Addendum to Operations Manual
PFS: GRAPH — Cat. No. 26-5307

Please note the following changes to this PFS:GRAPH manual before you continue with the installation or use of this product.

1. In the section entitled "Making the GRAPH Program Diskette Self-Loading," step 1 on pages I-5 and I-6 is incorrect. Both should read as follows:

   Turn on your computer. Insert the MS-DOS diskette into Drive A and press the reset switch.

2. To make your GRAPH diskette self-loading, an AUTOEXEC.BAT file containing the GRAPH program name must be on your GRAPH diskette. This file should be created **after** the INSTALL program has been run but **before** replacing the write-protect tab. To create the AUTOEXEC.BAT file:

   a. Be sure your GRAPH diskette is in Drive A.

   b. At the `A>` prompt, type:

   COPY CON AUTOEXEC.BAT (ENTER)
   GRAPH (ENTER)
   (F6) (ENTER)

   `1 File(s) copied` is displayed.

   Your AUTOEXEC.BAT file now resides on your GRAPH diskette. Replace the write-protect tab, and continue as instructed in the manual.

3. The following step must be added to the instructions given in the section on page I-7 entitled "Copying the Sample Charts."

   After the SAMPLE program has completed copying its files to your default drive but before changing the default drive back to A, as instructed in the last paragraph of the section, type the following command at the DOS prompt (`B>` or `C>`, depending on your system configuration):

   COPY A:SALES (ENTER)

   `1 File(s) copied` is displayed. Now change the default drive back to A, and label your diskette as instructed.

4. On page I-20, the manual suggests that you view a file named AREALINE as an example. This file is not included among the sample data files and, therefore, cannot be viewed.

Radio Shack
A Division of Tandy Corporation

pfs:® graph

user's manual

for Tandy Model 2000 Personal Computers

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Manual Author: Laura Varteressian

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preface

PFS:GRAPH is one of a series of easy-to-use programs from Software Publishing Corporation. This manual explains how you can use PFS:GRAPH to present your information in the form of bar, line, and pie graphs.

The Introduction describes how to use graphs and gives you an overview of how PFS:GRAPH works.

Chapter 1 explains how to provide the data for your graphs from the keyboard and how to edit data from the keyboard, regardless of how it was entered. Chapter 2 describes how to define the chart. This chapter covers changing the display options in the PFS:GRAPH program; displaying bar, line or pie graphs; producing cumulative graphs; entering legends and titles; displaying in color; and adjusting the scale of the Y axis. Chapter 3 shows how to display the chart, consisting of one to four graphs, on your screen. Chapter 4 explains how you retrieve a chart from your disk; how to save one by putting it on the disk; how to specify which items in a PFS:FILE, Multiplan™, and VisiCalc® file are to be read and used as X and Y data; and how to remove charts from a disk. Chapter 5 explains how to print your charts on a printer. Chapter 6 explains how to plot your charts on a plotter. Chapter 7 covers clearing the chart of its current contents. Chapter 8 explains how to leave the PFS:GRAPH program.

Appendix A contains the error messages you can receive while using PFS:GRAPH and describes what to do when a message appears. Appendix B shows the special keys used to control PFS:GRAPH. Appendix C covers using the PFS SETUP program for setting up GRAPH for your plotter or printer and installing the program on a hard disk. A glossary of terms used in this manual follows Appendix C.

If you have not already done so, please take a moment to complete and mail the User Group Enrollment Card. Enrollment in this group entitles you to receive product update information, new product announcements, and tips on using the PFS Family of Software.

Diskette Care and File Backup

By the time you have saved a number of graphs in chart files, you will probably have invested several hours of your time. It is worth a few extra minutes to protect this investment. We recommend following these guidelines:

1. Use only high-quality, double-density diskettes.

2. Always keep at least one backup copy of each chart. See our backup recommendations below.

3. Handle your diskettes carefully. Store away from heat, sunlight, and devices with strong magnetic fields (TVs, disk drives, printers, etc.).

Recommended Backup Procedure

1. Back up your charts on diskette or hard disk on a regular basis. If you update them daily, then back up daily. If you update less often, then back up whenever you update. You can use the MS-DOS COPY or DISKCOPY command to back up your charts.

2. If you ever encounter problems with a diskette, such as an I/O ERROR message, stop using the diskette at once and use the backup diskette (make a copy of the backup diskette first). If the problem recurs with the backup diskette, ask your computer dealer for help. Try reformatting the diskette that had the I/O error and see if that removes the problem. Reformatting will destroy all the data on the diskette, so keeping a recent backup copy is very important. If reformatting does not eliminate the I/O error problem, discard the diskette.

contents

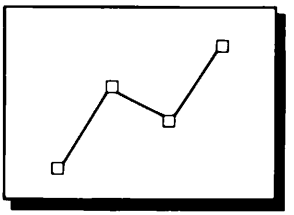
I: introduction

You may often have the need to represent information visually, in the form of a graph, to clarify your information and to enhance its impact in a report. PFS:GRAPH makes it easy to produce attractive graphs as a standard part of your business or personal repertoire. With PFS:GRAPH, you can organize your data into one of three graph types — bar, line or pie. PFS:GRAPH can accept data directly from the keyboard or it can retrieve data from PFS:FILE, Multiplan, or VisiCalc DIF files. This chapter describes how PFS:GRAPH (or simply GRAPH) works, in general terms. The rest of the manual provides detailed instructions.

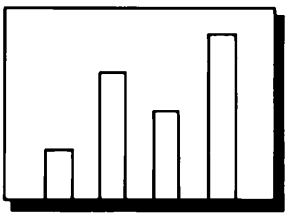
The Basics of Graphing

A graph is a drawing that shows the relationship between two or more sets of data. Graphs demonstrate, in visual form, the words and numbers you use in a report. A graph can convey the full significance of what you are presenting in a concise and persuasive manner. It can show relationships, trends, and comparisons among your data, and can summarize or clarify the point you are making. To make the meaning clear, a graph should be kept as simple as possible.

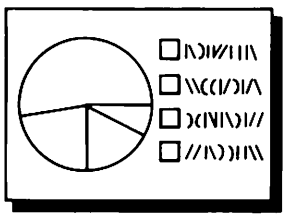
The most commonly used types of graphs are bar graph, line graph, and pie graph. They look like this:



LINE



BAR



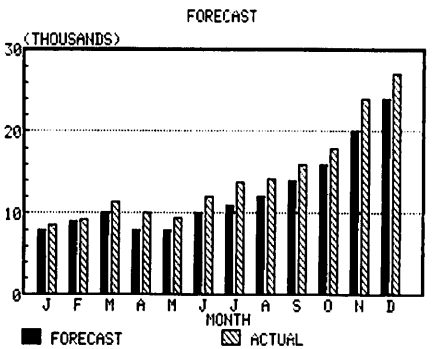
PIE

Bar graphs and line graphs use horizontal and vertical axes for their basic format. The horizontal line is called the X axis, and the vertical line is called the Y axis. The X axis usually shows the way you classify your data, for example: as months, ages, or words to identify items or groups. The Y axis is a scale showing the unit of measurement. Grid lines usually run horizontally across the graph and mark the units of measurement; tick marks, short marks between grid lines, are used for the same purpose.

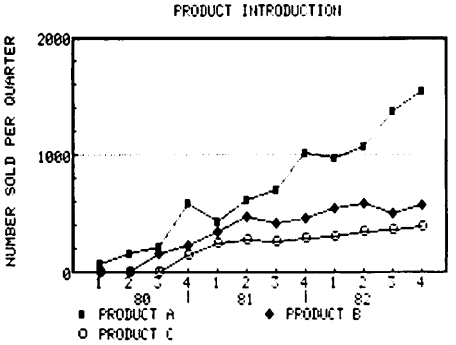
In this manual, the word "chart" refers to a completed picture, which can contain up to four sets of data (or graphs). The sets are labelled Graph A, Graph B, Graph C, and Graph D. These four sets of data, when displayed, are referred to as a chart.

The title at the top of a chart explains what the chart is about and other titles label the X and Y axes. In a chart showing more than one set of data, colors or patterns of shading differentiate the sets. The legend at the bottom of the chart shows these patterns, along with descriptive information.

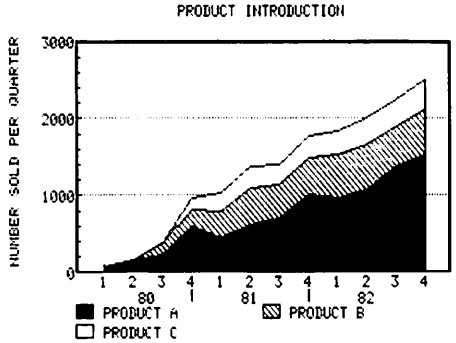
Bar charts are most useful for representing quantitative information, particularly to show comparisons between groups of data. For example, you could compare sales forecast figures with actual figures, as in the chart below.



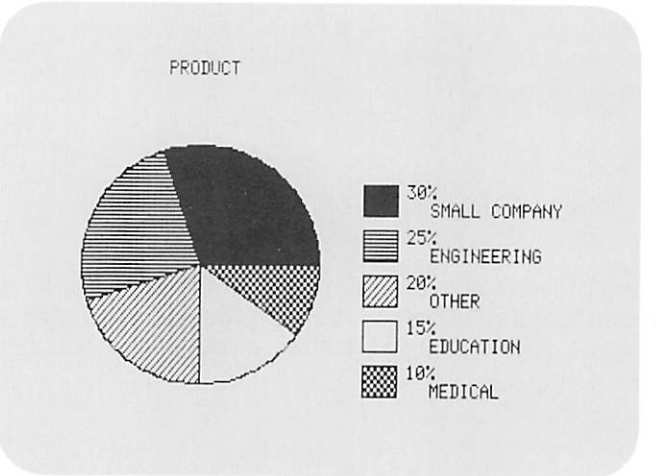
Line charts are useful for describing and comparing numerical information, such as showing trends or changes in data over time. For example, you could show the growth in sales of three products following their introduction.



A special kind of line chart, called an area chart, is useful for showing the relative importance of different items. The preceding line chart, displayed as an area chart, shows each product as a part of the total sales.



Pie charts usually show quantitative data in percentages or absolute numbers that are part of a whole, and can dramatize comparisons between parts in relation to the whole. The X axis values determine the number of segments and the Y axis values determine the size of the segments. Each segment is shaded with a different pattern, and legends identify each segment. For example, you could show by percentage how a product is being used by your customers.



What You Need to Use PFS:GRAPH

To use GRAPH, you need the following equipment:

- a Tandy Model 2000 Personal Computer with at least 256K of memory
- a monitor capable of displaying graphics
- a Color/Graphics Adapter card for printing or displaying graphs
- the PFS:GRAPH package, which includes the GRAPH program diskette, a spare copy of the GRAPH program diskette, and this manual

  Note: You cannot make a backup copy of the GRAPH program diskette using the MS-DOS DISKCOPY or COPY command. Instead, a spare copy is provided in case something happens to damage your original program diskette. Store it in a safe place.

- optional equipment
  - a DMP 200 or DMP 2100 printer
  - an HP 7470 or 7475 plotter
- several blank, high-quality, formatted diskettes or a formatted hard disk on which to store your charts

Note: If you have a serial printer or a plotter you need to use the SETUP program described in Appendix C. If you have a DMP 200 printer, you may want to use SETUP to make it the default printer. SETUP also enables you to install GRAPH on a hard disk, thereby eliminating the need to load from a diskette each time you use the program. If you have any of these items of equipment, see Appendix C now.

Making the GRAPH Program Diskette Self-Loading

Before you begin using GRAPH, you should modify the program diskette so that it is self-loading, which lets you load GRAPH without first loading MS-DOS. This manual assumes that you have made your GRAPH program diskette self-loading.

To modify the diskette, follow the instructions below, depending on whether your computer system has one or two diskette drives. Before beginning, remove the write-protect tab from the GRAPH program diskette and save it for later use.

For a two-drive system:

1. Insert the MS-DOS diskette into drive A and turn on your computer system.

2. Enter the date and time when MS-DOS asks you to do so. When the MS-DOS prompt (A>) appears, place the GRAPH diskette in drive A and the MS-DOS diskette in drive B. Type

   INSTALL

   and press the ENTER key.

3. When the computer displays the message

   PAUSE-Place MS-DOS diskette in drive "B" and
   leave the PFS series diskette in drive "A"

   press any key. You will see a series of commands and the in-use lights of the diskette drives will come on alternately for the next few moments as information is copied from the MS-DOS diskette to the GRAPH diskette. When the MS-DOS prompt reappears, replace the write-protect tab on the GRAPH program diskette. You are ready to begin using GRAPH.

For a one-drive system:

1. First, insert the MS-DOS diskette into the drive and turn on your computer system. Enter the date and time when MS-DOS asks you to do so.

2. When the MS-DOS prompt appears, place the GRAPH diskette in the drive, type

   INSTALL

   and press the ENTER key.

3. When the computer displays the message

   PAUSE-Place MS-DOS diskette in drive "B" and
   leave the PFS series diskette in drive "A"

   press any key to continue.

4. When the computer displays the message

   Insert diskette for drive B and strike any key when ready

   insert the MS-DOS diskette in the drive and press a key.

5. When the computer displays the message

   Insert diskette for drive A and strike any key when ready

   insert the GRAPH diskette in the drive and press any key.

6. Continue inserting the GRAPH diskette when the computer asks for a diskette for drive A, and the MS-DOS diskette when the computer asks for a diskette for drive B. When the MS-DOS prompt reappears, replace the write-protect tab on the GRAPH program diskette. You are ready to begin using GRAPH.

Copying the Sample Charts

The GRAPH program diskette contains several sample charts that you can practice on as you follow the examples in this manual. Before you start, we recommend that you copy these sample charts onto a formatted diskette (or hard disk). That way, you can practice using GRAPH on the copy and leave intact the original sample charts. Then someone else can also learn GRAPH at a later time by following the examples in this manual.

First, turn on the computer. To load GRAPH, insert the GRAPH program diskette in drive A and press RESET. When requested, enter the date and time. GRAPH will automatically load and display its Main Menu. Type E and press F10 to exit GRAPH. Insert a formatted diskette in drive B and change the default drive by typing B: and press ENTER. (If you have a hard disk, type C: and press ENTER to change the default drive to drive C.)

A program called SAMPLE on the GRAPH program diskette will automatically copy all the sample charts to the default drive. Start this copy program by typing

```
A:SAMPLE
```

and press ENTER. When the MS-DOS prompt returns, change the default drive back to drive A by typing A:. Remove the diskette containing the copy of the sample charts and with a felt-tipped pen, label it Graph Sampler. From now on, use the Graph Sampler diskette when following the examples in this manual.

Starting GRAPH

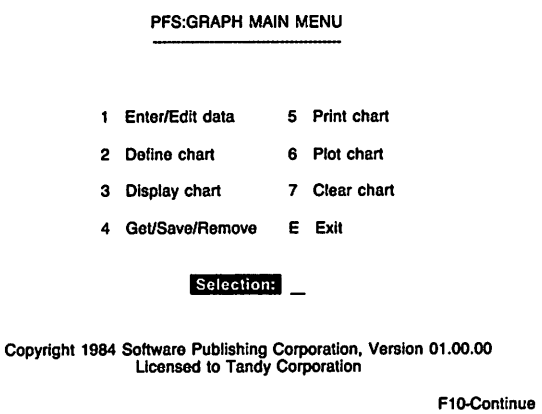
You can now load the GRAPH program and begin to use it. The procedure for loading the program is slightly different depending on whether or not the computer is turned on.

- if the computer is turned off, turn on the computer. Insert the GRAPH diskette in drive A and press RESET. Enter the date and time when requested, and GRAPH loads automatically. You hear the diskette drive as the program loads into memory.
- if the computer is turned on, simply exit from whatever program you are using. When the MS-DOS A> prompt appears, type GRAPH and press the ENTER key. GRAPH loads immediately into memory.

After loading GRAPH, remove the program diskette from the drive and put it back in its protective envelope.

The GRAPH Main Menu

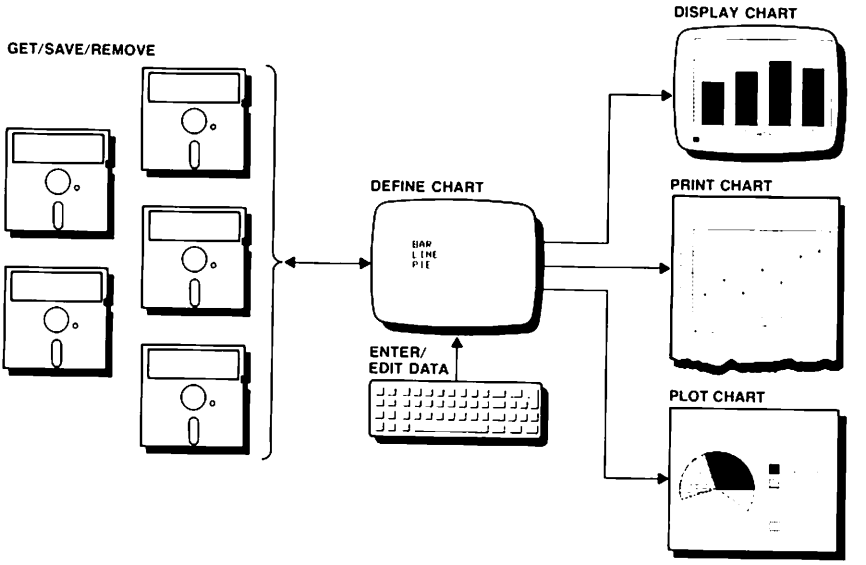
When you load the GRAPH program, the first thing you see is the GRAPH Main Menu:



This menu shows the main functions of GRAPH.

How GRAPH Works

You can see the flow of GRAPH functions in the following illustration:



In function 1, **Enter/Edit Data**, you can enter data directly from the keyboard or edit data already in a graph. You enter a code letter (the X Data Format) that tells GRAPH to structure your X axis as identifiers, dates of some kind, or as a numeric line. Then, you enter your X and Y data. You can create as many as four graphs, labeled A, B, C, or D, on one chart. All four graphs in the chart share the same X axis (and the same X Data Format).

Function 2, **Define Chart**, changes the way GRAPH displays your chart, and lets you add explanatory information to it. You can display your graph as a bar, line, or pie graph. You can stack individual graphs on top of one another or show them comparatively, side by side. You can adjust the Y axis to a different scale. You can also provide legends to identify each graph, and titles for the chart and both axes. You can display or suppress the horizontal grid lines. You can display or plot the chart in solid colors (if you have a color monitor or plotter) or patterns.

You can immediately display the chart on your monitor using function 3, **Display Chart**.

With **Get/Save/Remove**, function 4, you can bring a file from diskette into the computer, save one you've just created in the computer by putting it on a diskette, and erase files from the diskette. You can retrieve data from a PFS:FILE, Multiplan, or VisiCalc file and merge it with existing data, if you wish.

Using function 5, **Print Chart**, you can print your chart on a printer.

Function 6, **Plot Chart**, allows you to produce charts on a plotter, using transparencies or regular paper.

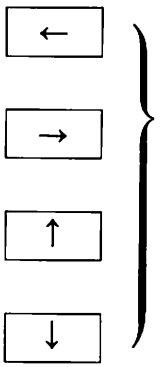
With function 7, **Clear Chart**, you clear the chart in the scratchpad of all its data and chart specifications.

Function E, **Exit**, allows you to leave the GRAPH program to use MS-DOS or another program.

Keyboard Control Keys

These are the main keys you use in GRAPH.

