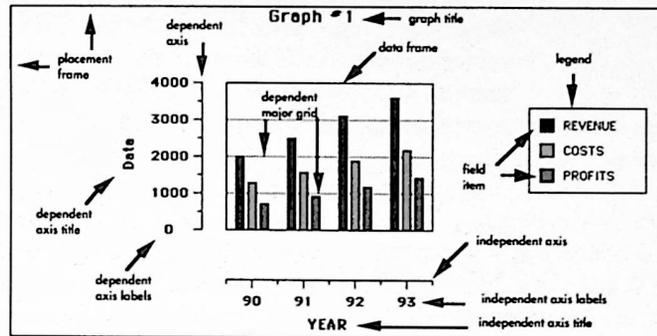
• Title	• Near Axis	• Far Axis
• Major Grid	• Near Labels	• Far Labels
• Minor Grid	• Near Major Ticks	• Far Major Ticks
• Baseline	• Near Minor Ticks	• Far Minor ticks

Giving the Full Graph command lets you select:

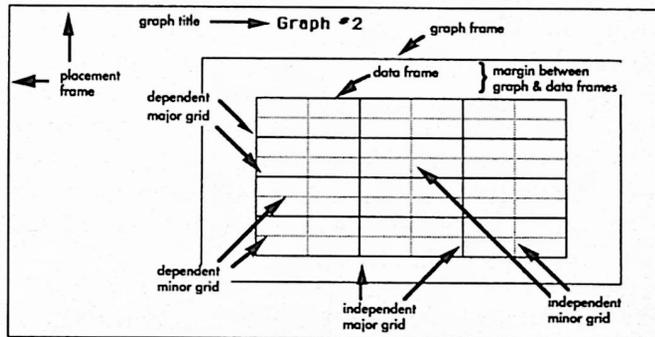
• Placement Frame	• Graph Frame	• Legend
• Title	• Data Frame	• Hi Mark/Lo Mark

To select bars, marks, and lines in a graph (field elements), choose the desired field name from the Fields submenu on the Objects menu.

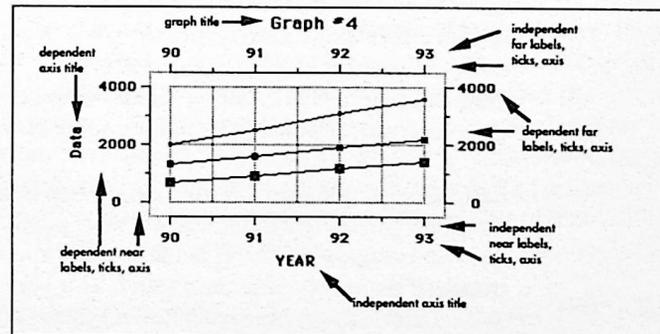
### Basic Graph Parts



### Frames and Grids



### Near and Far Graph Objects



### **Hidden Parts**

You may have noticed there are more objects to select on menus than are visible in the graph window. When you create a graph, certain elements are automatically visible, such as the data frame, the dependent major grid, the placement frame, near axes, major and minor ticks on these axes, labels and names, the legend, names in the legend, and lines, bars, and marks in the legend and graph. The graph has other parts, however, which are usually hidden:

• Independent Major Grid	• Minor Grids	• Far Minor Ticks
• Far Major Ticks	• Far Axes	• Far Labels
• Baselines	• Hi-Lo lines	• Graph Frame

To show or hide objects, select the desired object, and then use the Show or Hide command from the Objects menu.

### **Using the Palette**

MacGraphX's palette tools enable you to perform much of the formatting and all of the drawing you will do in the graph window. The palette also gives you color draw capabilities enabling you to add graphic embellishments and text. For a detailed look at the palette, see *About the Palette*.

When modifying a graph object, a palette command is similar to a menu command. You select the graph object to change, specify what attribute to change about the object, then issue the command from a menu.

If the open palette interferes with your work in the graph window, click in the zoom box in the palette's title bar to close it, and click and drag the palette's title bar to move the palette out of the way. You can open the palette again by clicking in its zoom box.

### **Cut, Copy, Paste, Clear, and Duplicate**

Graphics and text can be cut, copied, pasted, cleared, and duplicated with commands on the Edit menu. Cut and Clear commands hide standard elements of a chart (such as a bar, grid, tick, label), and delete user-drawn objects. The Duplicate command duplicates selected user-drawn objects only.

## **Printing**

You can print out the contents of an active graph window. Using the Print command on the File menu with the graph window active. The dialog you get will depend on what printer you have selected with the Chooser desk accessory. Make your choices and print out your graph.

## **Moving and Resizing**

By clicking on and dragging the outline of any graph object, you can position it where you like. Selecting the graph or data frame will result in the entire graph moving when you drag the frame. This includes the data frame, ticks, grid lines, annotations (if any), and axis labels. The graph title, will not automatically move along with the graph frame, however, unless anchored. If you hold down the Shift key while moving an object, motion will be constrained to the horizontal and vertical directions.

You can keep track of the exact location of selected objects in your graph window with the coordinates indicator shown on the palette. This indicator shows what type of object you have currently selected, its dimensions, and where it is located relative to the left and top boundaries of the graph window. It also indicates where the object is relative to its initial location as you move it horizontally and vertically. All distances are measured in pixels. Negative numbers indicate movement to the left or up; positive numbers, to the right or down.

To help in positioning graph objects more precisely, you can use your keyboard's cursor (arrow) keys. A selected object will move one pixel in the chosen direction each time you press the cursor key (or one grid unit, if the Grid option has been selected in the palette).

## **Anchoring Objects to the Graph Frame**

If you want graph items or user-drawn objects to keep their positions relative to the graph frame as you move or resize the graph, select the object and use the Anchor to Frame command on the Objects menu. When you later move or resize the graph frame, these anchored objects will remain in position. However, if you move the graph too close to the edge of the graph window such that an anchored object would fall outside of the placement frame, the object will be positioned closer to the graph.

Even though an object is anchored to the graph frame, you can still move it independently of the graph. Moving an anchored object will not move the graph.

## **Aligning**

The Align submenu on the Objects menu gives you several choices for aligning two or more selected objects. They are:

To Grid	Aligns the top left point of selected objects to invisible grid defined in the palette. You must have Grid selected in the palette.
Top	Aligns selected objects to the top of the top-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the top of the frame.
Middle	Aligns the middle of each selected object to a point halfway between the top point of the top-most object and the bottom point of the bottom-most object.
Bottom	Aligns selected objects to the bottom of the bottom-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the bottom of the frame.
Left	Aligns selected objects to the left of the left-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the left side of the frame.
Center	Aligns the center of each selected object to a point halfway between the right point of the right-most object and the left point of the left-most object.
Right	Aligns selected objects to the right of the right-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the right side of the frame.

Frames from overlaid graphs may be aligned.

## **Resetting Locations**

Should you move a graph label or title and later wish to return it to its default position, select it and give the Reset Location command on the Objects menu.

### **Transposing Axes**

If you wish to exchange the  $x$  and  $y$  axes in a graph, use the Transpose command from the Graph menu. This command will toggle the independent and dependent axes between the horizontal ( $x$ ) and vertical ( $y$ ) positions.

### **Resizing Objects**

You can easily resize the graph frame, data frame, placement frame, legend, and user-drawn graphics. Resizing is done by selecting the object and clicking and dragging on a resizing handle at a corner or side of the object.

If you wish to turn a rectangular or oval object into a square or circle, respectively, hold down the Shift key while dragging a handle. (MacGraphX may not always draw the data frame or graph frame as a perfect square, however, depending upon the “Exact Frame Size” option for each dimension, but will come as close as possible.) While resizing a line, the Shift key constrains it to be horizontal, vertical, or a  $45^\circ$  diagonal.

Resize an object in one direction only by clicking and dragging any handle. To resize it symmetrically, that is, equally in two directions, hold down the Option key while clicking and dragging any handle. If you want the square or circle to resize evenly in all four directions, hold down the Option and Shift keys while clicking and dragging a handle.

### **Moving or Resizing Frames Separately**

The data frame, graph frame, and placement frame are normally linked so that when you move or resize one, the other moves or resizes proportionally. The exception is that the data frame and graph frame can be moved around and resized within the placement frame without causing the placement frame to change shape or position. The placement frame, however, cannot normally be moved or resized independently of the data frame and graph frame.

You can disable the linkage between frames by pressing the Command key while moving or resizing a frame as previously indicated. With the Command key pressed, any moving or resizing affects only the selected frame. You still cannot enlarge the data frame past the graph frame, nor shrink the graph frame within the data frame, however. Nor can you enlarge these frames past the placement frame.

### Key Modifiers

To summarize, use the following modifier keys while resizing an object to get the designated result.

Option	Resizes an object symmetrically, that is, equally in two directions.
Shift	Constrains an object to a square or circle.
Option/Shift	Resizes an object with full symmetry, that is, equally in all four directions.
Command	Disables the linkage between frames so that they may be resized or moved separately.

### Resizing User-Drawn Graphics with Arrow Keys

You can use your keyboard's arrow keys, the keys that normally move the cursor, to resize selected objects in one-pixel increments. The arrow keys are used with the Shift and Option keys to resize graphics. The key combinations are:

Option-Arrow Left	Reduces object to the left.
Shift-Arrow Left	Enlarges object to the left.
Option-Arrow Right	Enlarges object to the right.
Shift-Arrow Right	Reduces object to the right.
Option-Arrow Down	Enlarges object to the bottom.
Shift-Arrow Down	Reduces object from the top.
Option-Arrow Up	Reduces object from the bottom.
Shift-Arrow Up	Enlarges object to the top.

### Grow to Frame

If you enlarge the graph frame past the data frame, you can extend a field elements (including drop shadow), grid line, axis, or baseline of your graph out to the graph frame. Select the object you want to extend from the Dependent Axis or Independent Axis submenu on the Graph menu. From the Objects menu, use the Grow to Frame command. You may select all fields to grow in both directions by selecting the legend before giving the Grow to Frame command.

### **Complete Grid**

The top dependent grid line and right-most independent grid line overlap the data frame (assuming the normal, non-transposed, orientation) and therefore are not shown. If your graph includes negative values, the left-most independent grid line and bottom dependent grid line also overlap the data frame and are not shown. If you are making a grid visible and want these grid lines to be shown, choose the Complete Grid command from the Lines menu with a grid selected. The top or right-most grid line (and bottom or left-most grid lines if the graph contains negative values) will be included with the corresponding grid.

### **Adjusting Grid Lines and Ticks**

Ticks and grid lines that intersect a widened data frame or graph frame can be lengthened to accommodate the greater width so that they overlap the frame as much as before. (Grid lines must first be brought to the front for this to be useful.) If you widen the data frame to six points, for instance, ticks and grid lines will no longer extend fully into the frame.



In the illustration above, the tick overlaps the frame perfectly. In the illustration below, the tick does not fully overlap a widened frame.



In the next illustration, the Length Adjust feature has corrected for the added width of the frame, and now the tick overlaps the frame completely again.

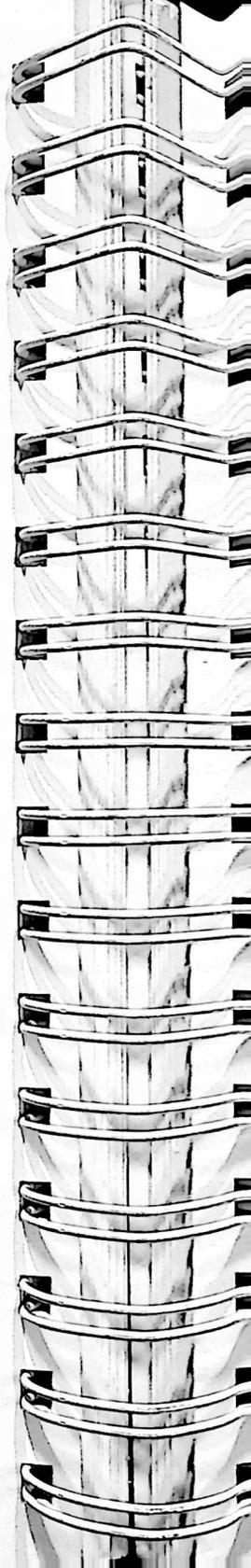


You can even extend grid lines and ticks *beyond* the data frame or graph frame, if you wish. Or grid lines can be shortened to avoid touching the data or graph frame for aesthetic purposes.

To adjust grid lines or a set of ticks for a widened frame, select the grid or ticks and choose Length Adjust from the Lines menu. From the submenu, choose the desired length in points. If you choose an adjustment length equal to the width of the intersecting line, the tick or grid line will adjust to exactly compensate for that width. Choose "?" to define your own length adjustment in points, inches, or centimeters.

### ***Setting Minimum Tick Spacing***

You can change the minimum distance between ticks on an axis with the Preferences command on the File menu. In the dialog, type in the desired distance in points in the "Minimum Tick Spacing" field for log and non-log graphs. The default distance is 12 points. The greater the minimum distance between ticks, the fewer minor ticks will appear on an axis.



### **Working with Layers**

In the graph window you can overlay graphs and graph objects. To make working with overlaid graphs and graphics easier, MacGraphX gives you these capabilities on the Graph menu:

Swap Graph Layers	Exchanges two graphs by moving the graph that is in front to the back.
Remove Layer	Removes the front-most graph layer.
Graphs in Front	Moves all user-drawn graphic objects such as lines, boxes, and text behind all graphs.
Graphs to Back	Moves all user-drawn graphic objects such as lines, boxes, text in front of all graphs.
Data Front	A default setting that puts field elements such as marks, lines, and bars in front of all grid lines. Deselecting it puts grid lines of forward graph in front of field elements of back graph.
Align Horiz	A default setting that ensures that overlaid graphs have the same width and horizontal position. Deselecting it allows you to move overlaid graphs separately from side to side.
Align Vert	A default setting that ensures that overlaid graphs have the same length and vertical position. Deselecting it allows you to move overlaid graphs separately up and down.

Note: Deselecting Align Horiz and Align Vert simultaneously will allow you complete freedom in moving overlaid graphs separately.

You also can move objects to the front or back with two commands on the Objects menu. They are:

Bring to Front	Brings selected objects to the front of the window. This is useful for objects you want to be visible but which have been covered up by other objects.
Send to Back	Sends selected objects to the back of the window.

For example, selecting a grid and using the Bring to Front command will bring that grid in front of the field data. This is a particularly useful look with the bar chart, as it allows the grid to delimit sections of each bar.

### ***Zooming***

To enlarge or reduce your graph for working purposes, the Zoom command on the Windows menu allows you to select the size of the graph relative to the normal window size. Normal Size is 100 percent, and Fit to Window shrinks the displayed information so the whole graph fits in the current-sized window. All other sizes are measured in percent of Normal Size.

### ***Extending the Graph Window***

You can enlarge the active graph window by hiding the scroll bars. From the Graph menu select Options; from the Options submenu select Window. In the Window Info dialog, click in the "Hide Scroll Bars" check box.

You can also open the Window Info dialog by double-clicking on the graph title or anywhere in the window other than on a graph object.

## ***Text and Numbers***

In MacGraphX, you can change the way text and numbers on the independent and dependent axis appear, add annotations formatted in a variety of ways, and type in your own text.

### ***Adding Annotations***

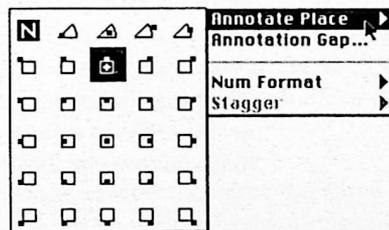
Annotations can add a great deal of clarity to your graph by displaying field names and values.

With the desired field selected, choose the Annotate Type command on the Text menu. From the submenu, select the desired annotation type:

None	Removes any existing annotation.
Value	Shows the value.
Percent of Tot	Shows the percent of total.
Running Tot	Shows a running total.
Running %	Shows a percent of the running total.
Field Name	Shows the field name.
Record#	Shows the record number.
Other	Shows the value of any other field in the dataset. Select one.

To specify the location of an annotation, you can use the Annotate Place and Annotation Gap commands also on the Text menu. First select the field (by clicking on it in the legend), and then give the command.

Annotate Place indicates placement for annotations relative to a selected category. Annotation positions in the top row of icons apply to a pie chart. Annotation positions from the second and third rows are useful for scatter, line, and area graph, so that the annotation will be close to the data point. Annotation positions from rows after the first apply to a bar or stacked bar chart. The choices are:



For example, the first choice in the third row puts the annotation text to the left near the top of the object. The center choice in the second row centers the annotation text above the point or bar. This is the default position for a non-pie annotation.

Annotation Gap allows you to set the amount of space between the annotation and the boundary of a bar, edge of a pie wedge, or position of a mark.

### **Number Formatting**

When you add annotations to a graph, it is often useful to specify their numeric formatting. If you are dealing in percentages, for example, you will want annotations to display a % sign. Or if you have a financial chart, you will want the proper dollar formatting to appear. To make these and other formatting changes, select the desired field by clicking on its name in the legend and use the Num Format command on the Text menu. On the Num Format submenu you have several predetermined settings to choose from. For a list and explanation of these settings, see the Num Format command in the *Menu Commands and Dialogs* chapter.

If you choose the New Format dialog to create your own custom numeric format, you have several choices. For an explanation of these options, see Num Format command in *Menu Commands and Dialogs*.

### **Formatting Axis Labels**

The numeric formats described above can also be used to change the way that numeric values on the dependent and independent axis labels are displayed. To use these formatting capabilities to make changes to the axis labels, select the desired labels and use the Num Format submenu from the Text menu.

### **Staggering Labels**

If an axis has so many values plotted on it, or long labels, so that the axis labels run into one another, you can stagger the labels to separate them farther from each other. Staggering puts axis labels into more than one row so that many values appear clearly along an axis. This is useful if the horizontal axis has many labels, or the vertical axis is crowded and its labels have been rotated.

To stagger labels or change the way they are currently staggered, select Near Labels from the Independent or Dependent Axis submenu on the Objects menu, or click on the labels once. Then choose Stagger from the Text menu. A submenu gives you several choices:

Auto	Lets MacGraphX stagger axis labels as necessary.
None	Puts staggered labels into a single row.
2 Lines, 3 Lines, and so on	Staggers labels into two or more lines.
Flipped	Reverses the lines of staggered labels.

### **Fonts and Typefaces**

Changing font attributes and typefaces is the same in the graph window as in any standard Macintosh application. You can change attributes for axis labels, axis names, annotations, and user-created text by selecting the desired objects and using the Font, Size, Style, Alignment, and Rotate commands from the Text menu. To change the font or typeface of annotations, select the appropriate fields in the legend by clicking on their marks. Do not try to select annotations by directly clicking on them.

The Rotation command allows you to rotate selected text to the left, right, or upside down, or return it to a normal orientation. Left corresponds to counter-clockwise, right to clockwise.

When setting alignment, remember that text is aligned to the border of the text box, not to any object outside the box. Labels are aligned to tick marks if they are perpendicular to the tick marks, or are aligned to each other if the labels are parallel to the tick marks (as commonly seen on the dependent axis).

### **Adding Your Own Text**

To add your own text to a graph, select the text tool , **T** , from the Tools pull-down menu (currently displaying a pointer) in the palette. The pointer will turn into a text insertion cursor as it passes over the graph.

Place the cursor where you want to begin, click, and type your text. When you want to begin a new line, press the Return key and continue typing. If you continue typing when a line gets to the edge of the window, your text will not automatically wrap to the next line. Wrap the text manually by pressing the Return key. You can end typing by clicking anywhere in the graph window, or pressing Enter.

### **Mixed Text**

Text attributes and typefaces can be mixed in the same line for labels, titles, and user-drawn text. Make the desired formatting changes from the Text menu (Font, Style, Size) as you create text, or select existing text and make the desired changes. You cannot, however, mix text colors in the same text block.

### **Changing the Dependent Axis Title**

If you're graphing two or more fields, the dependent axis is normally titled "Data." You may want to change this title to something that is more appropriate, such as "Dollars in Thousands" or "Frequency in MHz."

To change the standard title that is used with all graphs (the default title), use the Preferences command on the File menu. In the Preferences dialog, type the desired title in the "Default Dependent Title" field. You can make the title the default for all new documents by selecting "All New Files."

## **Colors, Shapes, Patterns, and Lines**

MacGraphX gives you many choices for changing colors, shapes, and patterns of objects in the graph window. You can even add drop shadows to graphs, bars, pies, and user-drawn objects.

Most of the changes you make to graph objects are made using draw tools found in the palette. (For a detailed description of the palette, see the chapter, *About the Palette*.) To use the palette's capabilities, select the desired object, make the palette choice specifying the attribute to change. Your command choices are:

Color	Specifies the color of a selected attribute of a graph object. In addition to the color selections given, New allows you to define new colors, including ramped colors for graduated color fills.
Pattern	Specifies the pattern of a selected attribute of a graph object. Choose a pattern from the pop-down menu.
Mode	Determines the background of patterns, either white, black, or clear.

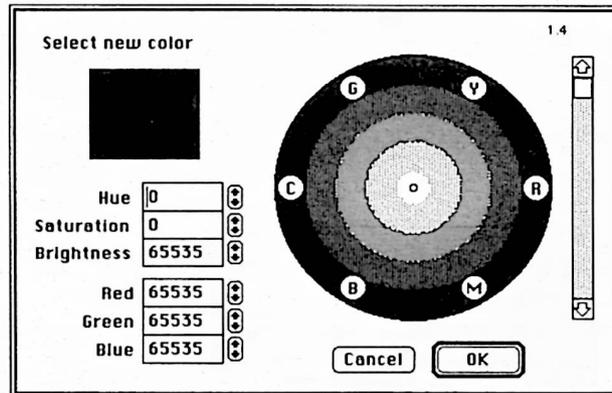
Listed below is a table of attributes and commands from the palette, and the graph objects they affect:

<b>This command...</b>	<b>Can change this part...</b>	<b>Of this object</b>
Pattern, Mode, and Color	Fill—The fill of a graph object	Field element such as a bar, area, piece of a pie or stacked bar, legend, a graph frame, a user-drawn graphic other than text or lines.
Pattern, Mode, and Color	Line — Line or boundary	Field element such as a line, area, bar, stacked bar, or pie wedge, legend, a tick, grid lines, Hi-Lo lines, a data or graph frame, non-text user-drawn graphic.
Pattern, Mode, and Color	Drop — Drop shadow	Field element such as an area, bar, stacked bar, or pie wedge, legend, graph frame, non-text user-drawn graphic.
Color	Text — Text	Graph name, field names, axis labels, annotations, user text.
Color	Mark —Field or Hi-Lo mark	Marks on a scatter, line, or area chart; Hi-Lo marks.
Pattern and Color	Bkgd — Text background	Graph name, field names, axis labels, annotations, user text.

