Advanced Personal Computer

™

GraphPlan

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Preface

Welcome to the world of financial planning and graphics with GraphPlan. Graph-Plan is a graphical data analysis program with which you can quickly and easily design, display, print, and plot presentation quality business reports and charts.

GraphPlan is a financial modeling tool for all types of business planning. Whether you deal with numbers, money, or people, GraphPlan can increase your effectiveness as a manager by saving you time and money. GraphPlan helps you plan and analyze to measure performance, manage resources, and make sound business decisions. It helps with calculating and displaying data and lets you do the thinking.

Based on the concepts of electronic spreadsheets and computer graphics, Graph-Plan lets you set up a matrix, or table. Then, with the graphics software, you can display selected data from the table in chart form. Within the table, data is entered and calculations performed according to the commands you give for each line. Instead of your having to figure results item by item, the electronic spreadsheet calculates the entire table by row and column. Having once created a table, you can make new assumptions by changing pieces of data. By recomputing results from the new data, GraphPlan performs a "what if" analysis in seconds. At any time in this process you can use the graphing commands to select rows or columns from the table to be displayed as a pie chart, bar chart, line chart, or a mixture of bar and line charts.

GraphPlan is easy to use. An on-screen menu representing all the commands is always available for fast, easy reference. With GraphPlan's built-in commands, ranging from simple mathematical functions to complex statistical computations, you simply select the desired command number. GraphPlan will ask you for any information necessary to complete the command. Chart option menus make it easy to specify the way you want to display your chart. You can select shading patterns, symbols and colors and specify labelling and scaling. Alternatively, if you prefer to let GraphPlan do the work, scaling is automatic and sensible defaults are assigned to your chart.

The charts generated by GraphPlan can be printed or plotted using the wide range of options offered by the graphing commands. GraphPlan saves the table options and graph options in a file so you can retrieve, alter or print your charts at a later time.

GraphPlan is fully compatible with MicroPlan. You can directly interchange table information between GraphPlan and MicroPlan programs. You do not have to use a special utility to convert MicroPlan tables to GraphPlan table format or vice versa.

Introduction

The overview presented below is intended to help you orient yourself to GraphPlan's many features and capabilities. Following the overview is a chapter-by-chapter guide to using the manual.

Overview

GraphPlan is an integrated software package that includes an electronic spreadsheet, graphics, and database management capabilities. You can enter data into a GraphPlan table either one value at a time or an entire row or column at a time. GraphPlan allows you to edit data, perform mathematical and statistical computations, do "what-if" analysis, and perform numerical ranking of data and alphabetic sorting of rows and columns. If you already have the MicroPlan software, you can perform GraphPlan operations on your MicroPlan tables and select data from the tables for graphing. GraphPlan has a versatile report formatter for generating printed tables.

In general, the maximum size of a table depends on the memory size of your computer. On a 64K machine (one with 64 kilobytes of RAM), you can expect to have tables containing up to 1,000 data values or "cells". Therefore, GraphPlan initially presents you with a table size of 50 rows and 20 columns. This table format can be changed easily to fit your requirements; and if you choose fewer columns, you can have more rows, or vice versa. With more memory capacity, you can have larger tables.

GraphPlan will operate on both color and monochrome display terminals, and supports multiple-pen plotters as well as dot matrix printers. On color display terminals, depending on your system's capabilities, GraphPlan charts can be displayed in up to 8 different colors. On non-color terminals there are six different shading patterns. There are three kinds of graphs—bar, line, and pie. Each graph corresponds to a row or column of data from a table. Graphs are combined and displayed together in a chart—up to 6 graphs may be combined into one chart. GraphPlan features the following types of charts:

- pie charts
- line charts
- horizontal and vertical bar charts
- mixture of line graphs and vertical bar graphs
- scattergrams (a special line graph in which data point symbols are displayed but connecting lines are not drawn)

Charts can be plotted in multiple pen colors. Three different page formats are provided to allow you to generate one 8″ × 11″ plot, two 5.5″ × 8″ plots side by side, and two 8″ × 5.5″ charts stacked vertically.

GraphPlan supports a variety of graphics printers. You can print your chart in normal size (approximately 5.5″ × 4″) or expand it to cover a full 8.5″ × 11″ page.

If you have MicroPlan or ProfitPlan, you will find GraphPlan very familiar. It uses the same commands to generate tables, perform mathematical computations, and do "what-if" analysis. It also uses the same display format for the table, the same user interface for moving the data pointer, and the same commands for entering and editing data in the table. When you load GraphPlan, you will notice the addition of three new commands (60—63) and (119—124) for graphing of data, a new series of statistical commands (130—144), and commands for sorting and ranking of row and column data (70—72).

How to use this Manual

This manual is intended as a guide not only to learning GraphPlan, but also as a companion in using GraphPlan. To make this easier, the manual is divided into three sections. *Section I* is a tutorial on fundamentals designed to teach you how to use GraphPlan. *Section II* is the advanced usage section, which explains Graph-Plan's statistical commands, as well as the ranking and sorting features. *Section III* is a command reference section which should be valuable for users at all levels of expertise.

The best way to learn GraphPlan is by using it. We suggest that you read through Chapter 1 and then follow the step-by-step example in Chapter 2. Throughout the manual, examples are given to illustrate various concepts and to allow you to compare your results with ours. An overview of the chapters included in the manual is given below.

Chapter 1 is an introduction to GraphPlan. This chapter gives you information that you will need to set up, install, and load GraphPlan on your microcomputer system. It also gives you an explanation of the GraphPlan screen, the Help command, and directions for moving the cursor while using GraphPlan.

In *Chapter 2* you are immediately taken to a "hands-on" learning situation by going through an actual Five-Year Forecast step-by-step. You will learn the basic steps associated with building a GraphPlan table and making a chart from the table data.

In *Chapter 3* you will learn how to build a GraphPlan table to your specifications. You will learn how to vary the table size, how to enter row and column descriptions, and how to specify formatting options on the screen. You will also learn how to save and load your tables for future use.

Chapter 4 shows you GraphPlan's built-in mathematical commands. You will see how easy it is to use these commands or to write your own formulas. Chapter 4 also covers the computing commands that let you see calculated results instantaneously.

Chapter 5 takes you through the process of formatting and printing reports. In this chapter you will see the kinds of report options that make GraphPlan's report generator unique.

Chapter 6 shows you how to use the graph option menus to design, print, and plot line, bar and pie charts to your specifications. You will learn how to choose the chart type and chart options that will represent your data in the most effective and meaningful way.

Chapter 7 discusses the different modes available in GraphPlan and how to use them. Other commands that you will find helpful in your advanced usage, including how to interface GraphPlan with a word processor, are also discussed.

Chapter 8 introduces GraphPlan's powerful statistical commands. These commands make complex statistical analysis simple.

Chapter 9 shows you how GraphPlan lets you rank and sort data in your tables easily and automatically. This sorted data can then be easily displayed in a plot or chart.

Section III is a complete reference section with a detailed description of each command.

Finally, there are appendices of alternate command keys, customization notes, and error messages.

This manual should be your constant companion while you are learning the features of GraphPlan. After you have become familiar with GraphPlan, you will probably want to refer back to this manual for help with a specific command or application. In any case, don't be afraid to experiment—it's the best way to learn.

Chapter 1

Getting Started
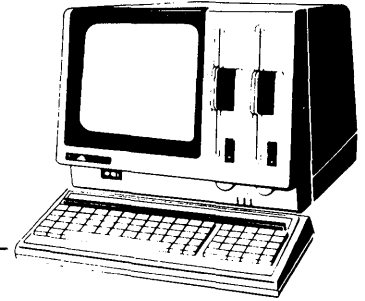
Chapter 1 is an introduction to the fundamentals of GraphPlan. Before you build your first spreadsheet and chart there are things about the general operation of GraphPlan that you need to know. This chapter will teach you how to install and load GraphPlan on your computer system. You will learn the location and use of terminal control keys, as well as the importance of backing up your system and data diskettes.

Getting Started

To use GraphPlan you will need the following:

1. Operating Systems:

    CP/M-86 (with GSX-86 device driver)
    MS-DOS

2. Your computer should have a minimum of 128K of random access memory

3. Your system must have at least one floppy disk drive. Two drives are preferred. About 250 kilobytes (K) of storage capacity is required to handle GraphPlan's system files on disk. For your own tables and chart storage, you will need additional room.

4. You will need a screen display that has at minimum, "cursor addressing" and "clear screen" features. Your display should also have a minimum of an 80 × 24 character screen. Consult your dealer or the terminal user manual about these features.

5. You will need a printer for printing reports and charts and a plotter if you want high quality color charts. Your printer must have graphics capability. Printers and plotters that can be used with GraphPlan are listed in the Customizing Notes in the front of this manual.

Making a Working Copy of GraphPlan

Copying GraphPlan for any reason other than for your own backup violates copyright laws. Each copy of GraphPlan is serialized. Your copy number appears on the screen each time you use GraphPlan. Only you have this registered copy of GraphPlan. Each copy you make of GraphPlan also shows this identification number, making it easy to identify the source of an unregistered copy.

You should keep the original diskette issued by Chang Labs as a backup diskette. Make a copy of GraphPlan for your daily work. Use this copy so that you will always have the master disk as a backup in case your working disk fails due to wear or accidental erasure. The following procedure will help you make a working copy of your GraphPlan diskette.

1. Follow the instructions that come with your operating system to format a diskette.

2. Place your master operating system diskette in drive "A" and your blank formatted diskette in drive "B". In response to the **A>** prompt, type **SYSGEN.** The SYSGEN command copies the operating system onto your blank diskette.

   Please note that the instructions for creating a system disk may be different for your system. Verify this step by consulting your system manual.

3. For CP/M users, make sure you have the copying program PIP.COM on your newly formatted diskette. You can transfer the PIP.COM file by typing:

   A> PIP B: = A:PIP.COM

4. Now insert your newly made system disk in drive A and the master GraphPlan diskette in drive B. (For CP/M systems, type ↓C to clear the drive.) Type in the following command:

   For CP/M systems: **A>PIP A: = B:*.*[V]**

   For MS DOS systems: **A>COPY B:*.* A:**

5. Put the GraphPlan master diskette away for safe keeping. Label the new diskette as your GraphPlan working diskette.

Loading GraphPlan

If you purchased GraphPlan from a local dealer, they will help you set up Graph-Plan to work with your microcomputer system.

To install GraphPlan for your system:

1. Be sure your computer is turned on.
2. Insert your GraphPlan system diskette in drive A.

   If you are using the GSX-86 device driver, please refer to your customization notes on how to install the device driver before running Graph-Plan.

   Otherwise, continue with Step 3.
3. Now you are ready to bring GraphPlan up on your screen.

   Type **GPLAN** <Return>

Your screen will show the following:

```
            MODE=NORMAL   ORDER= R/C      ROW=1-50      COL=1-20
        ROW 1  <-
ENTER COMMAND:                                      1 format:
ROW                                                 2 data:
——   —1—  —2—  —3—  —4—  —5—                         3 math:
1                                                   4 graphics:
2                                                   5 print:
3                                                   6 status:
4                                                   7 HELP
5                                                   8
6                                                   9 STOP
7                                                  10 utility:
'8                                                 11 sort:
9                                                  12 stats:
10                                                 13
11                                                 14
12                                                 15
13                                                 16 format:
14                                                 17 INSERT
15                                                 18 DELETE
16                                                 19 rows:
17                                                 20 ROW TITLE:
```

Customizing Reports for Printers

GraphPlan works with all brands of printers. Technically, GraphPlan prints all reports to the CP/M LST: device, or similar device under MS DOS. Therefore, if you need to interface your system with a particular printer for printing GraphPlan reports, you should check your system manuals for details, including baud rate settings and cable requirements.

You can print reports that are up to 99 columns wide, or up to 256 characters. The report width is limited by the printer and is controllable through GraphPlan options.

To select the report width, use the row title width, column width, and number of columns options in the OPTIONS (81) command. The width of printed reports in GraphPlan is simply calculated as follows:

Report Width = Row Title Width + Column Width * Number of Columns

If you set the options to a width that is greater than can be handled by your printer, then the printed results would not be meaningful. Therefore, you should set options that are appropriate for your printer.

GraphPlan is now ready to help you in solving your problems.

The GraphPlan Screen

When GraphPlan comes up on the screen you will notice that the screen is divided
into several sections.

Data Pointer   **Command Line**   **Status Line**

```
                    MODE=NORMAL   ORDER=R/C  ROW=1-50      COL=1-20
ROW 1  <-
ENTER COMMAND:
                                                    1 format:
ROW                                                 2 data:
—————————— ——1—— ——2—— ——3—— ——4— ——5——  3 math:
1                                                   4 graphics:
2                                                   5 print
3                                                   6 status:
4                                                   7 HELP
5                                                   8
6                                                   9 STOP
7                                                  10 utility:
8                                                  11 sort:
9                                                  12 stats:
10                                                 13
11                                                 14
12                                                 15
13                                                 16 format:
14                                                 17 INSERT
15                                                 18 DELETE
16                                                 19  rows:
17                                                 20 ROW TITLE
```
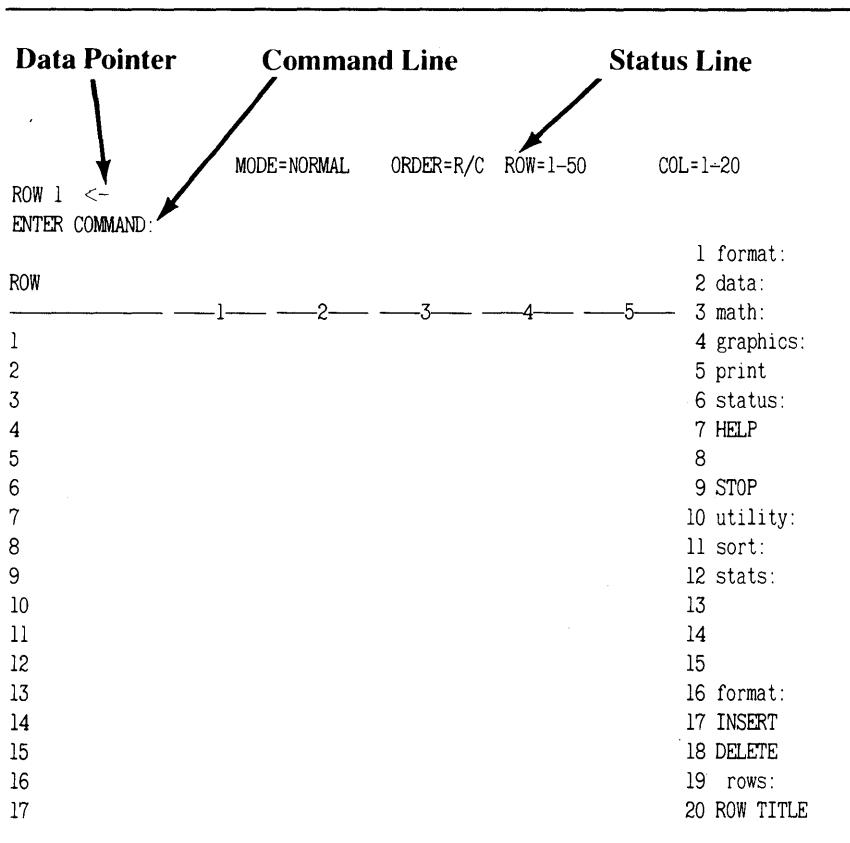
The major portion of the screen displays the **GraphPlan Table.** Each row of the table has been labeled with row numbers on the left side of the screen. GraphPlan has 12 blank spaces following each row number that are used to display row description. Row descriptions can be up to 40 characters in length. Each column of the table is also labeled with column numbers, with dashes on both sides. You can enter a two-line column description for each column that can vary from 4 to 20 characters for each column.