Key	Function
F10	**Continue.** Use this key to tell GRAPH to begin or continue with the function you selected.
ESC	**Escape.** Use the ESC key at any point to cancel the current operation and return to the GRAPH Main Menu.
TAB	**Tab.** The TAB key moves the cursor forward to the next item on the screen. With SHIFT, it moves the cursor back to the previous item.
BACKSPACE	**Backspace.** The BACKSPACE key moves the cursor one space to the left and removes any character in that space. Use this key to correct mistakes you make when filling in items on the screen.



Cursor Control Keys. These keys move the cursor one space in the direction shown by the arrow. They do not erase any characters.

INSERT

Insert. The INSERT key switches back and forth between strikeover and insert modes. When you type a character in insert mode, it is inserted at the cursor location, moving other characters on the line one space to the right. If the line is full, no more characters can be inserted.

DELETE

Delete. The DELETE key deletes the character at the cursor location.

HOME

Home. The HOME key moves the cursor to the first item on the screen.

F4

Erase screen. This key clears all your input from the screen and moves the cursor to the first item on the screen.

F3

Erase item. This key deletes characters from the cursor to the end of an item.

PG DN

Page Down. The PG DN key gives you a second screen for typing in data or displays the next page of a directory.

PG UP

Page Up. The PG UP key takes you back to the previous page.

NUM LOCK

Number Lock. The NUM LOCK key switches the numeric keypad to the right of the main keyboard between numbers and the PG UP, PG DN, and END keys.

File Name Conventions

You can use GRAPH to create files on any MS-DOS-compatible disk device that is connected to your computer system. Diskettes or a hard disk must be formatted with MS-DOS.

The conventions for naming chart files are the same as for other MS-DOS files. These conventions are briefly summarized below. For a complete description of file naming, see the MS-DOS manual.

A file name usually has two parts: the name of the drive and the name of the file. Separate the two parts with a colon (:). The drive name comes first, for example, A:STAFF. This refers to the file named STAFF on the disk in drive A.

If you use a file name without a preceding drive name (i.e., STAFF), GRAPH assumes the file is on the disk in the default drive (drive A unless you have changed it).

File names can be from one to eight characters long. You can use the letters A through Z, the numbers 0 through 9, and some special characters. Here are some sample file names:

TARGET82 WINES79 PATIENTS

A file name can also have an optional extension of a period and one, two, or three more characters. If a file name has an extension, you must always use the extension with the name in referring to that file. Some file names with extensions are:

TARGET82.JAN WINES79.#12 PATIENTS.>65

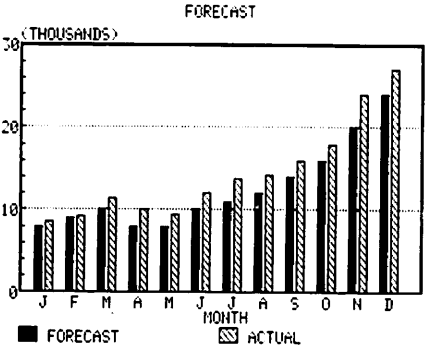
File names cannot contain spaces, commas, / or two periods (..). File names can have no more than eight characters in the name and three characters in the extension.

Experimenting with Graphs

Now that you have an overview of GRAPH's functions, let's experiment with some sample graphs from the Graph Sampler diskette. With your computer still on, insert the Graph Sampler diskette in drive A. Return to the Main Menu (press ESC if necessary), type 4 in the Selection item to select Get/Save/Remove, and press F10 (this tells GRAPH to perform the function you have selected).

The Get/Save/Remove Menu appears on the screen. Since you want to get a chart from the Graph Sampler diskette, enter 1 in the Selection item.

Bar Chart Sample: The Graph Sampler diskette contains several charts. Let's bring in the FORECAST chart first. Use the TAB key to move to the Directory or File Name item, type FORECAST, and press F10. GRAPH retrieves the chart and displays it on the screen.

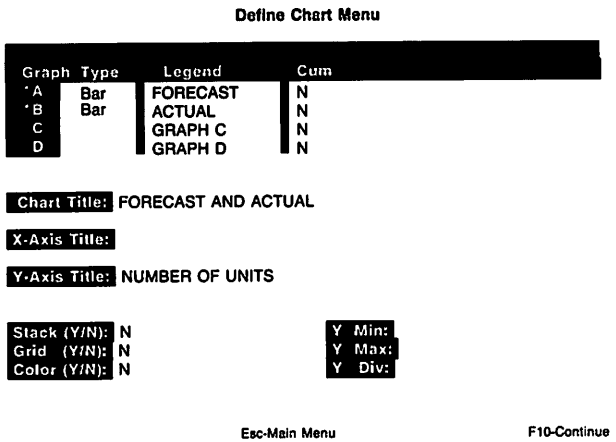


This is the kind of chart you'd be likely to create to show the forecast and actual product orders for your company. It contains two graphs: Graph A is the forecast and Graph B is the actual orders. The X axis shows January through December of 1982, while the Y axis shows the number of units expected and actually ordered. The data for Graphs A and B is as follows:

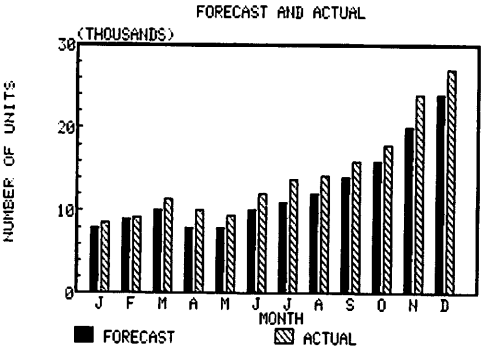
X DATA FORMAT: M

X DATA	Y DATA - GRAPH A	Y DATA - GRAPH B
1	8000	8500
2	9000	9300
3	10000	11500
4	8000	10000
5	8000	9500
6	10000	12000
7	11000	13800
8	12000	14160
9	14000	16000
10	16000	18000
11	20000	24000
12	24000	27000

Suppose you want to change the title at the top, add a label for the Y axis, and remove the grid lines. To do so, press ESC to return to the Main Menu. Select 2, Define Chart, and press F10. When the Define Chart screen appears, press the TAB key (this key is used to move from one item to the next) until the cursor reaches the Chart Title item. Type in FORECAST AND ACTUAL (or a title you choose). Move to the Y-Axis Title by pressing TAB twice, and type in NUMBER OF UNITS. Now press TAB three times to reach the Grid item, and type N. The Define Chart screen looks like this:



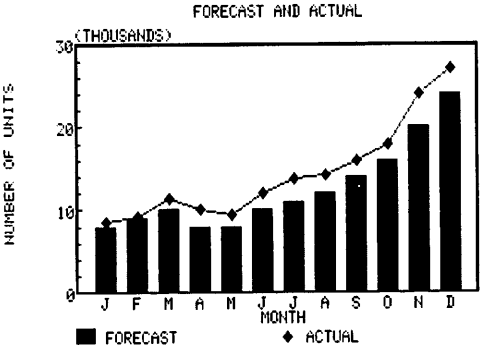
After the Define Chart screen is filled out, press F10 and GRAPH returns you to the Main Menu. To display the chart again, select 3 and press F10. The FORECAST chart should look like this:



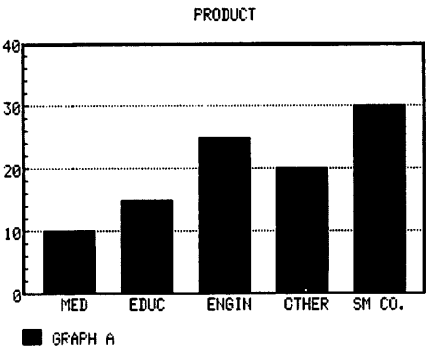
Bar and Line Sample: You can combine bar and line charts. To see this chart as a bar and line, return to the Main Menu. Select 2, Define Chart, and press F10.

When the Define Chart screen appears, press TAB three times until the cursor reaches the Type for Graph B. Type Line over Bar for Graph B. Press F10.

Return to the Main Menu and select 3, Display Chart. The FORECAST AND ACTUAL chart now appears as a mixed bar and line chart.



Pie Chart Sample: Now let's bring in a second sample from the Graph Sampler diskette. Press ESC to return to the Main Menu. Select 4, Get/Save/Remove, then press F10. Again you'll see the Get/Save/Remove Menu. Enter 1 in the Selection item. In the Directory or File Name item, type PRODUCT and press F10. (When GRAPH displays the Warning message, press F10 to continue.) GRAPH then displays the following chart:



The data for PRODUCT is as follows:

X DATA FORMAT: I

X DATA	Y DATA
Med	10
Educ	15
Engin	25
Other	20
Sm Co.	30

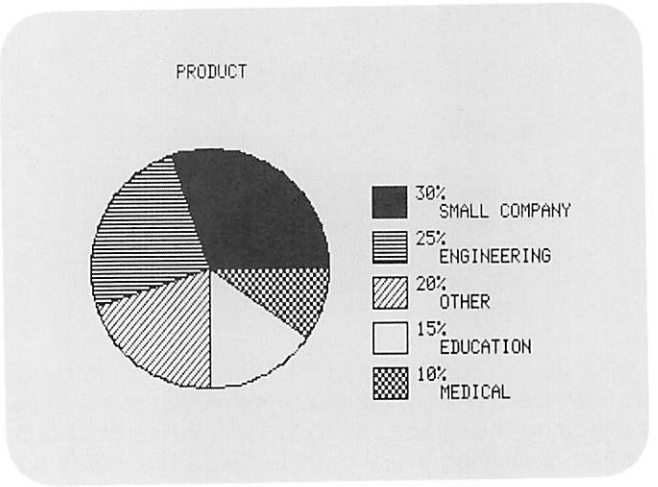
This graph gives you a percentage breakdown of how your product is being used by your customers. Percentages are more effectively shown in a pie chart, so let's change this graph. Also, there is no need to abbreviate the X data values when displaying a pie chart because the words are printed one below the other, so let's spell out each word.

Press ESC to go to the Main Menu. Then select 2, Define Chart, and press F10. When the Define Chart screen appears, type %PIE over Bar in the Graph A item (under Type). Press F10 to return to the Main Menu again.

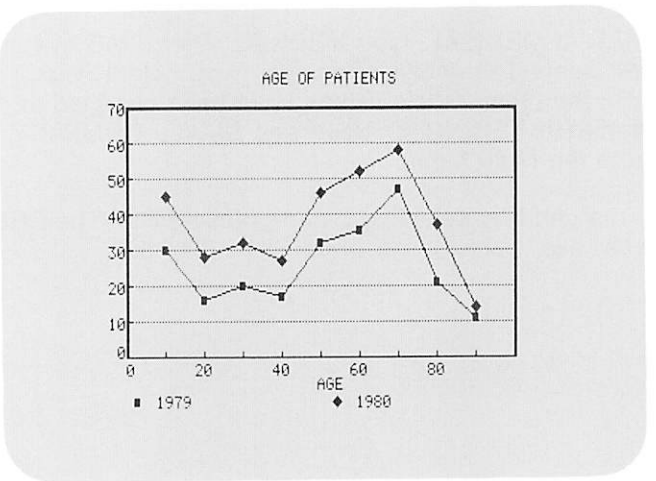
Now, enter 1 as the Selection item and press F10. GRAPH displays the Enter/Edit Data Menu with the cursor at the first X data.

To change MED to MEDICAL, type MEDICAL. Press TAB five times to reach the next item. (The TAB key repeats if you hold it down.) Repeat this procedure until the other X data values have been changed to EDUCATION, ENGINEERING, OTHER, and SMALL COMPANY. Then press F10 to return to the Main Menu.

Now display the chart by selecting 3 and pressing F10. The PRODUCT chart now looks like this:



Line Chart Sample: Press ESC to return to the Main Menu. Select 4, Get/Save/Remove, and press F10. The Get/Save/Remove Menu appears. Enter 1 in the Selection item, type AGE in the Directory or File Name item and press F10. (Press F10 at the warning message.) This is the chart you'll see:



This line chart compares the number of patients by age groups in 1979 and in 1980. It shows numbers representing ages on the X axis, and the number of patients at certain ages on the Y axis. The data for Graphs A and B looks like this:

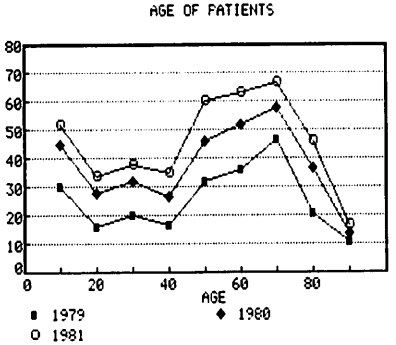
X DATA FORMAT: N

X DATA	Y DATA - GRAPH A	Y DATA - GRAPH B
10	30	45
20	16	28
30	20	32
40	17	27
50	32	46
60	36	52
70	47	58
80	21	37
90	11	14

Let's suppose you now have the age of patients data for 1981 and you would like to show it in a third graph added to this chart. Press ESC to return to the Main Menu. Enter 1 in the Selection item and press F10. The Enter/Edit Data Menu appears. The screen has five columns — one for X data and the other four for Y data for each of four graphs. Using the TAB key, move the cursor to the Graph C data column. Enter the following data for Graph C. Continue using the TAB key to move through the columns.

52
34
38
35
60
63
67
46
17

When you have completely entered the Graph C data, press F10, and you'll return to the Main Menu. To write in a legend for Graph C, select 2 for Define Chart, then press F10. Press TAB seven times to move the cursor to the Legend item for Graph C. Type 1981 and space over the remaining letters. Then press F10 and you'll return to the Main Menu. Now display the chart by entering 3 in the Selection item and pressing F10. The AGE OF PATIENTS chart looks like this:



There are several other sample charts on the Graph Sampler diskette. To experiment with them, just use the Get Chart function in Get/Save/Remove. Try the EARNINGS chart, for example, to see how GRAPH works with negative values. Try AREALINE to see how GRAPH displays an area chart. (Chapter 4 includes a list of the files on the Graph Sampler diskette.)

Information Sources

There are four different ways to enter data into the GRAPH program. The first is to type the data at the keyboard. The second is to have GRAPH read data directly from a PFS file stored on a disk. The third is to have GRAPH read data directly from a Multiplan SYLK file. And the fourth is to have GRAPH read data directly from a VisiCalc (DIF) file. In the last three cases, GRAPH makes it easy for you to transfer as much or as little of the information as you need.

Summary

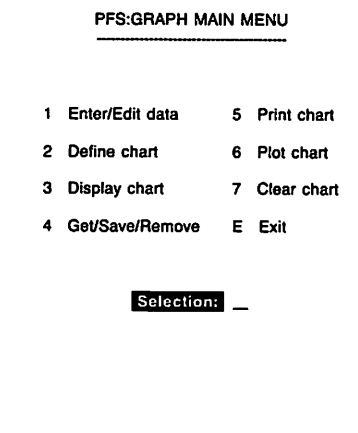
- PFS:GRAPH is a computer program that displays data in one of three types of graph — bar, line, or pie.
- GRAPH accepts data from the keyboard, PFS:FILE, Multiplan, or VisiCalc files and prints or plots a chart containing from one to four graphs.

- To use GRAPH, you need a Tandy Model 2000 Personal Computer with at least 256K of memory; a monitor capable of displaying graphics; the PFS:GRAPH package; blank, formatted diskettes or a formatted hard disk; and an optional printer or plotter and a plug-in graphics board.
- Make spare copies of your chart files to prevent the loss of valuable data.
- Use only double-density diskettes.

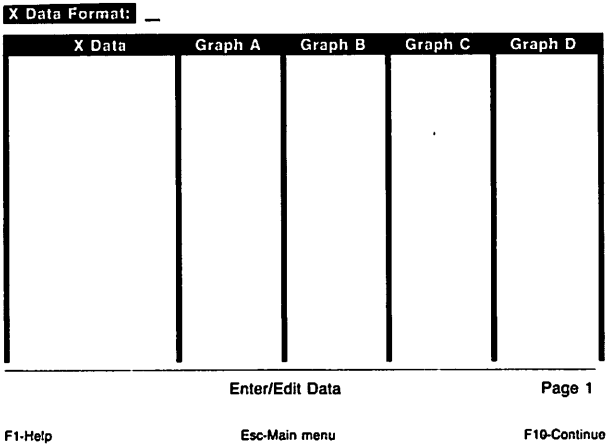
1: enter/edit data

The Enter/Edit Data function is used to enter the information for a graph from the keyboard. You can also edit the data that has been entered for a graph, regardless of the original source of the data.

To begin, return to the Main Menu (press ESC). If you have been following the examples in the Introduction, you must clear the chart in the scratchpad. To do this, select the Clear Chart function at the Main Menu and press F10 to continue. Press F10 again in response to the warning message. (If you have exited from GRAPH, type GRAPH in response to the A> prompt, and press ENTER.) Next, the GRAPH Main Menu appears:



Notice that the cursor is positioned in the Selection item. Type a 1 to indicate that you want to enter or edit data and press F10 to continue. The Enter/Edit Data Menu appears next:



You use this screen to tell GRAPH what your X data looks like and to enter the actual data for the chart. You can enter data for a single graph or up to four graphs in a single chart.

The X Data Format

The X Data Format tells GRAPH what kind of data you are going to enter for the X axis. GRAPH recognizes three kinds of X data: identifier, numeric, and date.

An *identifier* is simply a collection of characters that identify something, such as a department name, a product name, or a product number. To specify an X Data Format of identifier, enter the letter I for the X Data Format item at the top of the screen. Then, when you enter your X data, each X value must consist of 1 to 15 characters. However, for bar and line charts, you should limit identifiers to just a few characters each so that they will all fit comfortably across the X axis. For identifier X data, each graph can have up to 16 pairs of X and Y data values. (If you want to display your data in a pie chart, enter from 2 to 8 pairs.)

Numeric X data is simply a range of numbers that represent things like quantity, money, or age. Because numeric data implies a continuous range of values, numeric X data produces a line graph only. To specify a numeric X Data Format, enter N. When you enter your X data, each value must consist of a number. You can indicate a negative number by entering a minus sign (–) immediately before or after the number. You can include a

decimal point, too, if appropriate. In addition, you can enter numbers in scientific notation; for example, 1E6 or -1E5 or 2.5E-2. The largest number you can enter is 10 to the 29th power (1E29); the smallest fractional number is 10 to the -29th power (1E-29). (Although you can enter very large or very small numbers, GRAPH may change the way the number appears. See the section "Editing Data Already in the Graph" for more information.) With numeric X data, you can enter up to 36 pairs of X and Y data values for each graph.

An X Data Format of *date* indicates that the X data is some form of a date such as a day, a month, or a combination of month and year. To specify the X Data Format for dates, enter one or two of the codes shown below, depending on how you want to enter your dates.

Code	Used for:	Enter X data as:
D	Days of the month. D can be used only by itself. Days are displayed with up to 31 data points, so combining D with any other date code would exceed the 36-point wide screen display capability.	1,2,3, ... 31
M	Months of the year. M can be used by itself or with Y.	1,2,3, ... 12
Y	Years. Y can be used by itself or with M or Q.	2 or 4 digits (such as 84 or 1984)
Q	Quarters of the year. Q can be used by itself or with Y. (Quarterly data makes sense only when used by itself or combined with a year.)	1, 2, 3, 4

For example, suppose that you want to construct a graph that shows day-by-day order information for a certain month. You would specify D for the X Data Format, indicating that your X data represents days of a month. Then, when you enter your X data, enter 1 for the first day of the month, 2 for the next, and so on. (If a particular day has no orders, you don't need to enter it.)

On the other hand, if you want a graph showing order information by month for a certain year, you would specify an X Data Format of M (for month). Then, when you enter your X data, you would enter 1 for January, 2 for February, and so on. When you display your chart, you will see that GRAPH converts months entered as 1, 2,...12 to their initial letter; that is, J, F, M, A, M, etc.