Note that you use empty (X) pattern to hide the drop shadow.

### **Creating Your Own Colors**

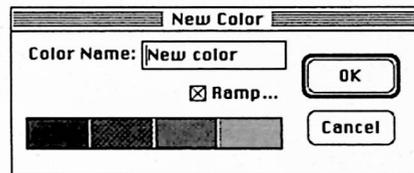
MacGraphX gives you the ability to create any custom colors you like, and add them to the list of colors in the palette. To define your own color, select New from the Color menu on the palette. In Apple's Color Picker dialog, you define a color by setting the Hue, Saturation, and Brightness; or the Red, Green, and Blue components of the color you want. Change the numbers in the fields corresponding to these attributes by highlighting them and typing in new ones, or by clicking on the arrows next to them. You can also use the scroll bar to the right of the color wheel to set brightness, and click on a color on the color wheel to set Hue and Saturation.



When you have set your color, click **OK**. In the dialog, give your color a name. When you return to the graph window, your new color will appear on the color menu and you can select it as desired.

### Ramped Color

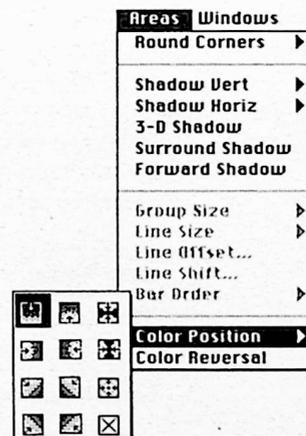
A ramped color, or graduated fill, is created in the same manner as a solid color, but with one additional step. In the second dialog, select the "Ramp" check box. You will return to the color picker dialog to specify a second color. The second color is necessary to create the effect of one color gradually shading into another. This second color can be completely different, or it can be a different shade of the first one. (If you're planning to output to a film recorder, you may wish to have the second color be a darker or lighter version of the first, for best results, due to hardware limitations.) When you have completed this second step, you will return to the dialog to name the color.



Note: that you can use a pattern with a graduated color, and the pattern will respect the graduated color.

### Color Position

With ramped colors you have several options for specifying the direction in which one color will shade into the other for a selected object. The Color Position submenu on the Areas menu gives you these choices:



The arrows for each selection on the menu show the direction in which the first color you defined shades into the other.

You can reverse the order in which your colors blend. If blue shades into green, for example, you can change it from green to blue. Select the object and choose the Color Reversal command on the Areas menu.

### **Fast Redraw**

Redrawing a screen with graduated fills takes more time than redrawing a screen with only solid colors. If you wish to turn off graduated fills in a graph window you are updating frequently, select Fast in the palette. MacGraphX will redraw the screen using only the first color from graduated fills.

### **Creating Your Own Graphics**

You can create your own graphics with the draw tools on the palette. These tools give you the ability to create vertical, horizontal, and diagonal lines and arrows, rectangles, squares, ovals, and circles. You can apply formatting commands from the palette and menus to these user-drawn graphics in the normal manner.

To select a tool and begin drawing, use the Tools menu on the palette and choose the desired object. For a list and explanation of palette tools, see *About the Palette*.

To bring up a clear graph window in which to draw, from the Graph menu select New Graph; from the New Graph submenu select Blank (Draw).

### **Line Formatting**

The palette lets you specify line colors, patterns, and modes. The Lines menu lets you to change the length and width of lines and ticks, adjust tick position on an axis, extend grid lines, axes, and the baseline to an enlarged graph frame, and adjust the length of grid lines and ticks for a widened data frame or graph frame. Your line formatting options are:

Line Width	Lets you select the width of a line in points.
Tick Length	Lets you set the length of tick marks in points.
Length Adjust	Adjusts the length of selected ticks and grid lines to the width of a perpendicular line (normally the data frame or graph frame). (See Adjusting Grid Lines and Ticks.)
Tick Position	Lets you to set the position of selected ticks (inside, outside or crossing the axis line).

For Line Width, Tick Length, and Length Adjust, selecting “?” on the submenu allows you to select a custom size in points, centimeters, or inches.

### **Displaying Hi-Lo Lines (Error Bars)**

Hi-Lo lines are used to clearly distinguish the high and low data points on a chart. They also serve as error bars for scientific graphs.

A Hi-Lo line is simply a line running parallel to the dependent axis with a mark on each end. To display Hi-Lo lines, select Full Graph from the Objects menu. On the submenu, choose either Hi Mark or Lo Mark. Then choose Show from near the top of the same menu. Hi-Lo lines will appear for each group of data in your chart.

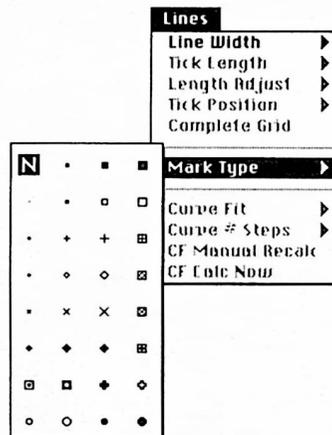
To display a Hi-Lo line in the legend box along with field marks, from the Graph menu select Options; from the Options submenu select Legend. In the Legend Info dialog, select “Show Hi-Lo.”

You can also open the Legend Info dialog by double-clicking on the legend frame.

### **Customizing Marks and Hi-Lo Lines**

You can change the length of Hi-Lo lines and the size and shape of Hi-Lo marks. To change the length of lines, select Legend from the Shifts submenu on the Graph menu. In the Legend Info dialog, select either “Absolute”, “Percentage”, or “Std Dev’ns”. This sets the Hi-Lo lines above or below the field values by an absolute number, percentage, or number of field standard deviations. Enter numeric values in the fields corresponding to “Hi Delta” and “Lo Delta.” To achieve a desirable effect, experiment a bit. Generally speaking, limit yourself to relatively modest values or Hi-Lo lines will not present an accurate view of your data.

To change the shape of the marks at each end of Hi-Lo lines, first select Hi Delta or Lo Delta from the Full Graph submenu on the Objects menu. You can also click on the top or bottom half of the Hi-Lo line in your legend if you have it displayed there. Then choose Mark Type on the Lines menu. You will see an assortment of mark types. They are:



### **Rounding Corners**

You can round the corners of a bar, stacked bar, table, graph frame, legend, placement frame, or user graphic with the Round Corners command. This command lets you specify the roundness of the corners of a rectangle. Selecting "?" lets you set a custom corner size in points, inches, or centimeters.

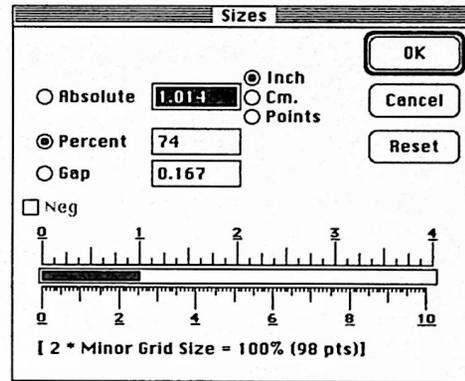
### **Field and Group Formatting**

MacGraphX gives you control over the size of individual fields and groups of fields with several commands on the Areas menu. You can also change their distance from each other and their order along the independent (usually,  $x$ ) axis. First select a field, then give the desired command.

To select the size of an entire record group as a percentage of the width of an interval along the independent axis, use the Group command. The standard size is 75% of this interval. Choosing "?" on the submenu allows you to set a custom width for the field group in points, centimeters, or inches, or as a percent value with settings in a Sizes dialog.

A scale indicates with a black horizontal bar the total width of the field group in inches and centimeters relative to the width of the

graph. Displayed beneath it is the width of a major interval on the independent axis. "Percent" sets the group width as a fraction of the major interval width (between major grid lines) of the independent axis; "Gap" insets the bar group from the major interval.



To specify the size of an individual bar or wedge of a pie, use the Bar Size or Pie Size command after selecting the desired field. Submenu choices are percentages of the group size. Choosing "?" lets you set a custom width for the field element in points, centimeters, or inches, or as a percent value with settings in the dialog.

A scale indicates with a black horizontal bar the total width of the field element in inches and centimeters relative to the width of the graph. Displayed beneath it is the value of the field size divided by the number of bars, or the width of a stacked bar, depending on the graph. For a bar graph, the "Percent" choice sets the bar width as a percentage of the width of the bar group (depending on the number of fields); "Gap" sets the individual bar width to be inset from the group width.

To set the radial or horizontal position of an element relative to its normal location, use the Offset command. Setting a negative value as a percentage moves an element to the left in a line, bar, or stacked bar chart. A positive value moves it to the right. In a pie chart, a slice of the pie is moved radially away from the chart regardless of whether you use negative or positive numbers. The "Percent" choice sets the distance as a percentage of the bar or pie's own size or, with a line, as a percentage of the major spacing on the independent axis.

With a line graph you can move a line vertically with the Line Shift command on the Lines menu. Setting a negative value moves the line down. A positive value moves it up. The "Percent" choice in the

Offset dialog sets the position as a percentage of one major interval of the dependent axis.

You can set the left-to-right order of all the bars in a group with the Bar Order command. You can also reorder the fields within a group by selecting a field in the legend and dragging it to reposition it relative to the other field elements.

### **Shadows**

Using drop shadows gives graph objects an illusion of depth. Create a drop shadow by selecting the desired object, choosing Drop on the palette, and specifying the color, pattern, and mode you desire. Drop works with any graph object, except text, lines, and marks. You can hide the drop shadow for an object by choosing the empty pattern for the drop shadow's pattern; the empty pattern is found at the top row, left side, of the Pattern menu on the palette, and is indicated with an "X."

You can make changes to the drop shadow of a selected graph object any time by choosing a new color, pattern, or mode from the palette or by making several choices from the Areas menu. They are:

Shadow Vert	Lets you specify the vertical displacement of a drop shadow. Selecting "?" lets you set the vertical displacement in points, centimeters, or inches.
Shadow Horiz	Lets you specify the horizontal displacement of a drop shadow. Selecting "?" lets you set the horizontal displacement in points, centimeters, or inches.
3-D Shadow	Changes the shadow of a selected graph or user drawn object to a three-dimensional shadow. This fills in the area between the object and its shadow.
Surround Shadow	Changes the shadow of a selected graph or user-drawn object to one that surrounds the object evenly on all sides.
Forward Shadow	Shifts an object so its shadow resides on the object's original position.

### **Delaying Screen Updates**

MacGraphX can make multiple formatting changes concurrently by waiting to update the screen until after you specify several changes.



This saves you the time of having to wait for one formatting change to be completed before making another. To use this feature, hold down the Control key (on the left side of the extended keyboard, below the Shift key) while making the desired choices on the palette or from menus. You can even draw an object. When you release the Control key, all the formatting changes will be executed.

### **Formatting the Legend**

You may format the legend in a variety of ways with settings in the Legend Info dialog. This dialog enables you to put field names into rows or columns, set margins, show names for fields that are hidden in your graph, and show Hi-Lo lines that appear in your graph.

To use these formatting options, from the Graph menu select Options; from the Options submenu select Legend. In the Legend Info dialog, make your choices. For an explanation of choices, see the Legend command in the *Menu Commands and Dialogs* chapter.

You may also open the Legend Info dialog by double-clicking on the legend's border.

### **Resetting Attributes**

Any object in the graph window, including user-drawn graphics, can be returned to its default values by selecting the object and giving the Reset Attributes command from the Objects menu.

### **Creating and Using a Template**

If you particularly like the way you have formatted a graph, you can save its attributes to apply to any new graph. Do this by selecting Template on the Graph menu with the desired graph window open. Name the template, which is a record of all the parameters you have set for the active graph, and click **Add**. Your template name now appears on the list of graph types on the New Graph submenu. When you wish to create a graph that looks the same as this one, just select it as you would any of the other types.

You can add, change, and delete any template by opening the Template dialog, making the desired changes, and clicking the button to add, delete, or change.

### **Saving a PICT File**

You can save any graph you are working on as a PICT file for use in a desktop publishing, desktop presentation, or graphics program by using the Save PICT command on the File menu. This command allows you the graphic image as a PICT file.

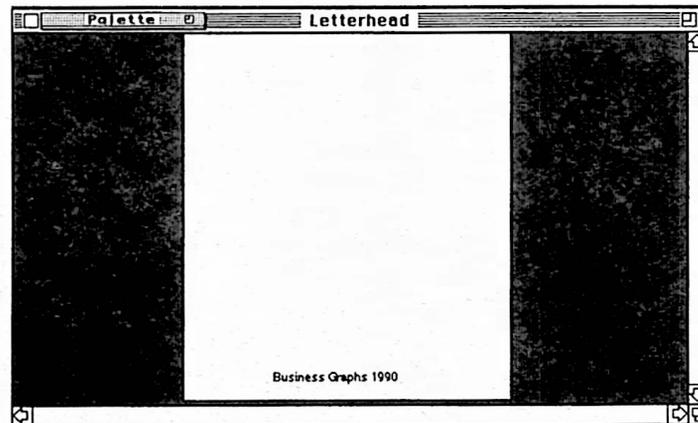
## Chapter 10: The Layout and Letterhead Windows

Working in the layout and letterhead windows lets you take the graphs you have created and formatted and lay them out over one or more pages with a recurring background. The layout and letterhead windows are opened by double-clicking on their icons in the docking window. You can also open them or bring them to the front of other windows by selecting them from the Open Window submenu on the Windows menu.

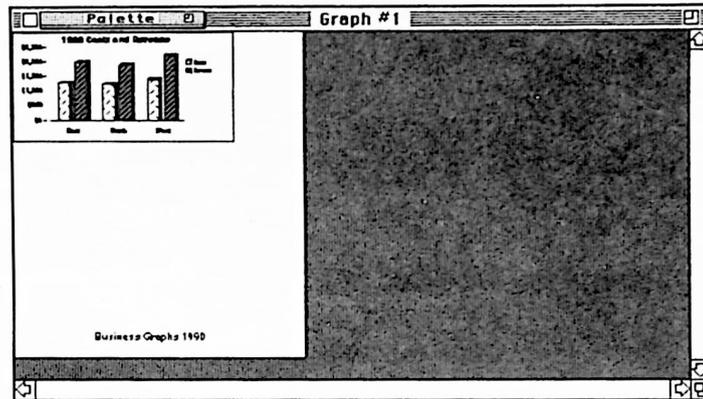
### Using the Letterhead Window

The letterhead window serves to place recurring text or graphics on each page in the graph and layout windows. When you open the letterhead window, you see a blank window with the palette in the upper right corner. You can create text or graphics in the letterhead window, positioning it where you would like it to appear on pages in the graph and layout windows.

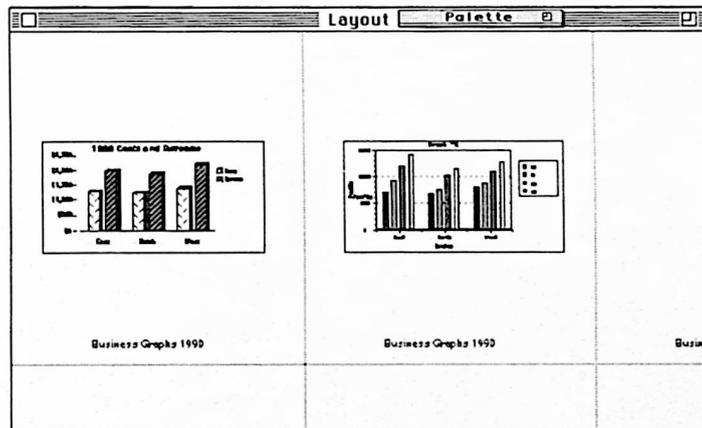
For example, a footer placed in the letterhead window (displayed with Zoom set to Fit to Window),



shows in the same location in the graph window,



and across pages in the layout window.



### **The Palette**

To create text or graphics in the letterhead window, use the palette as you would in a graph window. For an introduction to the palette and an explanation of how to use it to create text and graphics, see *About the Palette*, and “Colors, Shapes, Patterns, and Lines” and “Text and Numbers” in *Formatting Your Graph*.

When you have finished creating or pasting text or graphic objects into the letterhead window, position the objects on the letterhead page where you would like them to show on pages in the layout or graph windows. You can reduce the window size with the Zoom command on the Windows submenu to make it easier to position the text or graphics.

## Using the *Layout Window*

The layout window enables you to take multiple graphs and lay them out and print them over multiple pages. You can create a layout of up to 81 pages (9 by 9). When you open the layout window, you see a blank window with the palette in the upper right corner. You can use the palette to create text or graphics, but not to modify any graph placed in the layout window. If you have created a background in the letterhead window, you will see it in the layout window (unless you have elected not to).

### **Setting Up the Layout**

To specify the number of pages a layout will consist of, open the Window Info dialog by selecting Window from the Options submenu on the Graph menu, or by double-clicking anywhere in the layout window. In the dialog, specify the number of vertical and horizontal pages by selecting a number from the "Pages Across" and "Pages Down" pop-up menus.

How many pages down or across to make a layout will depend on how many graphs you want to place in the layout window, and how large they are.

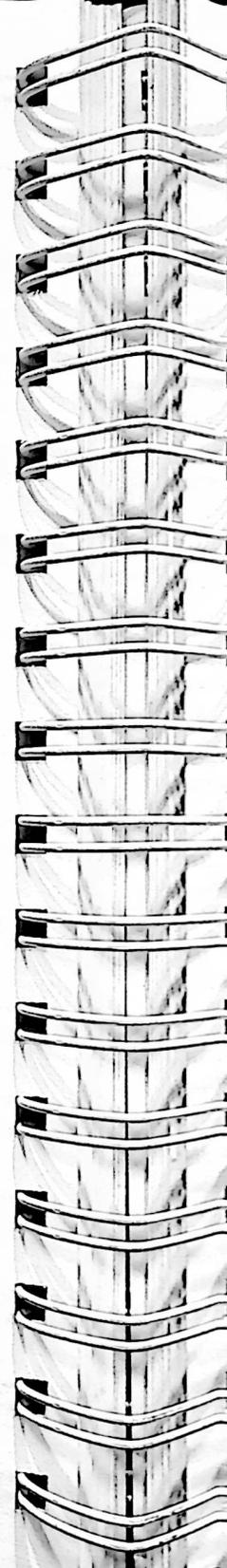
### **Landscape Orientation**

If a landscape (horizontal) page orientation would help better present your graphs, you can select page orientation with the Page Setup command on the File menu. The dialog you get will depend on what printer you have chosen with the Chooser desk accessory. If you choose a horizontal page orientation *after* creating a letterhead background or setting up the layout window, be sure to check where text and graphics appear after making the change.

### **Placing Graphs in the Layout Window**

When you have the layout size as large as you want, you can begin placing your graphs. With the layout window frontmost, select Place Graph from the Graph menu, and choose the desired graph by title from the submenu. The graph will appear in the upper left corner of the first page of the layout. You can click and drag your graph to any location in the layout.

Graphs placed in the layout window will appear as outlines only. This makes it faster to update the screen. If you wish graphs to appear in full detail, choose the "Show in Layout" check box in the Window Info dialog *of the graph window of the placed graph* (not the layout window).



Remember that even when fully visible your graphs are no longer really graphs in the layout window; they are images of graphs. They cannot be modified or updated in the layout window. To change the appearance of a (placed) graph in the layout window, go back to the (placed) graph's own window and modify the graph there.

### **Using Options and Commands**

The Window Info dialog provides you with several options for working in the layout window. The Window Info dialog is the same as the dialog for a normal graph window. From the Graph menu select Options; from the Options submenu select Window, or double-click anywhere in the layout window, but not on a graph object. See the Window command in *Menu Commands and Dialogs* for an explanation of choices.

When working in the layout window, you have full use of the Cut, Copy, Paste, and Clear commands. You can also use the Move to Front and Send to Back commands on the Objects menu, as well as the Align command there. For an explanation of these commands, see the *Menu Commands and Dialogs* and *Formatting Your Graph* chapters. Most other formatting and structuring commands are disabled in the layout window.

### **Adding Text and Graphics**

You can add text and graphics in the layout window by pasting it in or creating it with the palette. To create text or graphics in the layout window, use the palette as you would use it in a graph window. For an introduction to the palette and an explanation of how to use it to create text and graphics, see the chapter *About the Palette*, and "Colors, Shapes, Patterns, and Lines" and "Text and Numbers" in the chapter *Formatting Your Graph*.

One type of text you may want to add to your layout is page numbering. Page numbers must be manually entered and placed. Use the the palette's text tool to create text, and the commands on the Text menu to format text.

### **Printing**

When you have finished laying out your graphs, you can print out all or part of the layout. Use the Print command on the File menu with the layout window active. The dialog you get will depend on what printer you have selected with the Chooser desk accessory. Make your choices and print out your document.

# Chapter 11: Building Formulas

MacGraphX allows you to define the value of a field as the result of calculations determined by a *formula*. The ability to define formulas lets you examine your data under the light of mathematical models, and allows you to generate values for fields based upon specific relationships. For example, if you know gross revenue and costs and want to find profits, you can create a Profits field defined by a formula that subtracts the Costs field from the Revenue field. Profits will then be calculated for every record in your dataset, and recalculated if the data change.

## **Parts of a Formula**

Formulas consist of *operands*, *operators*, and *functions*. Operands specify the data used in the formula's computations. They can be numbers, the results of a complex calculation, field references, or, in some cases, text.