At the top of the GraphPlan screen are the Status Line, the Data Pointer, and the Command Line. The **Status Line** gives you information about GraphPlan's current mode, the current computing order, and the current row and column ranges. Unless you set it up otherwise, these options will default to the NORMAL mode; a computing order of rows before columns (R/C); and a range of 50 rows and 20 columns.

The **Data Pointer** tells you the row or column to be used to store the results of your next command. The data pointer also affects the way your charts are displayed. You may elect to have either rows or columns of data displayed as graphs but rows and columns may have the same identifying numbers. For example, if you have chosen row or column #1 for your graph and the data pointer is in row mode (that is, pointing to a row), GraphPlan will display row 1 in your chart; if the data pointer is in column mode, column 1 will be displayed. GraphPlan checks the mode of the data pointer before displaying a chart. This feature makes GraphPlan more flexible and will become more understandable in Chapter 2. In this manual, the row or column that is shown by the data pointer is referred to as the **CURRENT** row or column.

The **Command Line** will prompt you for a command number. Simply enter the command number that you wish to use and press <Return >. The command will automatically be entered and will prompt you for any additional information that is needed to execute the command.

Manual Conventions

In this manual, you will notice the use of certain words and symbols to indicate actions to be used in GraphPlan. These conventions are explained below:

<Return>   Carriage return

<CANCEL>   Use your cancel key to cancel a command after you have finished using the command. You can also use the cancel key to cancel a command if <Return> has been entered and you realize that you have entered an incorrect command. The CANCEL key may be labeled with HOME, CAN, or a similar label depending on your keyboard. The cancel key is also used to cancel a print or plot of a chart.

BKSP   Use the backspace key to correct typing errors if you have not yet pressed the <Return> key. On different keyboards this key may be labelled DEL, RUB, RUBOUT or a similar label.

CURSOR   Indicates keys that direct the movement of the cursor. In most
KEYS   cases these keys are the up, down, left, and right arrow keys.

<Escape>   Use the escape key to cancel prints and plots (as an alternative to using the <CANCEL> key). On different keyboards, this key may be labelled ESC or a similar label.

Choosing Commands

GraphPlan works by responding to commands in the form of numbers. For every command that you need to execute, there is a corresponding built-in GraphPlan command.

In addition to using the command numbers, GraphPlan will also respond to alpha characters that are codes for the regular numeric commands. So, if it is easier for you, simply use the "+" for the ADD command, an "F" for the FORMULA command, or any other single keystroke codes. A complete list of the alpha mnemonics is shown in Appendix A.

The GraphPlan MENU is always showing on the right side of your screen for easy reference. The main menu that you see when you bring GraphPlan up on the screen is organized into several groups. You will notice that these groups follow the logical order used to build a GraphPlan table. All commands followed by colons (:) have a related sub-menu.

```
                    MODE=NORMAL     ORDER=R/C  ROW=1-50       COL=1-20
ROW 1  <-
ENTER COMMAND:
                                                        1 format:
ROW                                                     2 data:
——————————————— ——1——  ——2—— ——3—— ——4— ——5——         3 math:
1                                                       4 graphics:
2                                                       5 print
3                                                       6 status:
4                                                       7 HELP
5                                                       8
6                                                       9 STOP
7                                                      10 utility:
8                                                      11 sort:
9                                                      12 stats:
10                                                     13
11                                                     14
12                                                     15
13                                                     16 format:
14                                                     17 INSERT
15                                                     18 DELETE
16                                                     19  rows:
17                                                     20 ROW TITLE
```

If you wish to see the commands in any of the sub-menus, simply enter the number of the group for which you want to see a sub-menu and press <Return>. For example, if you want to see the available commands under the heading of math, simply enter **3** and press <Return>. A new set of commands will appear in the menu on the screen. To get back to the main menu, simply press <Return>. Try it.

ENTER COMMAND: **3**   <Return>

Tell GraphPlan to display the group of mathematical commands. GraphPlan will respond with the menu shown below.

```
                 MODE=NORMAL  ORDER=R/C      ROW=1-50    COL=1-20
       ROW 1    <-
ENTER COMMAND:
                                                         40 math:
ROW                                                      41 ADD
─────────────  ──1── ──2── ──3── ──4── ──5──             42 SUB
1                                                        43 MULT
2                                                        44 DIV
3                                                        45 NEGATE
4                                                        46 INVERSE
5                                                        47 INTEGER
6                                                        48 ROUND
7                                                        49 CUMULATE
8                                                        50 ABSOLUTE
9                                                        51 ADD K
10                                                       52 SUB K
11                                                       53 MULT K
12                                                       54 DIV K
13                                                       55 SUM
14                                                       56 GET
15                                                       57 FLOOR
16                                                       58 CEILING
17                                                       59
```

ENTER COMMAND: <Return>

When you press <Return> without a command, GraphPlan will return to the original menu.

Moving the GraphPlan Table

GraphPlan usually displays 17 rows and 5 columns on the screen at a time—even though your actual table size can be much larger. Physical limitations of the screen allow only a portion of the table to be displayed at any one time.

GraphPlan will automatically move the screen to show other parts of your worksheet. This means that the cursor is always showing on your screen. You can move one column, one row, or you can move to any section of your table that you need to view simply by using the cursor keys to position your display.

Use your cursor keys to switch from the row mode to the column mode and vice versa. The right or left cursor keys put you in the column mode, and the up or down keys switch you back to the row mode. In short, with the use of your cursor keys, you can move to any part of your worksheet with the push of a button.

You can also use the SELECT ROW (33) or SELECT COL (34) commands to quickly move to any part of the screen. The SELECT ROW command allows you to position your cursor on a specific row; SELECT COL lets you go to a specific column.

The GOTO (36) command can be used to position the screen at a specific portion of the table. For example, to see the results at row 40, column 10 of your table, use the GOTO command and specify row 40, column 10. GraphPlan will position row 40, column 10 in the upper left corner of the screen.

The GraphPlan HELP Menu

If at any time you want on-screen help for one of the GraphPlan commands, simply enter the HELP (7) command. The HELP command will prompt you for the number of the command for which you need help. Simply enter the command number or the corresponding mnemonic command and press <Return>.

For example, if you need help for the ROW TITLE (20) command, you would enter command **7,** press <Return>, then enter **20,** and <Return>. A brief explanation of command 20 will appear at the bottom of your screen as shown below.

```
      ROW 1  <-
ENTER COMMAND:
                                          1 format:
ROW                                       2 data:
───── ──1── ──2── ──3── ──4── ──5──       3 math:
1                                         4 graphics:
2                                         5 print:
3                                         6 status:
4                                         7 HELP
5                                         8
6                                         9 STOP
7                                        10 utility:
8                                        11 sort:
9                                        12 stats:
10                                       13
11                                       14
12                                       15
13                                       16 format:
                                         17 INSERT
                                         18 DELETE
                                         19 rows:
20 ROW TITLE title . . . HOME (DOWN. UP. CANCEL)   20 ROW TITLE:
Enter or change row titles. Each title entered is placed in
the current row. The cursor keys move the current row pointer.
```

Press any of your cursor keys to recover your screen display.

Of course, the HELP command only gives you a 3-line description of the commands. For a more comprehensive description, consult the Command Reference Section of this manual.

The Care and Feeding of your Diskettes

Floppy diskettes are not indestructible and should be handled with care. In most cases diskettes prove to be surprisingly sturdy and will give you dependable service if you treat them properly.

- PROTECT your diskettes by keeping them in their protective envelope when not in use.
- DO NOT BEND diskettes.
- INSERT DISKETTES CAREFULLY into your disk drives. Never force a diskette into the disk drive.
- NEVER TOUCH THE DISKETTE SURFACE. Fingerprints and dust can destroy data. Always handle diskettes by their protective covering.
- DO NOT STORE DISKETTES NEAR A HEAT SOURCE. Like phonograph records, diskettes will warp or crack if exposed to extreme temperatures. For best results, store diskettes in a moderate temperature range.
- DO NOT EXPOSE DISKETTES TO MAGNETS. Magnetic fields will damage data stored on your diskettes. Be aware of possible magnetic fields from sources such as X-rays and other electronic equipment.

The Importance of Backup Copies

Accidents do happen. Just when you least expect it, a power failure or a defective diskette can cause you to lose your data. Unfortunately no one is immune to this aspect of working with computers, but you can soften the blow by making backup copies of your diskettes.

Backup copies are as important as your data. If the data is not essential, you might feel that making backup copies is a waste of time. If, however, you have data on your diskettes that is critical to your work, we strongly recommend that you make frequent backup copies of your data and store them separately in a safe place. Consult your operating system manual for instructions on making backup copies of your data diskettes. THE RESPONSIBILITY FOR MAKING BACKUP COPIES IS YOURS.

Exiting GraphPlan

Whenever you are through using GraphPlan and want to exit to the operating system, do the following:

1. Make sure you have saved any work you wish to keep.
2. ENTER COMMAND: **9** <Return>
   VERIFY (Y OR N): **Y** <Return>
   Exit GraphPlan using the STOP command.

Chapter 2

Doing a Sample Report and Chart
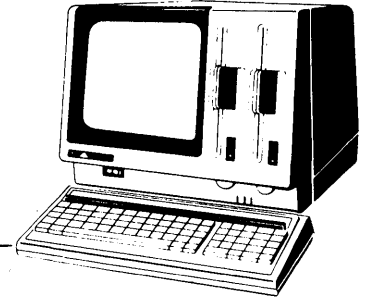
In this chapter you will learn the basic steps associated with building a table and its associated chart. You will produce a Five-Year Sales Forecast, make a change in your data and do a "what-if" analysis, build a chart, and print a report and chart.

The Five Year Sales Forecast

Let's assume you have a business and want to do a sales and gross profit forecast for the next five years. We will base the forecast on the following assumptions:

SALES:	Start with a base of $1,000 and grow 10% per period.
COST OF GOODS:	A constant 45% of sales figures.
SALES AND ADMINISTRATION:	A constant 20% of sales figures.
RESEARCH AND DEVELOPMENT:	A flat $300 per year.
TOTAL COSTS:	The sum of all costs (Cost of Goods, Sales and Administration, and Research and Development).
GROSS PROFIT:	Sales less total costs.

On your screen, the cursor on the command line will be prompting you to enter a command. Follow along on your computer by typing in all information in **BOLD TYPE.**

The first step in building the sample table is to set up the size of the table. This step is optional; you need not set up the table dimensions at all. In this case, however, you know the size of your table and limiting the size of the table in this way will make it easier to display the chart.

ENTER COMMAND: **109** <Return>   Set Up

   OK to erase current data?
   VERIFY (Y OR N): **Y** <Return>

   NUMBER OF COLUMNS (1–99): **5** <Return>
   ROWS (1–99): **6** <Return>

After you enter the number of columns you wish to use, GraphPlan calculates the maximum number of rows you may have and displays this figure (1–99 in the example). This number is a function of the memory size of your computer and may differ from the number we have shown in this example.

Now GraphPlan displays the table size in the upper left hand corner of the screen:

6ROWS×5COLS

GraphPlan requests verification that the table is set up properly. (This command clears any data or row/column titles that may be in the table display already.)

   VERIFY (Y OR N): **Y** <Return>

The next step in building the table is to enter titles for each row.

ENTER COMMAND: **20** <Return>   Row Title

The ROW TITLE command (20) allows you to enter titles for each row.

   ROW TITLE: **SALES** <Return>

Follow the prompts on your screen and type the description for row 1, SALES. Notice that after you press <Return>, the title goes into row 1 and the prompts continue asking for the next row title. If you make a typing error and you have not yet pressed <Return>, you can use your backspace key to erase the error and re-enter the title. If you have already pressed <Return>, use the cursor to return to the title and retype it.

ROW TITLE: **COST OF GOODS** <Return>

The prompt on the command line is now asking for the description for row 3.

ROW TITLE: **SALES AND ADMINISTRATION** <Return>

The prompts continue to ask for row descriptions. Notice that this description is clipped in the middle of the word ADMINISTRATION. Don't worry. The screen is currently set to display only 15 characters for each title. The full description will be remembered for later use, as in printing of the table. Later you will learn how to adjust the screen to show the entire row title.

Row and column titles are used as labels on the X-axis and as legends to identify the graphs. GraphPlan may shorten these titles to fit on the chart. Since GraphPlan shortens by truncation, on some charts you may wish to return to the table and abbreviate the row or column titles.