You can use the date codes M and Q with Y to indicate the months or quarters of more than 1 year. When you enter the X data for a chart with X Data Format of MY or QY, you must separate the two parts of the date by a non-numeric character such as /, :, @, or a space. The only valid combinations of date codes you can use are:

Code	Used for:	Examples of how you enter X data:
MY	months of more than 1 year	2/84, 2 1984, 2-84
YM	months of more than 1 year	84/2, 1984 2, 84-2
QY	quarters of more than 1 year	1/83, 1 1983, 1:83
YQ	quarters of more than 1 year	83/1, 1983 1, 83:1

Other combinations of date codes are not possible. (If you try to use a faulty combination, GRAPH chooses a date specification that makes sense.)

For example, you might want to create a graph showing shipments for each month in fiscal 1980, where the fiscal year runs from September 1980 to August 1981. You would specify the X Data Format as YM, then enter the X data in year and months (such as 80/9 for September, 81/1 for January, etc.)

When you use a date code as the X Data Format, GRAPH assumes that the dates should be in numeric order, so GRAPH sorts and displays the dates in order, starting with the earliest date. However, there may be times when you don't want GRAPH to display the dates in chronological order (for example, you may be displaying data for a fiscal year that runs from July 1 to June 30). In that case, you should use an X Data Format of identifier, instead of date. Then, when you enter your X data, number the months 7 to 12 and 1 to 6 and enter them in that order. GRAPH will display the months in the order you entered them because they are identifiers, rather than dates, and GRAPH does not sort identifier X data.

When you choose the X Data Format, keep in mind that it determines how you can display your chart and how many data points you can enter for each graph. The following table summarizes the use of the X Data Format:

X Data Format:	Graph can be displayed as:	Maximum number of data points per graph:
Identifier	bar	16
	line	16
	pie	2 to 8
Numeric	line	36
Date	bar	36
	line	36

Changing X Data Format

Once data has been entered, you cannot change the X Data Format. If you really want a different X Data Format, you must first remove all your data from the chart. To remove the data from a chart, return to the Main Menu and select function 7 to clear the chart. Then, return to the Enter/Edit Data function, enter a new X Data Format, and re-enter your data.

X and Y Data Columns

Once you have specified the X Data Format, you are ready to enter the data for the chart. You enter the X data for the chart in the first column. The other four columns are for Y data for each of the separate graphs that can appear on one chart. For example, if you have only one graph (that is, only one set of Y data), enter the Y data in the Graph A column. Press the TAB key to move the cursor to the X data column. Type the first X value, press TAB to move to the Y data column for Graph A and enter the corresponding Y value. Press TAB again to move to the next Y data column; if you are entering data for more that one graph, enter the Y data for Graph B. Continue using the TAB key to move from column to column to enter your data. (The TAB key repeats if held down.)

If you make a mistake while entering the data, use the cursor movement keys to move the cursor to the value in error and type the correct value in its place. You can delete a value by typing blanks over it. Or, use the F3 key to delete a value from the cursor to the end of the item. You can also use the HOME key to return to the first item on the form, or use F4 to erase all data in the form and return the cursor to the first item.

If your X Data Format is numeric or date, you can enter up to 36 pairs of X and Y values for each graph. (The total number of data points that can be shown on one chart is 144.) If your X Data Format is identifier, you can enter only 16 pairs of X and Y values for each graph because there is room for no more than 16 identifiers beneath the X axis.

Only 18 lines of data will fit on the screen at one time. If you have more values to enter when you reach the bottom of the form, use the PG DN key to bring up the next page and enter the last few items. If you need to go back to the previous page, just press the PG UP key.

You don't have to enter the data pairs in any particular order. During processing, GRAPH automatically sorts numeric X data into numerical order and date X data into chronological order. Thus, if you want to insert an extra pair of X and Y values, you can simply enter the values at the bottom of the existing data and GRAPH will sort them into the proper place. GRAPH doesn't sort identifier X data, but displays it in the order it was entered. If you want to change the order or insert a point, you must retype the data below the change or insertion point.

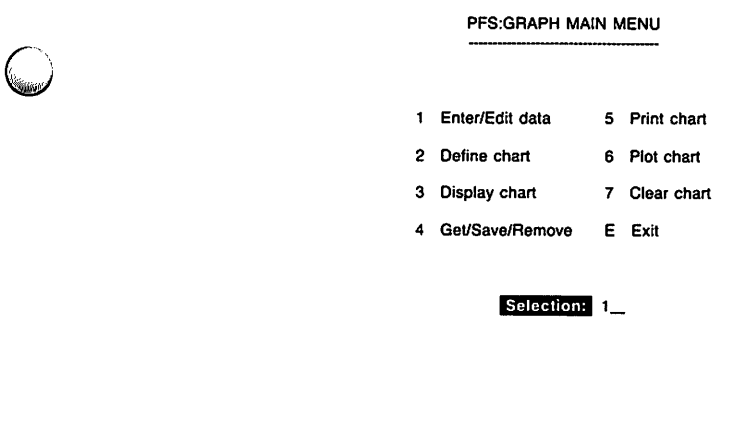
Processing the Data

When you have entered all the data for your graph, press F10 to continue. GRAPH checks all the X and Y values to make sure they are valid entries. If they are, GRAPH sorts the data (for numeric and date X data) and stores it in a working area of the program called the scratchpad. Also, if any X value was entered more than once, GRAPH adds together the corresponding Y values so that there is only one entry for that X value.

After GRAPH finishes processing the data, it returns to the Main Menu.

Example of Creating a Graph

For example, let's create a graph showing the number of employees in each department of a company. First, make sure the chart you were working on is cleared (return to the Main Menu, select the Clear Chart function, and press F10). Then at the Main Menu enter 1 as the Selection item. The screen should look like this:



Press F10 to continue. When the Enter/Edit Data Menu appears, enter the X Data Format. The X data for this example is the names (abbreviated) of the departments, so enter I for the X Data Format. Then use the TAB key to move to the X and Y data columns for Graph A in turn, and enter the following data values:

X Data	Graph A
MFG	9
MKTG	7
R&D	15
ADMIN	6
DOC	3

When you have finished entering the data, the Enter/Edit Data screen should look like this:

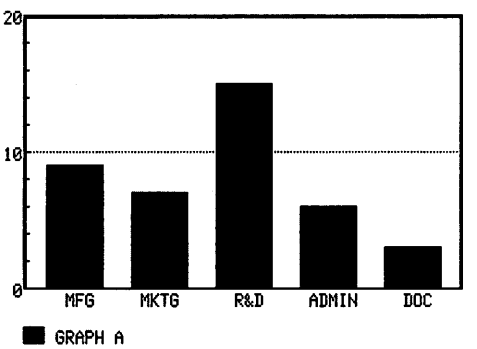
X Data Format: _

X Data	Graph A	Graph B	Graph C	Graph D
MFG	9			
MKTG	7			
R&D	15			
ADMIN	6			
DOC	3			

Enter/Edit Data Page 1

F1-Help Esc-Main menu F10-Continue

Press F10 to continue. GRAPH checks all the data to make sure it is valid, stores it in the scratchpad, and returns to the Main Menu. If you were to display the graph (using Selection 3 of the Main Menu), it would look like this:



Editing Data Already in the Graph

You can edit data that is already stored in the GRAPH scratchpad, regardless of the original source of that data.

To begin the Edit function, return to the Main Menu, enter 1 as the Selection item and press F10. GRAPH displays the Enter/Edit Data Menu that is currently in the scratchpad.

You might notice some differences between the way you entered your data and the way it is now displayed on the screen. For one thing, numeric and date X data appear in sorted order. The segments and the legends of pie charts are displayed in order by relative size of the segments. Therefore, when you change the data for a pie chart, the arrangement of the chart may change when it is displayed.

Also, any Y value greater than 999,999 appears in scientific notation. For example, the number 1,000,000 would appear as 1E6. If a number has more than six digits, GRAPH automatically truncates the number to six digits. Thus, the number 1234567 would appear as 1.23456E6.

When you display the Enter/Edit Data Menu to edit data in the scratchpad, GRAPH positions the cursor at the first value in the X Data column. Use the TAB key to move from column to column within the form. The table below shows how to edit the data displayed in the form. If you have more than 18 pairs of X and Y values for a graph, press PG DN to bring up the next page of the form. PG UP returns you to the previous page.

Editing function	How to do it:
Replace a value	Move the cursor to the value in error and type the correct value over it. If necessary, use the space bar or the F3 key to blank out any extra characters that may remain from the old data.
Insert a value (for numeric and date)	Enter the new value at the bottom of the list of data. (GRAPH sorts it into the correct position during processing.)
Insert a value (for identifier)	Enter the new value at the appropriate place and retype the data below that point.
Delete a value	Replace the existing X value with blanks or use the DELETE key or the F3 key to delete an unwanted value.

When the changes are complete, press F10. GRAPH reads the modified values, checking each X value to make sure it is a valid entry, and stores the changes in the scratchpad. Note that the changes are made to the data in the scratchpad only; the data in the file is not affected. If you want to change the values in the file, too, you must save the data using the Get/Save/Remove function. See Chapter 4 for more information on saving chart data.

Summary

- The Enter/Edit Data function is used to enter data from the keyboard or to edit data already in a chart.
- Up to four graphs, called A, B, C, and D, can be built on each chart.
- For X data in numeric or date format, you can enter up to 36 pairs of X and Y values for each of the four graphs (allowing a maximum of 144 data points in one chart).
- For X data in identifier format, you can enter up to 16 pairs of X and Y values for each graph (for a maximum of 64 data points in one chart).
- The X Data Format indicates the kind of X data you will enter:

I	(Identifier)	for words or names
N	(Numeric)	for numbers
D M Y Q	(Day) (Month) (Year) (Quarter)	for dates. Enter a single code or YM, MY, YQ,or QY.

- If an X value is entered more than once, GRAPH adds the corresponding Y values together and enters the sum as the single value for that X.
- GRAPH automatically sorts numeric X data in numerical order and date X data in chronological order.
- You can edit data in a graph, regardless of the source of that data.

- Keys frequently used when entering or editing data are:

F10	continue with the selected function
HOME	return the cursor to the first item of the screen
PG DN	bring up the next page of the Enter/Edit Data screen
PG UP	return to the previous page of the Enter/Edit Data screen
←	move the cursor left one character
→	move the cursor right one character
↑	move the cursor up one line
↓	move the cursor down one line
TAB	move the cursor forward to the next item on the screen
SHIFT + TAB	move the cursor to the previous item on the screen
ESC	return to the Main Menu without saving changes
F3	erase characters from the cursor to the end of the item
F4	erase all data in the Enter/Edit Data screen and return the cursor to the first item

2: define chart

The Define Chart function is used to change the way GRAPH displays your chart and to add explanatory information to it. Using Define Chart, you can display most data in any of three formats (bar, line or pie chart). You can "stack" the individual graphs on top of each other, adjust the Y axis to a different scale, and specify that the data in one or more of the graphs be displayed cumulatively. You can provide legends to identify data from each graph and titles for the chart and both axes. You can display the chart in solid colors (if you have a color monitor) or with patterned areas. Finally, you can control the horizontal grid lines.

To begin the Define Chart function, return to the Main Menu (press ESC if necessary). If you have been following the examples thus far in the manual, you must clear the chart in the scratchpad. To do this, select the Clear Chart function at the Main Menu and press F10. When you return to the Main Menu, enter 2 as the Selection item. The screen should look like this:

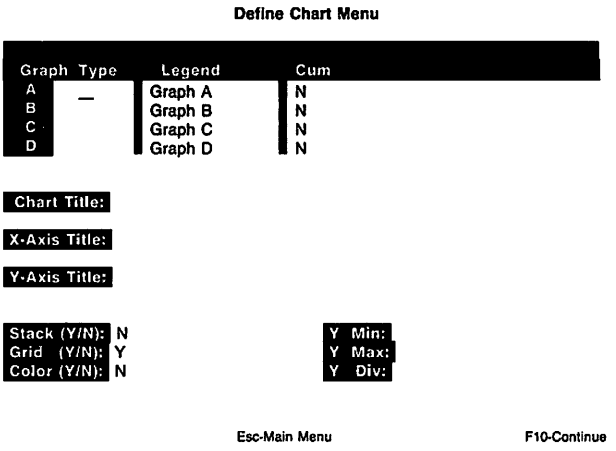
PFS:GRAPH MAIN MENU

1	Enter/Edit data	5	Print chart
2	Define chart	6	Plot chart
3	Display chart	7	Clear chart
4	Get/Save/Remove	E	Exit

Selection: 2

F10-Continue

Press F10. GRAPH displays the Define Chart Menu:



The Define Chart Menu

This menu determines how the chart will look when you print or display it. All you do is move the cursor to the item you want to change and fill in the desired information or value. When you have finished entering information in the menu items, press F10. The Main Menu reappears and GRAPH is ready to accept another function selection.

The information you enter in the Define Chart Menu is considered part of the chart and is used by GRAPH when displaying the chart. (When you save your chart, as described in Chapter 4, this information is saved as part of the chart.)

To move the cursor from one item to the next, press TAB. (The TAB key repeats if held down.) If you find a mistake after entering the information for an item, use the SHIFT TAB key combination to back up, then enter the correct information. Other cursor keys that might be helpful when entering information are:

Key	Function
←	moves the cursor to the left one character
→	moves the cursor to the right one character

↑	moves the cursor up one line
↓	moves the cursor down one line
HOME	returns the cursor to the first item on the screen
F3	erases the characters from the cursor to the end of the item
F4	clears all your typing from the Define Chart Menu and lets you start over

Let's look briefly at each item on the Define Chart Menu. Some items already have a value, called the default value, filled in by GRAPH.

*(to left of A,B,C,D)	indicates that the associated graph contains data. If there is no *, the graph contains no data.
Type	enter the word Bar, Line, Pie, or %Pie to determine the type of graph. If you don't want GRAPH to print a graph, blank out this item for that graph.
Legend	enter up to 18 characters to label the legend that is displayed at the bottom of the chart. The legend identifies the data from each graph.
Cum	enter Y to graph data points cumulatively (so that each point represents the total Y value from the first value up to that point); N to graph their actual value.
Chart Title X-Axis Title Y-Axis Title	enter titles for the chart, the X axis, and the Y axis. The chart title and the X-axis title can be up to 40 characters long. The Y-axis title can be 30 characters long.
Stack (Y/N):	enter N to use the X axis as the base for all graphs in the chart; Y to stack the graphs on top of each other.

Grid (Y/N): enter Y to display the chart with horizontal grid lines; N to display it without grid lines.

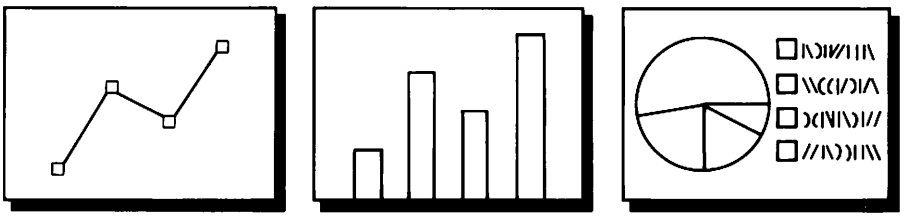
Color (Y/N): enter Y to display or plot the chart in color; N to display the chart in black and white. When displaying in black and white, GRAPH uses symbols and shading patterns to distinguish between data in the individual graphs. GRAPH chooses the colors, symbols, and patterns automatically.

Y Min:
Y Max:
Y Div: enter values to adjust the scale of the Y axis. Y Min sets the minimum value of Y that will appear on the chart; Y Max sets the maximum value; and Y Div defines the number of divisions on the Y axis. The maximum allowed value for Y Div is 10. If both Y Min and Y Max are blank, GRAPH automatically scales the chart, based on the data values.

Now let's look at each of these menu items in greater detail to see how you use them to display your charts.

Changing Graph Types

When you first create a chart, GRAPH assigns it a graph type based on its X Data Format. GRAPH creates a line graph for numeric X data and a bar graph for everything else. Depending on your needs, you might want to change one or more of the graphs in the chart to another type. The allowed types are:



LINE **BAR** **PIE**

To change the graph type for one of your graphs, display the Define Chart Menu, move the cursor to the Type column for the graph, and replace the current setting with the desired type. Then press F10 to return to the Main Menu. The next time you display the graph, it appears in the new format.

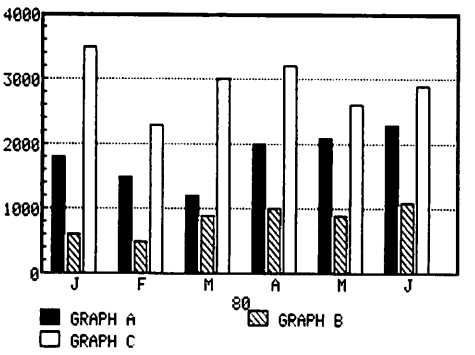
Example of Changing Graph Types

For example, let's retrieve a chart named SALES from the Graph Sampler diskette (use the Get/Save/Remove function, explained in Chapter 4). This chart shows sales for three products over a six-month period. The data is shown below. (The X Data Format is MY for month year.)

X Data Format: MY

X Data	Graph A	Graph B	Graph C
1/80	1800	600	3500
2/80	1500	500	2300
3/80	1200	900	3000
4/80	2000	1000	3200
5/80	2100	900	2600
6/80	2300	1100	2900

The chart looks like this:



GRAPH automatically displays the three graphs as bar graphs because they have an X Data Format of date. To change them to line graphs, select 2 from the Main Menu to display the Define Chart Menu. The cursor is at the Type column for Graph A; type LINE over bar. Move the cursor to the Type column for the other graphs, and make the same change. The menu should look like this:

Define Chart Menu

Graph	Type	Legend	Cum
*A	LINE	Graph A	N
*B	LINE	Graph B	N
*C	LINE	Graph C	N
		Graph D	N

Chart Title:

X-Axis Title:

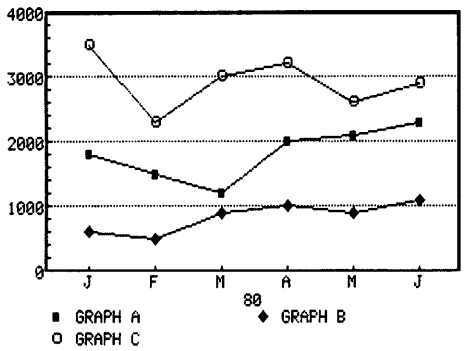
Y-Axis Title:

Stack (Y/N): N
Grid (Y/N): Y
Color (Y/N): N

Y Min:
Y Max:
Y Div:

Esc-Main Menu F10-Continue

Then press F10, and GRAPH returns to the Main Menu. The next time you select 3 from the Main Menu to display the chart it looks like this:



More About Graph Types

You can choose not to display one or more of the graphs in the chart by blanking out the Type column for that graph. (Use the space bar or the F3 key to blank out the letters.) The data remains in the chart, but the graph is not included when the chart is displayed or printed.

There are a few things to consider when you change graph types:

Bar Charts: Any graph with an X Data Format of date or identifier can be displayed as a bar graph. Up to 36 bars can be displayed side by side. However, if you display the bars side by side, the number of data points for each graph in the chart is limited to 36 divided by the number of graphs in the chart. You can avoid this limitation by stacking the graphs or by changing one or more of the graphs to line graphs. If you stack the graphs, you can display up to 144 data points (36 data points for each of the four graphs) in a single chart. See the section "Stacking the Graphs in the Chart," later in this chapter, for more information on stacking graphs and displaying a combination of bar and line graphs.

Line Charts: If you specify a numeric X Data Format, all graphs in the chart are displayed or printed as line graphs. You cannot change the graph type for numeric X data.