Operators define the kind of computations to be performed. They can define arithmetic, logical, or comparative operations. For an explanation of all the operators, see the description of the Operators menu in *Menu Commands and Dialogs*.

A function is a rule which operates on a set of arguments and returns a value. Arguments differ from function to function and can be numbers, text, dates, or fields. For example, the function ABS takes a numeric value and returns its absolute value. Thus, ABS(-5.6) will return 5.6. Not all functions operate on arguments. For example, the function RAND is a random number generator and takes no arguments.

For a description of functions and their arguments, see the Functions menu in *Menu Commands and Dialogs*.

## **Creating Formulas**

To define a formula for a field, from the Edit menu, choose Data; from the Dataset submenu, select Fields. Or you may double-click on a field name. First, type the name for the new field in the "New Name" edit item of the Define Field dialog. Tab to the "Formula" field. In the "Formula" field, enter the operand, operators and functions. If the operand is a value, type it in. If it is a field reference, type in the field name or select it from the Fields menu. Choose desired operators from the Operators menu, or a function

from the Functions menu, or type them in. A formula calculating profits, for example, might look like this:

The screenshot shows the 'Define Fields' dialog box. At the top, the title bar reads 'Define Fields'. Below the title bar, there is a text field containing 'Profits'. To the right of this field are buttons for 'Delete', 'Add', 'Rename', 'Cancel', and 'Modify'. Below the text field are two rows of radio buttons: the first row has 'Number' (selected) and 'No Stat'; the second row has 'Text' and 'No Graph'. A list box contains the following items: Record#, Year, Region, Sales, Revenue, Costs, and Profits. The 'Profits' item is highlighted. To the right of the list box is a 'Notes' field. Below the list box, there are two checkboxes: 'Constant' and 'N/A Is err'. At the bottom, a text field contains the formula 'Revenue - Costs'.

This formula tells MacGraphX to subtract the value in the Costs field from the value in the Revenue field and return the result in the Profit field, for each record. When you have completed a formula, click **Add** if you are adding a field, and click **Modify** if you are redefining an existing one.

### **Order of Evaluation**

When formulas contain more than one operator, MacGraphX performs the operations in the following order:

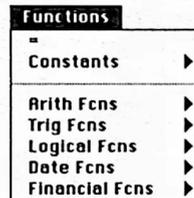
- $\wedge$
- - (negation)
- \* or /
- + or -
- =, <>, <, >,  $\geq$ ,  $\leq$
- NOT
- AND, OR

You can change the order of evaluation by using parentheses to group operations. The operations in parentheses are performed first. For example,  $40*(10-5)/(6+8)^2$  means:

- Subtract 5 from 10
- multiply the result by 40
- add 6 and 8
- square this number
- divide the result in step 2 by the result in step 4.

## Using Functions

With the Define Field dialog open, the Functions menu appears active and lists MacGraphX's functions. There are six types of functions:



For an explanation of the functions on each submenu, see the Functions menu in *Menu Commands and Dialogs*.

Functions can be entered alone or as part of a formula. To enter a function, type in the function name or select it from a submenu on the Functions menu. For the arguments, type in values or choose field names from the Fields menu.

### About Arguments

Although some functions take no arguments, most have one or more arguments. An argument is a value on which a function operates. An argument for a function is the same as an operand for an operator. Arguments of a function appear in parentheses and are separated by commas. In MacGraphX, an argument can be a number, a field reference, or the result of a calculation.

For example, the function that takes two numbers and returns the remainder of the first divided by the second, MOD, could look like this,

$$\text{MOD}(17,5) = 2,$$

or like this,

$$\text{MOD}(\text{Widgets},\text{Gizmos}) = n.$$

In the first example, the two argument are numbers; in the second, field references.

## **Applying Transforms**

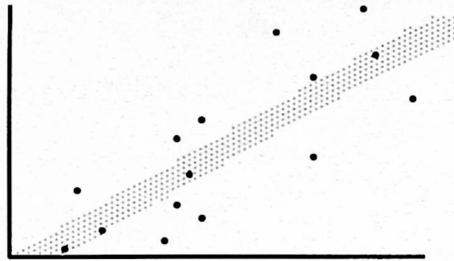
Transforms are a type of function which, rather than acting on data within each record separately, act on data in all the records cumulatively. For example, a transform might generate a running total of all values in a given field in several records. Like the functions discussed earlier, some transforms take arguments and others do not. MacGraphX comes with several transforms, and you can build your own. For a list and explanation of MacGraphX's transforms, see the Transforms and Curve Fits menu descriptions in the *Menu Commands and Dialogs* chapter.

Transforms are used the same way operators and functions are. In the Define Field dialog, select an existing field or enter the name of a new one. Enter the transform in the "Formula" field with the appropriate arguments in parentheses. Click on **Add** or **Modify** to execute the transform.

### **Using Transforms for Curve Fits**

Transforms can be used elsewhere besides the data window. MacGraphX uses transforms to create curve fits in scatter charts. Curve fits are lines that represent a mathematical model of your graph data. They are useful for showing patterns in data.

This is a straight line curve fit for a simple scatter chart:



This curve fit reveals a trend in the data that would not be as easily seen by simply connecting the marks. It shows an overall increase in the  $y$  variable as the  $x$  variable increases.

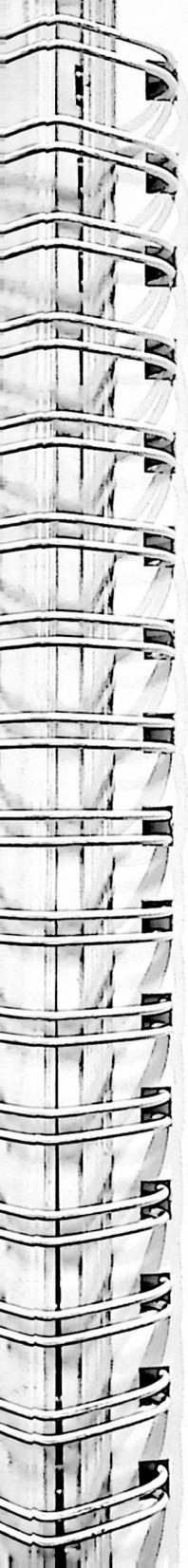
### **Creating a Curve Fit**

You can define a curve fit with transforms provided in MacGraphX or your own transforms. With a graph window active, select one or more fields from the legend. Use the Curve Fit command from the Lines menu; from the Curve Fit submenu, choose Define Curve Fit. In the dialog, type a name for the curve fit in the name field. Tab to the "Formula" field and select the desired transform from the Curve Fits menu.

When you have finished selecting a transform and specifying its parameters, click **Add**. The transform name will appear on the Curve Fit submenu, and the curve fit will appear in your scatter chart. To use this curve fit again, you need only select the desired fields and choose the name from Curve Fit submenu.

### **Building Your Own Transforms**

If you wish to build your own transforms for use in generating curve fits or for use in the data window, Bravo Technologies will send you a special instructional kit. The kit is free and will describe transform programming in detail. Write or call us to obtain this kit.



## Chapter 12: Making Graphs with Impact

In this chapter, you'll learn how to design graphs that clearly communicate the implications of your data.

Regardless of the graph type that you select, a few basic guidelines invariably apply.

**Simplicity** — “Less is more,” to quote any postmodernist. Use visual enhancements with discretion. Use only the amount of background grid necessary to showcase the data plotted on it. Distinguish primary points with bold, large type. Use the draw capabilities of MacGraphX to emphasize data values or trends. Avoid distracting visual elements. Devote your efforts to showcasing your data, and when you've done so, stop.

**Clarity** — Make it as easy as possible for a viewer to understand your graph. Use specific language and clearly legible text in your titles, labels, and annotations. Avoid symbols or legends that aren't instantly understandable.

When you're presenting more than one graph on a given subject, use a template, so all graphs use the same format. Graphs displaying related data are easier to understand if they use a common format: Variations in data are far more obvious if the graphs have similar appearance.

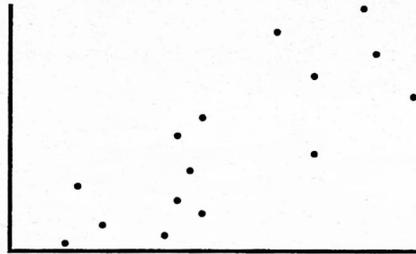
**Validity** — Not every set of numbers calls for graphing. Use graphs only when the significance of your data indicates trends or relationships. Use the right kind of graph to highlight the important relationships.

### **Using the Right Graph**

Whenever you're ready to create a graph in MacGraphX, you'll have seven different graph types to choose from. The type you'll want will depend entirely on what kind of data you want to display, and on what you want to emphasize — trends, changes, or values, for example. In some cases, you might want more than one type of graph, since each will showcase different aspects of your data. Below, we'll describe each graph type and tell you which is best suited for what kinds of data.

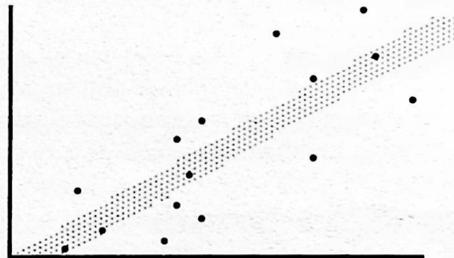
## Scatter

Scatter graphs are best suited for discerning a pattern in a seemingly random group of data.



Scatter charts are so named because they display data that (until you graphed it) wouldn't normally indicate clearly defined patterns. The initial pieces of data are essentially "scattered."

Presented as numbers, these pieces of data wouldn't indicate such tidy specifics as trends or averages. But plotted as a scatter graph, the data can allow viewers to make deductions based on the cluster patterns of the data. You can indicate the trend within the data group by using the curve fit capabilities of MacGraphX to showcase any mathematical relationships underlying the data.



You can use a curve fit to create a line showing a trend in your data. Widen the curve and give it a translucent pattern so that it appears as a tinted swath clearly pointing out the direction in a seemingly random set of data points. See the chapter *Building Formulas* to learn about using curve fits.

## Suggestions

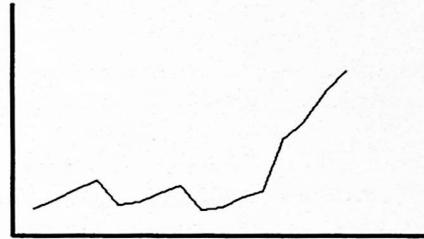
- When graphing several different kinds of data, make marks visually distinct by using different shapes, sizes, and colors. If you use large marks, make sure they don't overlap.

- You can label marks in a scatter chart with annotations if there are not too many points. Otherwise, it is best to use a legend or key to show what fields are represented.

### **Line**

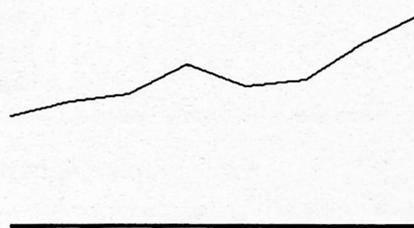
Line graphs are ideal for comparing two continuous (numeric) variables, such as sales (on the vertical axis) versus time (on the horizontal axis), or tax rate versus revenues.

In Western cultures, time, or any other continuous variable, generally increases from left to right on the number line. Therefore, such independent variables are plotted on the horizontal ( $x$ ) axis.



### **Suggestions**

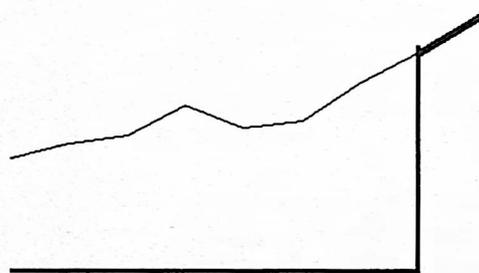
- Don't plot several fields whose values are too close to one another. You'll end up with a confusion of lines running across your graph. Instead, use several different graphs for fields with similar values.
- If you want to call attention to the result of the plotted data, show the far dependent axis (at the right edge of the diagram) and have the curve end there. Doing so emphasizes the end point rather than the beginning or middle of the data.



- When you emphasize a field by widening its line (using the Line Width command from the Lines menu), make sure the line doesn't obscure data values. The line should be thick enough to clearly show trends, but thin enough to show

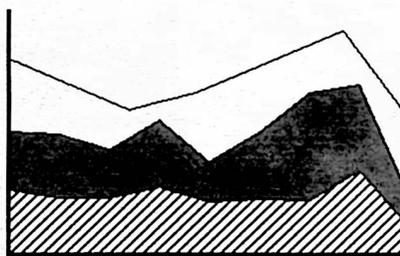
specific values. Selective use of color is also effective in emphasizing lines.

- To draw attention away from the graph data points, hide the marks. (Select no marks, "N," from the Mark Type submenu of the Lines menu.) If the specific data are crucial, enlarge the marks to make them more visible, or give them a contrasting color. You can annotate the marks as well.
- To emphasize a future projection, draw in a colored or thick line.



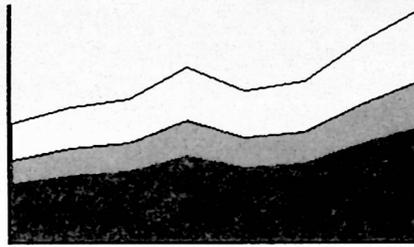
### **Area**

Area graphs are useful primarily to show accumulated data versus a continuous variable. For example, you can plot revenues for three product lines by year. The top line of the area graph will give total revenues for all three products.



A line graph emphasizes trends; an area graph emphasizes totals.

Because area graph automatically totals the data, it can be difficult to ascertain the contribution of any one field, assuming two or more fields are being graphed. For precise comparisons of field data, try line, scatter, or bar graphs.

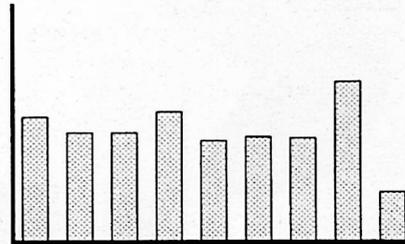


### Suggestions

- If you're working with an area graph, use sharp contrasts to clearly distinguish the areas; dissimilar patterns and contrasting colors work well.
- When you're presenting simple data (with just a few data points) area graphs can look impressive. Don't use area graphs for more complex data with many data points; the results will be distractingly jagged.

### Bar

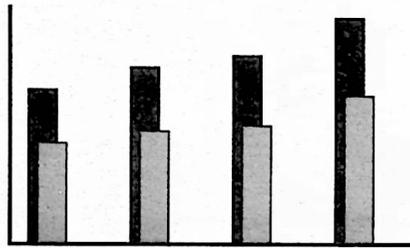
Bar graphs are useful for comparing field values and de-emphasizing trends. In contrast to line or scatter graphs, in bar graphs the independent field is often discrete (not continuous).



Horizontal bars are useful for comparing discrete field values (such as sales by product line) because they don't imply a quantity relationship as vertical bars do by their left-to-right ordering. Horizontal bars can be arranged in a number of ways: alphabetically, in ascending or descending order by size, in random sequence, and so forth. This format lets you put field labels inside the bars where they can be read from left to right.

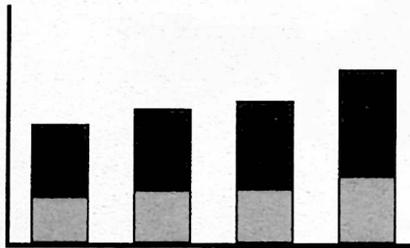
## Suggestions

- Avoid creating a bar chart with many field values. The resulting graph will be too cluttered. When you're working with many values, you might be better off using a line chart, or paring down the data so that they can be rendered with fewer bars.
- Given its natural simplicity, the bar chart lends itself to experimentation and embellishment. You can use different grid lines, tick widths, bar patterns and colors, and backgrounds, as you see fit.
- Label vertical bars with text running left to right, rather than rotating field labels (or other annotations) vertically along the bar. You could center a label above or alongside the bar.
- If you want to emphasize the disparity in length between bars, consider overlapping the bars (use the Bar Offset command from the Areas menu). This can produce a dramatic effect.



## Stacked Bar

Stacked bars show comparisons of summed (cumulative) amounts.



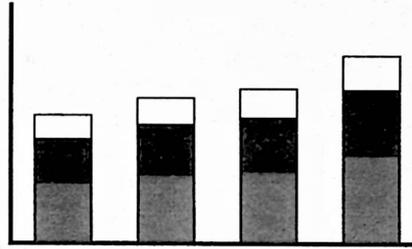
Bars in a stacked bar chart are subdivided into components representing separate field values.

Stacked bars are useful when showing the relative proportion of the parts to each other is more important than showing the relative

proportion of the parts to the whole. If showing parts in relation to the whole is your aim, use a pie chart. Because a rectangular bar makes judging area easier than a round pie, comparing values to each other is easier in bars than comparing slices of a pie.

### **Suggestions**

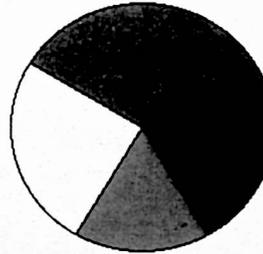
- When you're using stacked bars, place the dominant element at the bottom of the bars to act as a visual base against which the other segments can be measured.



- Use contrasting colors or patterns to distinguish the different fields in a bar.

### **Pie**

Pie charts show the proportion of parts to the whole.



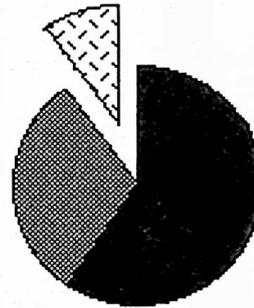
In a pie chart, a circle is broken into segments, called slices or wedges, proportional to the sizes of the elements plotted. The pie is best suited for showing the proportion of the parts to the whole, not of the parts to each other.

Pie charts lend themselves well to the dramatic presentation of data, particularly when color and other embellishments are added. Although the pie is better suited to showing the proportions of the whole, comparisons among data from several records are also possible.



### Suggestions

- Generally speaking, you'll want to limit the number of divisions in a pie to six; too many slices make the pie difficult to read.
- To emphasize a given field of a pie chart, separate the slice from the body of the circle (using the Pie Offset command from the Areas menu), and give it a contrasting color or pattern.



### Table

Tables let you organize data without plotting actual graphs.

<u>YEAR</u>	90	91	92	93
REVENUE	2000	2500	3100	3600
COSTS	1300	1575	1905	2180
PROFITS	700	925	1195	1420

A table is a systematic presentation of data, whether text, numbers, or symbols.



In MacGraphX, a table is a special type of chart in which the data values are always hidden, and annotations only are used. Annotations are placed within boxes defined by the minor grid lines. To position text within the table, select the fields and use the Annotation Place command from the Text menu; to color the text or background, select the fields and use the color options from the palette.

Because it's just as important to read across a table as it is up and down its columns, try to keep columns of information close together, so that the eye can move from side to side as easily as top to bottom. In a table with lengthy headings that require wide column spacing, use grid lines to create "tracks" between field values. Generous horizontal spacing between lines of type also makes sideways motion of the eye easier.

### **Suggestions**

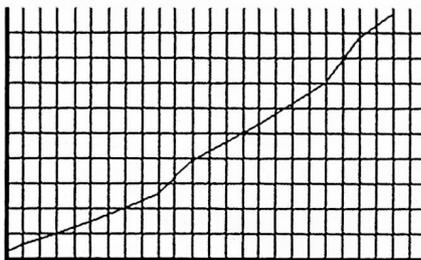
- Numeric data in tables is usually right-aligned.
- Keep column headings brief to make it easier to keep the data columns close together. Use abbreviations, condensed type, or rotated text as necessary.
- To give a table a strong rectangular shape, set a bold rule across the top and bottom edges, using the baseline and axes of the graph. You can also show the table inside a frame, or put a fill behind it.

### **Other Guidelines**

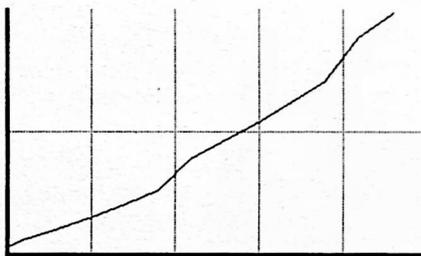
This section of the chapter will give you guidelines pertaining to graphs in general.

### **Grid Lines**

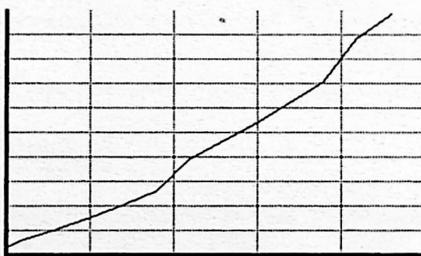
Grid lines make interpreting field values easier and keep the eye moving across the graph. Too many grid lines can make the graph difficult to read, however. If you don't use grid lines with discretion, your graphs could look like this:



One can also possibly use too few grid lines, which makes your values ambiguous. Line charts are especially reliant on grid lines to mark their values. This line chart is hard to read:

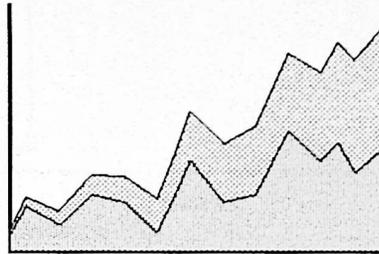


The right grid structures the data clearly.