ROW TITLE: **RESEARCH AND DEVELOPMENT** <Return>

ROW TITLE: **TOTAL COSTS** <Return>

ROW TITLE: **GROSS PROFIT** <Return>

This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command. The screen should show the following:

```
                    MODE= NORMAL   ORDER= R/C        ROW= 1-6         COL= 1-5
        ROW 1 (SALES)   <-
ENTER COMMAND:
                                                              1 format:
ROW                                                           2 data:
───────────── ──1── ──2── ──3── ──4── ──5──                   3 math:
1 SALES                                                       4 graphics:
2 COST OF GOODS                                               5 print:
3 SALES AND ADM                                               6 status
4 RESEARCH AND                                                7 HELP
5 TOTAL COSTS                                                 8
6 GROSS PROFIT                                                9 STOP
7                                                            10 utility:
8                                                            11 sort:
9                                                            12 stats:
10                                                           13
11                                                           14
12                                                           15
13                                                           16 format:
14                                                           17 INSERT
15                                                           18 DELETE
16                                                           19 rows:
17                                                           20 ROW TITLE
```

The data pointer and cursor are now back on row 1. The command line is prompting you for the next command.

The next step is to enter titles for each column. First use the right or left cursor key to move the data pointer to column 1.

ENTER COMMAND:**25** <Return>   Column titles

    COLUMN TITLE: 1. **YEAR 1**   **2.** <Return>

Note that GraphPlan allows two lines of column titles. In this table, you are using only one line of column titles so just press<Return> when prompted for the second line.

Enter the rest of the column titles in the same way you entered the row titles.
The column titles will be YEAR 1, YEAR 2, YEAR 3, YEAR 4, AND YEAR 5.
After you enter the last title, press <CANCEL>.

The screen should show the following:

```
                 MODE= NORMAL   ORDER= R/C       ROW= 1-6      COL= 1-5
        ROW 7  <-
ENTER COMMAND:
                                                          1 format:
ROW              YEAR 1    YEAR 2    YEAR 3    YEAR 4    YEAR 5    2 data:
———————————————  ——1——  ——2——  ——3——  ——4——  ——5——  3 math:
1 SALES                                                   4 graphics:
2 COST OF GOODS                                           5 print:
3 SALES AND ADM                                           6 status:
4 RESEARCH AND                                            7 HELP
5 TOTAL COST                                              8
6 GROSS PROFIT                                            9 STOP
7                                                        10 utility:
8                                                        11 sort:
9                                                        12 stats:
10                                                       13
11                                                       14
12                                                       15
13                                                       16 format:
14                                                       17 INSERT
15                                                       18 DELETE
16                                                       19  rows:
17                                                       20 ROW TITLE
```

According to our assumptions, SALES will start at $1,000 and grow at 10% per year. Let's enter data to reflect this assumption. First, move the data pointer back to row 1 by using the up or down cursory key.

ENTER COMMAND: **31** <Return>   Enter data
    CHOOSE (VALUE = 0, CONSTANT = 1,
       GROW = 2, INCR = 3): **2** <Return>

The ENTER command allows you to choose the method of data entry. You can enter data individually, value by value, by choosing "0". Choose "1" to enter a constant value for the entire line. The "2" option lets you enter a base value and have it grow by a certain percentage, and option "3" lets you enter a base value and have it increase by a constant amount. For our example, choose the GROW option (2).

BASE VALUE: **1000** <Return>

The command line prompts for the base value. Type in 1000. Notice that dollar signs and commas are not entered.

RATE: **10** <Return>

The prompt is now asking for the percentage rate. Type in 10. Notice that the percent signs are not entered. After you press <Return>, notice that row 1 contains the computed sales. The values start with 1,000 and grow by 10% per year.

Note that if you had not used the Set Up command to specify the dimensions of the table, limiting the columns to 5, all of the columns (20 or more of them) would now contain data.

The cursor and data pointer are now on row 2. According to our assumptions, the cost of goods is a constant 45% of sales, so we use the MULT K (53) command to multiply by a constant amount.

ENTER COMMAND: **53** <Return>

The MULT K (53) command allows you to compute the COST OF GOODS by multiplying a constant amount by row 1, SALES.

> VALUE: **.45** <Return>
>
> The command line is prompting for a value. Type in .45 to indicate 45%.
>
> ROW (1—6): **1** <Return>
>
> The prompt now asks for a row number. Type in 1 to indicate that the sales figures in row 1 should be used in the calculation. Again notice that the cursor and data point have automatically moved to row 3, SALES AND ADMINISTRATION.

We are assuming that sales and administrative costs are a constant 20% of our sales. Again use the MULT K command.

ENTER COMMAND: **53** <Return>

Multiply by a constant.

> VALUE: **.20** <Return>
>
> ROW (1—6): **1** <Return>

For row 4, we assume that RESEARCH AND DEVELOPMENT is a constant cost of $300 each year.

ENTER COMMAND: **31** <Return>

To enter costs for RESEARCH AND DEVELOPMENT, use the ENTER command. This time, however, select the constant value option.

> CHOOSE (VALUE = 0, CONSTANT = 1,
>   GROW = 2, INCR = 3): **1** <Return>
>
> BASE VALUE: **300** <Return>
>
> The command line now prompts you for the constant base value. Type in 300. Notice that row 4 shows the value of 300 in all columns.

The data pointer and cursor are now pointing to row 5. To calculate the TOTAL COSTS in row 5, sum rows 2 through 4.

ENTER COMMAND: **55** <Return>   Sum

Use the SUM (55) command to sum several rows.

   ROW BEGIN (1—6): **2** <Return>

   Start summing with row 2, COST OF GOODS.

   END (2—6): **4** <Return>

   Finish summing with row 4, RESEARCH AND DEVELOPMENT. Notice that the sum for each column of the table is computed and the result is stored in row 5.

Finally, calculate the GROSS PROFIT in row 6 as SALES, row 1, minus TOTAL COSTS, row 5.

ENTER COMMAND: **42** <Return>   Subtract

   ROW (1—6): **1** <Return>

   The command line prompts for the first row number. Type in 1, for row 1, SALES.

   ROW (1-6): **5** <Return>

   The prompt is now asking for the row number to subtract. Type in 5 for row 5, TOTAL COSTS. After you press <Return>, GraphPlan will calculate the GROSS PROFITS and put the results in row 6. Note that the results of calculations are placed in the row or column to which the data pointer is referring.

You have now completed your first Five-Year Forecast. The screen should look
like the following:

```
              MODE= NORMAL   ORDER= R/C        ROW= 1-6      COL= 1-5
      ROW 7  <-
ENTER COMMAND:
                                                          1 format:
ROW             YEAR 1     YEAR 2    YEAR 3    YEAR 4    YEAR 5    2 data:
─────────────── ──1──  ──2──  ──3──  ──4──  ──5──   3 math:
1 SALES         1,000.0    1,100.0   1,210.0   1,331.0   1,464.1   4 graphics:
2 COST OF GOODS   450.0      495.0     544.5     599.0     658.8   5 print:
3 SALES AND ADM   200.0      220.0     242.0     266.2     292.8   6 status:
4 RESEARCH AND    300.0      300.0     300.0     300.0     300.0   7 HELP
5 TOTAL COST      950.0    1,015.0   1,086.5   1,165.2   1,251.7   8
6 GROSS PROFIT     50.0       85.0     123.5     165.9     212.4   9 STOP
7                                                         10 utility:
8                                                         11 sort:
9                                                         12 stats:
10                                                        13
11                                                        14
12                                                        15
13                                                        16 format:
14                                                        17 INSERT
15                                                        18 DELETE
16                                                        19  rows:
17                                                        20 ROW TITLE
```

As you prepared the Five-Year Forecast, not only were the figures computed, but
the commands required to create the table were memorized. Let's take a look at
the corresponding command logic:

ENTER COMMAND: **22** <Return>   Show rows

Your screen should show the following:

```
Press any cursor key to recover your display.
     ROW 7   <-
ENTER COMMAND:
                   UNDER BLANK DEC FOR                      1 format:
ROW            TYPE LINE LINES SIZ MAT COMMAND PARAMETERS   2 data:
                                                           3 math:
1 SALES        data       -   -   -                         4 graphics:
2 COST OF GOODS data      -   -   - MULT K  K=0.45 ROW=1    5 print:
3 SALES AND ADM data      -   -   - MULT K  K=0.2 ROW=1     6 status:
4 RESEARCH AND data       -   -   -                         7 HELP
5 TOTAL COSTS  data       -   -   - SUM     ROWS 2-4        8
6 GROSS PROFIT data       -   -   - SUB     ROW=1 ROW=5     9 STOP
7              data       -   -   -                         10 utility:
8              data       -   -   -                         11 sort:
9              data       -   -   -                         12 stats:
10             data       -   -   -                         13
11             data       -   -   -                         14
12             data       -   -   -                         15
13             data       -   -   -                         16 format:
14             data       -   -   -                         17 INSERT
15             data       -   -   -                         18 DELETE
16             data       -   -   -                         19  rows:
17             data       -   -   -                         20 ROW TITLE
```

To recover your display, press any cursor key.

"What-If" Analysis

Let's make changes to our data and watch the entire Five-Year Forecast recalculate based on the new assumptions.

Do a "what-if" analysis with the assumption that the first year of RESEARCH AND DEVELOPMENT expenses row 4, column 1 will be $500 instead of $300.

ENTER COMMAND: **32** <Return>   Change
    ROW (1—6): **4** <Return>
    COL (1—5): **1** <Return>
    VALUE: **500** <Return>

Now that the change has been made, compute the entire report to see the effect of the new assumption.

ENTER COMMAND: **98** <Return>   Compute

In just a second, the new Five-Year Forecast will show the following:

```
DONE
  COL 1 (YEAR 1)  <-
ENTER COMMAND:
                                                        1 format:
ROW             YEAR 1    YEAR 2    YEAR 3   YEAR 4   YEAR 5   2 data:
                 —1—      —2—       —3—      —4—      —5—      3 math:
1 SALES         1,000.0   1,100.0   1,210.0  1,331.0  1,464.1  4 graphics:
2 COST OF GOODS   450.0     495.0     544.5    599.0    658.8  5 print:
3 SALES AND ADM   200.0     220.0     242.0    266.2    292.8  6 status:
4 RESEARCH AND    500.0     300.0     300.0    300.0    300.0  7 HELP
5 TOTAL COSTS   1,150.0   1.015.0   1,086.5  1,165.2  1,251.7  8
6  GROSS PROFIT  -150.0      85.0     123.5    165.9    212.4  9 STOP
7                                                        10 utility:
8                                                        11 sort:
9                                                        12 stats:
10                                                       13
11                                                       14
12                                                       15
13                                                       16 format:
14                                                       17 INSERT
15                                                       18 DELETE
16                                                       19  rows:
17                                                       20 ROW TITLE
```

Building a Chart

Choose command 4 from the main table menu.

ENTER COMMAND: **4** <Return>

You will see a sub-menu containing three graphing commands, DISPLAY CHART (61) simply displays the current chart. SELECT GRAPH (62) enables you to choose rows or columns from your table to be displayed as line, bar, or pie graphs. When you build a chart with SELECT GRAPH, certain automatic or "default" values are used for the display attributes, such as shading or color. In Chapter 6 you will learn to use the CHART OPTIONS (63) command to change the default options.

You have probably noticed that we use two terms to describe a chart. The term graph corresponds to one row or column of data in the table, and a graph may be one of three types—bar, line, or pie. Graphs are combined and displayed together in one chart—up to 6 graphs may be combined into one chart.

Let's assume that you want to make a bar chart from row 1 of the sample 5-year forecast table. The resulting chart will show how sales increase over the five-year period shown in the table. You use the SELECT GRAPH command to choose the rows to be displayed in the chart and the type of graph. First, make sure the data pointer is in row mode. If it is not, use the up or down cursor key to move the data pointer to the first row. Choose row 1 for graphing and choose bar type.

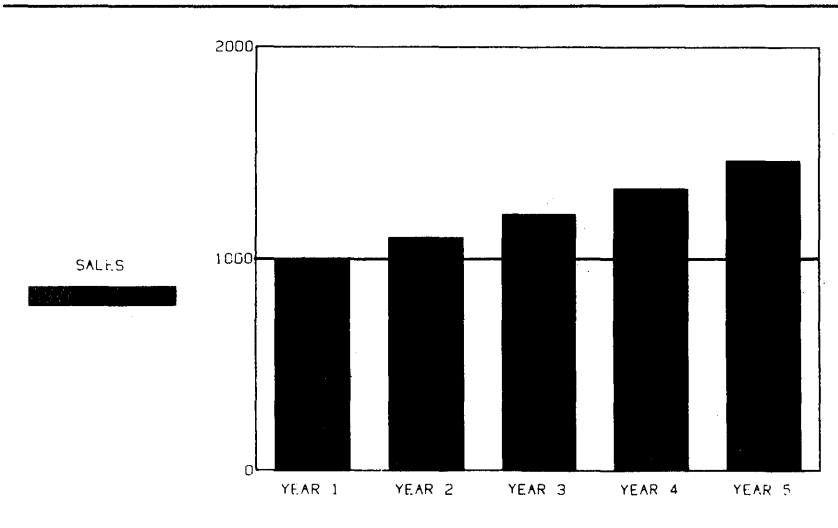ENTER COMMAND: **62** <Return>   Select Graph
   Enter Row (1—6) for Graph 1: **1** <Return>
   Choose (Bar=1, Line=2, Pie=3): For Graph 1: **1** <Return>

   Enter Row (1—6) for Graph 2:   <CANCEL>

You are now ready to display your bar chart.

ENTER COMMAND: **61** <Return>   Display Chart

Your chart should look like this:

Notice that the column titles (YEAR 1 — YEAR 5) are used to label the X-axis, the values in row 1 from columns 1 through 5 are used as the Y-axis data, and the row 1 title (SALES) is used as the legend identifier for graph 1. Also note, the complete title may not be displayed.

Except in horizontal bar charts (described in Chapter 6), the X-axis always represents the row or column titles and the Y-axis represents the range of values of the data.
Press <CANCEL> to return to the table display
Now let's change the data pointer to column mode (without changing the settings for graph 1), and display the chart again. Use the right or left cursor to move the data pointer to the first column.