Pie Charts: Any graph with an X Data Format of identifier and with two to eight data points can be displayed as a pie graph. (Only identifier X data can be displayed as a pie chart.) GRAPH draws the segments of the pie in order of size; it takes the entire screen to display one pie graph. For that reason, you cannot combine a pie graph with another type in the chart and be able to display all the graphs. A pie chart can show only one graph — the pie graph.

However, you can have data for more than one pie graph in a chart if they all share the same X data. When displaying or printing a pie chart, GRAPH reads the Type column of the first graph it comes to and displays the data from that graph. Thus, if you have two or more graphs in a pie chart, you must first blank out the entry in the Type column of the preceding graph (or graphs) to display or print Graph B, C, or D.

When GRAPH displays or prints a pie chart, it includes a list of the values represented by the segments of the pie. You can display those values as either percentages or numeric values. To display percentages, enter %Pie in the Type column. To display numeric values, enter Pie in the Type column.

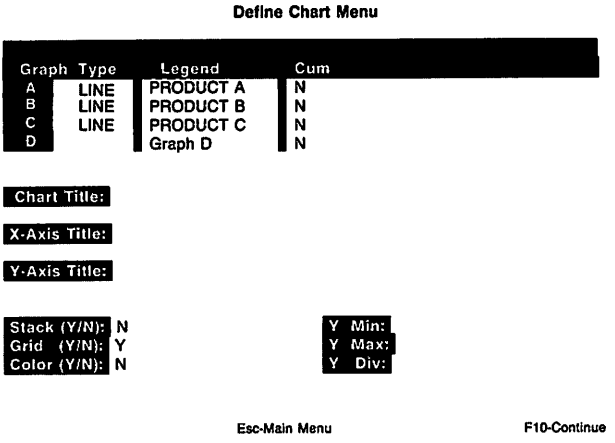
Entering Legends

GRAPH uses different symbols, shading patterns, or colors to distinguish the data from the individual graphs in a chart and prints a sample of each with a description. This description is called the *legend*. For bar and line charts, you can provide a description for these samples by entering up to 18 characters in the Legend item for each graph. (On pie charts, GRAPH takes the legend information from the X data.)

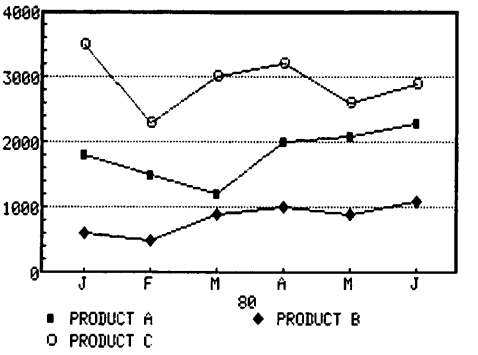
To enter a legend for a graph, display the Define Chart Menu, move the cursor to the Legend column for the graph, and type in the information. Then press F10. When you display the chart, your information appears next to the symbol, shading pattern, or color for that graph. The legend is displayed below the X axis.

Example of Entering Legends

For example, let's enter legends for the SALES chart example. First, display the Define Chart Menu, then move the cursor to the Legend column for Graph A and enter PRODUCT A. Now use those same steps to enter PRODUCT B for Graph B and PRODUCT C for Graph C. Your screen should look like this:



Press F10 to store the legends and return to the Main Menu. The next time you display the chart, the legends are displayed below the X axis:



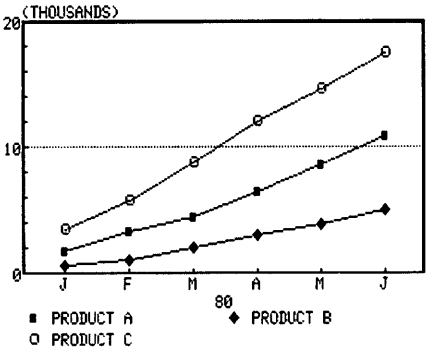
Graphing Cumulative Data

When data is graphed cumulatively, each point on the graph represents the total, or cumulative, Y value from the first value up to that point.

To display the data in a graph cumulatively, display the Define Chart Menu, move the cursor to the Cum column for the graph, and type Y. Then press F10 to store the chart definition and return to the Main Menu. When you display the chart, the data for that graph is displayed in cumulative form.

Example of Graphing Cumulative Data

For example, let's display cumulatively the graphs from the SALES chart example. First, display the Define Chart Menu, move the cursor to the Cum column for Graph A and enter Y. Do the same for Graphs B and C, then press F10. When you display the chart, it looks like this:



In this case, the values shown for each product represent the total year-to-date sales for that product, rather than the sales for that particular month.

Adding Titles

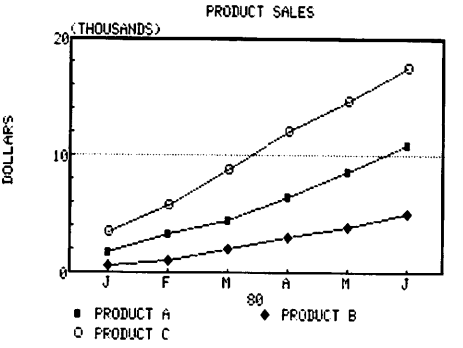
You can add a title to your chart as well as to its X and Y axes. To enter a title for your chart, display the Define Chart Menu, move the cursor to the Chart Title item, and type in the desired title. (The title can be up to 40 characters long.) Then press F10. When you display the chart, GRAPH centers the title above the chart.

To enter titles for the X or Y axis, follow the same procedure, moving the cursor to the item named X-Axis Title or Y-Axis Title. The X-axis title can be up to 40 characters; the Y-axis title, 30 characters. When you display the chart, GRAPH places the X-axis title below the X axis and the Y-axis title to the left of the Y axis. If the X Data Format is date, GRAPH supplies an appropriate title for the X axis if you do not.

When displaying a pie chart, GRAPH places the X-axis title beneath the chart title. This allows you to enter a two-line title, or a main and sub-title, for the chart. If you specify a Y-axis title, it appears at the bottom of the chart together with the word Total, and followed by the total value of the Y data. This total is shown only for values greater than 1.

Example of Adding Titles

Let's provide titles for the SALES chart example. First, display the Define Chart Menu, then move the cursor to the Chart Title item, and enter PRODUCT SALES as the title. Now, move to the Y-Axis Title item and enter DOLLARS. Press F10 to store these titles and return to the Main Menu. When you display the chart, the titles appear in the appropriate places:



Note that GRAPH supplied the title (80) for the X axis.

Stacking the Graphs in the Chart

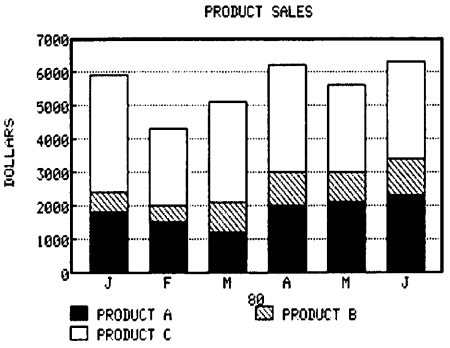
Sometimes it is helpful to "stack" one graph on top of another. For example, you may want to see how much each graph contributes to a total value. Or, you might want to display more data points than the maximum allowed for bar charts. (Stacking four bar graphs allows you to display up to 144 data points, 36 per graph, in a single chart.) An area chart, which is a type of stacked chart, lets you compare the relative size of up to four areas at a glance.

To stack the individual graphs in your chart, display the Define Chart Menu, move the cursor to the Stack item, and enter Y. Then press F10. When you display the chart, the graphs are stacked in either line graph or bar graph format.

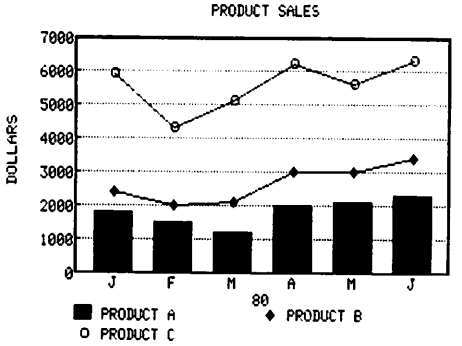
Example of Stacking Graphs

For example, let's stack the graphs in the SALES chart example to show total monthly sales. First display the Define Chart Menu, change the Type column to Bar for all three graphs, and the Cum column to N.

Now, to stack the bars, move the cursor to the Stack item, and type Y. Then press F10 to continue. When you display the chart, the bars that were previously displayed side by side are stacked on top of each other, with Graph A on the bottom, Graph B next, and Graph C on top. The chart looks like this:



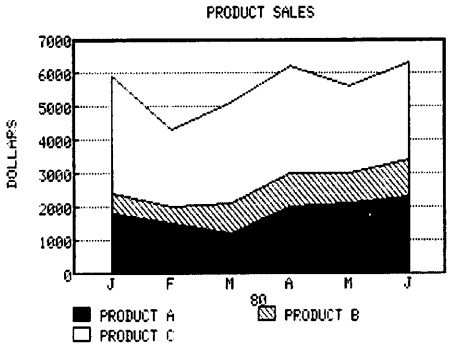
You can stack a combination of bar and line graphs in the same chart. In this case, GRAPH first displays the bar graphs at the bottom of the chart (stacked appropriately) and the line graphs above the last bar graph. For example, if you specify Graph A of the SALES chart example to be a bar chart, Graphs B and C to be line graphs, and enter Y for the Stack item, when you display the chart it looks like this:



Area Charts

Stacking is especially effective when you work with line graphs. You can produce an area graph that displays the area under each line in color or pattern. The SALES chart, which we displayed previously as a stacked bar chart, would be more effective if displayed as an area chart. You could then see the area for each product as part of a total area, rather than as separate bars.

To create SALES as an area chart, go back to the Define Chart Menu and change the graph type to Line for all three graphs. Leave the Stack item set to Y. If you have a color monitor, set the Color item to Y. Now press F10. When you display the chart, the areas below the lines are filled in with color. (If you leave the Color item set to N, it is displayed in patterns, as shown here.)



You can create an area chart only if the following conditions are met:

- All graphs contain no negative data points.
- All graphs have the same number of data points.
- All data points are within the display boundary set by the Y Min and Y Max items.
- All graphs are type Line.
- The graphs are stacked (that is, the Stack item is set to Y).

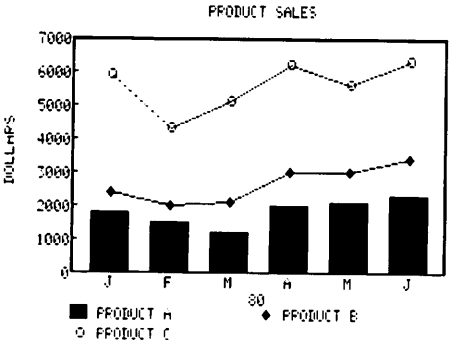
Horizontal Grid Lines

On bar and line charts, GRAPH provides horizontal grid lines at each division of the Y axis to make it easier for you to read the data values. If you wish, you can display the chart without these lines.

To display a chart without grid lines, first display the Define Chart Menu, then move the cursor to the Grid item, and enter N. Then press F10 to continue. When you display the chart, the grid lines don't appear. You can display the chart again with grid lines simply by changing the N back to Y.

Example of Displaying Without Grid Lines

For example, let's display the SALES chart as a bar and line chart without grid lines. First display the Define Chart Menu and change the graph type to bar for PRODUCT A. Then move the cursor to the Grid item and type N. Press F10 to return to the Main Menu. When you display the chart, it looks like this:



Displaying the Chart in Colors or Patterns

GRAPH displays, prints, or plots a chart with areas in solid colors (on a color monitor, printer, or plotter) or in patterns.

The default value of the Color item is N. To display a chart with colors, first display the Define Chart Menu, then move the cursor to the Color item, and enter Y. Press F10. When you display, print, or plot the chart, the areas will be solid colors rather than patterned. If you do not have a color monitor, printer, or plotter, change the Y back to N to go back to patterns.

Adjusting the Scale of the Y Axis

GRAPH automatically scales your chart according to its data values to provide an attractive and easily understood presentation of your data. Occasionally, however, you might want to adjust the scaling of the Y axis to highlight a certain section of the chart or to show more detail. You turn off the automatic scaling by entering scaling values that meet your special needs.

To rescale the Y axis of a chart, display the Define Chart Menu, move the cursor to the Y Min item, and enter the minimum value of Y that you want to appear on the chart. Next, move the cursor to the Y Max item and enter the maximum value of Y that you want to appear on the chart. Finally, move the cursor to the Y Div item, and enter the number of divisions you want on the Y axis. Press F10 to continue.

You must enter both Y Min and Y Max for GRAPH to perform the rescaling; Y Div is optional. Also, Y Max must be greater than Y Min. Finally, the value for Y Div must be between 1 and 10. If you enter a number larger than 10, GRAPH interprets it as 10.

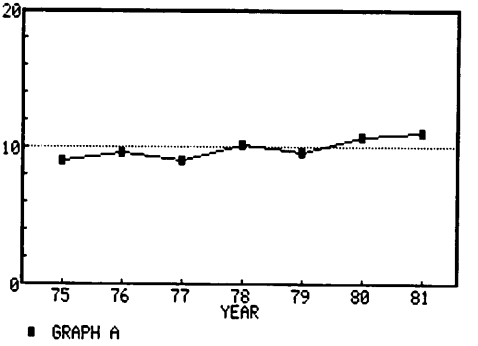
Example of Rescaling a Chart

For example, let's look at a situation where you might want to rescale a chart. Get the chart named GROWTH from the Graph Sampler diskette (use the Get/Save/Remove function) or enter this data from the keyboard. (The X Data Format is Y for year in this example.)

X Data Format: Y

X Data	Graph A
1975	9.0
1976	9.7
1977	9.1
1978	10.2
1979	9.6
1980	10.8
1981	11.1

This chart shows the growth in sales each year for seven years. If you display the graph as a line graph, it looks like this:

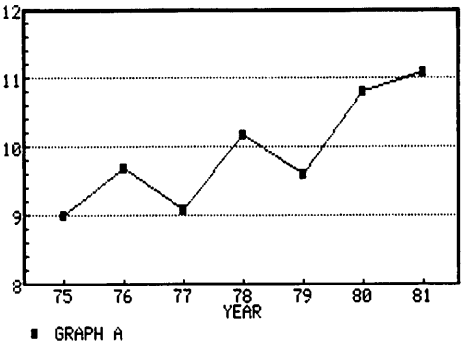


Notice that the Y axis is scaled from 0 to 20, but all the Y values are clustered between 9 and 11. The result is a very flat graph. The graph would look better and illustrate the changes in growth rate more clearly if the Y axis could be scaled from 8 to 12, with grid lines at every percent.

To rescale the Y axis in that way, display the Define Chart Menu, enter the following values for the items shown, and press F10.

Y Min:	8
Y Max:	12
Y Div:	4

When you display the chart using these new scaling values, it looks like this:



To return to automatic scaling, display the Define Chart Menu, move the cursor to Y Min and Y Max in turn, and enter blanks for the items.

Summary

- The Define Chart function is used to change the way your chart is displayed, and to add explanatory information to it. The items are:

Type	enter Bar, Line, Pie, or %Pie. If blank, the graph is not displayed.
Legend	enter a label (up to 18 characters) for each graph.
Cum	enter Y (for yes) to graph data cumulatively.
Chart Title X-Axis Title Y-Axis Title	enter a title for the chart and each axis (up to 40 characters for the chart and X-axis title; up to 30 characters for Y-axis title).
Stack	enter Y to stack the graphs in the chart.
Grid	enter N to remove horizontal grid lines.
Color	enter N to display, print, or plot the chart with patterns; Y to display, print, or plot the chart in color.

Y Min	enter the Y axis minimum.
Y Max	enter the Y axis maximum.
Y Div	enter the number of divisions for the Y axis (from 1 to 10)

- Special keys used in the Define Chart Menu are:

HOME	moves the cursor to the first item on the screen
TAB	moves the cursor to the next item
SHIFT TAB	moves the cursor to the previous item
F3	erases characters from the cursor to the end of the item.
F4	clears the information in the Define Chart Menu.
F10	stores the information entered in the menu and returns to the Main Menu.
ESC	returns to the Main Menu without storing changes.

3: display chart

The Display Chart function displays the chart that is in the GRAPH scratchpad.

Displaying the Chart

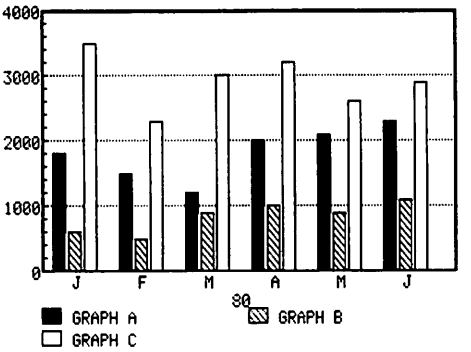
To display the chart, return to the Main Menu (press ESC if necessary) and enter 3 as the Selection item. Press F10 to continue. GRAPH displays the chart according to any specifications currently in the Define Chart Menu (see Chapter 2). If the chart cannot be displayed according to those specifications (or if there is no data in the chart), GRAPH displays an error message (see Appendix A).

Example of Displaying a Chart

For example, let's retrieve the chart named SALES from the Graph Sampler diskette again. Now, let's display the chart as if you had just entered the data. Press ESC to return to the Main Menu and enter 3 for the Selection item. The screen should look like this:

```
                    PFS:GRAPH MAIN MENU
                    -------------------

    1  Enter/Edit data          5  Print chart
    2  Define chart             6  Plot chart
    3  Display chart            7  Clear chart
    4  Get/Save/Remove          E  Exit

                    Selection: 3

                                              F10-Continue
```

Press F10, and GRAPH displays the chart:



Summary

- The Display Chart function displays the chart currently in the GRAPH scratchpad.

Key	Function
ESC	
or	returns to the Main Menu.
F10	

4: get/save/remove

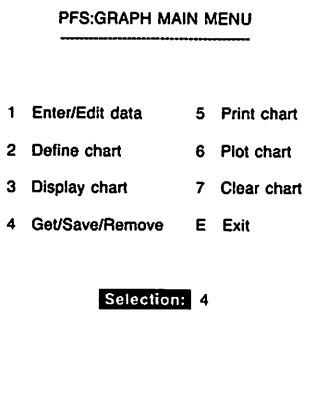
The Get/Save/Remove function has six options. You can get or save a chart. You can create a chart by getting data directly from PFS:FILE, Multiplan SYLK, or VisiCalc files, merging the data with existing data if you wish. You can also remove files.

While you are performing any of these tasks, you can get a listing of the files on your disk.

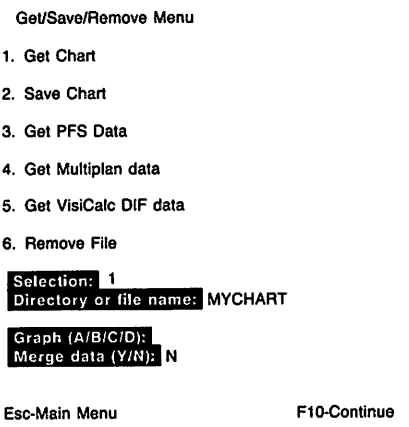
Getting a Chart

When you get a chart, you actually bring a copy of it into the GRAPH scratchpad, replacing any chart that may be there. You can then work with the chart as if you had just created it. You can edit data in the chart, add new data, or even add or delete a graph. (See Chapter 1 for information on editing a chart once it is in the scratchpad.)

To get a chart, first return to the Main Menu (press ESC if necessary) and type 4 as the Selection item.



When the Get/Save/Remove Menu appears, enter 1 in the Selection item and press TAB to move to the next item. Type the name of the chart you wish to get in the Directory or File Name item.