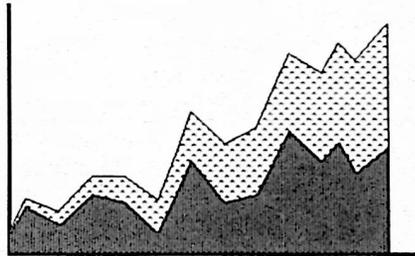


### **Fills and Colors**

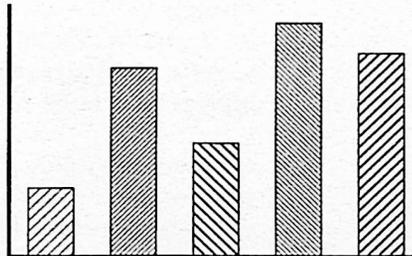
When you're using fills and colors to distinguish different data elements such as bars, slices of pies, or areas in an area chart, remember this cardinal rule: contrast is essential. This area chart does from too little contrast:



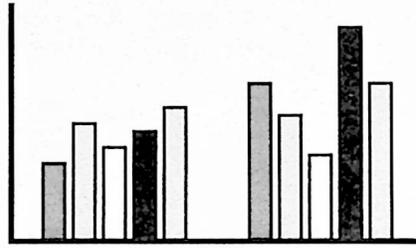
This graph, designed with more contrast, is far easier to read:



When you're shading different bars, don't limit yourself to only diagonals. The result might be more Pop Art than one might wish:



Use a bold color or pattern to make one field value stand out over others in a graph — highlight whichever field is the most important.



### **Scale**

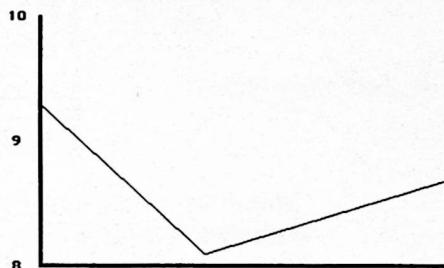
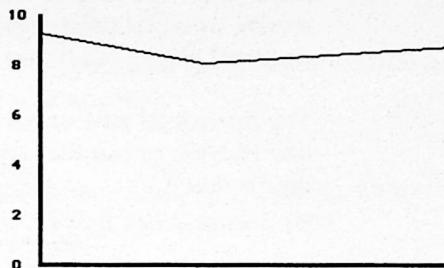
Scale is the distance between measures (major grids or ticks) along an axis. Scale is set in the Axis Info dialog box, which is accessed by double-clicking on an axis line, tick, grid or label, or by choosing Axis Info from the Options submenu from the Graph menu.

The scale that you set for the vertical and horizontal axes influences what the viewer concludes from your data. On the horizontal axis, if the distance between measures is long, the rise or fall of a line appears gradual. If measures are close together, up or down movement appears more precipitous. On the vertical axis, the opposite is true: a wider interval between grid lines will make a rise or fall look dramatic, a shorter interval will make it look incremental.

You can manipulate the scale to clarify or distort your data. (Needless to say, we heartily and fully endorse the former, and strongly discourage the latter — though we present all the tools necessary to do either.) For example, you could enlarge a graph's scale to emphasize a change that is numerically small, but that represents a large relative increase or decrease.

Consider the following: unemployment doubling from 2.5 to 5 percent in one year is a small numerical difference — a change of only 2.5 percent — but it represents twice as many people out of work. To emphasize this large relative change, use a large distance between measures along the vertical ( $y$ ) axis, and a short distance between measures along the horizontal ( $x$ ) axis, so that a line drawn from 2.5 to 5 rises dramatically. If you use a small vertical scale to represent this change, the graph will be technically accurate, but won't make its point as clearly.

The following two graphs show the same data, but, due to different scales along the dependent axis, give very different impressions.



By changing the baseline from 0 to 8, the scale for the  $y$  axis becomes dramatically larger; what appears to be a gradual fall and rise in the first graph becomes a steep drop and fast rise in the second

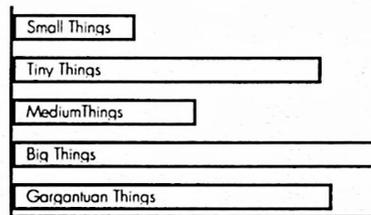
Changes in scale should only be used to clarify data. Most often, the automatic scale set by MacGraphX is preferred.

**Text**

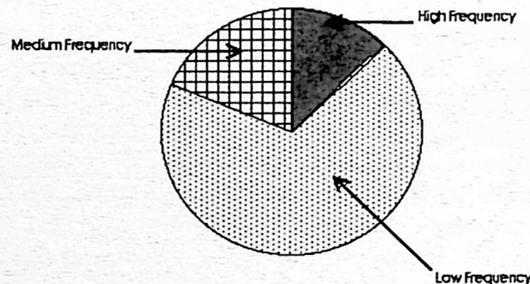
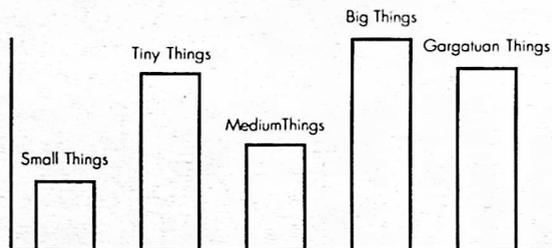
Keep labels clearly legible.

There is no ideal solution to the problem of labeling the vertical axis of a graph or a vertical bar. Avoid running a title up the side of the axis or bar, since it will be hard to read. Flush left or flush right works, unaesthetic as it may be. You might consider an annotation centered above the bar or axis.

The horizontal axis or bar is easy to label: Use a single horizontal line of type, or put the label, whether field name or quantity, within the bar itself.



Call-outs are appropriate for many graphs. Call-outs are labels appearing outside a field value, and often connected to the field value by a thin line. Use type of a readable point size. You can use MacGraphX's annotation command to create call-outs, or simply enter call-outs as text.



Be consistent in labeling parts of a graph. If you place the field names or amounts within some of the bars in a bar graph, put them

in all of them. If one bar is too small to contain the information, choose another way that will work for all the bars.

## **One Rule: Keep It Simple**

MacGraphX provides you with many sophisticated tools to enhance your chart. Use them sparingly.

### **Further reading:**

Holmes, Nigel, *Designer's Guide to Creating Charts & Diagrams*, New York: Watson-Guptill Publications, 1984.

Tufte, Edward R., *The Visual Display of Quantitative Information*, Cheshire, CT: Graphics Press, 1987.

White, Jan V., *Using Charts and Graphs*, New York: R. R. Bowker Company, 1984.

## Chapter 13: Menu Commands and Dialogs

This chapter lists and explains all the commands and dialogs accessed from MacGraphX's menus. Menus are listed as they appear in left-to-right order.

### File

**New** — Starts a new empty MacGraphX file. If a document is already open, New is disabled.

**Open** — Opens an existing MacGraphX file. The Open command is active when you have a blank document open or no document open at all.

**Close** — Closes the document you are currently working on, and asks you to save the document, if necessary.

**Save** — Saves to disk any changes you have made to a file since creating or last saving it. You should save regularly and frequently in order to avoid losing work in the event of a power outage or system crash.

**Save As** — Saves another copy of your file with a new name or in a different folder.

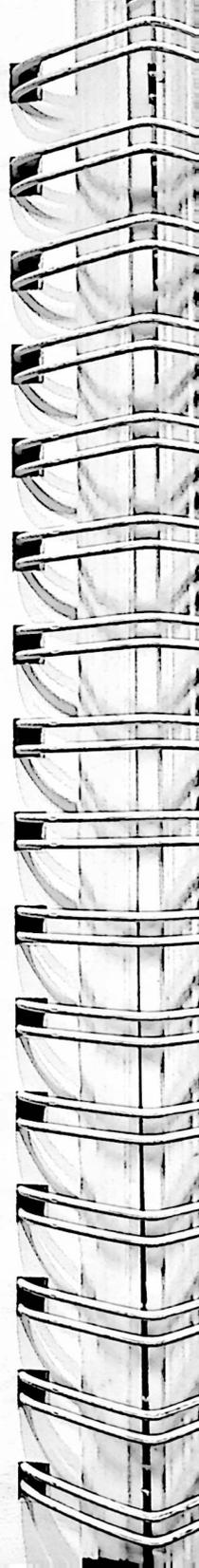
**Save Stationery** — Saves the current document as a stationery file — a set of file parameters without data or graphs. All fields, field settings, formulas, custom numeric formats, curve fits, and graph templates are preserved. A stationery file opens as an untitled document.

**Revert To Saved** — Undoes all the work you have done since you last saved a file to disk.

**Page Setup** — Sets the printer parameters for your document. The choices you have in Page Setup depend on the printer driver you have selected from the Chooser desk accessory.

**Print** — Prints the contents of the active window.

**Save PICT** — Saves a graph as a PICT graphics file for use in other applications. Most Macintosh graphics applications can open a PICT file.



**Import Data** — Brings data created in another application into MacGraphX. You do not need a MacGraphX document open to import data. If necessary, a document will be created when you give the Import command. Data may be entered in addition to data already existing in a dataset, either as new fields or as new records.

MacGraphX can read data files created on many programs such as MacCalc, Excel, or your favorite database or accounting program. Choose the data file format from the Import Data sub-menu. Only files with formats identical to the format you select will appear in the file list. Select All if you wish to import any file type.

After selecting a file, you can make choices in the Load dialog about the file you are importing.

Load Data h22MacUser Growth 6/90.C08h2

Full Data  Range

Row is Record  Column is Record

Field Name in 1st Record  Use

Records to Skip

Records to Load

Add New Fields  Use Formulas

Add New Records

New Field Notes

Your dialog choices are:

"Full Data"	Default setting that loads all of the data from the file to be imported.
-------------	--

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"Range"	<p>Specifies a range of data to import if not importing all of it, using standard spreadsheet range reference nomenclature. Enter the address of the beginning and ending cells, separated by a colon.</p> <p>Entering A1:G10, for example, would import all data from the first column (A) to the seventh (G), from the first row (1) to the tenth (10).</p> <p style="text-align: center;">© Range <input type="text" value="A1:G10"/></p>
"Row is Record"	Default setting that specifies that a horizontal row is one record.
"Column is Record"	Specifies that a vertical column is one record (common in financial data).
"Field Name in 1st Record"	Specifies that the names of each field make up the first record, and valid data starts in the second record.
"Use"	Retains the field names contained in the imported file when "Field Name in 1st Record" is also selected. If "Field Name" is not selected, enters "Field#1" automatically as the new field name for the first field, "Field#2" for the second field name, and so forth.
"Records to Skip"	Specifies the number of records to skip from the first data record (ignoring record with field names).
"Records to Load"	Specifies the number of records to load.
"Add New Fields"	Specifies adding imported data as new fields in an existing dataset after the current fields.
"Add New Records"	Specifies adding imported data as new records after existing records.
"Use Formulas"	Retains any formulas in the imported text or WKS file.

**Export Data** — Allows you to save your data in formats readable by other applications. You can make the following choices in the dialog:

"Text"	Exports a tab-delimited text file.
"WKS"	Exports a file in WKS format.
"SYLK"	Exports a file in SYLK format.
"Selected Records Only"	Exports only selected records in a file. Select records in the data window prior to giving the Export command.
"Include Field Names"	Exports existing field names along with data.
"Include Equations"	Exports all field formulas into a WKS or text file.

**Communicate** — Allows you to open or send a MacGraphX file, template, or PICT image over a network using Microsoft Mail. You must have Microsoft Mail software installed on your system and the other systems using the network.

Your MSMail Open options are:

MGX File	Opens a MacGraphX file that has been sent to you over the network. (Same as Open command.)
MGX Stationery	Opens a MacGraphX template that has been sent to you over the network. A template contains all the settings but none of the data in a MacGraphX document.
MGX Import	Imports data that has been sent to you over the network. (Same as Import Data.)

Your MSMail Send options are:

MacGraphX File	Sends a MacGraphX file to someone on the network with Microsoft Mail. (Same as Save As command.)
PICT File	Sends a PICT image of the active graph, letterhead, or layout window to someone on the network with Microsoft Mail. (Same as Save PICT command.)
Data Export	Exports data only to someone on the network with Microsoft Mail. (Same as Export Data command.)

**Preferences** — Allows you to set preferences for the current file or all new files. Your options are:

“This File”	Default setting that applies preferences to the current file only.
“All New Files”	Optional setting that applies preferences to all new files including the current one.
“Field”	Displays an alert box warning you that the delete or modify operation you are performing on a field cannot be undone.
“Template”	Displays an alert box warning you that the delete or modify operation you are performing on a template cannot be undone.
“Color”	Displays an alert box warning you that creating, deleting, or modifying a color cannot be undone.
“Curve Fit”	Displays an alert box warning you that the operation you are performing on a curve fit cannot be undone, deleted, or modified.
“Delete Graph/Layer”	Displays an alert box warning you that deleting a graph or graph layer cannot be undone.
“Num Format”	Displays an alert box warning you that deleting a numeric format cannot be undone.

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“Suppress Error Messages”	Prevents error messages from appearing on screen, but beeps instead.
“Min Tick Spacing” “Log”	Sets minimum tick spacing in points for axis labels for regular and log axes.
“Default Dependent Line”	Specifies a name for the dependent axis title. The default is “Data”.

**Quit** — Closes the file and application. A dialog box asks you whether you want to save your changes.

## **Edit**

The Undo, Cut, Copy, Paste, and Clear commands work for both data and graph windows. The other commands in the Edit menu only work on the data window.

**Undo** — Undoes the last editing or formatting command given from a menu in the data window or from the Palette or menu in a graph window.

**Cut** — Deletes the selected object and copies it to the Clipboard. When cutting records, MacGraphX collapses the dataset and renumbers the remaining records accordingly. If the objects to be cut are elements of a chart, such as a piece of a pie chart, those elements are hidden but not removed. To make the object reappear, select the cleared object and choose the Show command under the Objects menu.

In the graph window, this hides selected objects on a graph, and deletes selected user-drawn graphics. To make a graph object reappear, select the cut object and choose the Show command under the Objects menu.

**Copy** — Copies the selection to the Clipboard.

**Paste** — Pastes a graph object, cell or range of cells, or record or range of records into a graph or data window. When pasting records into a dataset, records will be added to the end of the dataset. Cut or copied cells replace an analogous range of cells with respect to an entry cell, or, if no entry cell is selected, are added in new records at the end of the dataset.

**Clear** — In the data window, this turns cells with numeric values to zero, and cells with an alphabetic text type blank. Clear a record or range of records by selecting the desired record numbers and giving the Clear command. Clear a single cell or range of cells by highlighting them and giving the Clear command.

In the graph window, this hides selected objects on a graph, and deletes selected user-drawn graphics. To make a graph object reappear, select the cleared object and choose the Show command under the Objects menu.

**Duplicate** — Duplicates records or enters blank records at the end of a dataset. When duplicating selected records, you can specify how many times you want them duplicated. You can also change the value of one cell by a percentage, an absolute value, or according to a formula. Also pastes a record or records in from the Clipboard.

When you use the Duplicate command, a Duplicate dialog appears with the following choices:

"Duplicate from Selected Records"	Duplicates selected records once.
"Duplicate One Record N Times"	Duplicates the first record the specified number of times.
"Insert Empty Record N Times"	Inserts a specified number of blank records.
"Fill Field"	Specifies a field that will change in each duplicated record. You can change the field by a percentage, an absolute value, or according to a formula. This feature can be used with "Duplicate from Selected Records," "Duplicate One Record N Times," and "Insert Empty Record N times." First check the "Fill Field" option, then select the field name from the Fields menu, or type the name of the field.

If you selected "Fill Field," MacGraphX shows another dialog box. This lets you indicate how to change the field.

**Insert** — Adds one blank record for each selected record, at the end of the dataset.

**Delete** — Deletes selected records. Delete does not change the Clipboard, so you cannot paste records or cells back into the dataset. You must use Undo *immediately* after using Delete to return deleted records or cells to the dataset.

**Fill Recs** — Causes a field in many records to change. You can specify that the change be by a percentage, absolute value, or according to a formula. The dialog is the same as the “Fill Field” dialog of the Duplicate command. The difference between these two commands is the Fill Recs command changes fields in existing records. The “Fill Field” dialog contains:

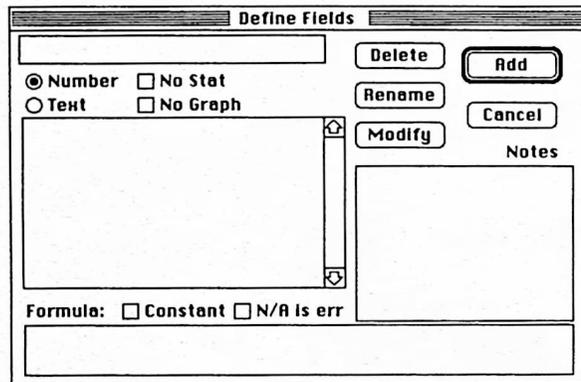
“Fill Field”	Specifies the field that will be filled with data.
“Constant Number or String”	Lets you specify a constant value for all duplicated records.
“Grow”	Allows you to change the field value by a fixed percentage or number. Set the starting value of the series in the “Start from” box and the increment in the “Step by” box (this value can be positive or negative). You must also specify whether you want to step “by Percent” or “by Amount.”
“Formula”	Allows you to define an equation. You will find field names, constants, operators, and functions on separate menus. See the <i>Building Formulas</i> chapter earlier in this manual for more information on how to create a formula.

**Summarize** — Determines the total, average, and maximum values, or standard deviation for all fields in selected records. Select a set of records, and give a command from the Summarize submenu. The result is entered as one new record at the end of the dataset. The new record will have a “T”, “V”, “M”, or “ $\Sigma$ ” next to the record number to indicate whether this result is a total, average, maximum value, or a standard deviation. Add-in statistics from the MG.XSTTs.f folder (such as geometric mean or sum of the squares) appear at the end of the submenu.

**Data** — Submenu with the following commands:

- Fields
- Sort
- Search
- Move to Top

**Fields** — Allows you to name or rename fields, define formulas, and set text types in the Define Fields dialog.



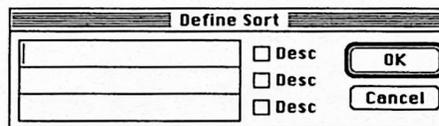
The Define Fields dialog choices are:

“New Name”	Name for new fields added to the dataset. Also permits you to change the name of an existing field.
“Number”	Defines a field as one that holds quantitative information (including dates) only. Alphabetic data may not be entered. Only number fields may be used in formulas and transforms.
“Text”	Defines a field as one that holds alphabetic information, and treats any numbers as alphabetic rather than numeric data. Data in a text field may not be used in formulas and transforms.

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"No Stat"	Disallows use of a selected number field for statistical purposes. Field cannot be totaled, averaged, etc.
"No Graph"	Disallows use of a selected field for graphing purposes.
"Constant"	Temporarily suppresses the recalculation of a formula for a selected number field.
"N/A is err"	Returns "N/A ERR" as the value of a calculated field when the value of an input is not available (N/A). If not selected, will process any null value as zero and place a number in the output field.
"Delete"	Deletes an existing field entirely after you select it in the scroll box.
"Rename"	Changes the name of a selected field to what you type in the "New Name" field.
"Modify"	Executes any new settings you have made in the Fields dialog.
"Formula"	See the <i>Building Formulas</i> chapter for information on how to create a formula.
"Notes"	A box in which to type in notes about a field.

**Sort** — Allows you to sort a dataset by up to three fields in the Define Sort dialog.



In the Define Sort dialog, specify the data fields to sort by, and their order, by entering their names in the sort fields. You may type in the names or select them from the Fields menu. Specify a descending sort by selecting the "Desc" check box for any field.

**Search** — Allows you to search records in a dataset by specified criteria. Found records are highlighted in the Recs# column. In the Define Search dialog, specify the field to search by typing the field name into the first field or by selecting it from the Fields menu. Enter the value or text string to search for (the “key value”) in the second field. (The Define Search dialog will automatically display the name of the field containing the entry cell and the entry cell’s contents.) Click on the appropriate radio buttons to define the search. Found records will appear with their record numbers highlighted. You have these choices:

“=”	Default that searches for the specified value or text (equals the key value).
“<” “≤” “>” “≥”	Searches for values less than less than or equal to greater than greater than or equal to the key value.
“Prefix”	Searches for the specified text at the beginning of a text string.
“Embedded”	Searches for the specified text anywhere in a text string.
“Not”	Finds records with values or text that do not match the specified search criteria.

**Move to Top** — Moves selected records to the top of the dataset.

**Recalc** — Gives you several options for recalculating the formulas and transforms in a dataset. Your choices are:

Manual Recalc	Prevents the automatic recalculation of formulas and transforms in a dataset.
Recalc Now	Recalculates formulas in a dataset when Manual Recalc is set.
Field No Recalc	Prevents the recalculation of formulas for selected fields.

Fields defined by formulas are recalculated in “natural order,” based upon the inherent dependencies; as necessary, fields that are inputs to formulas are calculated before the dependent formulas are calculated. All fields defined by transforms are calculated afterwards, in field order.

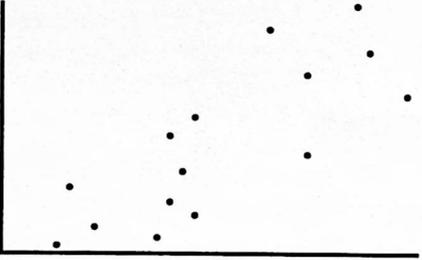
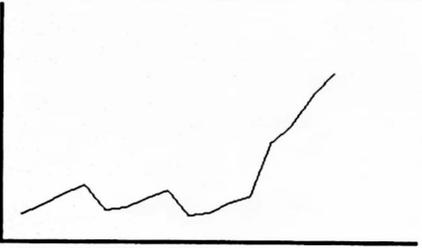
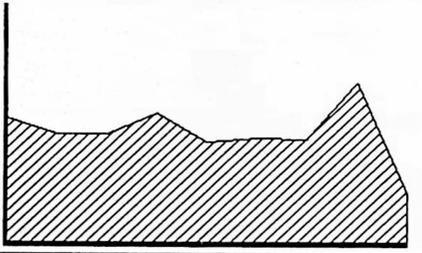
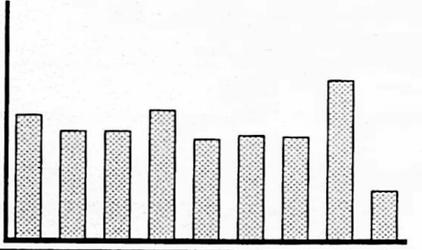
## Graph

The graph menu is enabled when a graph, letterhead, layout, or clipboard window is open on the screen.