Your screen should look like this after you enter DISPLAY GRAPH (61) and press <Return>.
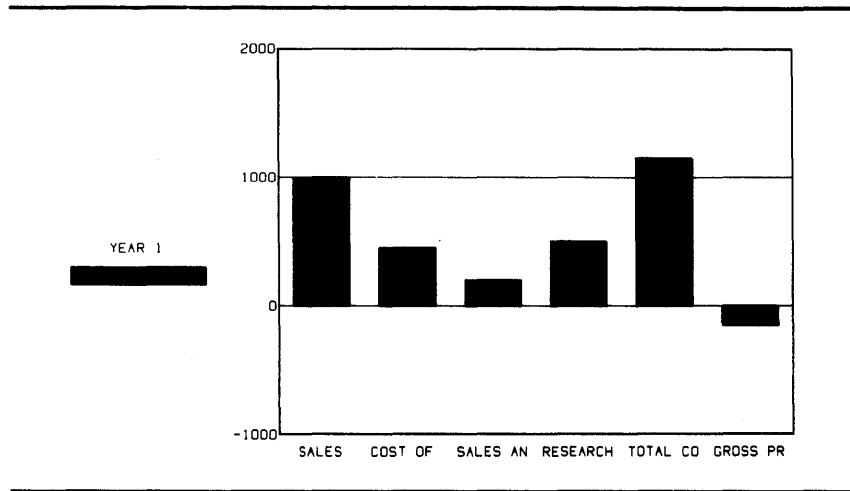
Notice that in this example, the row titles (SALES — GROSS PROFIT) are used to label the X-axis; the values from rows 1 through 6 of column 1 are used as the Y-axis data; and the column 1 title (YEAR 1) is used as the legend identifier for graph 1.

By setting the values of row and column ranges, you can define the portion of the table you want to display (Refer to Chapter 3 for more information about range settings.) GraphPlan will display only data values that are within the range settings. Data values that are outside the range settings are ignored.
Press <CANCEL> to return to the table display.

For example, suppose you want to see the SALES data from YEAR 1 through YEAR 4 only. You should first use the COLUMN RANGE (93) COMMAND to set the starting column to 1 and the ending column to 4.
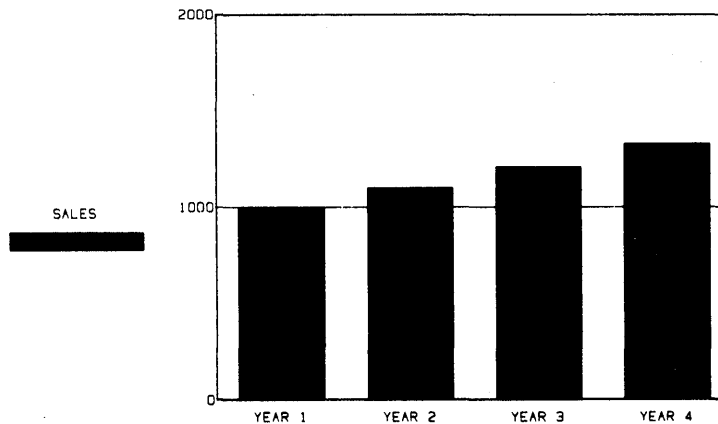
ENTER COMMAND: **93** <Return>   Column range

  COL BEGIN (1—5): **1** <Return>

  COL END (1—5): **4** <Return>

  Set column range to display only columns 1 through 4.

Now, setting the data pointer back to row mode (with the up or down cursor key), redisplay the chart using command 61 (Display Graph). It should look like this:

Press <CANCEL> to return to the table display.

Generating a Report

Now that you have built your table, let's print the report. Be sure your printer is connected and turned on, and your paper adjusted for printing to begin on the first line. This will leave enough room for the chart to be printed on the same sheet.

ENTER COMMAND: **82** <Return>   Titles

   PAGE NUMBER (0-999): **1** <Return>

   DATE (YEAR AS YY): **83** <Return>

   MONTH (1-12): **1** <Return>

   DAY (1-31): **1** <Return>

   ROW-RANGE BEGIN (1—6): **1** <Return>

   END (1—6): **6** <Return>

   COL-RANGE BEGIN (1—5): **1** <Return>

   END (1—5): **5** <Return>

   TITLE 1: **SAMPLE FIVE-YEAR FORECAST** <Return>

   TITLE 2: <Return>

   TITLE 3: <Return>

   Pressing the <Return> key by itself indicates that there are no titles for the second and third lines.

   SET PAPER; HIT RETURN <Return>

The TITLES (82) command sends your Five-Year Forecast table to the printer to generate the following report:

```
1/1/83                                                    PAGE 1
                    SAMPLE FIVE-YEAR FORECAST

                 YEAR 1    YEAR 2    YEAR 3    YEAR 4    YEAR 5
                ——1——    ——2——    ——3——    ——4——    ——5——

1 SALES          1,000.0   1,100.0   1,210.0   1,331.0   1,464.1
2 COST OF GOODS    450.0     495.0     544.5     599.0     658.8
3 SALES AND ADM    200.0     220.0     242.0     266.2     292.8
4 RESEARCH AND A   500.0     300.0     300.0     300.0     300.0
5 TOTAL COSTS    1,150.0   1,015.0   1,086.5   1,165.2   1,251.7
6 GROSS PROFIT    -150.0      85.0     123.5     165.9     212.4
```

Printing a Chart

To print the chart, you need to use the third graphing command, CHART OP-
TIONS (63).

ENTER COMMAND: **63** <Return>   Chart options

GraphPlan now displays the following menu:

Enter a selection:

        1 - Display Chart

        2 - Define Chart Options

        3 - Define Axes Options

        4 - Define Pie Options

        5 - Print Chart

        6 - Plot Chart

Make sure that your printer is connected and turned on and ready to print. You
will notice the cursor is positioned after the line beginning with "Enter Selection".
Type 5 for Selection #5, Print Chart.

Enter a selection: **5** <Return>   Print chart

The message line (the line above "Enter Selection:") now displays a message asking
if you want the chart to be a full page. This time, type "N" because you want the
chart to be small enough to fit on the same page as the table you just printed.

Do you want to enlarge your chart (Y/N)? **N**   <Return>

SET PRINTER AND HIT RETURN.

Now the chart is displayed and printing begins. To cancel the print, press <CANCEL> or <Escape>.

**Your completed print of the chart and table should look like this:**

1/1/83   PAGE 1

SAMPLE FIVE-YEAR FORECAST

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	—1—	—2—	—3—	—4—	—5—
1 SALES	1,000.0	1,100.0	1,210.0	1,331.0	1,464.1
2 COST OF GOODS	450.0	495.0	544.5	599.0	658.8
3 SALES AND ADM	200.0	220.0	242.0	266.2	292.8
4 RESEARCH AND A	500.0	300.0	300.0	300.0	300.0
5 TOTAL COSTS	1,150.0	1,015.0	1,086.5	1,165.2	1,251.7
6 GROSS PROFIT	-150.0	85.0	123.5	165.9	212.4
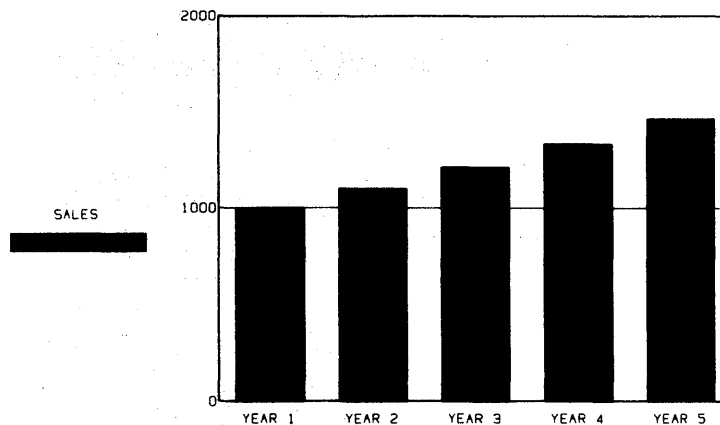
You can now save your chart and table on disk for future use with the SAVETBL (112) and SAVE CHART (121) commands.

Press <Escape> to return to the table display.

First, if you have more than one disk drive, you should use the SET DRIVE command. Assuming that you want to save the chart and table on Drive A:

ENTER COMMAND: **108** <Return>   Set disk drive

   DRIVE (A-P): **A**

ENTER COMMAND: 112 <Return>   Save table

   TABLE NAME: **FORECAST** <Return>

   Notice that the third line on the screen displays the current drive setting, DRIVE A:.

ENTER COMMAND: **121** <Return>   Save chart

   CHART NAME: **FORECAST** <Return>

Both table and chart can have the same name—a suffix is added to the names to distinguish them.

If you don't want to save this table and chart, you can reset the menu and clear the chart as follows:

ENTER COMMAND: **114** <Return>   Reset table

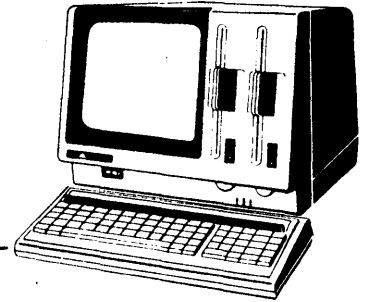   VERIFY (Y OR N): **Y**   <Return>

ENTER COMMAND: **123** <Return>   Reset chart

   VERIFY (Y OR N):   <Return>

Congratulations, you have just completed your first report. If you want to stop now and return to the operating system:

ENTER COMMAND: **9** <Return>   Stop

   VERIFY (Y OR N): **Y** <Return>

Chapter 3

Building Tables

Chapter 3 shows you how to format a table to your own specifications. You will learn how to enter row and column descriptions and the different options available for data entry.

You can view the format commands on your screen by entering command 1 and a <Return>. To see the data entry commands, entry command 2 and then<Return>.

Entering a Row or Column of Data

In Chapter 2, you used the ENTER (31) command to enter values for several rows in the Five-Year Forecast. The ENTER command can be used to enter a column of data as well.

When entering data with the ENTER command, you can choose the method of data entry from among four options. Choose the "0" option (VALUES) and you can enter data, value by value, one cell at a time. Choosing the "1" option (CONSTANT) will allow you to enter a constant value for the entire row or column. With the GROW option, "2", you can enter a value and have it grow by a certain percentage. Choose option "3" (INCR) and your base value will be increased or decreased by an amount specified by you.

For example, suppose you want to enter the values, 10, 20, 30, 40, etc. into column 3 of your table. To do this, you would use the following commands. If you need to clear your screen of existing data use the RESET (114) command as shown below:

ENTER COMMAND: **114** <Return> Reset table
 VERIFY (Y OR N): **Y** <Return>

ENTER COMMAND: **34** <Return> Select column
 COL (1–20): **3** <Return>

Use the SELECT COL (34) command to choose column 3. Notice that instead of using SELECT COL to position your cursor on column 3, you can also use either the right or left arrow keys (→ ←). The data pointer now shows **COL 3** ← .

ENTER COMMAND: **31**   <Return>   Enter

Use the ENTER command to enter values for column 3.

    CHOOSE (VALUE = 0,CONSTANT = 1,
            GROW = 2, INCR = 3): **3**   <Return>

Choose the increasing option.

    BASE VALUE: **10**   <Return>

    RATE: **10**   <Return>

Your display will show the following in column 3. Notice that the data pointer has automatically change to **COL 4** ← and is ready for your next entry.

```
                MODE=NORMAL  ORDER=R/C  ROW=1-50 COL=1-20
ROW 4  <-
ENTER COMMAND:
                                                     1 format:
ROW                                                  2 data:
───────────── ── 1── ── 2── ── 3── ── 4── ── 5──     3 math:
1                          10                         4 graphics:
2                          20                         5 print:
3                          30                         6 status:
4                          40                         7 HELP
5                          50                         8
6                          60                         9 STOP
7                          70                         10 utility:
8                          80                         11 sort:
9                          90                         12 stats:
10                         100                        13
11                         110                        14
12                         120                        15
13                         130                        16 format:
14                         140                        17 INSERT
15                         150                        18 DELETE
16                         160                        19  rows:
17                         170                        20 ROW TITLE
```

Entering Individual Values

If you prefer, you can enter values one at a time by using the ENTRY (30) command. With this command, you can go directly to a data entry position without having to go through the options offered in the ENTER (31) command.

With the ENTRY command you can use the cursor keys to move to the cell position of the value you wish to enter. This position is highlighted on your display. For example, suppose you want to enter the following data into column 4.

```
            -1-    -2-    -3-    -4-    -5-    -6-    -7-
COLUMN 4:   100    100    100     0     100    300    300
```

The following commands will do this:

ENTER COMMAND: **30** <Return>   Entry

   VALUE: **100** <Return>

Value for col 4, row 1.

   VALUE: <Return>

Value for col 4, row 2. Notice that by pressing <Return>, the previous value is repeated.

   VALUE; <Return>

Value for col 4, row 3.

   VALUE: **0** <Return>

Value for Col 4, row 4.

   VALUE: **100** <Return>

Value for col 4, row 5.

   VALUE: **300** <Return>

Value for col 4, row 6.

   VALUE: <Return>

Value for col 4, row 7. The prior value, 300, is automatically used by pressing <Return>. This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command.

Notice that while in the ENTRY mode, each <Return> causes the data pointer and the cursor to automatically move to the next row or column.

Because of the different methods available for entering data, you should determine the best way based on your particular application. In order to save time, you should also decide whether to use the row mode or the column mode before you begin entering your data.

Doing a Sample Inventory Table

To illustrate the formatting and data entry commands used in this chapter, let's prepare a sample Inventory table based on the chart below.

ITEM	UNIT COST	QUANTITY	TOTAL COST
DESKS	300	10	
CHAIRS	150	20	
SHELVES	200	5	
TOTAL			

Assume that you need an Inventory report to include three items: desks, chairs, and shelves. For each of these items, you want to show a unit cost, quantity, and total cost. You also want to show a grand total for all three items' cost. Let's start by setting up the table size for your Inventory example.

Setting Table Size

Your table size can be changed to accommodate a variety of applications. For example, by choosing a 5-column format, you can have up to about 200 available rows. This format could handle a full income statement, cash flow statement, and balance sheet in a single table. With 60 columns in your table, you can do a five-year, monthly projection of cash flows for a real estate development project. The potential size of each table is determined by the RAM (Random Access Memory) capacity of your computer. Based on a system with 64K (kilobytes) of RAM, your table can be up to 99 columns, **OR** up to 250 rows, with a total of approximately 1000 data cells. The SET UP (109) command will automatically calculate the maximum number of columns and rows to let you know how large your table can be.

The SET UP (109) command allows you to select table sizes. When you bring your program up on your terminal, the table that you see on the screen is 50 rows by 20 columns. The initial table size will always default to 50 rows by 20 columns unless you use the SET UP command to specify another size. Let's use the SET UP command to build a sample Inventory table that is 5 columns by 15 rows.