Insert the diskette containing the chart file you want to retrieve and press F10. (You don't have to change the last two items on the menu; GRAPH ignores those items when getting a file.)

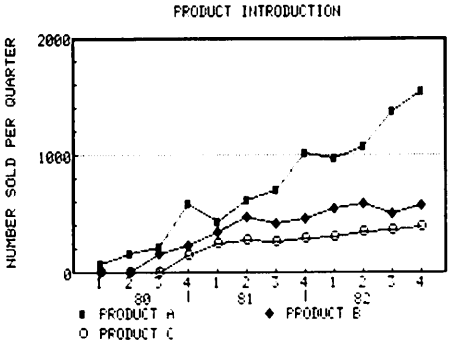
If you try to get a chart and there is a chart already in the scratchpad that has been changed, but not saved, GRAPH warns you that the chart is about to be overwritten. If you want to save the chart in the scratchpad, press ESC and GRAPH returns you to the Main Menu. You can then use Get/Save/Remove to save the chart in the scratchpad before getting another chart.

Example of Getting a Chart

For example, let's retrieve the chart named INTRO from the Graph Sampler diskette. Type 4 in the Selection item of the Main Menu and press F10. In the Get/Save/Remove Menu, enter 1 in the Selection item, and type INTRO in the Directory or File Name item. The screen should look like this:

```
Get/Save/Remove Menu

1. Get chart
2. Save chart
3. Get PFS data
4. Get Multiplan data
5. Get VisiCalc DIF data
6. Remove file

Selection: 1
Directory or file name: INTRO

Graph (A/B/C/D):
Merge data (Y/N): N

Esc-Main menu                    F10-Continue
```

Now insert the Graph Sampler diskette in drive A and press F10. GRAPH retrieves the chart from the file and displays it on the screen.

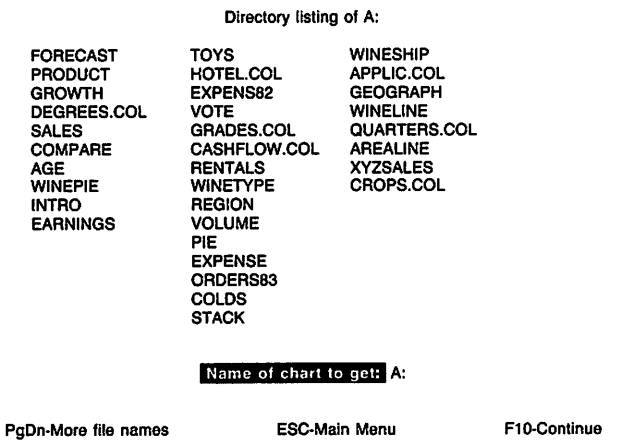


If you want to edit the data for the chart, select the Enter/Edit Data function of the Main Menu. GRAPH then displays the Enter/Edit Data Menu for the chart.

Listing Files

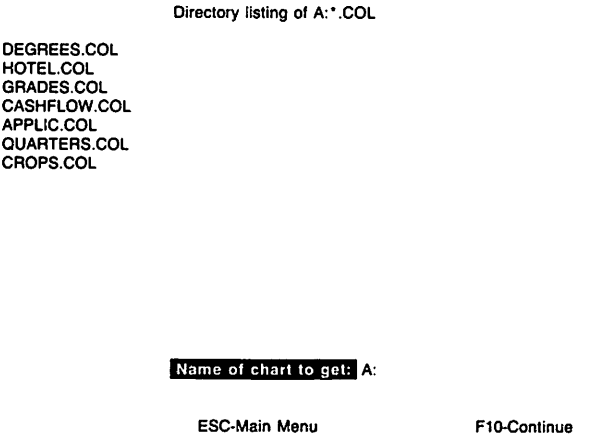
Sometimes you'll forget the exact spelling of the file you want to get or remove, or you want to be sure to save a chart with a name that fits in with the naming scheme you have been using. The Get/Save/Remove Menu lets you display a list of the files on the directory you want to use. After choosing the function you wish to perform, you can enter just a directory (or drive) name instead of a file name.

All the options on the Get/Save/Remove Menu let you list the files in a directory or disk. For example, to list all the files on the Graph Sampler diskette, specify just the drive name in which you have inserted the Graph Sampler diskette. The drive name must be followed by a colon, such as A: or B:. (If you leave the Directory or File Name item blank, GRAPH lists the files on the diskette in the default drive.) Press F10 and you will see a screen similar to this:



Notice that a few of these charts have been saved with the file name extension of .COL (to indicate that the Color item in the Define Chart Menu has been set to Y and that they can be displayed in color).

You can also enter a partial file name with "don't care" (*) characters in the same format as the MS-DOS DIR command. For example, to list just the files ending in .COL, you can fill out the menu with Selection item 1 and Directory or File Name of A:*.COL. You will get a listing of all files on drive A that have a file name extension of .COL.



See your MS-DOS manual for more details on using * in a file name.

As you use Get/Save/Remove, keep in mind that a listing of files is available to you under all of its options. If you know the name of the chart or file you wish to use, specify it in the Directory or File Name item, and GRAPH performs the operation immediately. If you wish to see a choice of file names, don't specify a file name; instead, put in the name of the drive containing the disk you wish to read. GRAPH then gives you a list of files on your disk. Fill in the Name of Chart to Get item with the name of the chart or other file you wish to use.

Saving a Chart

Generally, after you have created a chart in the scratchpad from data you entered from the keyboard or from a PFS:FILE, Multiplan, or VisiCalc file, you want to save the chart in a file on a diskette for later use. When you begin to save a chart, GRAPH expects you to have a formatted diskette in a drive and adds the chart you save to that diskette.

To begin the Save Chart function, return to the Main Menu (press ESC if necessary) and enter 4 as the Selection item. Press F10 and the Get/-Save/Remove Menu appears.

Enter 2 in the Selection item and enter a name for your file in the Directory or File Name item. Insert a formatted, double-density diskette in the default drive (or other drive if you specify the drive as part of the file name). The Get/Save/Remove Menu looks like this:

```
Get/Save/Remove Menu

1. Get chart
2. Save chart
3. Get PFS data
4. Get Multiplan data
5. Get VisiCalc DIF data
6. Remove file

Selection: 2
Directory or file name: MYCHART

Graph (A/B/C/D):
Merge data (Y/N): N

Esc-Main menu                    F10-Continue
```

Press F10 to continue. GRAPH stores the chart as a file under the name you entered. Any information entered in the Define Chart Menu is also saved as part of the chart.

If a file with that name already exists on the disk, GRAPH first displays a warning:

WARNING

MYCHART

This File Already Exists

Press F10 to continue

Press ESC to return to the Main Menu

Make sure you want to replace the original chart before pressing F10, since there is no way of recovering the chart once it has been replaced.

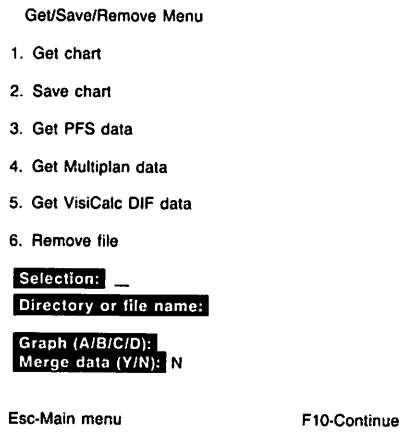
When the chart has been stored, GRAPH returns to the Main Menu. Note that the chart in the GRAPH scratchpad and the chart on the diskette are separate entities from this point on. You can edit the chart in the scratchpad without affecting the chart on the diskette, and you can remove the chart from the diskette without affecting the copy in the scratchpad.

Warning: If you save a chart using a file name that already exists on your diskette, the new chart replaces the existing one. Be sure you want to make this replacement, because there is no way to recover the previous chart.

Getting Data from Other Sources

You can use the Get/Save/Remove function to read data from a PFS:FILE, Multiplan, or VisiCalc file.

To read data from a file that was not created by GRAPH, first return to the Main Menu (press ESC if necessary), enter 4 as the Selection item, and press F10. The Get/Save/Remove Menu contains four items that you must fill in:



Let's take a look at each item and see how it applies to data from a PFS:FILE, Multiplan, or VisiCalc file.

Selection: enter a number that indicates the source of your data:

3	for a PFS:FILE file
4	for a Multiplan file
5	for a VisiCalc file

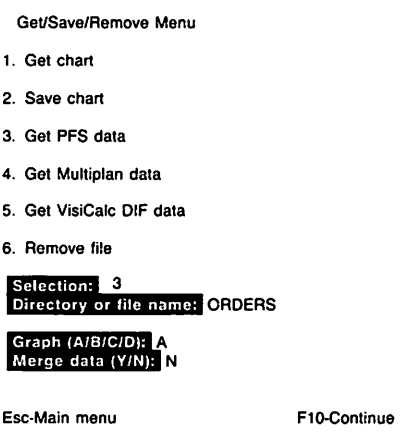
Directory or File Name: enter the name of the file containing the data; enter just a drive name (followed by a colon) for a list of files.

Graph (A/B/C/D): enter a letter to identify the graph. One chart can have up to four graphs, each identified by a single letter (A, B, C or D).

Merge Data: enter Y if you want GRAPH to merge the file data with data in the scratchpad; N if you don't want GRAPH to merge the data. In this case, any data for the graph currently in the scratchpad is first erased; the new data replaces whatever was in the scratchpad.

Getting Data from a PFS:FILE File

GRAPH can read data from a PFS:FILE file, including data from either all forms in the file or selected forms. To select the Get PFS Data option, enter 3 for the Selection item in the Get/Save/Remove Menu. Move the cursor to the Directory or File Name item and enter the file name (including any extension) for the PFS:FILE file. (If you need a list of files, enter just a drive name followed by a colon instead of a file name.) Fill out the next two menu items appropriately. The menu might look like this:



Insert the disk with the PFS:FILE file and press F10 again.

Retrieve Specifications

Next, GRAPH displays the retrieve specification. This is a copy of the blank form from the file. On it you specify which forms you want to use as the source of the data.

If you want to read data from all forms in the file, just press F10 without entering anything in the form.

If you want to read data from selected forms, enter retrieve specifications to tell GRAPH which forms to select. You can use any of the following retrieve specifications. (See Chapter 4 of the PFS:FILE manual for a complete description of retrieve specifications.)

characters	select all forms that have these exact characters for the specified item
..characters	select all forms that have these characters occurring at the end of the specified item
characters..	select all forms that have these characters occurring at the beginning of the specified item
..characters..	select all forms that have these characters occurring anywhere within the specified item
..	select all forms with any characters in the specified item
?characters	select all forms with any character in the ? position. ? can be anywhere in the string of characters
=number	select all forms with a value equal to this number in this item
<number	select all forms with a value less than this number entered for the specified item
>number	select all forms with a value greater than this number entered for the specified item
=number1..number2	select all forms with a value for the specified item that falls between number1 and number2, inclusive
/any of the above retrieve specs	select all forms that do not satisfy the retrieve specification

When you are satisfied with the retrieve specifications, press F10 to continue.

Graph Specifications

GRAPH displays the blank form again, this time with the words Graph Spec in the message area at the bottom of the screen. This time you specify the X Data Format and indicate which items will provide the X and Y data. You must specify the X Data Format and the X data, but you can omit the Y data specification if you wish. In that case, GRAPH counts the occurrences of each X value, and enters that count as the Y value for each X.

Specifying the X and Y Data

You use the Graph Spec form to choose the X Data Format and to specify which items are to be read as the X and Y data.

Specify the X data by entering X next to the item that is to be the source of the data. Specify the X Data Format by entering the format code immediately after the X. The format codes are: I if the X data is in identifier format; N if it is numeric; and the appropriate combination of D, M, Y, Q and – if it is in date format. Chapter 1 contains a complete description of X Data Format codes.

If you specify an X Data Format of date, you need to tell GRAPH what the dates in the file look like, as well as how you want them entered for the graph. Sometimes that means that GRAPH has to ignore one or more parts of each date in the file. For example, suppose your file lists data for each day in a given month. The dates are entered in the PFS:FILE file as year/month/day, but you want to graph them by day only. You want GRAPH to ignore the month and year, so enter --D as the X Data Format. As GRAPH reads the file, it will expect to find dates consisting of three groups of numbers, but it will ignore the groups in the positions represented by the hyphens. Thus, GRAPH will read the date 80/11/22 simply as 22.

Note that all dates should be entered in the PFS:FILE file in the same format. If not, the data read for the graph will be wrong.

Processing the PFS:FILE Data

When you have entered the necessary information, press F10. GRAPH reads the data, checking each X value to make sure it is a valid entry, and stores it in the scratchpad. GRAPH then displays a message on the screen indicating the number of PFS:FILE forms it has read. To continue processing, press F10 and GRAPH performs any necessary data reduction, stores the data in the scratchpad, and returns to the Main Menu. For example, if more than one form has the same X value, GRAPH adds the

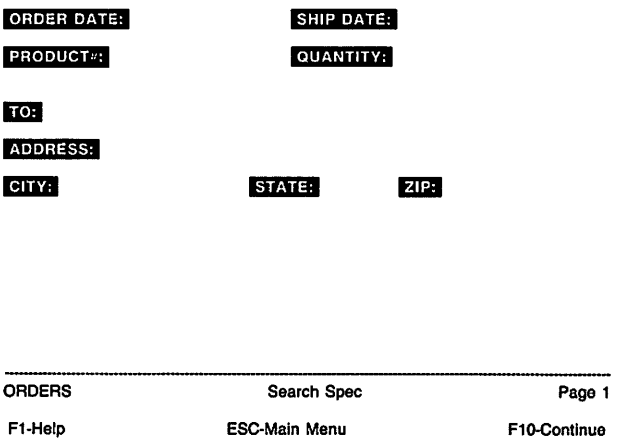
corresponding Y values and stores the sum as a single Y value for that X. As a result, GRAPH can combine data from thousands of PFS:FILE forms into a single pair of X and Y values. Thus, you can consolidate an enormous amount of information into a simple graph.

If you set the Merge item to Y, to merge data from different files, the same kind of data reduction occurs. If an X value is read from the merging file that does not exist in the original graph, it is simply added as a new X value for the graph. But if an X value is read that does exist, its Y value is added to the existing Y value.

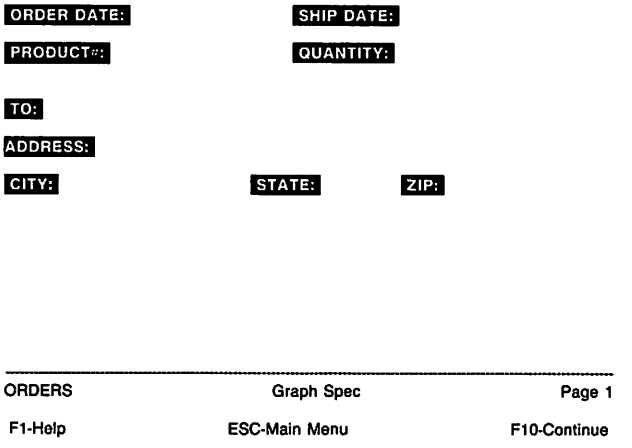
Example of Getting Data from a PFS:FILE File

Let's assume that you have a PFS:FILE file called ORDERS that records the dates and quantities of products ordered from your company for the month of May, 1982. (You could use your PFS:FILE program to create such a file for experimenting here.) Now suppose that you want to prepare a graph that shows the daily totals.

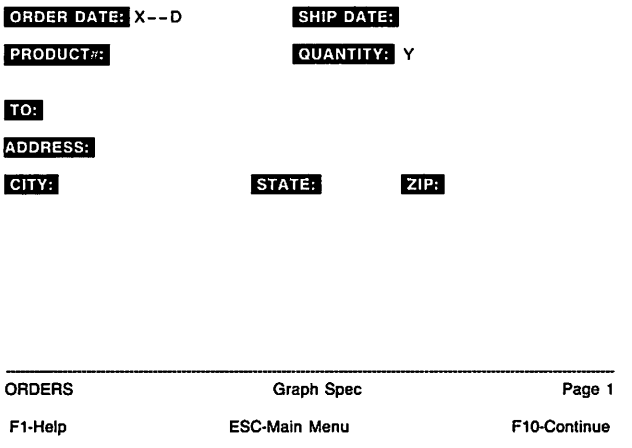
First, use the Clear Chart function to clear the scratchpad, then return to the Main Menu (press ESC if necessary), and enter 4 for the Selection item. When the Get/Save/Remove Menu appears, enter 3 to indicate that you want to read data from a PFS:FILE file. Type B:ORDERS in the Directory or File Name item, and type A in the Graph (A/B/C/D) item. Leave the Merge Data item set to N. Insert the PFS:FILE file named ORDERS in drive B. Press F10 and the Search Specification appears:



For this example, you want to read data from all forms in the file, so press F10 without entering any search specifications. GRAPH displays the blank form again, so that you can enter the graph specifications:

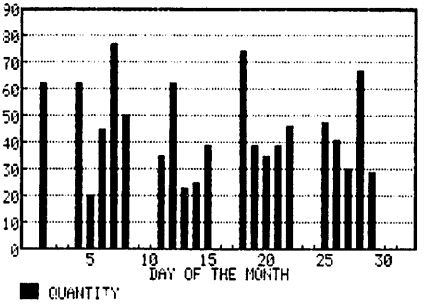


You are going to use the Order Date item as the source of the X data, so enter X in that item. The dates are entered in the form year/month/day, but you want to show only the days on the graph, so enter --D beside the X. This specifies the X Data Format. The Quantity item is the source of the Y data, so enter Y in that item to complete the graph specifications. The screen should look like this:



Now press F10 to begin reading the data. GRAPH checks each X value to make sure it is a valid entry and stores the data in the scratchpad. In this example, there are many forms entered for each date; during processing, GRAPH adds the quantities together from the forms for each date, and enters a single quantity as the Y value for that date.

If you display the graph, you can see that only one value is displayed for each day's orders:

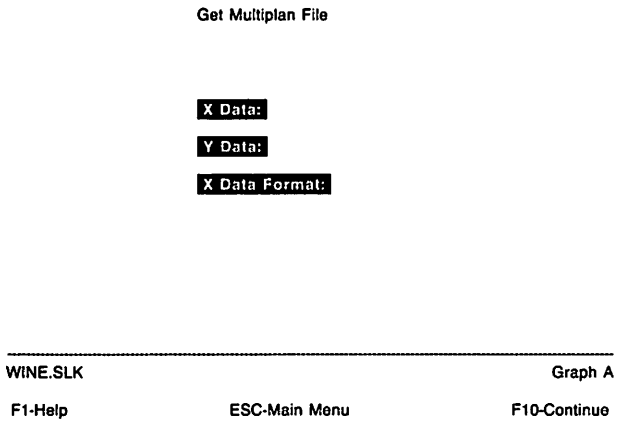


You could also get a graph of the number of orders placed each day by omitting a Y data item. In that case, GRAPH counts the number of forms that exist for each date, and enters the count as the Y value for that date.

Getting Data from a Multiplan (SYLK) File

You can read data directly from a Multiplan file. Before using a Multiplan file, you must save the file in SYLK (Symbolic Link) format. See your Multiplan manual for details of this procedure.

To select the Get Multiplan File option, enter 4 for the Selection item in the Get/Save/Remove Menu. Move the cursor to the Directory or File Name item and enter the file name (including any extension) for the Multiplan file. (If you need a list of files, enter just a drive name followed by a colon instead of a file name.) Fill out the next two menu items appropriately. Press F10 to continue and the Get Multiplan File form appears:



Specifying the X and Y Data

You use this screen to specify the rows (or columns) that contain the X and Y data and the X Data Format. The form shows the name of the Multiplan file and the graph identifier (A, B, C, or D) in the message area at the bottom of the screen. The items on the menu are:

X Data:	enter the number of the row or column that will provide the X data.
Y Data:	enter the number of the row or column that will provide the Y data.
X Data Format:	enter I if your data is in identifier format; N if it is in numeric; and the appropriate combination of D, M, Y, Q, and – if it is in date format. See Chapter 1 for a description of X Data Format codes.