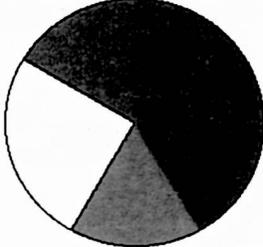
**New Graph** — Generates a chart or graph from data you have selected in a data window. You can choose from several types of charts or a blank chart. The submenu choices are:

Scatter	Chart with data represented as single points called marks. Each dependent field is represented by a different mark.
Line	Similar to a scatter chart except that the data marks in a field are connected by lines.
Area	Similar to a line chart except that the areas between the lines are filled in.
Bar	Chart with data represented as rectangles called bars. Each dependent field is represented by a different vertical or horizontal bars, grouped by record. Use Transpose for horizontal.
Stacked Bar	Similar to Bar chart except that bars within one record are stacked.
Pie	Chart with data represented as pieces of a circle called wedges or slices. Creates a pie for each record selected. There are no measurements along the dependent axis with pie charts.
Table	An organized arrangement of data (field values), represented as text.
Blank [Draw]	Gives you a blank graph window; used MacGraphX's draw capabilities.

The following graphs will give you an idea of what each graph type looks like.

Scatter	
Line	
Area	
Bar	

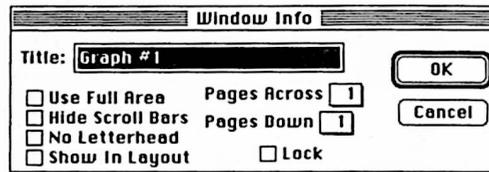
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Stacked Bar																					
Pie																					
Table	<table border="1"> <thead> <tr> <th><u>YEAR</u></th> <th>90</th> <th>91</th> <th>92</th> <th>93</th> </tr> </thead> <tbody> <tr> <td><b>REVENUE</b></td> <td>2000</td> <td>2500</td> <td>3100</td> <td>3600</td> </tr> <tr> <td><b>COSTS</b></td> <td>1300</td> <td>1575</td> <td>1905</td> <td>2180</td> </tr> <tr> <td><b>PROFITS</b></td> <td>700</td> <td>925</td> <td>1195</td> <td>1420</td> </tr> </tbody> </table>	<u>YEAR</u>	90	91	92	93	<b>REVENUE</b>	2000	2500	3100	3600	<b>COSTS</b>	1300	1575	1905	2180	<b>PROFITS</b>	700	925	1195	1420
<u>YEAR</u>	90	91	92	93																	
<b>REVENUE</b>	2000	2500	3100	3600																	
<b>COSTS</b>	1300	1575	1905	2180																	
<b>PROFITS</b>	700	925	1195	1420																	

**Options** — Lets you specify the structure and formatting for windows, graphs, axes, legends, and fields. The submenu items are:

- Window
- Graph
- Independent Axis
- Dependent Axis
- Legend
- Fields

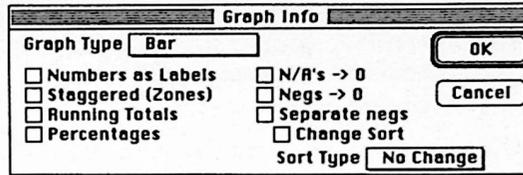
Window allows you to change the active graph window or layout or letterhead window in several ways with the Window Info dialog.



Your options are:

"Title"	Allows you to name a window.
"Use Full Area"	Enlarges the placement frame to surround the page or pages of the whole layout. Applies only to the graph window.
"Hide Scroll Bars"	Hides scroll bars and extends the window.
"No Letterhead"	Prevents the contents of the letterhead window from appearing in the graph or layout window.
"Lock"	Prevents changes from being made to a window. Applies only to a graph window.
"Pages Across"	Specifies the number of horizontal pages for a layout in the graph and layout windows.
"Pages Down"	Specifies the number of vertical pages for a layout in the graph and layout windows.
"Show in Layout"	Shows the contents of the graph window in detail rather than in outline form in the layout window. Must be specified in the graph window.

Graph allows you to change the active graph in many ways with the Graph Info dialog.



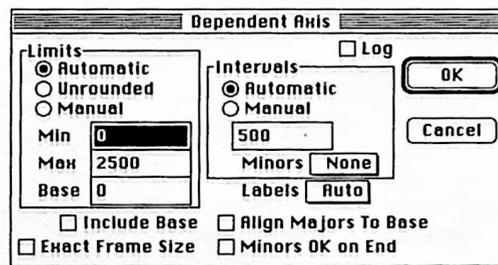
Your options are:

"Graph Type"	Changes the graph type to any of the other options listed in the New Graph command.
"Sort Type"	Allows you to select from "Natural," "Record #," "Sort List," and "Sort Order." Click in "Change Sort" check box first. "List Order" presents data as currently sorted in the dataset. "Natural" sorts the field for the independent axis in ascending alphabetic or numeric order. "Rec #" sorts by ascending record number. "List Sort" uses the order of the last direct sort chosen.
"Numbers as Labels"	Guarantees even spacing between field values regardless of their numeric value. This setting is a default for bar and stacked bar charts. Deselecting this option with numeric axis values may cause data (bars) to be spaced unevenly.
"Staggered (Zones)"	Moves the first major interval of the independent axis away from the dependent axis, creating a margin within the data frame. Doing this keeps bars and pies from overlapping the dependent axis. Bar and pie charts default to this setting.

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"Running Total"	Shows all objects in a field of your data as the accumulated total for each record. This feature is the default with a stacked bar graph and pie chart.
"Percentages"	Shows each value as a percentage of the total. Using percentages with Running Totals will show you the accumulated totals of those percentages.
"Negs -> 0"	Treats any negative value to 0 on the graph.
"Separate Negs"	Default setting for bar, stacked bar, and area graphs, accumulating negative and positive values separately. Deselecting "Separate Negs" causes negative values to be added in with positive numbers on the graph, lessening the totals.
"N/A's -> 0"	Treats any null value in the dataset as 0 for graphing.

Independent Axis and Dependent Axis let you change their respective axes with a dialog when numerical data is displayed.



Your options are:

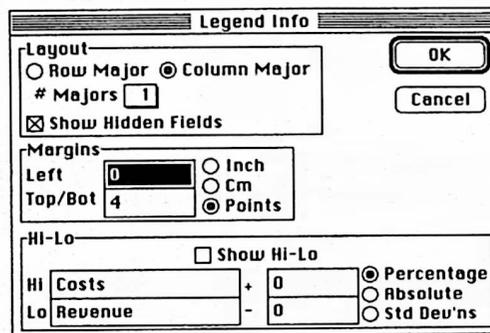
Limits: "Automatic"	Default setting that sets the limits of the axis from the lowest value to the highest value of the data intelligently rounded down and up, respectively.
Limits: "Unrounded"	Sets the limits of the axis at the highest and lowest values of the data plotted on the axis. Deselect "Include Base" to start the axis with the lowest plotted value if the lowest value is positive.
Limits: "Manual"	Sets the limits of the axis to any desired values. Type the desired beginning and ending numbers in the "Min" and "Max" fields.
"Include Base"	Default setting that includes a baseline in the graph even if it falls outside the range of values. If you would like a value other than 0 for the baseline, type the number in the "Base" field.
"Exact Frame Size"	Forces the axis size to equal the data frame size when grown by the user instead of rounding so that intervals are of equal size.
"Log"	Sets a logarithmic scale for the axis.
Intervals: "Automatic"	Default setting that automatically determines the intervals along an axis.
Intervals: "Manual"	Changes the major interval between numbers. Type the desired interval value in the spacing field.
"Minors"	Pop-up menu that lets you change the number of subdivisions between each interval (this can be "None").
"Labels"	Pop-up menu that lets you specify which major ticks along the axis are labeled. Selecting 1 labels every major tick; selecting 2, every second tick, and so on.

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“Align Majors To Base”	Default setting that starts the spacing of major grid with the baseline; otherwise, adjusts major grid to align with minimum value.
“Minors OK on End”	Allows minor ticks to occur at the end of the axis.

Note: When alphabetic information is displayed along an axis, or “Nums as Labels” is set in the Graph Info dialog, the Graph Info dialog appears rather than the respective axis dialog when you double-click on the axis or axis labels.

Legend controls parameters for the legend with settings in the Legend Info dialog.



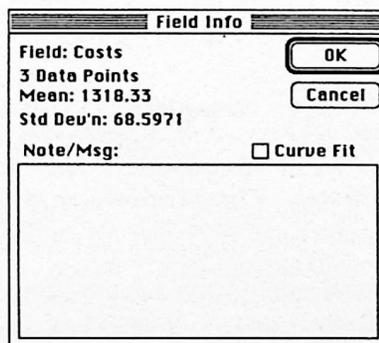
Your options are:

“Row Major/ Column Major”	Determines whether the legend objects are displayed in rows or columns.
“# Majors”	Specifies a fixed number of columns or rows in which to display legend information. For example, if you choose “Column Major” and 2 for “# Majors,” the legend objects will be displayed in two columns of as many rows as needed.
“Show Hi-Lo”	Displays a hi-lo line in the legend.

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"Show Hidden Fields"	Shows legend information for fields that are hidden on the graph.
"Left Margin"	Specifies the left margin in the legend box in inches, centimeters, or points. Even at a setting of 0, however, legend objects do not touch the side of the box.
"Top/Bot Margin"	Specifies the top margin in the legend box in inches, centimeters, or points. Even at a setting of 0, however, the first object does not touch the top of the box.
"Hi"	Specifies the field of the graph that will be used as the basis for the upper part of a Hi-lo Line/Error Bar. Hi value is calculated as a percentage, addition, or field standard deviation multiple of a constant with the specified field.
"Lo"	Specifies the field of the graph that will be used as the basis for the lower part of a Hi-lo Line/Error Bar. Lo value is calculated as a percentage, addition, or field standard deviation multiple of a constant with the specified field.

**Field Names** — Field names listed at the end of the Options submenu open a Field Info dialog for the chosen field.



The Field Info dialog provides the following information:

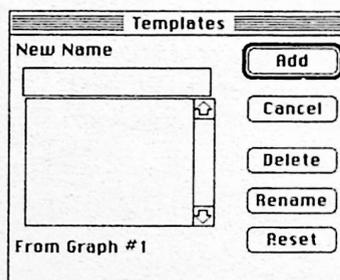
"Field:"	Indicates the field name.
"Data Points"	Indicates the number of values that define the field.
"Mean:"	Indicates the mean value (average) of the field's data points.
"Std Dev'n:"	Indicates the standard deviation of the field's data points.
"Note/Msg:"	Contains user notes about the field. Type in any notes or comments.
"Curve Fit"	Indicates that a curve fit has been applied to the field (scatter chart only). Curve fit data will be displayed in the "Note/Msg:" dialog.

**Delete Graph** — Deletes the active graph window but not an active layout or letterhead window.

**Transpose** — Exchanges the x (horizontal) for the y (vertical) axis.

**Place Graph** — Places a graph in the top left corner of the first page of the layout window. Graphs are listed on the Place Graph submenu.

**Template** — Saves the graph in the active window as a template for later use.



The Templates dialog choices are the following:

"Delete"	Deletes an existing template selected in the scroll window.
"Rename"	Renames an existing template selected in the scroll window. First select the template to rename and type in its new name in the New Name field.
"Reset"	Uses information in the active graph to replace information the selected template.

### **Layers**

Commands from this part menu affect the layers of a graph.

**Swap Graph Layers** — Exchanges two graphs by moving the graph that is in front to the back.

**Remove Layer** — Removes the front-most graph layer.

**Graphs in Front** — Moves user-drawn graphic objects such as lines, boxes, and text behind the graph.

**Graphs to Back** — Moves user-drawn graphic objects such as lines, boxes, and text on top of the graph

**Data Front** — A default setting that puts field elements such as marks, lines, and bars in front of all grid lines. Deselecting it puts grid lines of forward graph in front of field elements of back graph.

**Align Horiz** — A default setting that ensures that overlaid graphs have the same width and horizontal position. Deselecting it allows you to move overlaid graphs separately from side to side.

**Align Vert** — A default setting that ensures that overlaid graphs have the same length and vertical position. Deselecting it allows you to move overlaid graphs separately up and down.

Note that deselecting Align Horiz and Align Vert simultaneously will allow you complete freedom in moving overlaid graphs separately.

## Objects

**Show** — Makes a selected hidden graph object visible.

**Hide** — Hides a selected graph object.

**Reset Attributes** — Returns the attributes of a selected graph object to their default settings. Will work with a user-drawn object.

**Reset Location** — Returns a selected label or title to its default location. Will not work with a user-drawn object or the legend.

**Reset Graph Order** — Returns overlaid graphs to their original front-to-back order.

**Anchor to Frame** — Freezes a selected object in its current position relative to the graph frame. The graph cannot be moved or resized without moving the anchored object, but the anchored object can still be moved independently of the graph frame.

**Grow to Frame** — Enlarges a selected grid line, baseline, axis or field item (including drop shadows for bars) to extend past the data frame, to the graph frame; useful only if margin separates the data and graph frames. To allow all fields to grow to frame both horizontally and vertically, select the legend and issue this command.

**Align** — Gives you several choices for aligning two or more selected objects. They are:

To Grid	Aligns selected objects to invisible grid defined in the palette. You must have Grid selected. (See the chapter, <i>About the Palette</i> .)
Top	Aligns selected objects to the top of the top-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the top of the frame.
Middle	Aligns the middle of each selected object to a point halfway between the top point of the top-most object and the bottom point of the bottom-most object.

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Bottom	Aligns selected objects to the bottom of the bottom-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the bottom of the frame.
Left	Aligns selected objects to the left of the left-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the left side of the frame.
Center	Aligns the center of each selected object to a point halfway between the right point of the right-most object and the left point of the left-most object.
Right	Aligns selected objects to the right of the right-most object. If a frame (data frame, graph frame, or placement frame) is one of the objects, aligns objects to the right side of the frame.

**Bring to Front** — Brings selected objects to the front of the window.

**Send to Back** — Sends selected objects to the back of the window.

**Select All** — Selects all graph objects or all graph objects of a chosen type. Your choices are:

All	Selects all graph objects.
Text	Selects all text.
Lines	Selects all lines.
Rects	Selects all rectangles.
Grids	Selects all grid lines.
Ticks	Selects all ticks.
Titles	Selects all titles.
Labels	Selects all labels.

**Full Graph** — Selects one of the following graph objects:

• Placement Frame	• Graph Frame	• Legend
• Title	• Data Frame	• Hi Mark/Lo Mark

Note that showing the high mark or low mark will display the entire Hi-Lo line.

**Fields** — Selects one of the field elements in a graph.

**Independent Axis/Dependent Axis** — Selects one of the following axis objects:

• Title	• Near Axis	• Far Axis
• Major Grid	• Near Labels	• Far Labels
• Minor Grid	• Near Major Ticks	• Far Major Ticks
• Baseline	• Near Minor Ticks	• Far Minor ticks

The near axis is the axis corresponding to the “near” side of the graph, that is, the bottom or left side. The far axis is on the “far” side of the graph, that is, the top or right side.

## Text

The Font, Size, Style, Alignment, and Rotation commands let you change the way that text appears in the data window and in your chart. Selecting any of the choices in these commands changes the setting for all new text you type. You can also specify the format of numbers. In the data window, these choices affect the columns you have specified as the dependent columns (the columns with their names highlighted).

**Font** — Specifies the font for the selected text.

**Size** — Specifies the size for the selected text. The sizes that appear as outlines are font sizes resident in your system. Other font sizes may be selected with the Other command on the submenu. You may define custom sizes in points, centimeters, and inches by typing them in the blackened field.

**Style** — Specifies the font style for the selected text. The styles available are plain, bold, underline, italic, outline, and shadow. You can have more than one style on your text, such as bold italic.

**Alignment** — Specifies the alignment for the selected text: left, centered, or right. The text is aligned to the edge of the cell (if you are in the data window), or the border of the text box in a graph.

**Rotation** — Allows you to rotate text to the left or right, flip it upside down, or return it to a normal orientation. Left corresponds to counter-clockwise, right to clockwise. You cannot rotate text in the data window.

**Num Format** — Specifies, changes, and creates numeric formats for fields in the data or graph window. Select preset formats from the submenu or change and create formats in the Define Number Format dialog.

You have these choices in the Define Number Format dialog:

"Format Name"	Specifies the name for a new or renamed numeric format.
"(neg)"	Places a negative value in parentheses.
"Int"	Rounds all values to no decimal places, overriding the "Decimals" setting.
"%"	Multiplies value by 100 and appends "%" sign.
"M's"	Specifies each thousand multiple with "M" rather than a group of three zeroes.
"N/A's"	Shows blank cells as "N/A."
"000's"	Separates groups of three zeros by thousands separator (commas).
"Decs"	Specifies the number of decimal places for display.

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"Lead"	Specifies the number of digits that must appear before a decimal point. When used with Currency format, places a minimum number of spaces between the decimal point and the dollar sign.
"Fixed"	Rounds off a number to the number of decimals specified by the "# Decimals" pop-up menu.
"Currency"	Specifies a format that places a currency symbol before or after a number.
"Space"	Puts one space between the currency symbol and the number (before or after).
"After"	Specifies placing the currency sign after the value. Must be used with "Currency".
"General"	Minimizes the space a number takes up by stripping away trailing zeroes after the decimal point. Puts a number in scientific format if it takes up too much space.
"Scientific"	Specifies a scientific format.
"E+000"	Specifies the representation of the exponent value with a letter and three digits rather than the usual two digits. Used with "Scientific."
"Date"	Specifies a date field. Use with the date settings "mm dd yy", "dd mm yy", "mm yy", or "dd mm".
"mm dd yy" "dd mm yy" "mm yy" "dd mm"	Options to specify the order of the day, month, and year in a date field.
"Month: 01" "Month 1" "Month: Jan" "Year: 19yy" "Day: 01"	Options to specify the formatting for a date field. Choose whether the month will appear as a word, or a number (with lead zero); whether year will use century prefix; and whether day number will have lead zero.
"Separator"	Specify the mark by which to separate the month, day and year. If not selected, date items will be separated by space (between first two items) and comma (between second and third): "1-Jan-90" <i>vs.</i> "1 Jan, 90."

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"Delete"	Deletes a selected numeric format.
"Rename"	Renames a selected numeric format.
"Modify"	Applies changes made to the currently selected numeric format.

In addition to creating your own formats, you have these preset choices in the submenu under Num Format:

Same as Field	For use in the graph window only: specifies the format that is already is set in the Data window for the field.
General	Minimizes the space a number takes up by stripping away trailing zeroes. Puts a number in scientific format if it takes up too much space.
Fixed 0	Rounds off a value to the closest whole number.
Fixed1, Fixed2, and so on	Rounds off the value to the specified number of decimal places.
Sci2, Sci4	A scientific format with the value rounded to two or four decimal places. For instance, 1734 in Sci2 is represented as "1.73 E+03."
Currency 0, Currency 2	Shows dollar values rounded off to the nearest dollar or penny.
Percent 0, Percent 2	Shows percentages rounded off to the nearest zero or two decimal places.

The annotation commands are used only in the graph window. They allow you to add annotation text (such as field labels) to your field data and to specify the kind of annotation and its location. The annotation commands are also used to specify the position and value of text elements in tables.

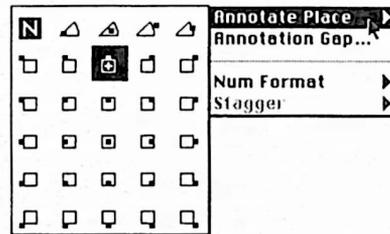
**Annotate Type** — Lets you add field annotation or select among different annotations for selected fields in your graph. To add annotation, select the field in the legend and the annotation type. The types are:

None	Removes any existing annotation.
Value	Shows the value.
Percent of Tot	Shows the percent of total.

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Running Tot	Shows a running total.
Running %	Shows a running total of percentages.
Field Name	Shows the field name.
Record#	Shows the record number.
Other	Shows the value of any other field in the dataset. Select one.

**Annotate Place** — Indicates placement for annotations relative to a selected category. The top row of icons apply to a pie chart. The rest apply to any other type of graph. The choices are:



For example, the first choice in the third row puts the annotation text to the left near the top of the object. The center choice from the second row (highlighted in the diagram) is the default for all non-pie graphs, and centers the annotation above the data value.

**Annotation Gap** — Allows you to select the gap between the annotation and the data point.

**Stagger** — Staggers labels along the selected axis. You can specify:

Auto	Lets MacGraphX stagger axis labels as necessary.
None	Puts staggered labels into a single row.
2 Lines, 3 Lines and so on	Staggers labels into two or more lines.
Flipped	Reverses the lines of staggered labels.

## Lines

Line commands are used to change the appearance of lines (such as grid lines, ticks, axes) and the borders of regions. When changing the line attribute for a one field in a bar, stacked bar, pie, or area graph, lines for *all* fields will be changed.

**Line Width** — Lets you select the width of a selected line in points. Selecting “?” allows you to select a custom width in points, centimeters, or inches.

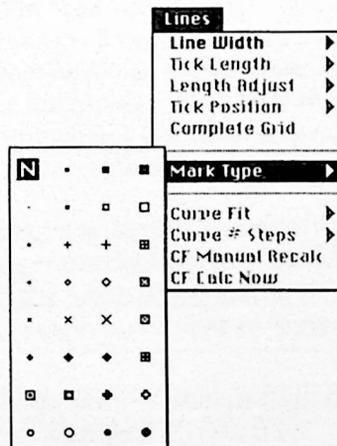
**Tick Length** — Allows you to set the length of the selected tick marks in points. Selecting “?” allows you to set a custom length in points, centimeters, or inches.

**Length Adjust** — Adjusts the length of selected ticks and grid lines to the width of a perpendicular line (normally the data frame or graph frame). Selecting “?” allows you to set a custom length in points, centimeters, or inches.