ENTER COMMAND: **109** <Return>   Set up table size

VERIFY (Y OR N): **Y** <Return>

Notice that answering "yes" (Y) to the SET UP verification query will clear the data from your screen. If you do not want the data cleared, respond with an "N" for no.

NUMBER OF COLUMNS (1–99): **5** <Return>

We want to have 5 columns in our table. Notice that you have the option for up to 99 columns.

ROWS (17–136): **15** <Return>

Our table will have 15 rows. Notice that you could have up to about 136 rows depending on the computer system you are using. The number of rows is considerably larger if you have more than 64K of RAM.

VERIFY (Y OR N): **Y** <Return>

The size of the table on the screen, the CURRENT table size, is shown in the upper left corner of your screen (15 ROWS BY 5 COLUMNS). The screen will now be reset to show a table that is 5 columns by 15 rows.

Entering Row and Column Descriptions

Row and column titles are easy to enter. Using the ROW TITLE (20) command, you can enter titles of up to 40 alpha or numeric characters for each row. Each title entered is placed in the current row as indicated by the data pointer and the highlighted block. You can use the cursor keys to position the data pointer to the row in which you want to enter a title. Let's enter row titles for the Inventory table.

ENTER COMMAND: **20** <Return>   Row titles

   ROW TITLE: **ITEM** <Return>

   Notice that after you press <Return>, the entry is moved to row 1 of your table. The command line will now prompt you for the description for row 2.

   ROW TITLE: **DESKS** <Return>

   ROW TITLE: **CHAIRS** <Return>

   ROW TITLE: **SHELVES** <Return>

   ROW TITLE: **TOTAL** <Return>

   This is the last row title to be entered, so use the <CANCEL> command to cancel the ROW TITLE command.

Now enter the column descriptions for your Inventory table. Columns are allowed 2-line descriptions of up to 20 characters. Each line of the title is automatically right justified in the column. If only one line of description is needed, simply press <Return> to indicate that a second line is not necessary.

ENTER COMMAND: **25** <Return>   Column titles

   COL TITLE 1: **UNIT** <Return>   Column 1 first title

   COL TITLE 2: **COST** <Return>   Column 1 second title

   COL TITLE 1: **QUANTITY** <Return>

   COL TITLE 2: <Return>

Pressing the <Return> key by itself, indicates that there is no second line column description.

   COL TITLE 1: **TOTAL** <Return>   Column 3 first title

   COL TITLE 2: **COSTS** <Return>   Column 3 second title

This is the last column title to be entered, so press the <CANCEL> key to cancel the COL TITLE command.

Your screen should show the following:

```
                 MODE=NORMAL    ORDER=R/C  ROW=1-15          COL=1-5
ROW 1 (ITEM)  <-
ENTER COMMAND:
                 UNIT            TOTAL                      1 format:
ROW              COST   QUANTITY  COSTS                     2 data:
───────────── ──1── ──2── .──3── ──4── ──5── 3 math:
1 ITEM                                                      4 graphics:
2 DESKS                                                     5 print
3 CHAIRS                                                    6 status:
4 SHELVES                                                   7 HELP
5 TOTAL                                                     8
6                                                           9 STOP
7                                                          10 utility:
8                                                          11 sort:
9                                                          12 stats:
10                                                         13
11                                                         14
12                                                         15
13                                                         16 format:
14                                                         17 INSERT
15                                                         18 DELETE
16                                                         19  rows:
17                                                         20 ROW TITLE
```

The **ROW TITLE** and **COL TITLE** commands can also be used to change row and column descriptions. They can be used to correct typing errors or to supply new titles. The new descriptions you supply simply replace the old descriptions in the table.

Entering Data

Using the data entry commands discussed earlier in this section, we will now enter data into the Inventory table. Use your cursor keys to position your cursor on column 1.

ENTER COMMAND: **30** <Return>   Data entry

    VALUE: **0** <Return>

    Row 1 is a heading and should have not values. The cursor will automatically go to column 1, row 2 ready for your next entry.

    VALUE: **300** <Return>

    Unit cost for desks (row 2) is $300.00.

    VALUE: **150** <Return>

    Unit cost for chairs (row 3) is $150.00.

    VALUE: **200** <Return>

    Unit cost for shelves (row 4) is $200.00. This is the last value to be entered here, so press the <CANCEL> key to cancel the ENTRY command.

The data pointer and the cursor automatically move to the next column ready for your next command. Let's use the ENTRY command again to enter data in column 2.

ENTER COMMAND: **30** <Return>   Data entry

    VALUE: **0** <Return>

    Row 1 is a heading and has no value.

    VALUE: **10** <Return>

    The quantity of desks, row 2, is 10.

    VALUE: **20** <Return>

    The quantity of chairs, row 3, is 20.

    VALUE: **5** <Return>

The quantity of shelves, row 4, is 5. This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command.

To get the TOTAL costs of the Inventory table, use the MULT (43) command to multiply column 1 by column 2.

ENTER COMMAND: **43** <Return>
   COL (1–5): **1** <Return>
   COL (1–5): **2** <Return>

Your results will appear in column 3. Your screen should now show the following:

```
                     MODE=NORMAL    ORDER=R/C  ROW=1-15      COL=1-5
        COL 4  <-
ENTER COMMAND:
                  UNIT                TOTAL              1 format:
ROW               COST    QUANTITY    COSTS              2 data:
————————————      —1—     —2—         —3—   —4—   —5—    3 math:
1 ITEM            0.0      0.0        0.0                4 graphics:
2 DESKS           300.0    10.0       3,000.0            5 print:
3 CHAIRS          150.0    20.0       3,000.0            6 status:
4 SHELVES         200.0     5.0       1,000.0            7 HELP
5 TOTAL                                                  8
6                                                       9 STOP
7                                                      10 utility:
8                                                      11 sort:
9                                                      12 stats:
10                                                     13
11                                                     14
12                                                     15
13                                                     16 format:
14                                                     17 INSERT
15                                                     18 DELETE
16                                                     19  rows:
17                                                     20 ROW TITLE
```

Saving and Loading Tables

After you have created a table, you will probably want to save the table for future use. You will also need to know how to reload tables from your diskette into your computer so that you can change or update data. To see the commands associated with saving and loading tables, enter command 10 (utility) and press <Return>.

You can save tables on diskettes and load the tables again using the SAVE TBL (112) and LOAD TBL (111) commands. Each table is identified by an 8-character name. You can direct the tables to be saved or loaded from any of the disk drives of your computer. More information about file names, maintaining tables, and changing disk drives can be found in Chapter 6.

To illustrate the save and load commands, let's save the table on your screen as an Inventory table example named INVENT, reset the table, and then load the saved Inventory table back from the disk.

ENTER COMMAND: **112**   <Return>   Save table

   TABLE NAME: **INVENT**   <Return>

When your table has been saved, you will see a message, "SAVED" in the upper left corner of your screen.

Now clear your screen using the RESET (114) command and then reload the table using the LOAD TBL (111) command.

ENTER COMMAND: **114**   <Return>   Reset

   VERIFY (Y OR N): **Y**   <Return>

ENTER COMMAND: **111**   <Return>   Load table

A directory is kept of all the tables that you save. After entering a load or save command, a message at the top of the screen will direct you to "Hit RETURN to see available tables or charts." If you wish to see the names of the tables in the directory, simply press <Return>. Continue pressing <Return to view additional tables.

    TABLE NAME: **INVENT** <Return>

Each table will save the following information:

1. Report options and titles.
2. Range settings and computer order
3. Row descriptions, options, and commands.
4. Column descriptions, options, and commands.
5. Table values.

In general, all relevant parameters are saved so that you can continue from one session to another without worrying about losing table information.

Enlarging Tables

The SET UP command can also be used to enlarge a table—as long as you remain within the size limitations of your RAM. To enlarge a table, first set the current table to the new dimension. Then load the table to be enlarged, into the CURRENT table.

Let's enlarge our current table from 5 columns by 15 rows to 20 columns by 50 rows.

ENTER COMMAND: **109** <Return>   Set up
   VERIFY (Y OR N): **Y** <Return>
   NUMBER OF COLUMNS (1–99): **20** <Return>
   ROWS (1–50): **50** <Return>
   VERIFY (Y OR N): **Y** <Return>

The current table will be set up to the new dimensions. The CURRENT table size is displayed in the upper left corner of your screen.

ENTER COMMAND: **111** <Return>   Load table

TABLE NAME: **INVENT** <Return>

MicroPlan will give you a message on the screen as follows:

New table is smaller than current table dimensions. Enlarge?
NEW=15×15   CURRENT=50×20
CHOOSE(NEW=0, CURRENT=1): 1 <Return>

Your Inventory table will be loaded into the enlarged matrix. If for some reason you decide not to enlarge the table, simply choose "0" in the above prompt, signifying that you wish your new table to remain the same size. Let's save the enlarged Inventory table using the SAVE TBL (112) command.

ENTER COMMAND: **112** <Return>

TABLE NAME: **INVENT** <Return>

You will receive a message from saying:

Your table file already exists. Continue with save?

VERIFY (Y OR N): **Y** <Return>

By answering "yes" to the verification, you have indicated that you want to write over the existing file called INVENT. Because you now have an updated version of INVENT, you will want to save the new version instead of the old.

Inserting and Deleting Lines

You can insert a new row or column using the INSERT (17) command. For example, let's insert a new row into the Inventory table. Put your cursor on row 5, then:

ENTER COMMAND: **17** <Return>   Insert

An empty row or column will automatically be inserted on the line indicated by your cursor. In reality, the row being inserted is the last row or column of your current table. Data in that row or column will be carried to the new location.

To delete a row or column, simply put your cursor on the row or column you wish to delete and use the DELETE (18) command. The command line will issue a prompt asking you to verify the deletion. A "Y" response to the prompt will clear the data from the deleted line and insert the line at the outer limits of your matrix. Any commands that referenced the deleted command will now reference the last row or column of your table.

For example, delete the line we just inserted into the Inventory table above. Use your cursor keys to move the cursor to row 5 and then follow the steps below.

ENTER COMMAND: **18** <Return>   Delete
   VERIFY (Y OR N): **Y** <Return>

Row 5 has been deleted and your table adjusted.

Reordering Rows and Columns

You can change the order of your rows using the REORDER (23) command. In the same way, the REORDER (28) command will let you reorder colunmns. Using these commands, you can change the order of rows and columns in already existing tables. For example, let's switch the order of columns 2 and 3 in our Inventory table.

ENTER COMMAND: **28** <Return>   Reorder columns
   OLD NUMBER (1-20): **3** <Return>
   NEW NUMBER (1-20): **2** <Return>

Your screen should show the following.

```
INVENT        MODE=NORMAL          ORDER=R/C  ROW=1-50      COL=1-20
         ROW 5 (TOTAL) <-
ENTER COMMAND:
                UNIT  TOTAL                           1 format:
ROW             COST  COSTS   QUANTITY                2 data:
───────────────  ──1──  ──2──  ──3──  ──4──  ──5──    3 math:
1 ITEM           0.0    0.0     0.0    0.0    0.0     4 graphics:
2 DESKS        300.0  3.000.0  10.0    0.C    0.C     5 print:
3 CHAIRS       150.0  3.000.0  20.0    0.0    0.0     6 status:
4 SHELVES      200.0  1.000.0   5.0    0.0    C.0     7 HELP
5 TOTAL                                               8
6                                                     9 STOP
7                                                    10 utility:
8                                                    11 sort:
9                                                    12 stats:
10                                                   13
11                                                   14
12                                                   15
13                                                   16 format:
14                                                   17 INSERT
15                                                   18 DELETE
16                                                   19  rows:
17                                                   20 ROW TITLE
```

By using the REORDER command you can make adjustments to your table without having to re-enter data. Of course, when you insert or reorder a line, command references for existing rows and columns are automatically retained.

Chapter 4

Math and Formulas
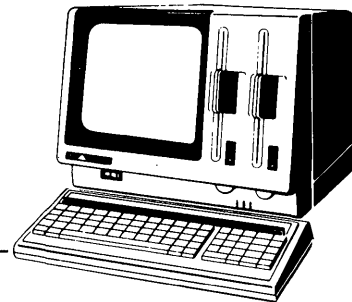
Chapter 4 explains how to use the built-in mathematical commands. In addition, you will learn how to write and use formulas, how to use the handy PLUG command, and how to calculate and recalculate your results with surprising speed. To see the mathematical commands on your screen, enter command **3** and then <Return>.

Simple Mathematical Functions

Mathematical computations are performed on entire rows and columns of your table. Let's go through some of the more common commands. Make sure your screen is cleared. If not:

ENTER COMMAND: **114** <Return>

   VERIFY (Y OR N): **Y** <Return>

   The RESET command clears the entire screen and displays the table.

For our purposes here we will be doing the commands from a row mode. If you prefer, you can also enter the mathematical commands in columns. Let's enter some sample data into row 1 and row 2 for working purposes.

ENTER COMMAND: **31** <Return>   Enter data

   CHOOSE (VALUE=0, CONSTANT=1,
         GROW = 2, INCR = 3): **1** <Return>

   BASE VALUE: **20** <Return>

ENTER COMMAND: **31** <Return>

   CHOOSE (VALUE = 0, CONSTANT = 1,
         GROW = 2, INCR = 3): **1** <Return>

   BASE VALUE: **10** <Return>

Now you are ready to use commands. The cursor and data pointer are on row 3 and the command line is ready to receive a command to enter data or put results on that row. Let's start with the ADD (41) command and add rows 1 and 2. Make sure your data pointer is pointing to row 3, then:

ENTER COMMAND: **41** <Return>   Add

   ROW (1–50): **1** <Return>

   ROW (1–50): **2** <Return>

The ADD command will add any two rows or columns in a table and put the results in the row or column indicated by the cursor and data pointer. For example:

<div align="center">

Row 1 + Row 2 = Row 3

</div>

Now let's subtract row 2 from row 1 and put the difference in row 4 using the SUB (42) command. Make sure your cursor is on row 4, then:

ENTER COMMAND: **42** <Return>   Subtract

   ROW (1–50): **1** <Return>

   ROW (1–50): **2** <Return>

The SUB command will subtract any two rows or columns of values and put the results in the row or column indicated by the cursor and data pointer. The first prompt asks for the row or column to subtract from; the second prompt asks for the row or column to subtract. For example:

<div align="center">

Row 1 − Row 2 = Row 4

</div>

Using the MULT (43) command, multiply row 1 by row 2 and put the results in row 5.