You can use a range in either the X Data or the Y Data item, but not in both. If you named the rows or columns (cells) of your Multiplan worksheet before saving it as a SYLK file, you can enter the name that corresponds to worksheet rows or columns instead of the row or column number for the X Data and Y Data items. Thus, you can access specific information from your worksheet without having to know its row or column number. When you assign a name to a portion of a worksheet, you can always retrieve the data by that name, even if the position of the data within the worksheet changes. (See your Multiplan manual for a detailed description of specifying rows and columns and naming cells.)

If you specify an X Data Format of date, you need to tell GRAPH what the dates in the file look like, as well as how you want them entered for the graph. Sometimes that means that GRAPH has to ignore one or more parts of each date in the file. For example, suppose your file lists data for each day in a given month. The dates are entered in the Multiplan file as year/month/day, but you want to graph them by day only. You want GRAPH to ignore the month and year, so enter --D as the X Data Format. As GRAPH reads the file, it will expect to find dates consisting of three groups of numbers, but it will ignore the groups in the positions represented by the hyphens. Thus, GRAPH will read the date 80/11/22 simply as 22.

Processing Multiplan Data

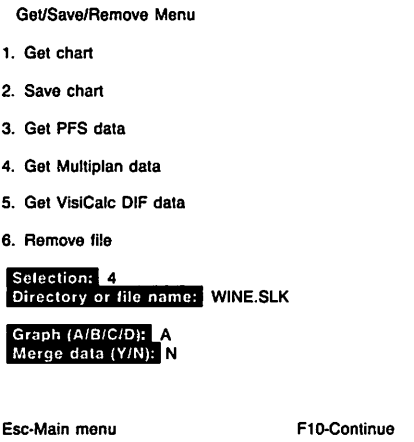
When you have filled in the three menu items, press F10. GRAPH reads the data from the file, checking to make sure each X data value is a valid entry, and stores it in the scratchpad. GRAPH prints a message on the screen to indicate the number of data points that it has read so far. Press F10 again and GRAPH performs any necessary data reduction, and stores the data in the scratchpad.

If you set the Merge item to Y, to merge data from different files, the same kind of data reduction occurs. If an X value is read from the merging file that does not exist in the original graph, it is simply added as a new X value for the graph. But if an X value is read that does exist, its Y value is added to the existing Y value.

Example of Getting Data from a Multiplan File

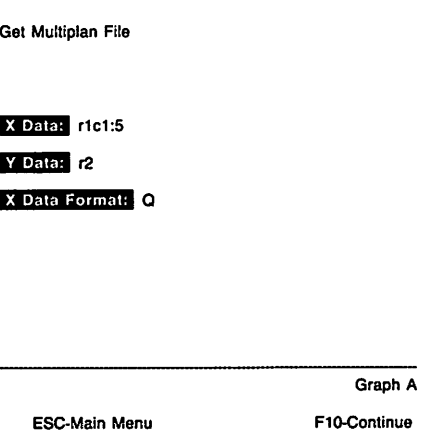
The Graph Sampler diskette contains a sample Multiplan SYLK file, called WINE.SLK. WINE.SLK is a spreadsheet showing the number of cases of various wines sold by a winery during 1983. Let's create a chart from WINE.SLK to show quarterly shipments of Cabernet.

Return to the Main Menu and select Clear to clear the scratchpad. When the Main Menu reappears, type 4 in the Selection item. Press F10 and the Get/Save/Remove Menu appears. Type 4 as the Selection item to choose the Get Multiplan Data option. Type WINE.SLK in the Directory or File Name item. Type A in the Graph (A/B/C/D) item, and leave the Merge Data item set to N. The screen should look like this:



Press F10 to continue.

GRAPH next displays the Get Multiplan File form. The X data in your spreadsheet (the numbers 1, 2, 3, and 4) represent the four quarters of the year. This data is in row 1, columns 1 through 5, so type r1c1:5 in the X Data item. The Y data is the number of bottles of Cabernet sold each quarter, which is in row 2. Type r2 in the Y Data item. Because the X Data Format is date and this chart represents quarters of the year, enter Q in the X Data Format item. The filled-in menu looks like this:



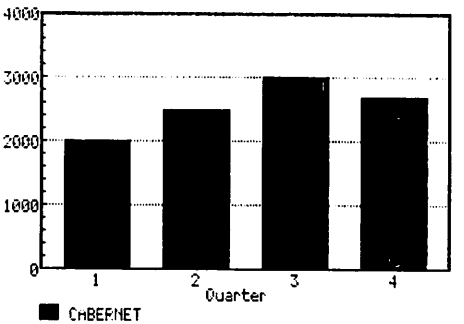
Note that if you had named row 1 of the worksheet QUARTER and row 2, CABERNET, you could enter the respective names in the X Data and Y Data items.

Press F10 to continue. GRAPH begins processing the data and displays a screen indicating the number of data points it has read:

4 Data points read

Press F10 to continue

Press F10 again. GRAPH performs any necessary data reduction, and stores the data in the scratchpad. When you display the chart, it looks like this:

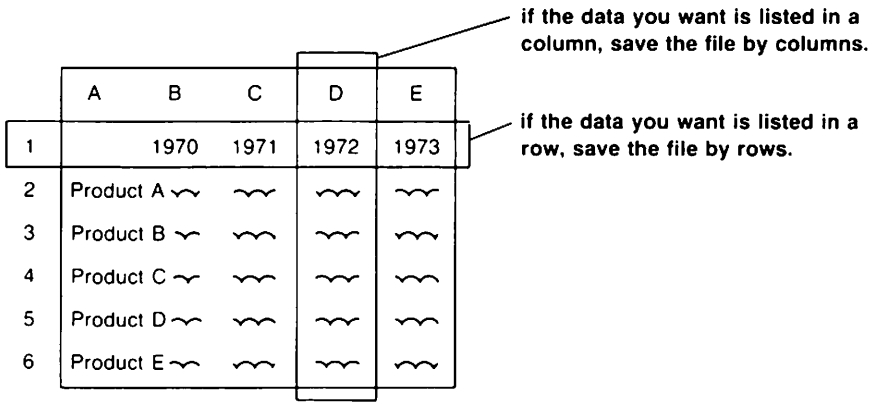


Getting Data from a VisiCalc (DIF) File

You can enter data directly from any DIF file, created by a spreadsheet program such as VisiCalc or 1-2-3. GRAPH reads the data from the file and stores it in the GRAPH scratchpad.

Preparing the VisiCalc File

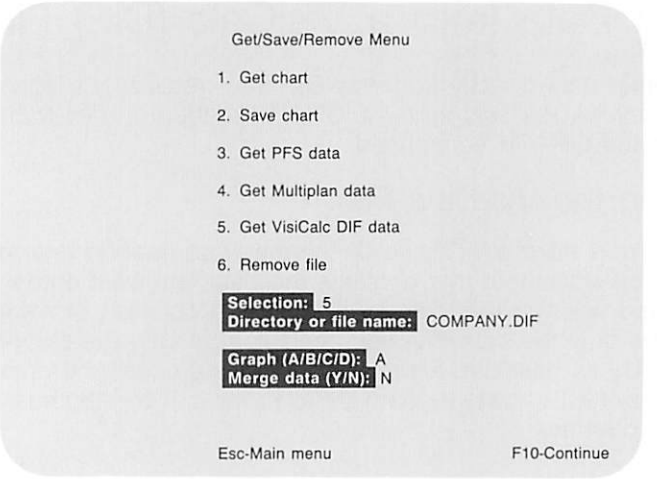
Before you can store your file in DIF format, you need to determine the portion of the worksheet that contains the data you want entered into GRAPH, and whether that data is contained in columns or rows. You should store only the data that you need so that GRAPH can read from the file as quickly as possible. Also, if you want to process the data by rows, you must save it by rows; if you want to process it by columns, you must save it by columns.



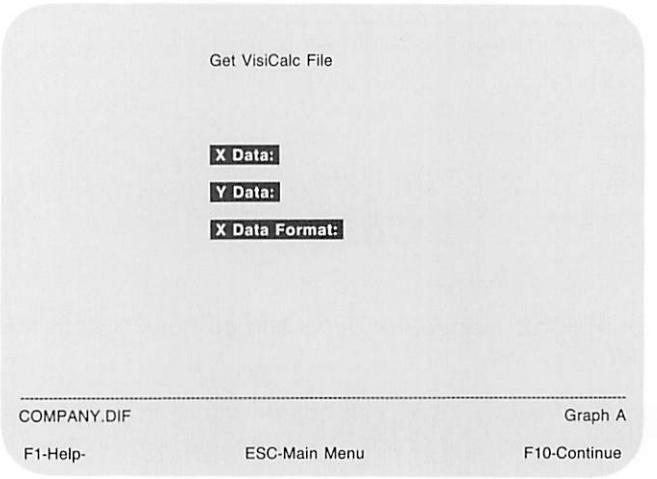
Refer to your VisiCalc manual for directions on how to store the selected portion of the worksheet.

To select the Get VisiCalc (DIF) File option, return to the Main Menu, enter 4 for the Selection item and press F10. The Get/Save/Remove Menu appears.

Enter 5 for the Selection item to indicate that you want to read data from a VisiCalc file. Move the cursor to the Directory or File Name item and enter the file name (including any extension) for the VisiCalc file. (If you need a list of files, enter just a drive name followed by a colon instead of a file name.) Fill out the next two menu items appropriately. A filled-in menu might look like the following:



Insert the DIF file diskette in the drive and press F10. GRAPH displays the Get VisiCalc File Menu:



Specifying the X and Y Data

You use this menu to specify the rows (or columns) that contain the X and Y data and the X Data Format. Notice that the menu shows the name of the VisiCalc file you specified in the lower left corner of the screen, and the graph identifier (A, B, C or D) in the lower right corner. The items on the menu are:

X Data:	enter the number of the row (or column) that will provide the X data. The row (or column) number is determined by the position in the DIF file, not the position in the original worksheet. Thus, the first row in the DIF file is row 1, regardless of its row number in the original worksheet.
Y Data:	enter the number of the row (or column) that will provide the Y data.
X Data Format:	enter I if your X data is in identifier format; N if it is in numeric; and the appropriate combination of D, M, Y, Q, and – if it is in date format. See Chapter 1 for a complete description of X Data Format codes.

If you specify an X Data Format of date, you need to tell GRAPH what the dates in the file look like, as well as how you want them entered for the graph. Sometimes that means that GRAPH has to ignore one or more parts of each date in the file. For example, suppose your file lists data for each day in a given month. The dates are entered in the VisiCalc file as year/month/day, but you want to graph them by day only. You want GRAPH to ignore the month and year, so enter --D as the X Data Format. As GRAPH reads the file, it will expect to find dates consisting of three groups of numbers, but it will ignore the groups in the positions represented by the hyphens. Thus, GRAPH will read the date 80/11/22 simply as 22.

Processing VisiCalc Data

When you have filled in the three menu items, press F10. GRAPH reads the data from the file, checking to make sure each X data value is a valid entry, and stores it in the scratchpad. GRAPH prints a message on the screen to indicate the number of data points that it has read so far. Press F10 to continue.

Data Reduction

If GRAPH finds the same X value more than once, it adds the corresponding Y values and stores the sum as a single Y value for that X. For example, suppose your VisiCalc file lists product orders by day for a six-month period, but you want to build a graph that shows total orders for each of the six months. You would enter an X Data Format of M-- to tell GRAPH to ignore the day and year parts of the date when reading the data. Thus, up to 31 different Y values may be found for each month. GRAPH adds them together and enters the total as the Y value for that month.

If you set the Merge item to Y, to merge data from different files, the same kind of data reduction occurs. If an X value is read from the merging file that does not exist in the original graph, it is simply added as a new X value for the graph. But if an X value is read that does exist, its Y value is added to the existing Y value.

For very large numbers, GRAPH may ignore the rightmost digits when retrieving the data and plotting the chart. However, the appearance of the chart is unaffected by this.

Example of Getting Data from a VisiCalc File

Let's assume that you have a VisiCalc file called COMPANY.82 that shows your company's sales, expenses, and profit for each month in 1982. The first few months on the worksheet look like this:

	Jan	Feb	Mar	Apr	May	Jun
Costs						
Production	1300	1295	930	1840	8	1340
R & D	1550	1572	1115	2200	1599	1603
Mktg/Admn	1020	1045	932	2304	1069	1053
Total Costs	3870	3912	2977	6344	2676	3996
Total Sales	5630	5754	4500	5807	5790	5775
Profit	1760	1842	1523	537	3114	1779
Taxes	880	921	761.5	0	1557	889.5
Net Profit	880	921	761.5	0	1557	889.5

Now let's build a graph that shows total costs for each month from January to June. First, you need to save the portion of the worksheet that contains that data in DIF format:

start saving the file here

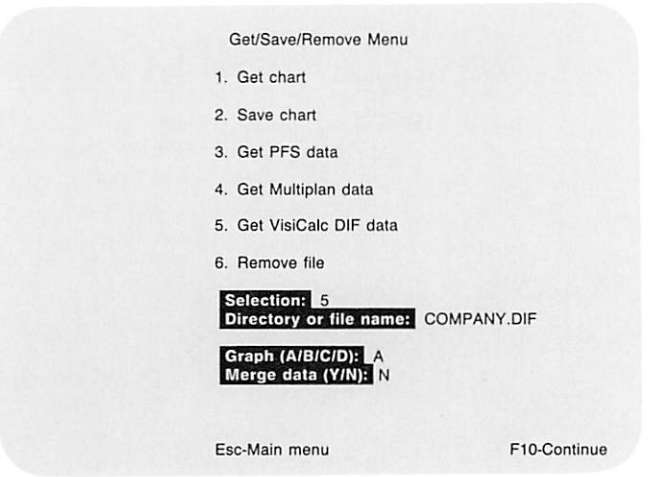
	Jan	Feb	Mar	Apr	May	Jun
Costs						
Production	1300	1295	930	1840	8	1340
R & D	1550	1572	1115	2200	1599	1603
Mktg/Admn	1020	1045	932	2304	1069	1053
Total Costs	3870	3912	2977	6344	2676	3996
Total Sales	5630	5754	4500	5807	5790	5775
Profit	1760	1842	1523	-537	3114	1779
Taxes	880	921	761.5	0	1557	889.5
Net Profit	880	921	761.5	0	1557	889.5

stop saving the file here

Rows 1 and 6 contain the X and Y data, so begin saving the worksheet at row 1 and stop at the end of row 6. Be sure to save the file in rows. In this example, we will save to the new file COMPANY.DIF.

When the file has been saved in DIF format, reload GRAPH. Enter 4 for the Selection item and press F10. The Get/Save/Remove Menu appears on the screen.

Enter a 5 to indicate that you want to read data from a VisiCalc DIF file, move to the next item, and enter A (because this is a new chart). Leave the Merge Data item set to N. Enter your VisiCalc file name (COMPANY.DIF in this example) and insert the diskette with your VisiCalc file. The menu should look like this:



Press F10 to continue and GRAPH displays the Get VisiCalc File Menu:

COMPANY.DIF Graph A

F1-Help- ESC-Main Menu F10-Continue

The X data is in row 1 in the VisiCalc file, and the Y data is in row 6, so enter 1 and 6 for X Data and Y Data, respectively. Finally, enter I for the X Data Format to indicate that the X data is identifier. The VisiCalc file name already shows in the lower left corner, while the graph identifier is in the lower right. The screen should look like this:

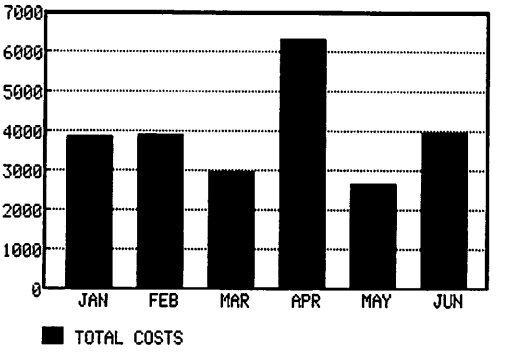
COMPANY.DIF Graph A

F1-Help- ESC-Main Menu F10-Continue

Press F10 and GRAPH begins reading the data points from the specified rows. When all the data has been read, GRAPH displays the following message:

```
6 Data points read

Press F10 to continue
```

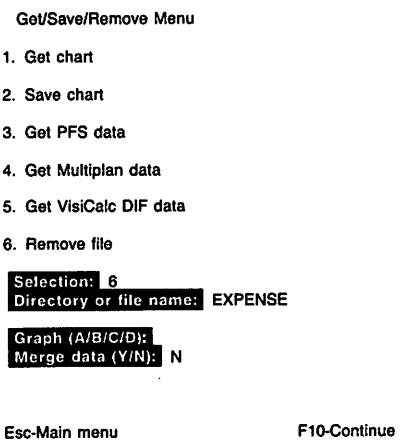
GRAPH performs any necessary data reduction, stores the data in the scratchpad, and returns to the Main Menu when you press F10. If you display the graph, it looks like this:



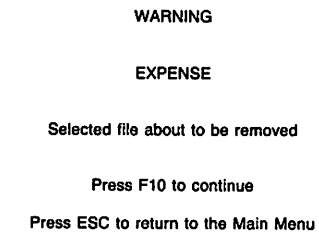
Removing a File

When you remove a file, GRAPH erases the copy saved on the diskette. It is a good idea to get a chart file and display it before you remove it from the diskette, to verify that you really want to remove it. There is no way to recover a file once the Remove File function has erased it.

To remove a file named EXPENSE, select the Get/Save/Remove function from the Main Menu. Enter 6 as the Selection item and the name of the file you want to erase in the Directory or File Name item. (Leave the last two items on the menu; GRAPH ignores them when removing a file.) The screen should look like this:



Insert the chart diskette and press F10. GRAPH warns you that the file is about to be removed, and gives you a chance to change your mind:



Press F10 if you want to go ahead and remove the file. GRAPH permanently erases the file from the diskette, and returns to the Main Menu. If you press ESC, GRAPH does not remove the file and returns to the Main Menu.

For example, let's remove the GROWTH chart file from your diskette. In the Get/Save/Remove Menu, enter 6 as the Selection item and GROWTH in the Directory or File Name item. Press F10. GRAPH displays a warning message to give you a chance to change your mind. Press F10 again to go ahead with the removal. GRAPH deletes the chart from the diskette, and returns to the Main Menu. If you press ESC, GRAPH abandons the operation and returns to the Main Menu.

Warning: Once you remove a file from the diskette, there is no way to recover it. Make sure that you have no further need for the file before you remove it.

Summary

- The Get/Save/Remove function has six options, each with the capability of listing files on disk:

  - Use Get Chart to retrieve a chart that is stored in a file on a disk.

  - Use Save Chart to store your chart in a file for use at a later time.

- Use Get PFS Data to read data from a PFS:FILE file.
- Use Get Multiplan Data to read data from a Multiplan SYLK file.
- Use Get VisiCalc DIF Data to read data from a VisiCalc DIF file.
- Use Remove File to erase a file from a disk.

- To get a listing of the files on a disk, enter just a drive name followed by a colon in the Directory or File Name item.
- Use the Graph (A/B/C/D) item to identify each graph in your chart.
- Use the Merge Data item to add the new data to the data already in the graph.
- If an X value is entered more than once, GRAPH performs data reduction, adding together the corresponding Y values and entering the sum as the single value for that X.
- Keys used frequently with Get/Save/Remove are:

Key	Function
TAB	moves the cursor to the next item.
SHIFT TAB	moves the cursor to the previous item.
F10	proceeds with the selected function. For example, when used with Get Chart, it retrieves the chart specified in the Directory or File Name item.
ESC	returns to the Main Menu without performing any function.