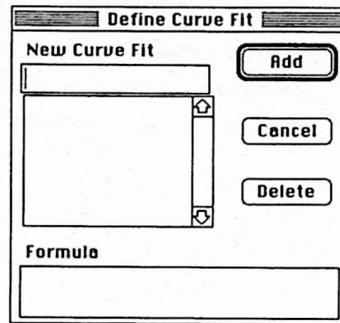
**Tick Position** — Allows you to set the position of selected tick marks, to be inside, outside, or across the perpendicular axis line.

**Complete Grid** — Selects the top dependent or right-most independent grid line (and bottom dependent or left-most independent grid line if your graph contains negative values) even though they may overlap the data frame. First select the dependent or independent major grid to enable this command.

**Mark Type** — Allows you to choose the mark type for the point on a scatter chart, line chart, or area chart, or the end points of a hi-lo line. The choices are:



**Curve Fit** — Specifies the definition of the curve for selected fields in a scatter chart with the Define Curve fit dialog.



The Define Curve Fit dialog has these capabilities:

"New Curve Fit"	Names a new curve fit.
"Formula"	A field in which to define a formula for the curve fit. Use the Curve Fits menu to help.
"Delete"	Deletes a selected curve fit.
"Add"	Adds a new curve fit.

**Curve # Steps** — Allows you to select the number of line segments a curve will consist of. Your choices are:

Same Points As Graph	Same number of points in the curve as data points on the graph.
Use Major Count	Same number of points in the curve as major ticks.
Use Minor Count	Same number of points in the curve as minor ticks.
Use Size	Same number of points in the curve as graph width (in pixels).
10, 20, 25, 50...	Specifies a number of points.

**CF Manual Recalc** — Prevents the automatic recalculation of a curve fit based on new data.

**CF Recalc Now** — Immediately recalculates a curve fit based on new data. This command is useful with CF Manual Recalc.

## Areas

Area commands are used to change the appearance of areas such as bars, wedges of a pie graph, or user-drawn rectangles. The commands are:

**Round Corners** — Lets you specify the roundness of the corners of a rectangle. Selecting “?” lets you set a custom corner size in points, inches, or centimeters.

**Shadow Vert** — Lets you specify the vertical displacement of a drop shadow. Selecting “?” lets you set the vertical displacement in points, centimeters, or inches.

**Shadow Horiz** — Lets you specify the horizontal displacement of a drop shadow. Selecting “?” lets you set the horizontal displacement in points, centimeters, or inches.

**3-D Shadow** — Changes the shadow of a selected graph or user-drawn object to a three dimensional shadow. This fills in the area between the object and its shadow.

**Surround Shadow** — Changes the shadow of a selected graph or user-drawn object to one that surrounds the object on all sides.

**Forward Shadow** — Shifts an object so its shadow resides on the object's original position.

**Group Size and Pie Size** — Selects the size of the entire field group as a percentage of the width of an interval along the independent axis. The standard size is 75% of this interval. Group/Pie Size applies to pie and bar graphs. Choosing “?” on the submenu allows you to set a custom width for the field group in points, centimeters, or inches, or as a percent value.

In the dialog, a scale indicates with a black horizontal bar the total width of the field group in inches and centimeters relative to the width of the graph. Displayed beneath it is the width of a single major interval on the axis.

The “Percent” option sets the group width as a percentage of the width of the independent major interval. The “Gap” option sets the group width as equal to the independent major interval, inset by the given amount.

**Field Size, Wedge Size, Line Size** — Sets the size of a bar's width or pie's wedge. Submenu choices are percentages of the group size.

Choosing "?" lets you set a custom width for the field element in points, centimeters, or inches, or as a percent value. A scale indicates with a black horizontal bar the total width of the field element in inches and centimeters relative to the width of the graph. Displayed beneath it is the value of the group size divided by the number of bars, or the width of a stacked bar, depending on the graph.

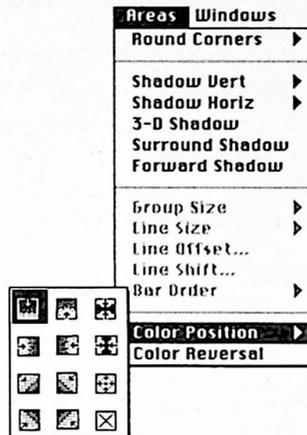
The "Percent" option sets the bar width as a percentage of the group width divided by the number of dependent fields being graphed. The "Gap" option set the bar width to be equal to the group width divided by the number of dependent fields being graphed, inset by the given amount.

**Bar Offset, Wedge Offset, Line Offset** — Sets the independent position of a field element (bar, pie wedge, line) relative to its normal location. Setting a negative value as a percentage moves an element to the left in a line, bar, or stacked bar chart. A positive value moves it to the right or up in the direction of increasing values. In a pie chart, a wedge of the pie is moved radially away from the chart regardless of whether you use negative or positive numbers. The "Percent" choice in the Offset dialog sets the distance as a percentage of the field element's own size or, in the case of Line Offset, as a percentage of the major spacing on the independent axis.

**Line Shift** — Sets the dependent position of a line relative to its normal position. Setting a negative value moves the line down. A positive value moves it up. The "Percent" choice in the Offset dialog sets the position as a percentage of the axis.

**Field Order** — Sets the left-to-right order for elements within a group.

**Color Position** — Lets you set the direction of graduated color in a selected object. The arrow in each setting indicates the direction the first color shades into the second color for the gradient. Your choices are:



Graduated (ramped) colors are created with the “New...” command from the Color menu in the palette.

**Color Reversal** — Reverses the order of graduated color in an object.

## Windows

**Open Window** — Lets you open a window or activate it (bring it to the front). You can select the Clipboard window, the data window, the letterhead window, the Help window, the layout window, or any of your graph windows. You may have up to 16 graph windows open at once.

**Close Window** — Closes any active window.

**Zoom** — Selects the size of the graph relative to the normal window size. Normal Size is 100 percent and Fit to Window shrinks the displayed information so the graph fits in the current-sized window. All other sizes are measured in percent.

**Clean Up Icons** — Regroups window icons in the docking window by aligning them to an invisible grid. This is useful when resizing the docking window.

## Special Menus

When using the Define Field, New Format, Duplicate, Fill Field, and Define Curve Fit dialogs, the standard MacGraphX menu bar changes to one featuring the following menus:

- Edit
- Fields
- Transforms
- Curve Fits
- Functions
- Operators

If you select a menu object from the Fields, Transforms, Curve Fits, Functions, or Operators menu while in one of these dialogs, that object will be entered in the field in which you are currently editing. These menus make for faster and easier formula building by conveniently providing you with the elements you need to create formulas.

The Edit menu contains commands found on the regular edit menu, therefore it will not be described in detail here. The cut, copy, and paste functions are meant to make it faster and easier to edit text strings in dialogs. The other menus are as follows:

### **Transforms**

These transforms are for use in the Define Fields dialog only:

**LinearFit** — Takes two fields for arguments; new field values are the best straight-line fit approximation of the second input field to the first input field.

**NthDiff** — Takes one integer,  $n$ , and one field for arguments; new field values are the  $n^{\text{th}}$  level difference of the input field. If  $n$  is one, each new value is difference between current input field value and prior one.

**RAvg** — Takes one integer,  $n$ , and one field for arguments; each new field value for current record is the moving average for the input field, calculated by summing the  $n$  previous field values (including the current) and dividing by  $n$ .

**RLag** — Takes one integer,  $n$ , and one field for arguments; each new field value for current record is the difference between the current value of the input field, and the  $n^{\text{th}}$  previous value. This is the growth of the input, adjusted for periodicity (such as seasonal or quarterly fluctuations).

**RLag%** — Takes one integer,  $n$ , and one field for arguments; each new field value for current record is the difference between the current value of the input field, and the  $n^{\text{th}}$  previous value, divided by the  $n^{\text{th}}$  previous value. This is the percentage growth of the input, adjusted for periodicity (such as seasonal or quarterly fluctuations).

**ZDiff** — Takes one field for argument; first computes the mean and standard deviation for input field across all records, and calculates each new field value as current value of the input field minus the mean of the input field, divided by the standard deviation of the input field. This normalizes the input field.

**RunTotal** — Takes one field for argument; each new field value is the sum of all previous values of the input field, including current value.

**RunAverage** — Takes one field for argument; each new field value is the average of all previous values of the input field, including current value.

### **Curve Fits**

These transforms are for use in the Curve Fits dialog only. Transforms used in curve fits always use exactly two fields as inputs, in addition to any other arguments. These input fields are never explicitly given in the formula for the curve fit, but are always assumed to be the independent field as the first input field, and the selected dependent field value as the second input field.

**CubicSpline** — Takes no arguments; creates data for a smooth curve connecting all the data points in a scatter graph.

**LinearFit** — Takes no arguments; creates data for the best straight-line approximation of the dependent field versus the independent field.

**LNFit881** — Takes no arguments; creates data for the best logarithmic approximation of the dependent field versus the independent field; requires mathematical coprocessor (68881 or 68882).

**PolyFit** — Takes one integer,  $n$ , as argument; creates data for best-fit  $n^{\text{th}}$  degree polynomial approximation of the dependent field versus the independent field.

### **Functions**

In the following examples, an “x,” “y” or “x<sub>i</sub>” indicates a numeric value (a field, number, or part of a formula that evaluates to a number), and “Record#” is the record number of the current record being calculated. For example, in MOD(x<sub>1</sub>,x<sub>2</sub>), MOD is the function name (Modulo) and x<sub>1</sub> and x<sub>2</sub> are the arguments. This particular function takes exactly two numeric arguments.

**Constants** — Values that remain constant in a formula. MacGraphX has the following constants:

0, 1, 2, 3, 4, 5, 10	Numeric constants.
FALSE	Logical FALSE defined as a constant equal to zero.
PI	Mathematical constant $\pi$ (=3.141592653...)
RAND	Takes no arguments and returns a random number between 0 and 1. Each time a dataset is recalculated a new random number will be generated. For example, RAND may return 0.6645.... RAND*10 will return a random number between 0 and 10.
TRUE	Logical constant defined to equal one.

**Arith Fcns** — MacGraphX provides you with many arithmetic functions:

ABS	Takes a numeric value and returns its absolute value, i.e., the number's distance from zero on the number line. For example,  ABS(5.6) = 5.6, ABS(-5.6) = 5.6.
EXP	Takes any number and returns $e^x$ , where e is the constant 2.71828... (the base for the natural logarithm). For example,  EXP(1) = 2.71828..., EXP(2) = 6.38906...
GROW#	Takes two numbers and adds the first to a multiple of the second. GROW#(x,y) is defined to be  (x + (Record# * y)).

*continued next page...*

GROW%	Takes two numbers and multiplies the first by an exponential growth of the second, taken as a percentage. GROW%(x,y) is defined to be $(x * ((1 + y/100) ^ \text{Record\#}))$ .
INT	Takes any number and returns only the integer part of that number.
LN	Takes any number greater than zero and returns its natural logarithm. For example, LN(2) = 0.69314..., LN(EXP(2)) = 2.
LOG	Takes any number greater than zero and returns its common (base 10) logarithm. For example, LOG(100) = 2, LOG(2) = 0.30102...
MOD	Takes two numbers, ( $x_2 \neq 0$ ) and returns the remainder of $x_1/x_2$ . For example, MOD(17,5) = 2, MOD(-23,4) = -3.
ROUND	Takes any number x and returns its value rounded to n number of decimal places. If n is a negative number, then x is rounded to the multiple of 10 specified by n. For example, ROUND(3.1456,2) = 3.15, ROUND(3.1456,0) = 3, ROUND(123.456,-2) = 100.
SQRT	Takes a positive number and returns its square root. For example, SQRT(16) = 4, SQRT(8) = 2.828....

**Trig Fcns** — Trigonometric functions relate corresponding parts of a right triangle. MacGraphX's Trigonometric functions are:

ACOS	Takes any number x and returns the inverse value of its cosine in radians. For example, $ACOS(-1) = 3.14... [\pi]$
ASIN	Takes a number x, the size of an angle in radians, and returns its inverse sine in radians. For example, $ASIN(1) = 1.57... [\pi/2]$
ATAN	Takes a number x and returns the inverse value of its tangent. in radians For example, $ATAN(1) = 0.785... [\pi/4]$
ATAN2	Same as above but takes two inputs, and respects the sign of each. For example, $ATAN2(-1,-1) = 3.92... [5\pi/4]$
COS	Takes any number x, the size of an angle in radians, and returns the value of its cosine. The cosine is always a value between -1 and 1. For example, $COS(\pi/3) = 0.5.$
SIN	Takes a number x, the size of an angle in radians, and returns its sine. The value returned is between 1 and -1. For example, $SIN(\pi/2) = 1.$
TAN	Takes a number x, the size of an angle in radians, and returns the value of its tangent. For example, $TAN(\pi) = 0.$

**Logical Fcns** — Produce a logical value. Logical values are TRUE and FALSE. In calculations, MacGraphX uses the corresponding numbers 1 and 0.

IF	Takes x as the condition to be tested and returns $x_1$ if the condition is true (i.e., evaluates to a non-zero number) and returns $x_2$ if the condition is false. For example, IF( $x > 24$ , $x_1$ , $x_2$ ) will return the value $x_1$ if x is greater than 24, otherwise it will return the value $x_2$ .
ISERR	Takes a field as an argument and returns 1 if the field value for the current record contains error value, otherwise 0. Cells that contain infinite values (e.g., 1/0) are not counted as containing errors.
ISNULL	Takes a field as an argument and returns 1 if the field value for the current record contains no value, otherwise 0.

**Date Fcns** — Return a number for the specified date.

TODAY	Returns the number (days since December 31, 1903) of today's date. Takes no arguments.
-------	---

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DATE	Returns the number (days since December 31, 1903) of the date specified by the arguments. Year must indicate a year between 1904 and 2079, and so must have a value between 4 and 179. Month may be between 1 and 12. If the month is greater than 12, it rolls over. For example, a value of 13 for month indicates January of the following year. Enter the day appropriate for the given month, though days also roll over into the next month. For example, DATE(84,1,1) = 29221, DATE(81,2,31) = DATE(81,3,3) = 28187.
DAY	Takes the date number as an argument and returns the day of the month in the date. For example, DAY(29221) = 1.
MONTH	Takes the date number (the number of days since December 31, 1939) as an argument and returns the number of the month. For example, MONTH(29221) = 1 (January).
YEAR	Takes the date number (the number of days since December 31, 1939) as its argument and returns the year of the date. For example, YEAR(29221) = 84.
WEEKDAY	Takes the date number (the number of days since December 31, 1939) as its argument and returns the number of the day of the week of the date. For example, WEEKDAY(29221) = 1 (Sunday).

**Financial Fcns** — Perform financial calculations.

PMT	Calculates the payment per period for principal $x$ at interest rate $i$ for $n$ periods. $PMT = x \cdot (i / (1 - (1+i)^{-n}))$ . For example, $PMT(10,0.1,2) = 5.76$ .
PV	Calculates the present value of an ordinary annuity with payments of $x$ at interest rate $i$ after $n$ periods. $PV(x,i,n) = x \cdot (1 - (1+i)^{-n}) / i$ . For example, $PV(10,0.1,2) = 17.35$ .
FV	Calculates the future value of an annuity with income payments of $x$ at a periodic interest rate $i$ after $n$ periods. $FV = x \cdot ((1+i)^n - 1) / i$ . For example, $FV(10,0.1,2) = 21$ .

**Arithmetic Oprs** — MacGraphX has five arithmetic operators. They perform the following operations:

+	Addition
-	Subtraction
*	Multiplication
/	Division
^	Exponentiation

**Comparison Oprs** — Compare two operands. The result of comparison operations is always either TRUE (1) or FALSE (0). In calculations, MacGraphX uses a true result as 1 and a false result as 0. The comparison operators are:

=	Equal
≠	Not equal
>	Greater than
≤	Less than or equal to
≥	Greater than or equal to

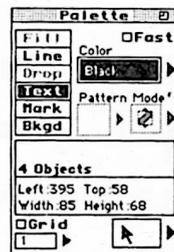
Note: Text must be enclosed in quotation marks when used as an operand. for comparison operators.

**Logical Oprs** — Produce a result that is always TRUE or False. In numeric calculations, MacGraphX equates TRUE to 1 and FALSE to 0. Logical operators are:

AND	Combines two logical expressions. The result is true if and only if both of the formulas are true: 2>1 AND 2<4 is true (1), 2>1 AND 2>2 is false (0).
OR	Combines two logical expressions. The result is true if either or both of them is true: 2>1 OR 2>2 is true (1), 2<0 OR 2>2 is false (0).
NOT	Negates the expression that follows it. For example: If x > 10 is true (1), NOT(x>10) is false (0).

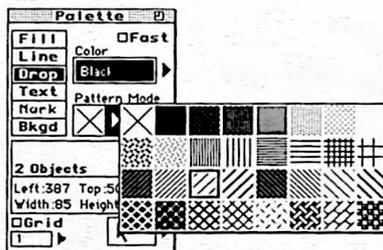
## Chapter 14: About the Palette

The palette gives you tools to modify objects in a graph, letterhead, and layout window, and create your own graphics. The palette automatically appears when you open one of these windows, and “floats” above the graphic windows. You can roll up the palette to by clicking in the zoom box in the title bar of the palette, on the right side. You can expand the palette to full view by again clicking in its zoom box. You can also move the palette around on the screen by clicking and dragging the title bar of the palette. The palette looks like this:



### Using the Palette

Using the palette is similar to using standard menus. First, select an object in the active window. Then choose the part of the object to modify (Fill, Line, Drop, etc.) by clicking on it in the palette. Finally, give a command by clicking on the arrow next to a menu's status field and dragging the cursor to the desired setting on the pop-down menu. When you release the mouse, the selected object in the window changes its appearance.



### Palette Features

The palette has four kinds of features: selectors, commands, measures, and tools.

## **Selectors**

Selectors specify the attribute of an object that a command will act on. When you select an object, some of the selectors become active. If a selector is gray, it is inactive and cannot be used with the chosen object. For instance, the Mark selector will not be active when you select a field element in a bar graph or pie chart since it allows you to change only the attributes of a mark.

In addition, selectors work only with certain commands. The selectors and their respective commands are:

**Fill**—Allows you to change the fill attributes of an object. Use with “Pattern,” “Color,” and “Mode” commands.

**Line**—Allows you to change the outline of an object. Use with “Pattern,” “Color,” and “Mode” commands.

**Drop**—Allows you to create a drop shadow for an object. Use with “Pattern,” “Color,” and “Mode” commands.

**Text**—Allows you to change the color of text. Note that font, size, style and rotation are changed via the Text menu on the menu bar.

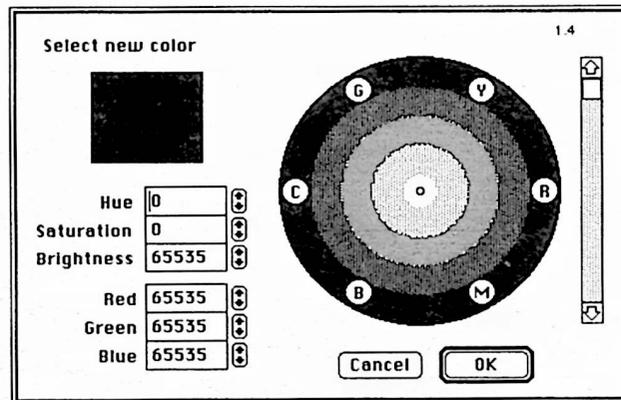
**Mark**—Allows you to change the color of a mark (such as in a scatter chart). The actual mark shape is selected with the Mark Type command of the Lines menu.

**Bkgd**—Allows you to change the background surrounding text. Use with “Pattern,” “Color,” and “Mode” commands.

## Commands

Commands change the appearance of an object for the attribute you have chosen with a selector. The commands are:

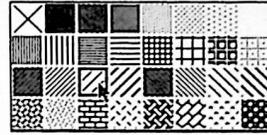
**Color**—Specifies the color of an object. In addition to the color selections given, “New” allows you to define new colors with Apple’s Color Picker dialog:



Your choices in the dialog are:

“Hue”	Sets the hue of your color. Click on the upper arrow to increase, the lower one to decrease. Hue is the position on the color wheel (from red to purple).
“Saturation”	Sets the intensity of the selected color.
“Brightness”	Sets the darkness of your color.
“Red”	Sets the amount of red in your color. Click on the upper arrow to increase, the lower one to decrease.
“Green”	Sets the amount of green in your color.
“Blue”	Sets the amount of blue in your color.
Color Wheel	Allows you to change hue and saturation by clicking anywhere in it.
Scroll Bar	Specifies brightness.

**Pattern**—Specifies the pattern of a selected attribute of an object. Choose a pattern from the pop-down menu. Patterns can be altered for the fill or outline of any graph object or user-drawn graphic.



**Mode**—Specifies the background of patterns, either white, black, or clear. The modes are:



Default setting that sets the background white.



Sets the background black.



Sets the background clear.

### **Measures**

Measures give you information and options having to do with the size, location, and status of graph objects.

**Coordinates Window**—Indicates what object you have currently selected, its dimensions, and where it is located relative to the left and top boundaries of the graph window. It also tells you where the object is relative to its initial location as you move it along invisible horizontal and vertical axes. All distances are measured in pixels. Negative numbers indicate movement to the left or up, positive numbers, to the right or down.

**Grid**—Creates an invisible grid to help align graph objects. Using the pop-down menu you select the size of the grid in pixels. An object can then be moved in any direction by the increment selected.

**Fast**—Replaces graduated fills with the first color of the fill so that updates to the graph window can be made faster.

## **Tools**

Use the Tools menu as you would any menu on the palette. When you release the mouse after using a tool, the pointer tool, , is automatically reselected. If you wish the tool you chose to remain selected indefinitely, hold down the Option key while selecting the tool.



The default tool for the palette. Allows you to select any graph object by clicking on it. You may also move and resize graph objects. To move an object, select it and drag by a boundary.

Resizing is done by selecting the object and clicking and dragging on a resizing handle at a corner or side of the object. A user-drawn line has a handle at each end.

If you wish to turn a rectangular or oval object into a square or circle, respectively, hold down the Shift key while dragging a handle. (MacGraphX may not always draw the data frame or graph frame as a perfect square, however, depending upon the "Exact Frame Size" option for each dimension, but will come as close as possible.) While resizing a line, the Shift key constrains it to be horizontal, vertical, or a 45° diagonal.