ENTER COMMAND: **43** <Return>   Multiply

ROW (1–50): **1** <Return>
ROW (1–50): **2** <Return>

The MULT command will multiply any two rows or columns of values in a table and put the results in the row or column indicated by the cursor and data pointer. For example:

Row 1 × Row 2 = Row 5

Use the DIV (44) command to divide row 1 by row 2 and put the results in row 6.

ENTER COMMAND: **44** <Return>   Divide
ROW (1–50): **1** <Return>
ROW (1–50): **2** <Return>

The DIV command will divide any two row or columns of values and put the quotient in the row or column indicated by the cursor and data pointer. For example:

Row 1/Row 2 = Row 6

The ADD K (51), SUB K (52), MULT K (53), and DIV K (54) commands perform similar computations. Instead of working with two rows or columns, these commands work with one row or column and a constant. The constant that you supply for these commands will be added to, subtracted from, multiplied by, and divided into each value of the row or column that you indicate.

The other mathematical commands are used in the same manner as the commands described above. The additional commands include: NEGATE (45) command, IN-VERSE (46) command, INTEGER (47) command, ROUND (48) command and ABSOLUTE (50) command. Some of the more frequently commands are explained in the section below. Try experimenting with some of the commands on your own. For more information about a specific command, please refer to the Command Reference Section of this manual.

Special Math Functions

The CUMULATE (49) command is helpful in situations where you need a cumulative total over a period of time. Let's use the CUMULATE command to calculate the cumulative total for the data in row 5 and put the results in row 7. Make sure your cursor is on row 7.

ENTER COMMAND: **49** <Return>   Cumulate

   VALUE: **100** <Return>

   ROW (1–50): **5** <Return>

The CUMULATE command computes cumulative totals for a row or column of a table. After entering the command, the first prompt will ask for an initial or base value. This is especially useful for balance-forward types of calculations that have an ending balance to be carried forward. There must always be a base value entered when using the CUMULATE command. If you have no previous balance value, a "0" must be entered.

The SUM (55) command is one of the most frequently used of the mathematical commands. Use the SUM command to total the data from row 1 through row 7 and put the results in row 8. Make sure your cursor is on row 8, then:

ENTER COMMAND: **55** <Return>   Sum

   ROW BEGIN (1–50): **1** <Return>

   Number of row to begin summing.

   END (1–50): **7** <Return>

   Last row to be included in the sum.

The SUM command lets you add any number of consecutive rows or columns. Like the other mathematical commands, you can position your results wherever you need to have them appear. The results will appear in the row or column indicated by your data pointer and cursor.

The GET (56) command will copy data from one row or column to another. Use the GET command to put the values from row 5 into row 9. Make sure your cursor is on row 9, then:

ENTER COMMAND: **56** <Return>   Get

   ROW (1–50): **5** <Return>

The GET command allows you to retrieve data from any row and put it anywhere in your current table. Of course, the same thing can be done with columns in the column mode. You should note, however, that you cannot put data from a row into a column or data from a column into a row.

Floor and Ceiling

The FLOOR (57) and CEILING (58) commands can be used to answer basic "if-then" questions about an existing row or column of values. Let's use the FLOOR command to analyze the data in row 7 and put the results in row 10. Your data pointer should be pointing to row 10.

ENTER COMMAND: **57** <Return>   Floor

   VALUE: **800** <Return>   Minimum Value

   ROW (1–50): **7** <Return>

   Row to compare to the minimum value.

When using the FLOOR command, you set a minimum value, or floor and then compare each value in your row or column. If a value in that line is greater than the minimum value you have specified, then that value will remain unchanged. If a value is less than or equal to the minimum value, then the minimum value will be entered. In our example, every value in row 7 that was less than 800 became 800. Values greater than 800 remained unchanged.

Now use the CEILING command to compare row 7 with a maximum value of 575. Put the results in row 11.

ENTER COMMAND: **58** <Return>   Ceiling

   VALUE: **575** <Return>   Maximum Value

   ROW (1–50): **7** <Return>

   Row to compare to maximum value.

The CEILING command works the same way as the FLOOR command, only in reverse. With the CEILING command, you set a maximum value or ceiling. When you compare a line with your maximum value, anything greater than or equal to the ceiling value will become that value; anything less than that maximum value will stay the same. In our example, all values in row 7 that were greater than 575 were changed to 575; other values were not changed.

Your screen showing the examples used above should look like the following:

```
                    MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
      ROW 12  <-
ENTER COMMAND:
                                                      1 format:
ROW                                                   2 data:
──────────────  ──1──  ──2──  ──3──  ──4──  ──5──     3 math:
 1 SAMPLE DATA   20.0   20.0   20.0   20.0   20.0     4 graphics:
 2 SAMPLE DATA   10.0   10.0   10.0   10.0   10.0     5 print:
 3 ADD           30.0   30.0   30.0   30.0   30.0     6 status:
 4 SUB           10.0   10.0   10.0   10.0   10.0     7 HELP
 5 MULT         200.0  200.0  200.0  200.C  200.0     8
 6 DIV            2.0    2.0    2.0    2.0    2.0     9 STOP
 7 CUMULATE     300.0  500.0  700.0  900.0 1,100.0   10 utility:
 8 SUM          572.0  772.0  972.0 1,172.0 1,372.0  11 sort:
 9 GET          200.0  200.0  200.0  200.0  200.0    12 stats:
10 FLOOR        800.0  800.0  800.0  900.0 1,10C.0   13
11 CEILING      300.0  500.0  575.0  575.0  575.0    14
12                                                   15
13                                                   16 format:
14                                                   17 INSERT
15                                                   18 DELETE
16                                                   19 rows:
17                                                   20 ROW TITLE
```

Displaying Command Logic

The SHOW ROWS (22) command provides you with excellent documentation for every part of your worksheet. The SHOW ROWS command displays the commands that have been memorized for each row. All formulas, base values, parameters, and print options for each command will be shown on the display on your screen. The SHOW COLS (27) command will display corresponding information about columns.

If you want to change the command for a particular row or column, you can over-write the original command by entering a new command. The new logic will be reflected when you use the SHOW ROWS or SHOW COLS commands. Use the SHOW ROWS command to see the table logic for each of the mathematical commands that you have just used.

ENTER COMMAND: **22** <Return>   Show row logic

Your screen will show the following:

Press any cursor key to recover your display.
    ROW 12 <-
ENTER COMMAND:

ROW	TYPE	UNDER LINE	BLANK LINES	DEC SIZ	FOR MAT	COMMAND	PARAMETERS	40 math:
								41 ADD
								42 SUB
1 SAMPLE DATA	data		−	−	−			43 MULT
2 SAMPLE DATA	data		−	−	−			44 DIV
3 ADD	data		−	−	−	ADD	ROW=1 ROW=2	45 NEGATE
4 SUB	data		−	−	−	SUB	ROW=1 ROW=2	46 INVERSE
5 MULT	data		−	−	−	MULT	ROW=1 ROW=2	47 INTEGER
6 DIV	data		−	−	−	DIV	ROW=1 ROW=2	48 ROUND
7 CUMULATE	data		−	−	−	CUMULATE	K=100 ROW=5	49 CUMULATE
8 SUM	data		−	−	−	SUM	ROWS 1 − 7	50 ABSOLUTE
9 GET	data		−	−	−	GET	ROW=5	51 ADD K
10 FLOOR	data		−	−	−	FLOOR	K=800 ROW=7	52 SUB K
11 CEILING	data		−	−	−	CEILING	K=575 ROW=7	53 MULT K
12	data		−	−	−			54 DIV K
13	data		−	−	−			55 SUM
14	data		−	−	−			56 GET
15	data		−	−	−			57 FLOOR
16	data		−	−	−			58 CEILING
17	data		−	−	−			59

Press any cursor key to recover your display.

The NULLIFY Command

If you want to delete a command from your table entirely, you must use the NUL-LIFY (39) command to nullify the command logic. NULLIFY will issue a prompt to verify that the current row or column should be nullified. The NULLIFY command will not affect the data currently in your table.

Using Formulas

Although all commands have built-in formulas, it may be necessary for you to enter your own formulas for specialized computations. There are two commands that let you enter formulas into your tables. The FORMULA (35) command applies your formulas to an entire row or column. The PLUG (37) command lets you put a formula in a single location, or cell. With these two commands, you can do calculations on an entire row or column OR cell-by-cell calculations, as needed.

With the PLUG and FORMULA commands you can combine table references and constants with mathematical operators to make formulas. The valid operations consist of addition (+), subtraction (−), multiplication (*), and division (/). You can use up to 40 characters in each formula.

When using the PLUG and FORMULA commands, you will also probably want to reference data already in your table. You can reference any row or column by preceding the row or column number with the letter "L". For example, you would reference row 7 as L7 or column 19 as L19. Row and column references are automatically distinguished according to the data pointer. If the data pointer is pointing to a row, then all line references are to rows. If the data pointer points to a column, then all line references are to columns.

Your formula can also reference single values in your table. Single value references are formed by preceding the row and column number with the letter "V". For example, to reference the value in row 1, column 1, enter V1, 1 as part of your formula. To reference row 8, column 19, you would enter V8,19 as your reference. Notice that in a single value reference, the row number must precede the column number. Also, you must use a comma to separate the two values.

Of course, you can always use constants in your formulas. Constants are numbers such as .45 and 300. Notice that negative numbers such as -1.0 cannot be used. To use negative numbers, enter them as an expression such as (0-1).

L	reference a row or column	L7
V	reference a single value	V1,2
+	add two values	L1+L3
−	subtract two values	V3,4-V5,6
*	multiply two values	L4*L16
/	divide two values	V4,4/10

In a complex formula, multiplication and division are performed before addition and subtraction. For example, in the formula **L3 + 2* L1**, line 1 will be multiplied by 2 before adding the values from line 3.

If your intent is to add 2 to every value of L3 before multiplying by the values in line 1, you can use parentheses. The following example would clearly specify your intent:

(L3 + 2) *L1

The easiest way to learn is by doing. Clear your screen using the RESET (114) command. Enter some sample data. In row 1 using command 30 (ENTRY):
        VALUE: 1000.0 <Return>, 1250.0 <Return>, 1562.5 <Return>
                1953.1 <Return>, 2441.4 <Return>, <CANCEL>
In row 2 using command 31 <ENTER>:
    CHOOSE (VALUE=0, CONSTANT=1, GROW=2, INCR=3): 1   <Return>
    BASE VALUE: 575 <Return>

Then enter the sample formulas below using the FORMULA (35) command, starting in row 3.

L1	equivalent to the GET command
L1–L2–L3	subtract lines 2 and 3 from line 1
L3/L2*100	Equivalent to the RATIO command
V1,1	set current row or column to the value in row 1, column 1
L3/V3,1*100	calculate line 3 as a percent of the value in the first column of row 3— same as the % of TOT command

Using the FORMULA Command

Let's experiment using the FORMULA command in the following example. Suppose that your cost of goods has a fixed and variable component. Cost of goods is 45% of sales plus a $300 constant expense. Assume that row 1 of your sample data contains sales data. You can then enter the formula **.45 * L1 + 300** to calculate the desired results. To produce the above example, put your cursor on row 9, then

ENTER COMMAND: 35 <Return>   Formula
    FORMULA: **.45*L1 + 300** <Return>

Check your results against the following:

```
                        MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
        ROW 9 (.45*L1 +300)  <-
ENTER COMMAND:
                                                          1 format:
ROW                                                       2 data:
─────────────────  ──1──  ──2──  ──3──  ──4──  ──5──     3 math:
1 SAMPLE DATA      1,000.0  1,250.0  1,562.5  1,953.1  2,441.4  4 graphics:
2 SAMPLE DATA        575.0    575.0    575.0    575.0    575.0  5 print:
3 L1               1,000.0  1,250.0  1,562.5  1,953.1  2,441.4  6 status:
4 L1-L2-L3          -575.0   -575.0   -575.0   -575.0   -575.0  7 HELP
5 L3/L2*100          173.9    217.4    271.7    339.7    424.6  8
6 V1,1             1,000.0  1,000.0  1,000.0  1,000.0  1,000.0  9 STOP
7 L3/V3,1*100        100.0    125.0    156.3    195.3    244.1  10 utility:
8                                                               11 sort:
9 .45*L1 +300        750.0    862.5  1,003.1  1,178.9  1,398.6  12 stats:
10                                                              13
11                                                              14
12                                                              15
13                                                              16 format:
14                                                              17 INSERT
15                                                              18 DELETE
16                                                              19 rows:
17                                                              20 ROW TITLE
```

Now use the SHOW ROWS (22) command to display your table logic as shown on the screen below.

```
Press any cursor key to recover your display.
    ROW 9 (.45*L1+300)  <-
ENTER COMMAND:
```

ROW	TYPE	UNDER LINE	BLANK LINES	DEC SIZ	FOR MAT	COMMAND PARAMETERS	
							1 format:
							2 data:
							3 math:
1 SAMPLE DATA	data		–	–	–		4 graphics:
2 SAMPLE DATA	data		–	–	–		5 print:
3 L1	data		–	–	–	L1	6 status:
4 L1-L2-L3	data		–	–	–	L1-L2-L3	7 HELP
5 L3/L2*100	data		–	–	–	L3/L2*100	8
6 V1,1	data		–	–	–	V1,1	9 STOP
7 L3/V3,1*100	data		–	–	–	L3/V3,1*100	10 utility:
8	data		–	–	–		11 sort:
9 .45*L1+300	data		–	–	–	.45*L1+300	12 stats:
10	data		–	–	–		13
11	data		–	–	–		14
12	data		–	–	–		15
13	data		–	–	–		16 format:
14	data		–	–	–		17 INSERT
15	data		–	–	–		18 DELETE
16	data		–	–	–		19 rows:
17	data		–	–	–		20 ROW TITLE

Press any of your cursor keys to recover your display.

Using the PLUG Command

Sometimes it is useful to relate various entries of your table in a formula and store the single value result in a specific cell location on your table.