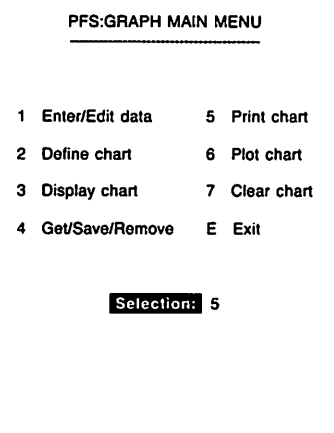
5: print chart

The Print Chart function is used to produce a paper copy of your chart on a printer. You can then use the printed chart to illustrate and clarify data included in a report or presentation. You can also print a chart to a disk file, and include that file as part of a PFS:WRITE document.

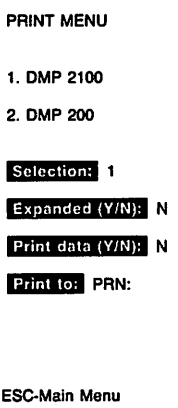
You will probably want to run a program called SETUP, which is on the GRAPH program diskette. (See Appendix C for details.) Refer to the manual that came with your printer for operating instructions for your printer.

Using a Printer

To begin the Print Chart function, return to the Main Menu (press ESC if necessary) and enter 5 as the Selection item. Your screen should look like this:



Press F10 to continue and the Print Menu appears:



This menu asks you what type of printer you are using, whether you want a list of the actual data points for each graph in the chart, what size you want the output to be, and where to print the chart. The menu options are:

Selection:	enter 1 to print on the DMP 2100 or 2 to print on the DMP 200
Expanded (Y/N):	leave N to print the chart in normal size (approximately 3" x 4"); enter Y to rotate it and expand it to fill an 8-½" x 11" page.
Print Data (Y/N):	leave N if you do not want the list of data points printed; enter Y to print them.
Print to:	This is the standard MS-DOS name for the device to which the output is sent or the name of a disk file. Enter PRN: for a parallel printer or the name of a disk file. If you print to a disk file, you can include the chart in a PFS:WRITE document.

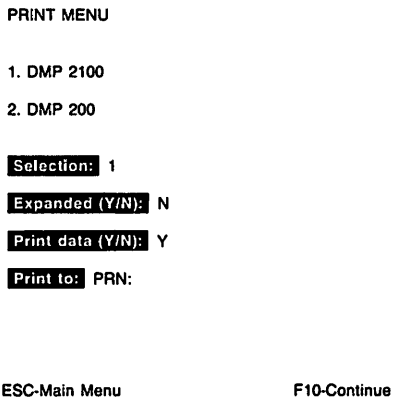
GRAPH saves the information you entered in the menu items and uses it as defaults each time you print. These defaults are saved until you change them, turn off the computer, or run another program. When you start the program again, the defaults are those established by the SETUP program described in Appendix C. When you have entered all four items, press F10 to continue. GRAPH prints a copy of the chart as specified and returns to the Main Menu. GRAPH prints the data if you specified Print Data Y, and then pauses to display the following message:

```
About to print chart

Press F10 to continue
Press ESC to return to the Main Menu
```

You can press F10 to continue (after adjusting the paper, if appropriate) or ESC if you do not want to print the chart at this time. Once the printing begins, you can stop it by pressing ESC. Be sure to adjust the paper in the printer before printing the next chart.

Example of Printing a Chart

For example, let's assume you want to print the chart named SALES on the DMP 2100 printer. First, you should get the chart from the Graph Sampler diskette (using the Get/Save/Remove function). Then return to the Main Menu and enter 5 for the Selection item. Press F10 to continue, and GRAPH displays the Print Menu. Assuming that you have the DMP 2100 printer connected to your computer, enter 1 for the Selection item, leave the N for Expanded, enter Y for Print Data, and leave the Print To item with the default value of PRN:. Your screen should look like this:



Next, press F10 to continue. GRAPH prints the data for the three graphs in the chart:

	Graph A	Graph B	Graph C
1/80	1800	600	3500
2/80	1500	500	2300
3/80	1200	900	3000
4/80	2000	1000	3200
5/80	2100	900	2600
6/80	2300	1100	2900

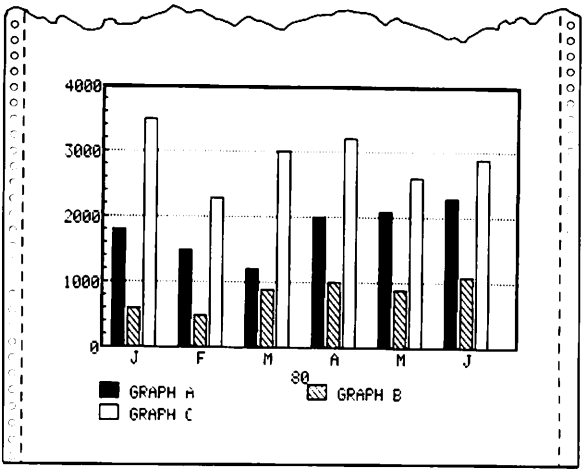
After printing the data, GRAPH pauses to display the following message:

About to print chart

Press F10 to continue

Press ESC to return to the Main Menu

Press F10 to continue. GRAPH prints the chart below the list of data:



Summary

- You use the Print Chart function to produce a copy of your chart on a printer.
- Print your chart to a disk file if you want to include it as part of a PFS:WRITE document.

Warning: It is a good idea to save a chart before you print it. You should be especially careful to enter the correct number in the Selection item. If you ask GRAPH to print to a device that is not part of your system, you may get unexpected results. You also may not be able to Escape to the Main Menu. If this should happen, reinsert the GRAPH program diskette and press the black RESET button to restart. Unfortunately, any chart that was in the scratchpad is lost, unless you had previously saved it on a disk.

6: plot chart

The Plot Chart function is used to produce a paper copy of your chart on a plotter. Because a plotter can draw on transparency paper as well as regular paper, you can also make overhead transparencies.

You may want to run a program called SETUP, which is on the GRAPH program diskette. (See Appendix C for details.) Refer to the manual that came with your plotter for its operating instructions.

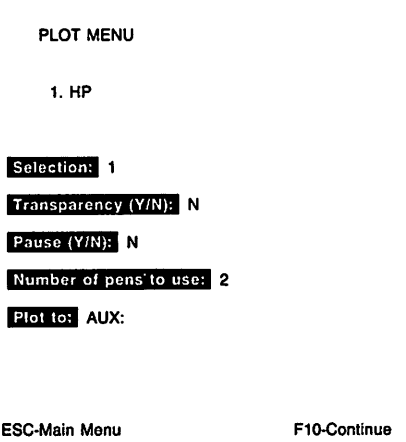
It is a good idea to save a chart before you plot it. If you use GRAPH incorrectly to plot a chart, you may lose the data in the scratchpad.

Using a Plotter

To begin the Plot Chart function, return to the Main Menu (press ESC if necessary) and enter 6 as the Selection item. Your screen should look like this:

```
PFS:GRAPH MAIN MENU

1 Enter/Edit data      5 Print chart
2 Define chart         6 Plot chart
3 Display chart        7 Clear chart
4 Get/Save/Remove      E Exit

Selection: 6

                                F10-Continue
```

Press F10. The Plot Menu appears next:



This menu asks you what type of plotter you are using, what type of paper you are using, whether you want to change pens before each graph is drawn, the number of plotter pens GRAPH should use, and the slot to which your plotter is connected. Let's look at each of these items in detail:

Selection: enter 1 to indicate that you will use an HP plotter

Transparency (Y/N): enter Y if you are using transparency paper; N if you are using regular paper. If you specify transparency paper, the speed of the pen is reduced so that the lines are drawn clearly despite the slickness of the paper. You must use special pens when making transparencies. If the transparency sheet tends to stick, put a sheet of regular paper under it. On transparencies, pie charts are exploded so that colors do not touch.

Pause (Y/N):	enter Y if you want GRAPH to stop after each graph or pie segment to prompt you to change pens (e.g., to use a different color for each graph or segment); N if you want to plot the entire chart without changing pens.
Number of Pens to Use:	enter the number of pens that you want GRAPH to use when plotting the chart. You must enter a number from 1 to 9. The default value is 2. If you answered Y to the Pause item, GRAPH ignores your response to this question.
Plot to:	enter the standard MS-DOS name for the slot to which you have the plotter connected. Use AUX: for your HP plotter.

If you want to draw a bar chart with solid colored bars (a pie chart with solid colored pie segments or an area chart with solid colored areas), you must set the Color item on the Define Chart Menu to Y before beginning the Plot Chart function.

When you have entered all items, or if you want to accept the default values, press F10. GRAPH draws the chart on the plotter. If you specified Y for the Pause item, GRAPH pauses before each part of a chart is drawn and prompts you to change the pen:

Please change pens

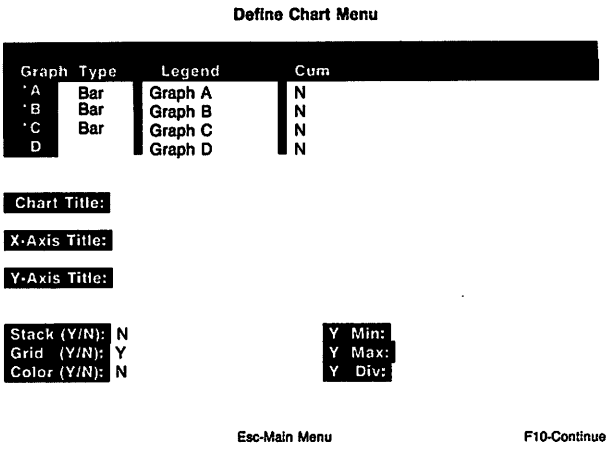
Press F10 to continue

Press ESC to return to the Main Menu

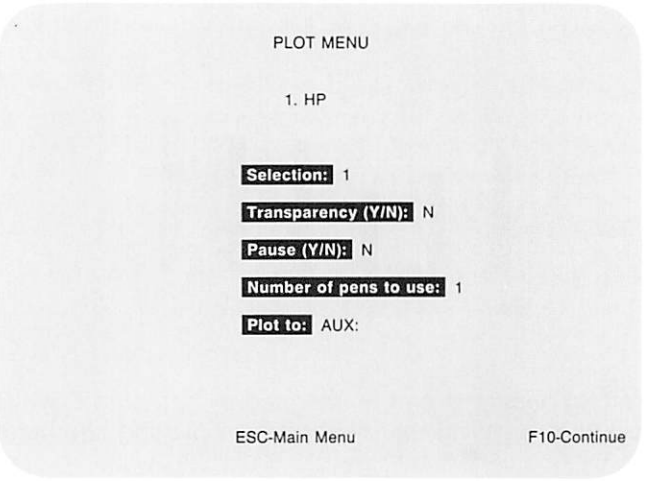
Change the pen when the plotter stops, then press F10 to continue.

Example of Plotting a Chart

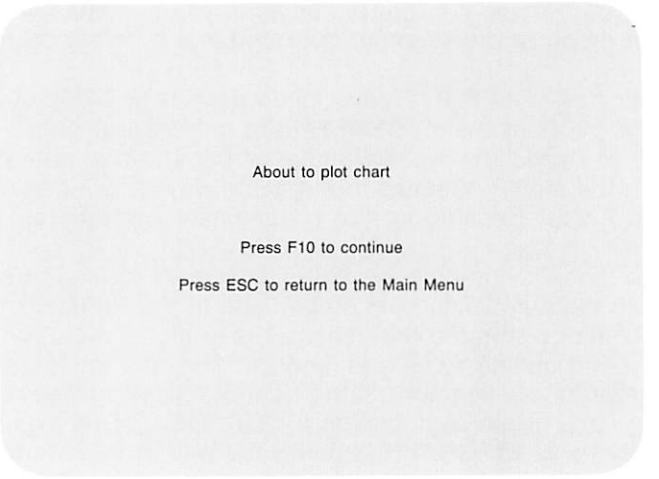
For example, let's assume you want to plot the SALES chart on regular paper using one pen color. First get the chart from the Graph Sampler diskette (using the Get/Save/Remove function), if it isn't already in the scratchpad. Display the Define Chart Menu and make sure that the Type column lists Bar for each graph in the chart, and that the Color setting is N. The screen should look like this:



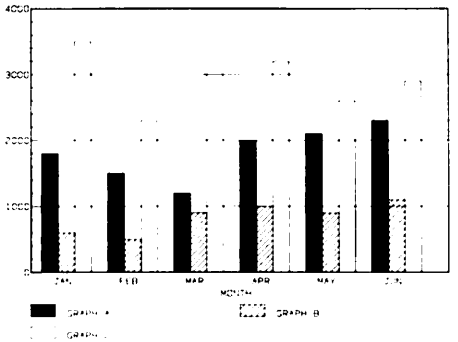
Press F10 to enter this data. When the Main Menu reappears, enter 6 as the Selection item. Press F10 to continue, and the Plot Menu appears. Enter 1 for the Selection item. Because you want to use regular paper and only one pen color, enter N for the next two items. Enter 1 for the Number of Pens to Use item. This example assumes you have an HP plotter connected to AUX:.



Press F10. GRAPH displays the following message:



Insert a sheet of paper in the plotter and be sure the pen is in the holder. Then press F10 to begin plotting. The plotted chart looks like this:



Once the plotting begins, it can be stopped by pressing ESC. Be sure to put a new piece of paper in the plotter before plotting another chart.

Changing Plotter Pens

A 2-pen plotter (such as the HP 7470A) draws the chart outline, titles, and legends with the left pen. It draws each graph or pie segment with the right pen. If you answer Y to the Pause item, you can change the right pen so that each graph or pie segment is plotted in a different color.

If your plotter has more than 2 pens (such as the HP 7475) and you entered Y for the Pause item, GRAPH uses only pens 1 and 2, regardless of the value you specified in the Number of Pens to Use item in the Plot Menu. Thus, the plotter operates in the same way as a 2-pen plotter. Change pen 2 to plot each graph or pie segment in a different color.

To use more than 2 pens on your plotter, answer N to the Pause item. Then indicate the number of pens to be used in the Number of Pens to Use item. Plotters with more than one pen use pen 1 exclusively for printing the chart outline, titles and legends. They do not use pen 1 for plotting a graph or pie segment. If the number of pens is less than the number of graphs or pie segments in a chart, GRAPH re-uses some pens when plotting the chart. GRAPH chooses the pen or pens to re-use in such a way that you can easily distinguish one graph or pie segment from another.

Example of Plotting on Transparency Paper

Now let's assume you want to make a transparency copy of the same chart, using different, solid colors for the bars of each graph. First display the Define Chart Menu and enter Y for the Color item. Then return to the Main Menu and enter 6 as the Selection item. Press F10 and the Plot Menu appears.

We want to plot on transparency paper, so enter Y for the Transparency item, and replace the standard pens with special pens meant for use on transparency paper. Because we want to change a pen to another color after each graph is drawn, enter Y for the Pause For Pen Change item. GRAPH will pause for pen changes; therefore, it ignores your answer to the Number of Pens to Use item. You can leave it at its current value. The filled-in menu should look like this:

```
                    PLOT MENU

                    1. HP

Selection: 1
Transparency (Y/N): Y
Pause (Y/N): Y
Number of pens to use: 2
Plot to: AUX:

ESC-Main Menu                    F10-Continue
```

Insert the transparency paper in the plotter, if you haven't already done so and press F10. The plotter begins drawing the chart on the transparency paper. When it completes the bars for the first chart, the plotter pauses and GRAPH displays this message on the screen:

Please change pens

Press F10 to continue

Press ESC to return to the Main Menu

Replace the pen and press F10. GRAPH draws the next graph, then stops again, giving you the same instructions. This continues until the chart is complete.

Summary

- Use the Plot Chart function to produce a paper or transparency copy of your chart.
- To plot a bar, pie, or area chart with patterns, enter N for the Color item in the Define Chart Menu before beginning the Plot Chart function. To plot with solid colors, enter Y for the Color item.
- You can plot on regular or transparency paper, pausing to change pens after each graph in the chart, if desired.

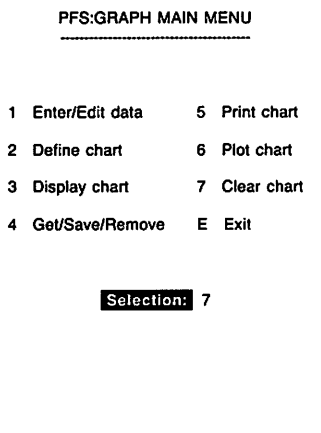
Warning: It is a good idea to always save a chart before you plot it. You should be especially careful to enter the correct number in the Selection item of the Plot Menu. If you ask GRAPH to plot to a device that is not part of your system, you may get unexpected results. You also may not be able to Escape to the Main Menu. If this should happen, reinsert the GRAPH diskette and press the black RESET button to restart. Unfortunately, any chart that was in the scratchpad is lost unless you had previously saved it on a disk.

7. clear chart

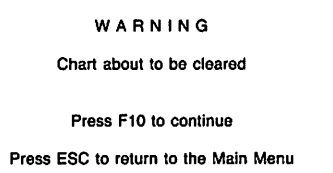
The Clear Chart function is used to clear the data from all graphs in the chart currently in the scratchpad. This function clears the GRAPH scratchpad only; it does not affect the copy of the chart that is stored on the diskette. (To remove the stored copy, use the Get/Save/Remove function, described in Chapter 4.)

Clearing the Chart

To clear the chart, first return to the Main Menu (press ESC if necessary). Enter 7 in the Selection item. The screen should look like this:



Press F10 to continue. GRAPH warns you that it is about to clear the chart and gives you a chance to change your mind:



Press F10 to go ahead and clear the chart. GRAPH erases the chart from the scratchpad, and returns to the Main Menu. If you press ESC, GRAPH does not remove the chart and returns to the Main Menu.

For example, let's clear the SALES chart sample from the GRAPH scratchpad (it should still be there). Make sure the Main Menu is displayed (press ESC if necessary) and enter 7 as the Selection item.

Press F10 and GRAPH warns you that it is about to clear the chart and gives you a chance to change your mind. Press F10 to clear the chart, and GRAPH returns you to the Main Menu.

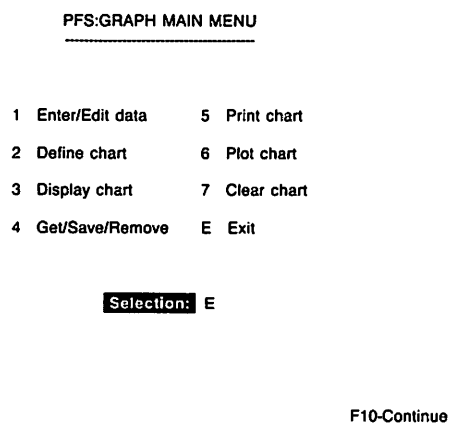
Summary

- Use the Clear Chart function to clear the data from the chart currently in the scratchpad. This does not affect the copy stored on the diskette.

8: exit

When you are finished using the GRAPH program, or when you want to leave GRAPH to perform MS-DOS commands, you can use the Exit function to leave the GRAPH program.

To select Exit, return to the Main Menu (press ESC, if necessary) and type E as the Selection item. The screen should look like this:



Press F10.

If you try to exit from GRAPH when the scratchpad contains a chart that has been changed, but not saved, GRAPH displays a warning message that the chart has not been saved. To save the chart in the scratchpad, press ESC. GRAPH returns you to the Main Menu. You can then use the Get/Save/Remove function to save the chart in the scratchpad before exiting.