Resize an object in one direction only by clicking and dragging any handle. To resize it symmetrically, that is, equally in two directions, hold down the Option key while clicking and dragging any handle. If you want the object to resize symmetrically in all four directions, hold down the Option and Shift keys while clicking and dragging a handle.

### **Moving or Resizing Frames Separately**

As explained in *Formatting Your Graph*, frames are normally linked, i.e., moving and resizing one affects the others. You can disable the linkage between frames by pressing the Command key while moving or resizing a frame. With the Command key pressed, any moving or resizing affects only the selected frame. You still cannot enlarge the data frame past the graph frame, nor shrink the graph frame within the data frame, however. Nor can you enlarge these frames past the placement frame.



Allows you to enter or change text. The cursor becomes: . MacGraphX does not automatically wrap text, but will wrap to the next line when you press Return. You may mix font attributes and typefaces in the same text block, but you may not have different colored text in the same block.



Draws rectangles and squares. Your cursor becomes: . The Shift key acts as a constraining tool allowing you to draw a square.



Draws ovals and circles. Your cursor becomes: . The Shift key acts as a constraining tool allowing you to draw a circle.



Draws rounded rectangles and squares. Your cursor becomes: . The Shift key acts as a constraining tool allowing you to draw a square with rounded corners.



Draws horizontal, vertical, and diagonal lines. Your cursor becomes: . The Shift key acts as a constraining tool allowing you to draw a perfectly horizontal, vertical, or 45° line.

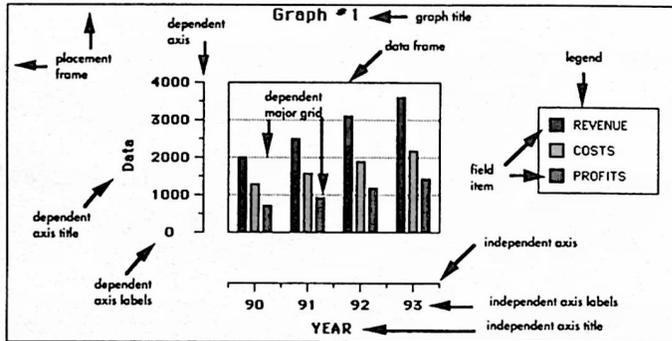


Draws horizontal, vertical, and diagonal arrows. Your cursor becomes: . The Shift key acts as a constraining tool allowing you to draw a perfectly horizontal, vertical, or 45° arrow.

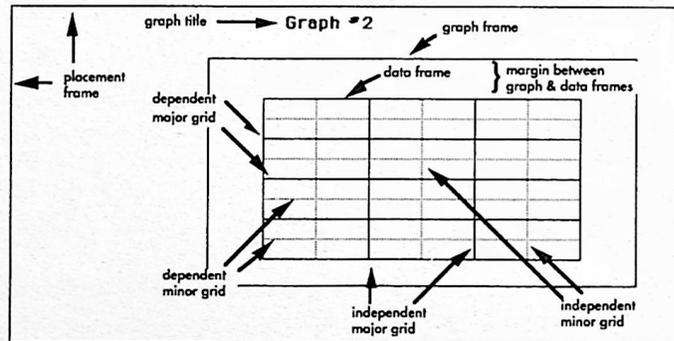
# Appendix

This Appendix contains illustrations of the parts of a graph, repeated from previous sections of the manual. This Appendix also provides you with a list of "power selection keys" to select graph objects from the keyboard, and a list of possible errors.

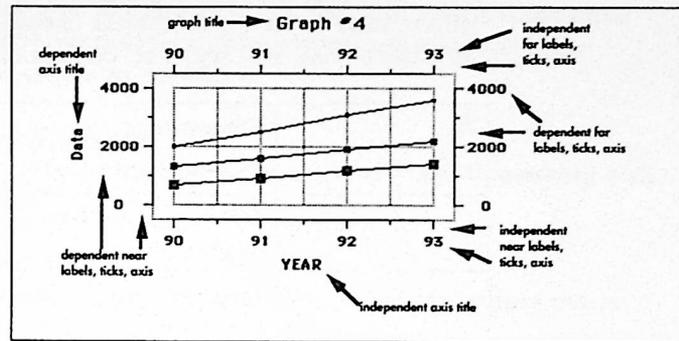
## Basic Parts



## Frames and Grids



## Near and Far Parts



## Power Selection Keys

The following keys select graph objects in the active graph window. Use them to select objects without taking your hands off the keyboard. Press a key to specify an object, object class, or class modifier to be selected. Keys may be typed in any order. Press the return key to perform the selection.

### Object classes

The following commands select objects that occur at least twice in a graph, e.g., axes, ticks, etc. You may use modifier keys to further specify which object to select; otherwise, all objects of that class will be selected..

g	Selects a grid. Use the appropriate modifier key to specify independent or dependent, minor or major.
b	Selects a baseline. Use the appropriate modifier key to specify independent or dependent.
l	Selects a label. Use the appropriate modifier key to specify independent or dependent, near or far.
a	Selects an axis. Use the appropriate modifier key to specify independent or dependent, near or far.
t	Selects ticks. Use the appropriate modifier key to specify independent or dependent, minor or major, near or far.
e	Selects an axis title. Use the appropriate modifier key to specify independent or dependent; without a modifier, selects the graph title.

### Modifier Keys

The following keys specify independent or dependent, major or minor, near or far for the object classes listed above. If used without an object class, will select all objects of that type.

d	Dependent.
i	Independent.
,	Minor .(Note that “,” is under “<” on the keyboard.)
.	Major. (Note that “.” is under “>” on the keyboard.)
n	Near..
f	Far.
x	x axis (horizontal axis).
y	y axis (vertical axis).

### Singular Objects

The following commands do not require the use of modifier keys because the objects they select occur only once in the graph window.

p	Selects the placement frame.
[	Selects the graph frame.
]	Selects the data frame.
k	Selects the key (legend).
e	Selects the graph title (unless used with a modifier key).

### Fields

The following commands select fields (bars, lines, areas, pieces of a pie) and marks in a graph window.

1 2 ...9	Selects field 1, field, 2, field 3, and so forth.
h	Selects the high mark in a Hi-Lo line/Error bar.
w	Selects the low mark in a Hi-Lo line/Error bar.

## **Errors**

In your work with MacGraphX, you may run across some error messages. This section lists those errors, and suggests some solutions to common problems.

### **MacGraphX Errors**

This section lists the error messages you may see in working with MacGraphX.

#### **Memory Error**

The most common error you may see is due to running out of memory:

- An error occurred: there is not enough memory to complete the operation. Free mem: 5%.

The dialog box in which this message appears gives you the chance to "**Clear Boards**," which clears out the clipboard and the internal undo buffer, and temporarily gives some more space to MacGraphX. If you see this error, you're running dangerously low on memory. We strongly suggest that you save your work and quit the program.

If you are running under Multifinder, you can allot more memory to MacGraphX. In the Finder, select MacGraphX by clicking once on its icon. (Don't double-click, or you will inadvertently open the program.) Use the "Get Info" command from the File menu of the Finder. In the dialog box which appears, increase the Application Memory Size for MacGraphX, at the lower right.

#### **Dialog Entry Errors**

In using dialog boxes, you must often enter a number or the name of a field in an edit box. If you've mistyped in an edit box that requires some piece of information, you'll see one of these errors:

- An incorrect integer value was entered.
- A correct number must be entered.
- A positive number must be entered.
- A larger number must be entered.
- A correct text string must be entered.

- A correct field name must be entered.
- A correct field constant must be entered.
- A correct record number must be entered.
- A correct cell specification must be entered.
- A correct range specification must be entered.
- A correct numeric field must be entered.

If you see one of these errors, the offending edit box will be highlighted. Check your typing. In a dialog box, you can use the Fields menu to correctly choose a field name to be entered into the current edit box.

### **Formula Errors**

In using equations for defining field values or for curve fits, you might run into syntax errors when entering formulas. The errors are:

- There was an unrecognized term in the equation.
- The equation did not end properly.
- There were too many or too few arguments to the function.
- A part of the equation cannot be recognized.
- Miscellaneous parse error.

If you see one of these errors, check your typing. Make sure you spell the names of functions and field arguments correctly. Make sure that you gave the correct number and type of arguments to functions and transforms. Make sure that all parentheses balance. (MacGraphX will add extra parentheses at the end of formulas, as needed, to balance parentheses.)

### **Scale Errors**

When using manual scaling on an axis, you might see this error:

- The manual scale parameters could not be accommodated.

If you see this error message, MacGraphX couldn't give you the requested manual scaling, and therefore resorted to automatic

scaling. To fix the problem, open up the axis info dialog box that was most recently changed, and examine the scaling values entered. Make sure that the scaling interval is smaller than the difference between the minimum and maximum limits of the graph data

### **Save Error**

In saving your data, you may see the following error:

- There is not enough room on disk to save the file.

Try to save your file again, but use a disk with more free space.

### **Printing Errors**

In printing, hardware or software problems may occur. The most common problem is caused by not having the proper printer resource files in your System folder, such as the "ImageWriter" or "LaserWriter" file. Note that a printer resource file is listed as a "Chooser document" in the System folder. The errors are:

- Unknown print error.
- Saving spool file error.
- Unimplemented control error.
- I/O abort error.
- Not enough room in heap for printing.
- Printer not found or closed.
- Connection just closed.
- Write request too big.
- Request already active.
- Bad connection refnum.
- No free connect control blank available.
- Postscript error.
- Printer timeout.

If you see one of these errors, use the Chooser desk accessory to verify that the correct printer is selected. Verify the physical (hardware) connections between your computer and the printer; check the network if necessary. Increase the memory allotted to MacGraphX (see "Memory Errors," above). Increase the free space on your disk (if your printer is spooling to disk).

### **File Errors**

In saving or opening a file, an error with the file system may occur. The most common cause of errors is a bad medium, such as a damaged track on your hard disk. The file errors are:

- Unknown file error.
- No default volume.
- Bad drive number or negative count.
- Bad file reference number.
- Bad volume name.
- External file system error.
- I/O error.
- No such drive.
- No such volume.
- File not found.
- File already open for writing.
- Attempt to open locked file for writing.
- Too many files open.
- End of file error.
- File not open.
- Disk full error.
- File locked.

- Software volume lock.
- Hardware volume lock.
- Read/write permission doesn't allow writing.
- Duplicate file name and version.
- Directory full error.
- File busy error.

Most of the errors listed above won't really ever happen, but they are listed here for completeness. If you get a file error, use one of the available software tools to check your disk for physical problems. Unlock your disk, as necessary. Run a disk optimizing program (such as Disk Express from ALSoft) to reclaim unused disk space.

# Glossary

The following is a glossary of chart terminology.

**Annotations** — Text or numbers added to a graph indicating field values or names.

**Baseline** — The line from which bars or areas are drawn.

**Curve Fit** — A line that indicates an approximation, trend, or mathematical model of the data in a scatter charts.

**Data Frame** — The frame that encompasses all data values.

**Dependent Axis** — The (usually) vertical axis of a graph that measures variables by showing values increasing from bottom to top. Non-numeric values also may be shown along the axis. If vertical, also known as the  $y$  axis.

**Error Bars** — See “Hi-Lo Lines.”

**Far Axis** — The normally invisible axis on the “far” side of the graph, that is, the top or right side.

**Far Axis Labels** — Text or numbers along a far axis showing values or names. Axis labels correspond to each major tick.

**Field Elements** — Any part of a graph representing fields. This includes a bar, part of a stacked bar, piece of a pie, or mark.

**Graph** — A series of points, a line, a curve, or an area that represents the variation of a variable in comparison with that of one or more other variables.

**Graph Frame** — The rectangular frame that surrounds all field elements, encompasses the data frame, and overlaps the dependent and independent axes.

**Hi-Lo Lines** — Lines which correspond to the difference between the highest and lowest values in a field group. They are used to make the data range easier to see or to indicate the accuracy of measurements. Hi-Lo lines are sometimes called “Error Bars.”

**Independent Axis** — The (usually) horizontal axis of a graph that usually measures time, or some other sequential variable, by showing values increasing from left to right. Non-numeric values also may be shown along the independent axis. If horizontal, also known as the  $x$  axis.

**Interval** — The distance between two major grids or ticks on an axis. Intervals are usually divided into smaller, unlabeled measures.

**Legend** — Box containing information identifying fields in a graph. The legend is sometimes called the “Key.”

**Major Grid Lines** — Long lines that delimit the major intervals within the data frame. There are dependent and independent major grid lines.

**Major Tick** — A short line marking a major interval on an axis and running perpendicular to that axis, touching it. There are dependent and independent, near and far, major ticks.

**Margin** — Space between the data frame and the graph frame.

**Marks** — Small points representing values in a scatter, line, or area chart, or at each end of a hi-lo line. Marks can vary in shape and size.

**Minor Grid Lines** — Long lines that subdivide the major intervals within the data frame. There are dependent and independent minor grid lines.

**Minor Tick** — A short line subdividing a major interval on an axis and running perpendicular to that axis, touching it. There are dependent and independent, near and far, minor ticks.

**Near Axis** — The axis on the “near” side of the graph, that is, the bottom or left side.

**Near Axis Labels** — Text or numbers along a near axis showing values or names. Axis labels correspond to each major tick.

**Placement Frame** — The rectangular frame that surrounds all items of the graph, and specifies where the graph appears on the page. All visual elements must be inside the placement frame.

**Second Independent Axis** — A subdivision of the field that is displayed on the independent axis. Note that this is not a second axis line.

**$x$  Axis** — Another name for the horizontal axis. The  $x$  axis is usually but not always the independent axis.

**$y$  Axis** — Another name for the vertical axis. The  $y$  axis is usually but not always the dependent axis.

# Index

- 3-D drop shadow 30, 45
  - hiding 71
- 3-D Shadow 128, 185
  
- ABS 191
- ACOS 193
- Addition 196
- Align 110, 176
- Align Horiz 115, 175
- Align Vert 115, 175
- Alignment 89, 119, 178
- Anchor to Frame 109, 176
- anchored objects 56
- AND 197
- Annotate Type 117, 181
- Annotation Gap 117, 182
- Annotation Place 117, 182, 147
- annotations 116, 212
- Areas 185
- argument 137
- arguments 134, 136
- Arith Fcns 191
- Arithmetic Oprs 196
- ASIN 194
- ATAN 194
- ATAN2 194
- Auto 182
- average 89
- axes
  - even spacing between intervals 101
  - hiding 66
  - patterning 68, 74
  - scaling and formatting 102
  - selecting 66, 68
  - showing 61, 62, 74
  - transposing in the graph window 61
  - widening 61, 62, 74
- Axis Info dialog 150
- Axis Labels 213
- axis labels
  - aligning 69, 77
  - formatting 26
  - hiding 68
  - numeric formatting 69, 118
  - rotating 63
  - selecting 26, 62, 63, 68, 77
  - staggering 118
- axis titles
  - hiding 40, 55, 70
  - selecting 40, 55, 70
- bar graph
  - creating 36
  - second independent axis with 35
- Bar Offset 64
- Bar Offset, Wedge Offset, Line Offset 186
- Bar Order 128
- Bar Size 127
- bars
  - coloring 58, 59
  - patterning 58, 59
  - reordering 24, 25
  - shading 149
- baseline 101, 178, 212
- basic concepts
  - cells 8
  - data frame 9
  - data window 7
  - dataset 8
  - desktop 6
  - docking window 6
  - entering data 9
  - field 8
  - field indicator 10
  - graph frame 9
  - importing data 9
  - legend 12
  - near and far sides 51
  - objects 10
  - on-line help 52
  - overlaid graphs 52
  - palette 11
  - placement frame 9
  - power selection keys 10, 205
  - Preferences dialog 53
  - record 8
  - resizing handles 10
  - searching 51
  - selecting graph objects 10
  - selecting a range of records 9
  - selecting fields 9
  - sorting 51
  - transposing axes 52
  - windows and icons 6
- Bkgd 121, 199
- Blank [Draw] 124, 165
- Bottom 177
- Bring to Front 116, 177
  
- call-outs 152
- cells 8, 80
  - clearing 87
  - copying 86
  - cutting 86
  - pasting 87
- Center 177
- CF Manual Recalc 103, 184
- CF Recalc Now 103, 184
- Chooser 109, 132, 133, 210
- Clean Up Icons 187
- Clear 81, 87, 108, 159, 160
- Clipboard 87, 159, 160, 161, 187
- Close 154
- Close Window 79, 187
- Color 120, 200
- Color menu 187
- Color Picker dialog 122, 123, 200
- Color Wheel 200
- Scroll Bar 200

Color Position 123, 187, 189  
Color Reversal 124, 187  
Communicate 157  
Comparison Oprs 196  
Complete Grid 113, 183  
Constants 191  
constraining tool 203  
continuous variable 141  
coordinates indicator 109  
Coordinates Window 201  
Copy 86, 159  
COS 193  
Create Graph dialog 93  
CubicSpline 189  
Currency 0 181  
Currency 2 181  
Curve Steps, Steps  
Curve Fit 102, 103, 138, 184,  
212  
    cubic spline 103  
    linear 103  
    logarithmic 103  
    polynomial 103  
    recalculating 103  
curve fits 102, 137, 138, 140,  
188, 189  
Curve Fits dialog 189  
custom colors 122  
    ramped color 123  
Cut 86, 108, 159  
  
data 134, 162  
    entering  
        field by field 14  
        in a preset dataset 83  
        record by record 13,  
83  
    exporting 90  
    fields and records  
        adding 84  
    importing 14, 84  
    overlapping data frame  
101  
Data Export 158  
data frame 9, 177, 204, 212

    hiding 58, 65  
        selecting 41, 55, 58, 65, 76  
Data Front 115, 175  
data types 85  
data window 7, 18, 79  
    arrow keys 81  
    closing 79  
    columns, resizing 89  
    fields, renaming 86  
    grow box 89  
    moving around in 81  
    opening 79  
    resizing 90  
    selecting cells, fields, and  
records 82  
    text formats 89  
    zoom box 20, 90  
    dataset 79, 134, 135  
dataset 8  
DATE 195  
Date Fcns 194  
DAY 195  
Define Curve Fit dialog 102,  
138, 184, 188  
Define Fields dialog 83, 84, 85,  
86, 134, 136, 137, 162, 163,  
188  
Define Number Format dialog  
179  
Define Search dialog 88, 164  
Define Sort dialog 88, 163  
Delete 87, 161  
Delete Graph 174  
dependent axis 19, 102, 106,  
112, 167, 170, 212, 214  
    selecting 62  
dependent axis title  
    changing 120  
    hiding 27, 28  
    selecting 27  
dependent field, defining 16,  
21, 35, 37  
desktop 6  
dialogs, accessing 95  
Disk Express 211

Division 196  
docking window 6, 79, 130  
draw tools 120, 124, 198, 202  
Drop 121, 128, 199  
drop shadow 28, 44, 121, 128  
    coloring 29, 44  
    hiding 64  
    patterning 58, 59  
    specifying 29  
Duplicate 83, 87, 108, 160, 161,  
188  
Duplicate dialog 87, 160  
  
Edit 159, 188  
Enter 81  
entering data 9  
entry cell 80  
Equal 196  
Error Bars 173, 212  
errors 207  
    dialog entry 207  
    file 210, 211  
    formula 208  
    MultiFinder 207  
    printing 209  
    save 209  
    scale 208  
Escape 81  
EXP 191  
Exponentiation 196  
Export 157  
Export Data 90, 157  
  
FALSE 191, 196  
Far Axis 178, 212  
far axis labels 212  
    selecting 69  
    showing 69  
far dependent axis  
    selecting 74  
    showing 74  
Far Labels 178  
Far Major Ticks 178  
Far Minor ticks 178  
far sides 68

- Fast 124, 201
- field 8
- Field Elements 212
- field indicator 10
- Field Info dialog 173, 174
- field labels 181
- field lines
  - coloring 46, 47
  - patterning 46, 47
  - widening 45, 46
- field names 173, 182
- Field No Recalc 164
- Field Order 186
- Field Size, Wedge Size, Line Size 18
- fields 80, 85, 107, 134, 162, 167, 178, 188, 206
  - defining 92
  - indenting 66
  - selecting in the graph window 45, 58, 63, 64
  - sorting 88
- File 154
- Fill 121, 199
- Fill Field 87, 188
- Fill Field dialog 87, 161
- fill patterns, changing 41
- Fill Recs 161
- fills and colors 149
- Finder 207
- Fit to Window 116, 130, 187
- Fixed0, Fixed1... 181
- Fld No Recalc 84
- Flipped 182
- font 178
  - changing 23, 38, 56, 57, 62, 63, 70
  - enlarging 57, 70, 71
- formulas 83, 134
  - natural order, 165
  - order of evaluation 135, 136
  - recalculating 84
- Forward Shadow 128, 185
- frames, moving and resizing separately 111
- Full Graph 106, 125, 126, 177
- functions 134, 136, 137, 188, 190
- FV 196
- General 181
- graduated fill 123
- graph 96, 99, 101, 102, 104, 116, 165, 167, 169, 212
  - creating 15, 17, 22
  - defining, four steps 91
  - moving 56, 70
- graph frame 9, 177, 204, 212
  - selecting 70
- Graph Info dialog 67, 96, 97, 99, 101, 169, 172
- graph objects
  - aligning 110
  - anchoring 109
  - arrows 203
  - Basic Parts 204
  - circles 203
  - clearing 108
  - colors, shapes, and patterns 120
  - copying 108
  - cutting 108
  - drop shadow 128
  - duplicating 108
  - frames, moving and resizing separately 202
  - Frames and Grids 204
  - handles 202
  - hidden 108
  - layers 115, 116
  - lines 124, 203
  - modifying 108
  - moving and resizing 109
  - Near and Far Parts 205
  - ovals 203
  - pasting 108
  - rectangles 203
  - resetting attributes 129
  - resetting locations 110
  - resizing 202
  - rounded rectangles 203
  - rounded squares 203
  - rounding corners 126
  - selecting 28, 105, 107
  - showing hidden 61
  - squares 203
  - text, mixing attributes 203
- graph title
  - changing 24
  - moving 56, 70
  - selecting 23, 38, 62
- graph types
  - Area 142, 165, 166
  - Bar 143, 165, 166
    - horizontal 143
  - Line 141, 165, 166
  - Pie 145, 146, 165, 167
  - Scatter 140, 165, 166
  - Stacked Bar 144, 165, 167
  - Table 146, 165, 167
- graph window
  - bar order 128
  - closing 105
  - delayed screen updates 129
  - deleting 105
  - extending 116
  - fast redraw 124
  - field and group size 126
  - mixed text 120
  - naming 105
  - negative values 97
  - numeric formatting 118
  - opening 54, 105
  - printing 109
  - reordering fields 99
  - reordering records 99
  - saving a PICT file 129
  - template 129
  - text, wrapping 203
  - text and numbers 116
  - text formatting 119
  - transposing axes 111