PLUG formulas are similar to the regular formulas described above, however, these formulas cannot have references to an entire row or column. In other words, you cannot use line references (L1 or L9) in the PLUG formulas. The PLUG formulas can only reference individual table values (V1,1 or V2,19) or constants.

The results from the PLUG command can be placed anywhere in your table. It is not necessary to enter the PLUG command on the same row or column that you want your results to go. The PLUG command formula will be stored in the row or column indicated by your cursor and data pointer. The results from that formula will be placed in the location specified with the PLUG command prompts.

For example, you can enter the PLUG command on an unused row or column, say row 50, and have it place its calculated results in any cell, for example row 2, column 1.

To illustrate the use of PLUG, suppose you want to do a special weighted profit margin on your Five-Year Forecast table. The formula is the sum of profits for the first three years divided by the sales for the first three years. The following commands show how to do this calculation.

ENTER COMMAND: **111** <Return>   Load table
    TABLE NAME: **FORECAST** <Return>
    CHOOSE (NEW=, CURRENT=1): **1** <Return>

Select an unused row to store the PLUG command logic.

ENTER COMMAND: **33** <Return>
    Row (1–50): **50** <Return>

ENTER COMMAND: **37** <Return>   Plug
    Row (1–50): **8** <Return>
    Column (1–20): **1** <Return>
    Plug result in row 8, column 1.
    FORMULA: (V6,1 + V6,2 + V6,3)/(V1,1 + V1,2 + V1,3)* 100 <Return>
    The calculated results will be displayed in row 8, column 1.

Notice that you can put only one command per row or column. If you enter one command over another, the second command will override the initial command. For example, if you enter your PLUG command on the same row as a SUM command, the PLUG command will override the SUM command. You can use the SHOW ROWS (22) command to check the logic for your table. Enter command 36 (GOTO) and select row 1, column 1 to view the result in row 8, column 1 of 1.8.

Using the COMPUTE Command

As you enter data in your table, all the commands you used to calculate the values for a row or column are memorized. When all your commands have been entered, issue the COMPUTE (98) command. In seconds, the table will be updated to reflect your results.

In Chapter 2, you used the CHANGE (32) command to ask a "what-if" question. In fact, you can do many types of "what-if" analysis including:

1. Change entire rows or columns of the table using the ENTER (31) command.
2. Change the command used to compute a row or column.
3. Change the values associated with commands.
4. Extend the model with more rows or columns.

Each command you enter replaces any command that was previously entered in that row or column. The new commands are used to compute new values, replacing the previous command.

Doing a "what-if" analysis is simple. The following steps outline the procedures you need to perform a "what-if" analysis on any of your tables.

1. Select the row or column you want to change by moving the data pointer.
2. Issue the commands to perform the desired calculation or to enter the new data values.
3. When all changes have been completed, issue the COMPUTE command to instantly update your table.

To illustrate some uses of the "what-if" capabilities, load the Five-Year Forecast example that you did in Chapter 2 by using the following steps:

ENTER COMMAND: **111** <Return>   Load table

   TABLE NAME: **FORECAST** <Return>

   CHOOSE (NEW=0, CURRENT=1): **1** <Return>

Suppose your COST OF GOODS in line 2 should be 42.5% of SALES instead of 45%. To ask this "what-if" question, use the MULTI K (53) command again—but this time, use the new percentage. Position your cursor on row 2, then:

ENTER COMMAND: **53**   <Return>

Multiply by a constant.

   VALUE: **.425**   <Return>

   Enter new value of 42.5%.

   ROW (1–50): **1**   <Return>

ENTER COMMAND: **98**   <Return>

Use the COMPUTE command to update your table. Your results will be rounded to one decimal place unless you specify otherwise.

In a few seconds, you would get the following on your screen:

```
DONE.
       ROW 3 (SALES AND ADM)  <-
ENTER COMMAND:
                                                      1 format:
ROW                                                   2 data:
───────────── ──1── ──2── ──3── ──4── ──5── 3 math:
1 SALES         1,000.0  1,100.0  1,210.0  1,331.0  1,464.1  4 graphics:
2 COST OF GOODS   425.0    467.5    514.3    565.7    622.2  5 print:
3 SALES AND ADM   200.0    220.0    242.0    266.2    292.8  6 status:
4 RESEARCH AND    500.0    300.0    300.0    300.0    300.0  7 HELP
5 TOTAL COSTS   1,125.0    987.5  1,056.3  1,131.9  1,215.1  8
6 GROSS PROFIT   -125.0    112.5    153.8    199.1    249.0  9 STOP
7                                                     10 utility:
8                                                     11 sort:
9                                                     12 stats:
10                                                    13
11                                                    14
12                                                    15
13                                                    16 format:
14                                                    17 INSERT
15                                                    18 DELETE
16                                                    19 rows:
17                                                    20 ROW TITLE
```

As a second example of "what-if" analysis, suppose RESEARCH AND DEVEL-OPMENT costs start at $700 and drop to $300 by year five. To make this change position the cursor on row 4 and enter the new figures using the ENTER command.

EWNTER COMMAND: **31** <Return>

Enter the new RESEARCH AND DEVELOPMENT figures.
    CHOOSE (VALUES=0, CONSTANT=1,
            GROW=2,INCR=3): **3** <Return>
    BASE VALUE: **700** <Return>
    RATE: **-100** <Return>

ENTER COMMAND: **98** <Return>

Now compute your new results.

The screen will show the following:

```
DONE.
     ROW 5 (TOTAL COSTS)  <-
ENTER COMMAND:
                                                     1 format:
ROW                                                  2 data:
─────────────── ──1── ──2── ──3── ──4── ──5── 3 math:
1 SALES          1,000.0  1,100.0  1,210.0  1,331.0  1,464.1  4 graphics:
2 COST OF GOODS    425.0    467.5    514.3    565.7    622.2  5 print:
3 SALES AND ADM    200.0    220.0    242.0    266.2    292.8  6 status:
4 RESEARCH AND     700.0    600.0    500.0    400.0    300.0  7 HELP
5 TOTAL COSTS    1,325.0  1,287.5  1,256.3  1,231.9  1,215.1  8
6 GROSS PROFIT    -325.0   -187.5    -46.3     99.1    249.0  9 STOP
7                                                    10 utility:
8                                                    11 sort:
9                                                    12 stats:
10                                                   13
11                                                   14
12                                                   15
13                                                   16 format:
14                                                   17 INSERT
15                                                   18 DELETE
16                                                   19  rows:
17                                                   20 ROW TITLE
```

Chapter 5

Formatting and
Printing Reports

Chapter 5 explains how to design presentation-quality reports. You will learn how to set printing options for individual rows and columns as well as how to set global options for your entire report.

Setting Print Options

There are three different commands that let you set options for a printed report: the OPTIONS (81) command, the SET TYPE (21) command for rows, and the SET TYPE (26) command for columns. These commands set options only for printed reports. They will not show up on your screen.

The OPTIONS (81) command sets global or overall print options that apply to your entire report. Some of the options you can set with this command include overall row title widths, column widths, number of columns per page, and page controls. The OPTIONS command also provides top and left margin options to support printers with automatic paper feeds. The global print options are the lowest level of print options in the options hierarchy, and will be overridden by both the row and column SET TYPE commands.

The row SET TYPE command (21) sets print options for individual rows. Options include setting row types, underlining, and the number of decimal places for each row. The row SET TYPE (21) options will override the global options, but will be overridden by the column SET TYPE (26) command.

The column SET TYPE command (26) sets print options for individual columns. Options under this command include columns widths and number of decimal places for each column. The column SET TYPE options are the highest in the options hierarchy, and will override both the global and row SET TYPE option settings. Once set, the column options cannot be changed.

To illustrate the formatting and printing capabilities, let's use the Inventory table that we created in Chapter 3.

ENTER COMMAND: **111** <Return>   Load table

    TABLE: **INVENT** <Return>

Setting Row Options

You can specify a row as a heading, subtitle, footnote, or as a normal data row. You can also underline a row, insert trailing blank lines, specify the number of decimal places for row values, and specify if you want "$" or "%" signs with your values. For the Inventory report, let's assume that we want to designate rows 1,4, and 5 as follows:

Row 1 ITEM: Heading only; no data assigned to row.

Row 4 SHELVES: Last item before TOTAL; need single underline.

Row 5 TOTAL: Total figures; need double underline.

To specify these row print options, use the SET TYPE (21) command.

ENTER COMMAND: **21** <Return>

The SET TYPE command allows you to set options on each row. For each option, if you press <Return> without a response, the previous setting for an option will remain unchanged.

    ROW: **1** <Return>

Specify options for row 1.

TYPE (DATA = 0, SUBT = 1, HEAD = 2,
    NOTE = 3, OMIT = 4): **2** <Return>

Each row can be identified as a row of numeric data; a subtitle that centers the corresponding row title in your report; a heading that leaves the area to the right of the row title blank; or a footnote that puts the row title at the bottom of the page. If you prefer, the entire row can be omitted on the printed report.

Select option "2" to designate row 1 as a heading for the Inventory report. If you had pressed the <Return> key by itself, the option would have defaulted to the current setting of "0", meaning a data row. When you designate a row as a heading, subtitle, or footnote, the entire row text—up to 40 characters—will be displayed on your screen. Once options have been selected, they will be remembered and will be saved as part of your table until they are changed.

UNDERLINE (NO = 0, [–] = 1, [=] = 2, [__] = 3): <Return>

Each row can be underlined with dashes, double underlined using equal signs, or underlined with a true single underline. By pressing the <Return> key by itself, the option setting defaults to the current setting of "0", no underline. If you had selected option "3" at an earlier date, then the current setting in the upper right corner would say CURRENT = 3. A single <Return> would leave the "3" setting intact.

TRAILING BLANK LINES (NEW PAGE = 9): <Return>

Each row can have up to 8 blank lines trailing a particular row. A value of "9" indicates that a new page will be started following this row. This option must be set to indicate the position of page breaks in multi-page reports. By pressing the <Return> key by itself, the option defaults to "0" trailing blank lines.

DECIMAL PLACES (0–3 OFF = 4): <Return>

Each row can have from 0 to 3 decimal places. By pressing the <Return> key by itself, the option defaults to 1 decimal place.

FORMAT (NO = 0, [%] = 1, [$] = 2, NO, = 3): <Return>

Each row can have "%" or "$" signs with each value. You can also choose to have no commas in a particular row by choosing option 3 (NO,). By pressing the <Return> key by itself, the option setting defaults to "0" where no signs are placed with the values.

The sign format option is the last prompt for row 1. The SET TYPE command automatically prompts you to set the options for another row if you desire. Let's continue to set the print options for row 4 and 5 with the following commands.

ROW (1–50): **4** <Return>

Specify options for row 4.

TYPE (DATA = 0, SUBT = 1, HEAD = 2, NOTE = 3, OMIT = 4): <Return>

Leave option at current setting.

UNDERLINE (NO = 0, [–] = 1, [=] = 2, [__] = 3): **1** <Return>

Underline row 4 with dashes.

TRAILING BLANK LINES (New Page = 9): <Return>

Leave option at current setting.

DECIMAL PLACES (0–3 OFF = 4): <Return>

Leave option at current setting.

FORMAT (NO = 0, [%] = 1, [$] = 2, NO, = 3): <Return>

Leave option at current setting.

ROW (1–50): **5** <Return>

Specify options for row 5.

TYPE (DATA = 0, SUBT = 1, HEAD = 2, NOTE = 3, OMIT = 4): <Return>

UNDERLINE (NO = 0, [-] = 1, [=] = 2, [__] = 3): **2** <Return>

Specify a double underline.

TRAILING BLANK LINES (NEW PAGE = 9): <Return>

DECIMAL PLACES (0–3 OFF = 4): <Return>

FORMAT (NO = 0, [%] = 1, [$] = 2, NO, = 3): <Return>

Press the <CANCEL> key to cancel the SET TYPE command. You can display a summary of the row options that you have just set with the SHOW ROWS (22) command.

ENTER COMMAND: **22** <Return>   Show row options.

The SHOW ROWS command displays the option settings as well as the commands that have been specified for each row. Notice that if you want to see options for rows that are not currently visible on your screen, you must first show the other portion of the table on the screen and then use the SHOW ROWS command. Your screen will show the following:

```
Press any cursor key to recover your display.
     COL 1 (UNIT COST)  <-
ENTER COMMAND:
                  UNDER BLANK DEC FOR                        1 format:
ROW          TYPE LINE LINES SIZ MAT COMMAND  PARAMETERS     2 data:
                                                             3 math:
1 ITEM       head            -   -   -                       4 graphics:
2 DESKS      data            -   -   -                       5 print:
3 CHAIRS     data            -   -   -                       6 status:
4 SHELVES    data  ----      -   -   -                       7 HELP
5 TOTAL      data  ====      -   -   -                       8
6            data            -   -   -                       9 STOP
7            data            -   -   -                       10 utility:
8            data            -   -   -                       11 sort:
9            data            -   -   -                       12 stats:
10           data            -   -   -                       13
11           data            -   -   -                       14
12           data            -   -   -                       15
13           data            -   -   -                       16 format:
14           data            -   -   -                       17 INSERT
15           data            -   -   -                       18 DELETE
16           data            -   -   -                       19  rows:
17           data            -   -   -                       20 ROW TITLE
```

To recover your display, press any of the cursor keys.

Setting Column Options

You can format each column by using the column SET TYPE (26) command. With this command you can control individual column widths, specify the number of decimal places, and indicate whether or not you want "$" or "%" signs with your values. Note that column options will always override previously set row options.

Let's format column 2 (QUANTITY) of the Inventory table so that it has no decimal places.

ENTER COMMAND: **26** <Return>

Set type options for columns.

    COLUMN (1-20): **2** <Return>

Specify options for column 2.

    COLUMN WIDTH (4-20): <Return>

Each column can have a different width, ranging from 4 to 20 characters (including commas and decimals). By pressing the <Return> key by itself, the column width defaults to the current setting of 10 spaces.

    DECIMAL PLACES (0-3 OFF = 4): **0** <Return>

Each column can have from 0 to 3 decimal places. By pressing the <Return> key by itself, the number of decimal places defaults to the current setting of 1 decimal place. For the Inventory report, set the number of decimal places in column 2 to "0".

    FORMAT (NO = 0, [%] = 1, [$] = 2, NO, = 3): <Return>

Each column can have "%" or "$" signs with each value. By pressing the <Return> by itself, the option defaults to the current setting of "0", and no signs are placed with the values.