Once you exit, you are out of the GRAPH program and under MS-DOS control. Next, the MS-DOS prompt appears on the screen:

A> (or B> if your current default drive is B:)

At this point, you could perform any MS-DOS commands you wish, or you could insert PFS:FILE or another program diskette. Then simply type in the name of the new program and press ENTER.

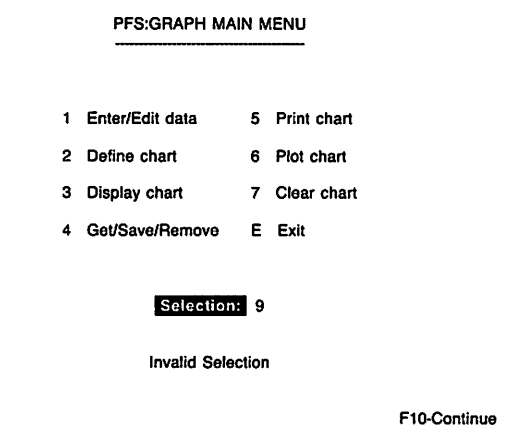
Summary

- Use Exit to leave the GRAPH program and go back to MS-DOS.

A: appendix

Error Messages

GRAPH displays a message whenever an error condition is encountered. Certain errors are the result of mistakes made when you enter information, like specifying X and Y data or the X Data Format, getting or removing charts, and defining charts. Other errors are the result of physical limitations or problems with certain elements of your computer system. Most of these messages are displayed in the message area at the bottom of the screen.



Other messages are displayed on a separate screen.

Printer is not ready

Press F10 to continue

Press ESC to return to the Main Menu

When you encounter one of these messages, simply locate the message in the following list and follow the instructions in the Corrective Action column. To return to normal GRAPH operation, press ESC.

Following is the list of GRAPH messages, arranged in alphabetical order:

Message	Corrective Action
Bad File Name	You entered a file name that cannot be recognized. Make sure the file name is typed correctly. File names cannot contain a space, comma, /, or double periods (..). Make sure the file name contains only allowable characters. Refer to the section on file name conventions in the Introduction for allowable names. Or, you attempted to reference a device that isn't in your system. Make sure you typed the device name correctly; for example, B:MYFILE with no spaces.

Message	Corrective Action
Cannot change X data format	This may occur when reading data from other sources (such as a PFS:FILE file). You specified an X Data Format that differs from the existing one. For example, if you specify the X Data Format as MY for Graph A and then specify it as I for Graph B, GRAPH displays this message and indicates the current X Data Format. Enter the same X Data Format for each graph.
Cannot Find File	The name you specified in the Directory or File Name item cannot be found. Make sure you enter the name of a file that exists on your diskette. List the files on your diskette, if necessary. Be sure you have specified the drive correctly.
Cannot find X data	The X data you specified for a row or column does not exist in the VisiCalc file. For example, if the file has 4 rows of data and you specified row 6 as your X data, GRAPH displays this message. Go back to the VisiCalc program and examine the worksheet to make sure the row or column specified exists in the VisiCalc file.
Cannot find Y data	The Y data you specified for a row or column does not exist in the VisiCalc file. For example, if the file has 4 rows of data and you specified row 6 as your Y data, GRAPH displays this message. Go back to the VisiCalc program and examine the worksheet to make sure the row or column specified exists in the VisiCalc file.
Cannot Print to the Console	You have tried to print a chart to a console. You can print charts on a printer or to a disk file. Make sure the Print To item of the Print Menu is PRN: or a disk file name.

Message	Corrective Action
Chart is full	You have tried to save a chart with more data values than GRAPH allows. GRAPH can save up to 36 X data points on one graph (144 per chart), or 16 X data points for an X Data Format of I. If you enter more than 36 data points for a chart, GRAPH does one of the following: 1. If the X Data Format is date, GRAPH sorts the incoming X data in chronological order. GRAPH removes the X data that is farthest away from the starting date to make room for X data that is closer to the starting date. 2. If the X Data Format is N, GRAPH removes the highest X data value to make room for lower X values. 3. If the X Data Format is I, GRAPH rejects incoming X data after the chart has 16 X data points. You can use the Enter/Edit Data function to remove some of the dates, numeric X values, or identifier X values.
Chart is too wide	This error may occur during the Display Chart function. You can display up to 36 bars side by side in a bar chart. If your chart contains four graphs, each with 10 data points, there would be 40 bars in the chart; GRAPH cannot display it except in stacked mode. If you press ENTER after GRAPH displays this message, GRAPH displays the data for the first 36 values of X, whether or not there is data associated with each of them. Or, you can use the Enter/Edit Data function to remove some data points.

Message	Corrective Action
Directory is Full	GRAPH tried to write information to a disk, but the disk's directory contains the maximum number of files. If you have unnecessary files on a chart diskette, you can free up some space in the directory by removing them (see Chapter 4).
Disk Has Been Changed	The PFS:FILE file disk has been removed from the disk drive. Replace the disk containing the PFS:FILE file.
Disk is Full	GRAPH tried to write information to a disk and found that there was no room left. This can occur when GRAPH is trying to save a chart file or is trying to write some information in a PFS file during the search or graph specification and finds no room on the diskette. If you have unnecessary files on a chart diskette, you can free up some space by removing them (see Chapter 4). If you have unnecessary forms in the PFS:FILE file, free up space by removing them or moving some forms to a different file and then merging the data from both files when building the graph. (See your PFS:FILE manual.)
Disk is Write-Protected	GRAPH needs to write on the disk, but it is write protected. GRAPH uses some areas of PFS data diskettes to temporarily store information. Also, during the Save Chart and Remove File functions, GRAPH must write on the diskette. Remove the write-protect tab from the diskette. To protect the charts, be sure to make a duplicate copy of your chart diskettes.
Drive is Not Ready	The diskette drive door is open. Close the door.

Message	Corrective Action
Empty Chart	If no data has been entered in the chart or if the Type column in the Define Chart Menu has been blanked out for all graphs in the chart, there is nothing to display. If you entered data and you get this message, you probably forgot to press F10 before leaving the Enter/Edit Data function and your data is lost. Return to the Enter/Edit Data function and enter your data again, or enter the desired type in the Type column of the Define Chart Menu.
Enter values for both Y Min and Y Max	This message may appear in the Define Chart function. You must specify both the Y Min and Y Max values to adjust the Y scaling of a chart. In the Define Chart Menu, specify both Y Min and Y Max.
File is Maximum Size	To get data from a PFS:FILE file, GRAPH must store some information in the file; however, the file has reached maximum size. You can use PFS:FILE to copy the design to a new file and transfer forms there. Or, if there are unneeded forms in the file, remove them.
Internal Error	Your hard disk is probably malfunctioning. Contact your dealer.
Invalid data for pie chart	GRAPH cannot display a chart in pie format if it has less than two points, more than eight points, or any negative data points. Also, the chart can be displayed as a pie chart only if it has an X Data Format of identifier. You can delete any data points with negative values, or delete enough data points so that only eight remain. Make sure the chart has I entered for its X Data Format.

Message	Corrective Action
Invalid Selection	The number entered for the Selection item of a menu is invalid. The number must be one of those shown on the menu. Enter a number shown on the menu.
I/O Error	Some physical problem has been encountered with the disk drive, the disk controller, or the diskette. Possible causes are: Disk drive door open. Close the door. Malfunction. Stop using this diskette and do not copy it onto your backup copy. Make another copy of your backup, then try reformatting the bad disk. If the I/O error persists, throw out the disk and try a new one, or take the disk drive to your dealer for testing.
Missing X	This message may occur while retrieving PFS:FILE data. You have not identified which item in the graph spec is the X data. Move the cursor to the item you want to use for X data and mark it with an X and the X Data Format.
Name not found	GRAPH cannot find a row or column in the file with the name you specified. Check to make sure you specified the correct row and column names.
No files found	GRAPH cannot find a file on the directory with the name you specified. Make sure you typed the correct file name including extension, if it has one. List the files, if needed.
No help is available here	You have pressed F1 for Help, but there is no Help information available for this screen. Help is available only when you see F1-Help displayed at the bottom of the screen.

Message	Corrective Action
Not a chart file	In the Get Chart function, you entered the name of a file that is not a GRAPH chart file. Return to the Main Menu, select the Get/Save/Remove function, then in Get Chart, enter the name of a GRAPH chart file.
Not a Multiplan file	The Multiplan file you specified was not saved in SYLK format. GRAPH cannot read data from a Multiplan file that is not saved in SYLK format. Go back to the Multiplan program and save your data in SYLK format.
Not a PFS Data file	In the Get Chart function, you entered the name of a file that is not a PFS:FILE file. Return to the Main Menu, select the Get/Save/Remove function, then in Get Chart, type the name of a PFS:FILE file.
Not a VisiCalc file	The VisiCalc file you specified was not saved in DIF. GRAPH cannot read data from a VisiCalc file that is not saved in DIF. Go back to the VisiCalc program and save your data in DIF. Refer to your VisiCalc manual for instructions on saving in DIF.
Please provide both x and y data locations	You haven't told GRAPH where to get the X or Y data. If you are accessing a PFS:FILE file, you must specify the X data. For Multiplan and VisiCalc files, you must specify the row (or column) of both the X and Y data.
Plotter is not ready	GRAPH cannot access the plotter you specified. Make sure your plotter is turned on and is on-line. Make sure you have specified the correct plotter.
Printer is not ready	GRAPH cannot send data to the printer. Make sure the printer is turned on, on-line and has paper. Make sure you specified the correct printer.

Message	Corrective Action
Search List is too long	The retrieve specifications you entered when retrieving PFS:FILE data do not fit in the program's internal storage space. Specify fewer requests in the retrieve specifications.
This program requires a graphics/adaptor card.	The function you selected requires the graphics/adaptor card. You must install a graphics/adaptor card in your system to print or display a chart.
Type A, B, C, or D	The graph you select must be identified as A, B, C, or D. Enter an appropriate identifying letter: A, B, C, or D.
X data format is wrong	The X Data Format you have entered is not valid, so GRAPH can't process your data. The X Data Format must be I, N, or a combination of D, M, Y, Q, or –. Enter a valid X Data Format. See Chapter 1 for instructions on specifying X Data Format for keyboard data and Chapter 4 for data from other sources.
X data is wrong	The X data doesn't match the X Data Format. For example, if the X Data Format is MY and the X data is 70/80, GRAPH treats the first component of the X data as a month. Because M must be a value between 1 and 12, GRAPH rejects the 70/80. If the X Data Format is N, GRAPH tries to interpret all X data as numeric. If the X data in not numeric, GRAPH cannot interpret it. Also, if you specify numerical values that are too large or too small (1E29 is the largest number; –1E–29 is the smallest), GRAPH cannot interpret the data.

Message	Corrective Action
X data is wrong (cont.)	In PFS:FILE, Multiplan, and VisiCalc data, this message appears with the erroneous X data. You can either continue reading the next X data from the file or press ESC to return to the Main Menu. You can go back to the PFS:FILE, Multiplan, or VisiCalc file to change the X data so that it works with the X Data Format, or you could change the X Data Format so that it matches the X data. In the Enter/Edit Data function, GRAPH stops reading data and places the cursor over the erroneous X data. You can then edit the X data (see Chapter 1 for instructions on specifying X data).
Y data is wrong	GRAPH always interprets Y data as numerical values. If you enter Y data that cannot be interpreted as numerical values, GRAPH cannot process the data. Invalid numerical data includes non-digit characters or numbers that are too large or too small (1E29 is the largest number; -E-29 is the smallest). Use the Enter/Edit Data function to change the Y data to an acceptable numerical value (see Chapter 1). Or, go back to the PFS:FILE, Multiplan, or VisiCalc file to change the Y data.
Y Max must be greater than Y Min	This message may appear in the Define Chart function. The Y Max value you specify must be greater than the Y Min value. Change either the Y Max value or the Y Min value so that Y Max is greater than Y Min.

B: appendix

Quick Reference Guide

This appendix provides a summary of the things you need to know to use GRAPH.

Screen Control Keys

Key	Function
→	moves the cursor right one space
←	moves the cursor left one space
↑	moves the cursor up one line
↓	moves the cursor down one line
TAB	moves the cursor to the next item on the screen
SHIFT + TAB	moves the cursor back to the previous item
HOME	moves the cursor to the first item on the screen
INSERT	switches between strike-over and insert modes
DELETE	deletes character at cursor location

GRAPH Control Keys

Key	Function
F10	continues with the selected function
F4	erases the current screen and moves the cursor to the first item on the screen
F3	erases characters from the cursor to the end of the current item
PG DN	displays the next screen when entering data, or the next page when listing a directory
PG UP	displays the previous screen when entering data, or the previous page when listing a directory
ESC	returns to the Main Menu

X Data Formats

Words

I	Identifier

Numbers

N	Numeric

Dates

D	Day (data can be 1...31)
M	Month (data can be 1...12)
Y	Year (data can be 2 or 4 digits)
Q	Quarter (data can be 1...4)
-	Ignore field
YM	Year and Month — maximum of 36 data points, or three years
QY	Quarter and Year — maximum of 36 data points, or nine years

Date Examples

YM-	means dates are stored in year/month/day format but only years and months are needed
-Y	means dates are stored in month/year format but only years are needed
D	means dates are stored with only the day of the month

C: appendix

The SETUP Program

This appendix explains how to use the SETUP program to modify GRAPH to work properly with your computer system. The SETUP program can also install the PFS:GRAPH program on a hard disk. Use SETUP after you have made a backup copy of GRAPH.

To run the SETUP program, follow these steps:

1. Remove any write-protect tab from the PFS:GRAPH program diskette.

2. At the MS-DOS A> prompt, type

   SETUP

   and press the ENTER key. The following screen appears:

```
PFS: Software Series SETUP Program
Copyright 1984 Software Publishing Corporation

You can use this SETUP Utility to
modify the following PFS product(s).

  PFS:GRAPH


SETUP modifies these programs to work
with different equipment (such as a
serial printer or a hard disk).

Choose any option from the SETUP menu,
and answer the questions that appear.
If you make a mistake, press Escape to
return to the SETUP menu and try
again.

Press Enter to continue.
```

3. Press the ENTER key to continue. SETUP now displays its menu:

```
SETUP MAIN MENU

1. Select a printer
2. Select a plotter
3. Install program to a hard disk
E. Exit

Selection:
```

You have four options: to select a printer, select a plotter, install GRAPH on a hard disk, and exit from the SETUP program. Each procedure prompts you for the information it needs. If you make a mistake while using SETUP, press the ESC key to return to the SETUP Main Menu. You can then either try again or exit from SETUP.

4. Type the number of the option you want (and press ENTER). When you are done with the SETUP program, remove the GRAPH program diskette from the drive and put a write-protect tab back on the diskette.

Selecting a Printer

If you are using GRAPH with a DMP 2100 or DMP 200 printer, choose the Select a Printer option. Type 1 and then press ENTER. SETUP then asks you to select the printer you are using:

```
SELECT PRINTER

1. DMP 2100
2. DMP 200
3. Other Tandy Dot Matrix Printers
4. Tandy Daisy Wheel Printers
5. Other

Selection:
```

Note: Although the Select a Printer option lists the printers supported by all the PFS products, PFS:GRAPH supports only the DMP 2100 and the DMP 200.

Type 1 if you have a DMP 2100; 2 if you have a DMP 200. Press ENTER and SETUP asks you:

```
The printer connects to
(PRN:, AUX:, COM1:, COM2:):
```

Enter one of the choices listed. If you choose PRN:, SETUP returns you to its Main Menu. If you choose AUX:, COM1: or COM2: for a serial printer, SETUP asks you a series of questions, one at a time:

```
Baud rate
(110, 150, 300, 600, 1200, 2400, 4800, 9600):

Data bits (7 or 8):

Stop bits (1 or 2):

Parity (ODD, EVEN, NONE):

Use XON/XOFF (Y/N):
```

Answer each question appropriately for your printer, and press ENTER after each answer. Your printer manual should give you this information or you can call your dealer for help. After you answer the last question, SETUP returns to its Main Menu.

Selecting a Plotter

If you are using an HP plotter with GRAPH, choose the Select a Plotter option of the SETUP Main Menu. Type 2 in the Selection item and press ENTER. SETUP then asks you to select the plotter you are using:

```
SELECT PLOTTER

1. HP

Selection:
```

Type 1 and press ENTER. SETUP then asks:

```
The plotter connects to
(PRN:, AUX:, COM1:, COM2:):
```

Enter AUX:, COM1: or COM2:. SETUP then asks you a series of questions, one at a time:

```
Baud rate
(110, 150, 300, 600, 1200, 2400, 4800, 9600):

Data bits (7 or 8):

Stop bits (1 or 2):

Parity (ODD, EVEN, NONE):

Use XON/XOFF (Y/N):
```

Answer each question appropriately for your plotter, and press ENTER after each answer. Your plotter manual should give you this information or you can call your dealer for help. After you answer the last question, SETUP returns to its Main Menu.

Installing GRAPH on a Hard Disk

If you have a Tandy Model 2000 HD or have connected to your computer any other hard (fixed) disk that MS-DOS can recognize, you can install the GRAPH program and your GRAPH chart files on the hard disk. This saves you from having to start GRAPH from the program diskette each time you want to use it.

Note: You are allowed to install the program with SETUP only five times. If you are having disk failures that require you to install the program to your hard disk several times in a row, contact your dealer for help before using up your limit of allowed installations.

To install GRAPH on a hard disk, type 3 following Selection and press ENTER. You will see the following screen:

```
Please note the following before
continuing:

- You can install the program only
  on a hard disk.

- Remove the write-protect tab from
  the program diskette.

- You can use this install procedure
  only FIVE times. You have 5
  install(s) left.

Drive or directory to install on:
```

Type the drive name for your hard disk drive or the drive and the directory names for the part of the hard disk where you want the program located (for example, C: or C:\programs\). To install GRAPH in a subdirectory, you must type the name of the subdirectory. Then press ENTER.

The GRAPH and SETUP programs are copied to the hard disk you specified. You see the OK message and then the SETUP Main Menu again.

Exiting from the SETUP Program

When you are done using the SETUP options, type E following Selection and press ENTER. The MS-DOS prompt A> appears and you are ready to run GRAPH with the changes you've made in SETUP.

G: glossary

chart	in this manual, it refers to a form, like a piece of paper where one to four graphs are shown
cumulative graph	a graph where each point represents the sum of all Y values up to that point
cursor	the square on the screen that indicates where any value you type in will appear
DIF file	a VisiCalc file saved in Data Interchange Format as explained in the VisiCalc manual
disk/diskette	technically speaking, a disk is any round flat data storage device. Diskettes are small disks, the 5-¼ inch floppy disks being one example. In this manual, the terms disk and diskette are used interchangeably; diskette to be specific and disk for short
graph type	the format of a graph; for example, bar, line, or pie
grid lines	horizontal lines at regular intervals on the Y axis that help you determine the value of a point or bar
legend	the symbols and labels used to identify data from different graphs in the chart
merge	to combine data from more than one source when creating a graph
scale	the range of values covered by the Y axis of a chart
scratchpad	a temporary working area in the GRAPH program that is used to display and define charts
stack	to display a chart so that each graph in the chart uses the previous graph as its base
tick marks	short marks along either axis that help you see the value of a point or bar

write-protect tab	a gummed label stuck on a diskette to cover the notch in the side of the diskette cover. If this notch is open, the disk can be written on. If the notch is covered, the disk drive senses this and will not write on the diskette.
X axis	the horizontal axis of a chart
X Data Format	a code, like MY, that tells GRAPH to recognize the X data as identifiers, numbers, or dates
Y axis	the vertical axis of a chart

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