- user-drawn graphics 124
- user text 119
- zooming 116
- graphs
  - basic guidelines 139
    - Clarity 139
    - Simplicity 139
    - Validity 139
  - enlarging beyond page 104
  - overlying 94
- Graphs in Front 115
- Graphs to Back 115, 175
- Greater than 196
- Greater than or equal to 196
- Grid 109, 201
  - completing 113
- grid lines 148
  - adjusting 113
  - coloring 43
  - hiding 75
  - patterning 61
  - selecting 30, 42, 61, 67, 75
  - showing 61
  - widening 31, 42
- Group 126
- Group Size and Pie Size 185
- GROW
- Grow to Frame 112, 176
- GROW% 192
- Hi-Lo lines 125, 129, 173, 212
  - length 125
  - marks 125, 126
- Hi Delta 126
- Hi Mark 125
- Hi Mark/Lo Mark 177
- Hide 108, 176
- horizontal (x) axis 91, 94, 141
- horizontal axis 150, 214
  - labeling 152
- icons, windows and 6
- IF 194
- Import Data 9, 84, 155
- independent axis 19, 36, 102, 106, 112, 167, 170, 212, 214
  - selecting 61
- independent axis labels, selecting 57
- independent field 143
  - defining 15, 21, 37, 91
- Insert 83, 161
- insertion bar 80
- installing MacGraphX 4
  - on a double 800K floppy setup 5
  - on a hard disk 5
- INT 192
- intervals 101
- ISERR 194
- ISNULL 194
- key 213
- labels, formatting 39
- layout window 130, 132, 198
  - cut, copy, paste, and clear 133
  - number of pages 132
  - page numbering 133
  - page orientation 132
  - placing graphs 132
  - printing 133
  - text and graphics 133
- Left 177
- legend 12, 43, 129, 167, 172, 177, 213
  - aligning 72, 77
  - changing fonts in 59
  - default columnar configuration 76
  - enlarging 77
  - enlarging text in 59
  - formatting 129
  - giving a clear background to 69, 73
  - giving a clear boundary to 60, 73
  - Hi-Lo lines 125
  - moving 60, 65
  - selecting 44, 59, 63, 64, 71, 77
  - widening 73
- Legend Info dialog 76, 125, 129, 172
- Length Adjust 113, 124, 183
- Less than or equal to 196
- letterhead window 130
  - footer 130
- Line 103, 121, 199
- line graph 37
  - creating 38
- Line Shift 127, 186
- Line Width 124, 141, 183
- LinearFit 188, 189
- Lines 102, 182
- LN 192
- LNFit881 189
- Lo Delta 126
- Lo Mark 125
- Load dialog 15, 84, 155
- LOG 192
- Logical Fcns 194
- Logical Oprs 197
- MacGraphX
  - launching 18
  - minimum requirements 4
- MacGraphX File 158
- Major Grid 178
- Major Grid Lines 213
- major intervals 213
- Major Tick 213
- Manual Recalc 164
- Margin 213
- Mark 121, 199
- Mark Type 126, 142, 183
- mark types, changing 48, 49, 75
- marks 142, 213
  - selecting 48, 75
- maximum 89
- measures 213
- Memory Error 207

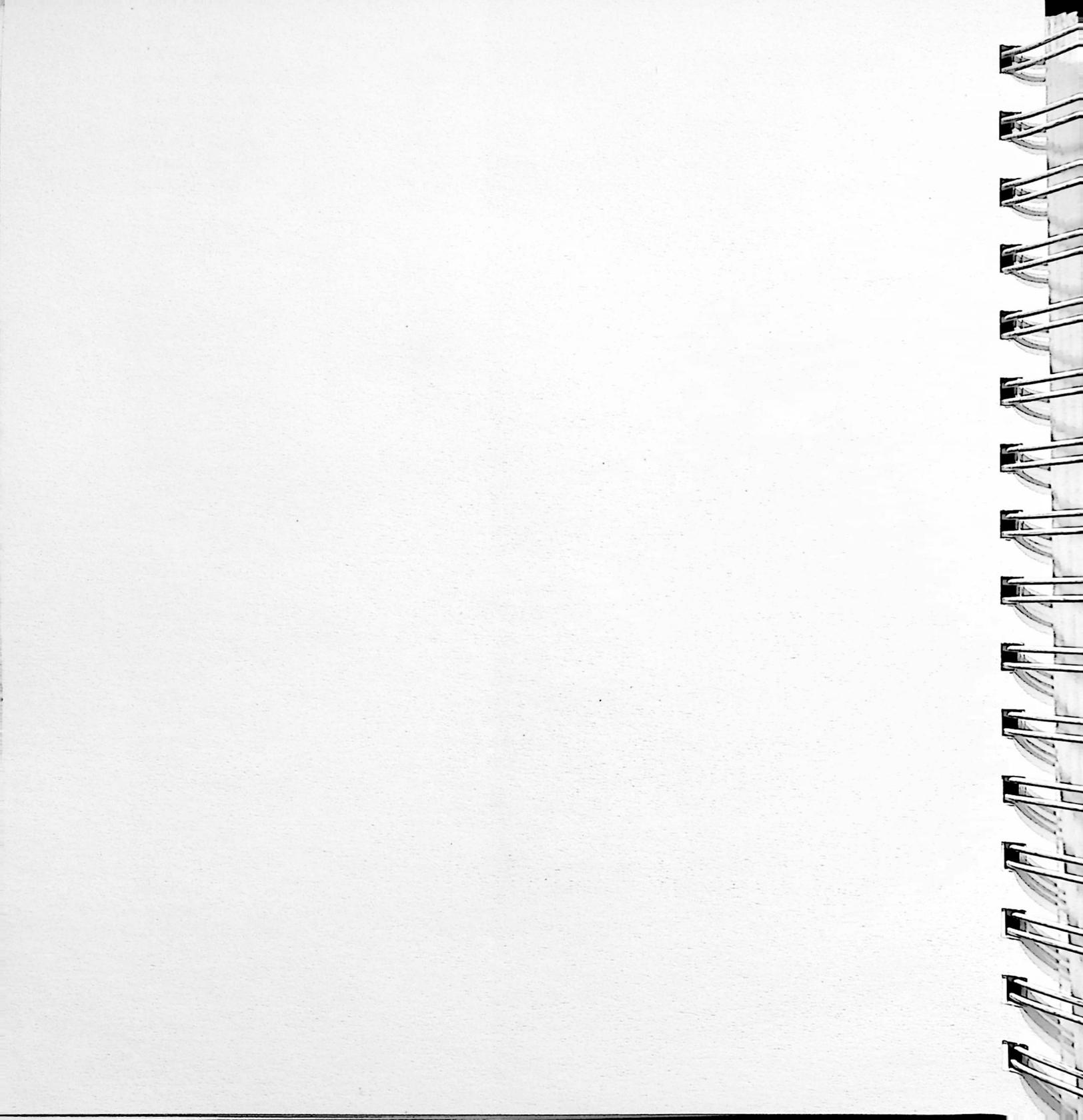
MG.XSTTs.f folder 161  
MGX File 157  
MGX Import 157  
MGX Stationery 157  
Middle 176  
Minor Grid 178  
Minor Grid Lines 213  
Minor Tick 213  
minor ticks 101  
MOD 192  
Mode 120  
MONTH 195  
Move To Top 88, 162, 164  
MSMail Open 157  
MSMail Send 158  
Multiplication 196  
  
N/A 163  
Natural order 100  
near and far sides 51  
Near Axis 178, 213  
Near Labels 118, 178  
Near Major Ticks 178  
Near Minor Ticks 178  
near sides 68  
New 154  
New Format 86, 179  
New Format dialog 118  
New Graph 94, 124, 129, 165  
None 181  
Normal Size 116, 187  
NOT 197  
Not equal 196  
Note/Msg, dialog 174  
NthDiff 188  
null values 87  
Num Format 86, 118, 179, 181  
number line 141  
numeric formats 86  
    new 86  
    preset 86  
  
objects 10  
object class 206  
Object Classes 205

Offset 127  
Offset dialog 128, 186  
on-line help 52  
Open 154  
Open command 19  
Open Window 79, 105, 130,  
    187  
Operands 134  
Operators 134, 188  
Options 96, 99, 101, 102, 104,  
    116, 125, 129, 132, 133, 167,  
    173  
OR 197  
overlaid graphs 52, 115  
  
Page Setup 154  
palette 11, 108, 120, 122, 124,  
    128, 130, 131, 132, 133, 198  
    commands 198, 199, 200  
    measures 198, 201  
    modes 201  
    moving 11, 28, 198  
    pattern 201  
    selectors 198, 199  
    tools 198, 202  
    zoom box 11, 24, 41, 108,  
    198  
Paste 86, 159  
Pattern 120, 128  
Percent 0, Percent 2 181  
Percent of Tot 181  
percentages 96  
PI 191  
PICT file 129, 158  
Pie Size 127  
Place Graph 132, 174  
placement frame 9, 104, 177,  
    204, 213  
    selecting 71  
PMT 196  
PolyFit 190  
power selection keys 10, 205  
    modifier keys 206  
Preferences 158

Preferences dialog 53, 114,  
    120, 158  
Print 108, 133, 154  
PV 196  
  
quadratic curve fit 103  
Quit 159  
  
ramped color  
    direction 123  
    patterns with 123  
RAND 191  
RAvg 188  
Recalc 164  
Recalc Now 164  
recalculation  
    automatic 95  
    manual 84  
records, 8  
    copying 86  
    cutting 86  
    duplicating 87  
    finding 88  
    moving 88  
    pasting 87  
    searching 89  
    selecting 15, 21, 35, 37, 91  
    sorting 20  
        multiple fields 88  
        summarizing 89  
registered user, becoming 5  
Remove Layer 115, 175  
Reset Attributes 67, 129, 176  
Reset Graph Order 176  
Reset Location 110, 176  
resizing 10  
    modifier keys 112  
    symmetrically 111, 202  
    using arrow keys 112  
Return 81  
Revert To Saved 154  
Right 177  
RLag 179  
RLag% 189  
Rotation 119, 178, 179

ROUND 192  
 Round Corners 126, 185  
 RunAverage 189  
 Running % 182  
 Running Tot 182  
 running totals 95  
 RunTotal 189  
  
 Same as Field 181  
 Same Points As Graph 103, 184  
 Save 154  
 Save As 19, 54, 154  
 Save PICT 129, 154  
 Save Stationery 154  
 scale 150  
 scatter chart 102  
 Sci2, Sci4 181  
 Search 88, 162, 164  
 searching 51  
 Second Independent Axis 214  
 second independent field 92  
     defining 35, 92  
 second tutorial file 54  
 Select All 106, 177  
 selecting fields 9  
 selecting graph objects 10  
 selecting range of records 9  
 Send to Back 116, 177  
 Setup 132  
 Shadow Horiz 128, 185  
 Shadow Vert 128, 185  
 Show 108, 125, 176  
 SIN 193  
 Singular Objects 206  
 Size 178  
 Sizes dialog 64  
 slices 145  
 Sort 88, 162, 163  
 sort cursor 88  
 sorting 51  
 Special Menus 188  
 SQRT 192  
 stacked bars 145  
 Stagger 118, 182  
  
 standard deviation 89  
 statistical functions 89  
 Style 178  
 Subtraction 196  
 Summarize 161  
 Surround Shadow 128, 185  
 Swap Graph Layers 115, 175  
 SYLK 90, 157  
  
 Tab 81  
 tab-delimited files 85  
 tab-delimited text 90  
 TAN 193  
 technical support line 5  
 Template 129, 174  
 Template dialog 129, 175  
 text 121, 178, 199  
     changing alignment 57  
     enlarging 56  
     formatting in the graph window 23  
     selecting 70  
     underlining 23, 38  
 text-only files 85  
 text tool 119  
 Tick Length 124, 183  
 Tick Position 124, 183  
 ticks  
     adjusting 113  
     hiding 62, 66  
     minimum spacing 114  
     selecting 57, 62, 66, 75  
     widening 57, 75  
 Title 177, 178  
 To Grid 176  
 TODAY 194  
 Top 176  
 total 89  
 transforms 137, 138, 188, 189  
     building your own 104, 138  
     parameters 102, 103  
     recalculating 84  
 Transpose 94, 111, 174  
 transposing axes 52, 111  
     in the data window 94  
     in the graph window 61, 113  
 Trig Fcns 193  
 TRUE 191, 196  
 tutorial  
     length to complete 18  
 Tutorial file 19  
  
 underline  
     toggling off 56  
 Undo 87, 159  
 undo buffer 207  
 Use Major Count 103, 184  
 Use Minor Count 103, 184  
 Use Size 103, 184  
  
 Value 181  
 vertical (y) axis 92, 94, 150, 214  
     labeling 152  
  
 wedges 145  
 WEEKDAY 195  
 what-if analyses 87  
 Window 104, 116, 131, 132, 133, 167, 168, 187  
 Window Info dialog 104, 116, 132, 133, 168  
 windows and icons 6  
 WKS 90, 156, 157  
  
 x axis 213, 214  
  
 y axis 212, 214  
 YEAR 195  
  
 ZDiff 189  
 zones 67, 101  
 Zoom 116, 130, 131, 187





# MacGraphX MacGraphX

## Quick Reference Card

### Selecting records and fields

Shift	Extends selection
Command	Toggles selections
Option-Shift	Sorts by field; moves records
Option	Second independent field

Click "Recs#" to select all records.  
Double-click on field name for Fields dialog.

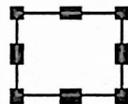
### Cursors in the Data Window

	Record Selector
	All Record Selector
	Dependent (Y) Field Selector
	Independent (X) Field Selector
	2nd Independent (X2) Field Selector
	Column Width Resizer
	Sort Field/Move Rows

### Selecting graph items

Shift	Add to selection Constrains move (vert, horiz, diag) Grows rectangle to square
Command	Unlinks frames (move and grow)
Option	Grows symmetrically
Option-Shift	Grows symmetrically (four-way)

Select handle (dark box) to grow.  
Select off the handle to move.



### Resizing graph items with arrow keys

Option	Resize item from lower-right corner.
Shift	Resize item from top-left corner.
Shift-Option	Resizes item symmetrically from lower-right corner.

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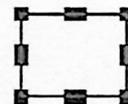
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## Power

### Selection Keys

#### Object Classes

g Grid  
 b Baseline  
 l Label  
 a Axis  
 t Ticks  
**Modifiers**  
 d Dependent  
 i Independent  
 , Major [under '>']  
 . Minor [under '<']  
 n Near  
 f Far  
 x x direction (horiz)  
 y y direction (vert )

#### Objects

p Placement Frame  
 [ Graph Frame  
 ] Data Frame  
 k Key (Legend)  
 e Title  
 h hi (of hi-lo/error bar)  
 w low (of hi-lo/error bar)  
 1...9 fields 1-9

## Menu Command Keys

### File

N New  
 O Open  
 S Save  
 P Print  
 Q Quit  
 L Load All

### Edit

Z Undo  
 X Cut  
 C Copy  
 V Paste  
 B Clear  
 D Duplicate  
 I Insert  
 K Delete  
 R Fill Recs  
 = Recalc Now  
 F Fields

### Graph

1 Scatter  
 2 Line  
 3 Area  
 4 Bar  
 5 Stacked Bar  
 6 Pie  
 7 Table  
 0 Blank [Draw]  
 ' Swap Layers  
 T Transpose  
**Objects**  
 [ Show  
 ] Hide  
 G Grow To Frame  
 H Bring to Front  
 J Send to Back  
**Window**  
 W Close  
 ? Help



white



black



clear

### Background Mode (Color)

## Draw

### Tools



Point



Text



Rect



Oval



Rnd rect



Line



Arrow

Color		Pattern		Mode
C	P	M	<b>Fill</b>	<input type="checkbox"/> Fast
C	P	M	Line	Color
C	P	M	Drop	Black
C	P	M	Text	Pattern Mode
C	P	M	Mark	<input type="checkbox"/>
C	P	M	Bkgd	<input type="checkbox"/>
Fld*1				
Left:387 Top:51				
Width:85 Height:19				
<input type="checkbox"/> Grid				
1				

## Power

### Selection Keys

#### Object Classes

g Grid  
 b Baseline  
 l Label  
 a Axis  
 t Ticks  
**Modifiers**  
 d Dependent  
 i Independent  
 , Major [under '>']  
 . Minor [under '<']  
 n Near  
 f Far  
 x x direction (horiz)  
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#### Objects

p Placement Frame  
 [ Graph Frame  
 ] Data Frame  
 k Key (Legend)  
 e Title  
 h hi (of hi-lo/error bar)  
 w low (of hi-lo/error bar)  
 1...9 fields 1-9

## Menu Command Keys

### File

N New  
 O Open  
 S Save  
 P Print  
 Q Quit  
 L Load All

### Edit

Z Undo  
 X Cut  
 C Copy  
 V Paste  
 B Clear  
 D Duplicate  
 I Insert  
 K Delete  
 R Fill Recs  
 = Recalc Now  
 F Fields

### Graph

1 Scatter  
 2 Line  
 3 Area  
 4 Bar  
 5 Stacked Bar  
 6 Pie  
 7 Table  
 0 Blank [Draw]  
 ' Swap Layers  
 T Transpose  
**Objects**  
 [ Show  
 ] Hide  
 G Grow To Frame  
 H Bring to Front  
 J Send to Back  
**Window**  
 W Close  
 ? Help



white



black



clear

### Background Mode (Color)

## Draw

### Tools



Point



Text



Rect



Oval



Rnd rect



Line



Arrow

Color		Pattern		Mode
C	P	M	<b>Fill</b>	<input type="checkbox"/> Fast
C	P	M	Line	Color
C	P	M	Drop	Black
C	P	M	Text	Pattern Mode
C	P	M	Mark	<input type="checkbox"/>
C	P	M	Bkgd	<input type="checkbox"/>
Fld*1				
Left:387 Top:51				
Width:85 Height:19				
<input type="checkbox"/> Grid				
1				

## Help & Troubleshooting

If you experience difficulties when using MacGraphX, try these remedies:

- See the *Appendix* for a list of error messages and possible solutions.
- Use the on-line help. Double-click on the help window's icon in the docking window to bring the help window to the foreground. Scroll through the topics presented to find one appropriate to the situation.
- Read the manual. Work through the tutorial again. Skim through the table of contents and the index to locate a topic appropriate to the problem.
- If all else fails, call Bravo Technologies' technical support line at 415/841-8552, Monday through Friday from 10 a.m. to 5 p.m. Pacific Standard Time. Have your MacGraphX serial number handy.

Name \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
\_\_\_\_\_

Place  
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Bravo Technologies, Inc.  
P.O. Box 10078  
Berkeley, CA 94709-0078

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## Warranty

If you discover physical defects in the diskette within the first sixty days after purchasing the product, Bravo Technologies, Inc., will replace the defective item; return the item along with proof of purchase. Otherwise, this software is sold "as is"; Bravo has tested the software and reviewed the documentation, but Bravo makes no warranty or representation, either express or implied, regarding the software's or documentation's quality, performance, merchantability, or fitness for a particular purpose. In no event shall Bravo be liable for any direct, indirect, special, incidental, or consequential damages or lost profits resulting from any defect in the software, diskette, or manual, even if advised of the possibility of such damages. Bravo's liability for damages to users of the program shall in no case exceed the amount paid by the user for the product. In particular, Bravo shall have no liability for any programs or data stored in use with this program, including the cost of recovering such programs or data. The warranty and remedies set forth herein are exclusive and in lieu of all others, oral or written, expressed or implied. No Bravo dealer, agent, or employee is authorized to make any modification, addition, or extension 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.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

Telephone \_\_\_\_\_

MacGraphX™ Serial Number: BT10301 - \_\_\_\_\_

Where did you hear about MacGraphX™?

\_\_\_ advertisement: (circle)

MacWorld

MacUser

MacWeek

others: \_\_\_\_\_

\_\_\_ article/review: (specify magazines/date) \_\_\_\_\_

\_\_\_ friend or colleague

\_\_\_ dealer recommendation

\_\_\_ user group recommendation

\_\_\_ other: \_\_\_\_\_

How did you receive MacGraphX™?

\_\_\_ purchased from dealer (specify) \_\_\_\_\_

\_\_\_ purchased through mail order (specify) \_\_\_\_\_

\_\_\_ received as gift

\_\_\_ other: \_\_\_\_\_

With what hardware do you plan to use MacGraphX™?

\_\_\_ Mac Plus \_\_\_ Mac SE \_\_\_ Mac SE/30 \_\_\_ Mac II

\_\_\_ Mac Iix \_\_\_ Mac Iicx \_\_\_ Mac Iici \_\_\_ Mac II fx

\_\_\_ Mac Ilsi \_\_\_ Mac LC \_\_\_ Mac Classic

\_\_\_ other: \_\_\_\_\_

For how long have you owned your Mac? \_\_\_\_\_ months

What other hardware do you own? \_\_\_\_\_

What Macintosh magazines do you read? \_\_\_\_\_

What software programs do you use? \_\_\_\_\_

Anything else you'd like to tell us? \_\_\_\_\_



# **BRAVO**

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AppleLink: D1380