Press the <CANCEL> key to cancel the SET TYPE command. You can see a summary of the column options that you have just set with the SHOW COLS (27) command.

ENTER COMMAND: **27** <Return>

The SHOW COLS command displays the option settings as well as the commands that have been specified for each column. Notice that if you want to see options for columns that are not currently visible on your screen, you must first show the other portion of the table on screen and then use the SHOW COLS command. Your screen will display the following.

```
Press any cursor key to recover your display.
     COL 1 (UNIT COST)  <-
ENTER COMMAND:
```

COL	COLUMN WIDTH	DEC SIZ	FOR MAT	COMMAND	PARAMETERS	
						1 format:
						2 data:
						3 math:
1 UNIT COST	10	1	–			4 graphics:
2 QUANTITY	10	0	–			5 print:
3 TOTAL COSTS	10	1	–	MULT	COL=1, COL=2	6 status:
4	10	1	–			7 HELP
5	10	1	–			8
6	10	1	–			9 STOP
7	10	1	–			10 utility:
8	10	1	–			11 sort:
9	10	1	–			12 stats:
10	10	1	–			13
11	10	1	–			14
12	10	1	–			15
13	10	1	–			16 format:
14	10	1	–			17 INSERT
15	10	1	–			18 DELETE
16	10	1	–			19 rows:
17	10	1	–			20 ROW TITLE

To recover your display, press any of the cursor keys.

Printing Reports

After setting print options for individual row and column formats, you will want to finish your report design by setting options for the overall report. These global report options include row description width, column width settings, number of columns per page, number of decimal places, and other features that affect the over-all report. These options will not show on screen—only on the printed report. Let's set the global print options for the Inventory report using the OPTIONS (81) command.

ENTER COMMAND: **81** <Return>   Printing options

   TOP MARGIN (0–50): <Return>

   LEFT MARGIN (0–50): <Return>

The two options above support printers with automatic paper feeds. If your printer does not have an automatic paper feeder simply press <Return> . The options will default to the current settings.

   ENHANCEMENT (0–3): <Return>

This options gives you the ability to take advantage of special printer features such as bold print, expanded print, and compressed print. Your dealer can assist you in accessing these options with your printer.

   ROW TITLE WIDTH (4–40): **10** <Return>

Row descriptions can have from 4 to 40 alpha-numeric characters. By pressing the <Return> key by itself, the row title width option will default to the current setting of 20 characters. For the Inventory report, set the row title width to 10 characters.

   COLUMN WIDTH (4–20): <Return>

Columns can have from 4 to 20 numeric characters. By pressing the <Return> key by itself, the column width will default to the current setting of 10 characters.

   COLUMNS PER PAGE (1–20): <Return>

The maximum number of columns that you can print on a page will vary, depending on your table size and your printer. Because current table is 20 columns wide, you have the option to print up to 20 columns. By pressing the <Return> key by itself, the number of columns per page will default to the current setting of 10 columns per page. If you have more than 10 columns in your table to print, the first 10 columns will be printed on page 1 and the second 10 columns on page 2. Row titles, column titles, and report titles will automatically be repeated on each page.

DECIMAL PLACES (0–3): <Return>

Each value in your table can have from 0–3 decimal places in the printed report. By pressing the <Return> key by itself, the number of decimal places will default to the current setting of 1 decimal place.

OMIT ZERO ROWS (NO = 0, YES = 1): <Return>

Any rows that have all zero values can be eliminated from the printed report. By pressing the <Return> key by itself, the omit zero rows option will default to the current setting of "0" which will print zero rows.

SUPPRESS ZERO VALUES (NO=0, DASH=1, BLANK=2): **2** <Return>

Zero values in rows and columns can be printed with zeros, identified with a dash, or left blank. By pressing the <Return> key by itself, the suppress zero values option will default to the current setting of printing zero values as zeros.

PRINT ROW TITLE AFTER WHICH COLUMN (0–9): <Return>

Row titles can be printed between any two columns up through the middle of the table. By pressing the <Return> key by itself, the option will default to "0", printing the row titles on the left side of the report, in front of column 1.

NEGATIVE NUMBERS (-N = 0, N- = 1, (N) = 2):   <Return>

Negative numbers can be displayed with a negative sign preceding the number, or, for accounting purposes, they may be shown with a trailing negative sign, or in parenthesis. By pressing the <Return> key by itself, the option will default to the current option of "0", printing negative signs in front of the numbers.

PAGE CONTROL (OFF = 0, FEED = 1, PAUSE = 2):   <Return>

For reports longer than a page, the printer can be set to the desired page control. The form feed option issues a page break command so that each page appears on a new sheet of paper. The pause option will instruct the printer to break between pages to allow a new sheet of paper to be inserted into the printer. By pressing the <Return> key by itself, the page control option defaults to a continuous print without intervention. Three blank lines will automatically be skipped between pages.

Before using the feed and pause control options, you must use the trailing blank line option in the SET TYPE (21) for rows command to identify page breaks.

OMIT COMMAS (NO = 0, YES = 1):   <Return>

To accommodate wide reports, the comma option can be turned off to save space. By pressing the <Return> key by itself, the omit commas option defaults to printing all numbers with commas separating every three digits of large numbers.

DOUBLE SPACE (NO = 0, YES = 1):   <Return>

Data rows can be single or double spaced. By pressing the <Return> key by itself, the double space option defaults to the current setting of "0" indicating single spacing.

OMIT LINE NUMBERS (NO = 0, YES = 1):   <Return>

Row and column numbers can be printed or eliminated on your final report. By pressing the <Return> key by itself, the omit line numbers option defaults to "0", printing the row and column numbers.

After completing the global options for your report, you will want to set the title information, report ranges, and print a final report using the TITLES (82) command. Each TITLE option will identify the default settings. However, if the TITLE option has been set before, the CURRENT setting will reflect the previous setting. The TITLES command will send your report to the printer, so make sure your printer is on and connected, and your paper adjusted.

ENTER COMMAND: **82** <Return>   Report titles

PAGE NUMBER (0–999): <Return>

A page number can be printed in the upper right corner of the report if you desire. By pressing the <Return> key by itself, the page number defaults to the "OFF" position and the report pages will not be numbered.

DATE (YEAR AS YY): **83** <Return>

Date information can be printed in the upper left corner of the report. By pressing the <Return> key by itself, the date defaults to the "OFF" position, and no date will be printed. If you enter a value for the year option and <Return>, the command line will prompt you for the month and day as follows. If no year number is entered, then the month and day options will be skipped.

MONTH (1–12): **1** <Return>

Months January through December are identified by corresponding numbers 1 through 12. By pressing the <Return> key by itself, the month option will default to the "OFF" position, and no month will be printed.

DAY (1–31): **1** <Return>

Days of the month are identified by the numbers 1–31. By pressing the <Return> key by itself, the day option will defaults to the "OFF" position and no day will be printed.

ROW-RANGE BEGIN (1–50): **1** <Return>

END (1–50): **5** <Return>

You can decide to print only a few rows of your table by using the row ranges print option. By pressing the <Return> key by itself, the row range defaults to printing all of the rows in the table.

COL-RANGE BEGIN (1–20): **1** <Return>

END (1–20): **3** <Return>

Indicate the columns to print in your report by using the column range option. By pressing the <Return> key by itself, the column range defaults to printing all of the columns in the table.

Setting row and column ranges with the TITLES command will set the row and column ranges for the entire table. To change the row and column ranges back to their original settings after printing, use the ROW RANGE (92) and COL RANGE (93) commands.

TITLE 1: **TAKING INVENTORY** <Return>

TITLE 2: **SAMPLE PROBLEM** <Return>

TITLE 3: <Return>

Reports are allowed up to three title lines, with a maximum of 40 alpha-numeric characters each. The quote mark (") is an illegal character and should not be used in report titles. Report titles are centered at the top of each page of the report. Pressing the <Return> key by itself, indicates that there is no title for that line.

If you do want to print your report at this time, hit the <CANCEL> key to cancel the report. If you do want to print your report, check to see that the printer is connected and turned on, and your paper adjusted.

SET PAPER; HIT RETURN: <Return>

Your printed Inventory report will look like the following:

```
1/1/83
                    TAKING INVENTORY
                    SAMPLE PROBLEM

                     UNIT  QUANTITY       TOTAL
                     COST                 COSTS
         ——————    ——1——  ——2——     ——3——

      1 ITEM
      2 DESKS      300.0        10    3.000.0
      3 CHAIRS     175.0        20    3.500.0
      4 SHELVES    200.0         5    1.000.0

              ————————  ————————  ————————

      5 TOTAL
              ========= ========= ===========
```

To show the overall report options for your Inventory report on screen, use the SHOW OPTIONS (84) command.

ENTER COMMAND: **84**   <Return>

Show global print options and title information for Inventory report. Your screen should show the following:

```
Press any cursor key to recover your display.

ENTER COMMAND:
                    UNIT            TOTAL               1 format:
ROW                 COST  QUANTITY  COSTS               2 data:
───────────── ───1─── ───2─── ───3─── ───4─── ───5───  3 math:
      REPORT OPTIONS                                    4 graphics:
DATE:  83/1/1              PAGE NUMBER: 0               5 print:
TITLE 1:  TAKING INVENTORY                              6 status:
TITLE 2:  SAMPLE PROBLEM                                7 HELP
TITLE 3:                                                8
                                                        9 STOP
TOP MARGIN: 0  LEFT MARGIN:  0                         10 utility:
ROW TITLE WIDTH: 10                                    11 sort:
COLUMN WIDTH:  10                OMIT COMMAS:  NO       12 stats:
COLUMNS PER PAGE:  10            DOUBLE SPACE: NO       13
DECIMAL PLACES:  1              OMIT LINE NUMBERS:  NO  14
OMIT ZERO ROWS (NO=0,YES=1):  0                        15
SUPPRESS ZERO VALUES (NO=0,[-]=1,[ ]=2):  0            16 format:
PRINT ROW TITLE AFTER WHICH COLUMN:  0                 17 INSERT
NEGATIVE NUMBERS (-N=0,N-=1, (N)=2:  0                 18 DELETE
PAGE CONTROL (OFF=0,FEED=1,PAUSE=2):  0                19  rows:
                                                       20 ROW TITLE
```

Press any of the cursor keys to recover the table.

Printing Tables and Reports

To get a printed copy of your table, complete with row settings, row commands, column settings, column commands, report options, and title information use the PRINT TBL (118) command.

Reports can be printed without going through the TITLES (82) command. After you have set the report OPTIONS with command 81, you can send the report straight to the printer with the REPORT (83) command. You can also use the RE-PORT command to print tables that have already been saved on disk.

Cancelling Reports

Reports that have started printing can be stopped by pressing the <CANCEL> key. Printing will stop and a message on the screen will indicate that the report has been cancelled.

Chapter 6
Building Charts
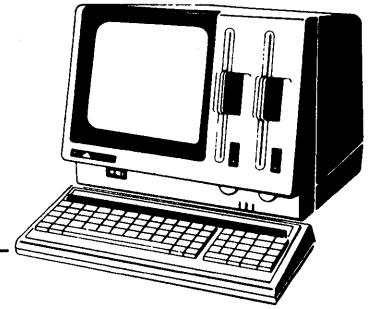
In Chapter 6 you will learn how to make charts to fill your own requirements. You will also find many examples and suggestions for the most effective and meaningful ways to display your data. Finally, you will learn how to produce your charts on a printer or plotter.

GENERAL NOTES

Before we introduce the Chart Options menus, here is some general information about chart building:

Select Graph Command

SELECT GRAPH (62) and CHART OPTIONS (63) interact with each other in selecting rows and columns and choosing graph type. This interaction gives you the option of varying the rows or columns selected for graphing and the graph type without having to return to the Chart Options menus.

There are two ways to use the SELECT GRAPH command.

(1) Enter the row/column number when prompted, as you did in the sample in Chapter 2.

(2) Move the data pointer to a row or column title. When prompted for a row/column number, press <Return>. The row or column pointed to by the data pointer is selected for the graph.

If you wish to remove a selection, enter a zero when prompted for row/column number.

You should keep in mind what can happen when you use SELECT GRAPH to reset the options of a chart. For instance, if you use the Define Chart Options menu to select row 1 for a graph and then use SELECT GRAPH to choose a second row, you may inadvertently change the first graph. This can happen when you press <Return> to reach the second graph and the data pointer is pointing to, for instance, row 6—graph 1 will now display row 6 data.

Data Pointer

When you display a chart, the position of the data pointer affects the chart's appearance. Since rows and columns are numbered in the same way, the data pointer mode tells GraphPlan whether you want to graph rows or columns. If you have selected rows for your graphs, the data pointer should be in row mode to properly display the chart. If you have selected columns, the data pointer should be in column mode. The second line of the table menu screen shows the mode and location of the data pointer. For instance, if the data pointer is on row 1, which is titled "Sales" the data pointer line looks like this:

<div align="center">ROW 1 (SALES) ←</div>

Row and Column Ranges

Chart display can be affected by row or column ranges that you have set. For instance, if your table contains 20 columns of data, all 20 columns will be displayed in a chart whose graphs are made from rows unless you limit the number of columns by setting a column range. Also, if you select row 1, for instance, and columns 10 through 20 are outside the column range, you will have only the first 10 data entries in row 1 in your chart.

Notice that the last two entries in the status line at the top of your table screen show the current ranges. If you set the column range, for example, to columns 1 through 5, the status line shows the following information:

MODE=NORMAL   ORDER=R/C   ROW=1—50   COL=1—5

CHART OPTIONS MAIN MENU

You use the CHART OPTIONS command (63) to specify the way GraphPlan displays your chart. CHART OPTIONS works somewhat differently from the other GraphPlan commands. When you enter 63 (CHART OPTIONS) from the menu, GraphPlan presents the following menu:

```
Enter selection:


      1 - Display Chart

      2 - Define Chart Options

      3 - Define Axes Options

      4 - Define Pie Options

      5 - Print Chart

      6 - Plot Chart
```

To choose one of the selections listed on the Chart Options Menu, you type the number associated with that selection right after the words "Enter Selection".

Selection 1, Display Chart, operates the same way as DISPLAY CHART (61) on the table menu; it simply displays the current chart.

Selections 2, 3, and 4 each display a sub-menu from which you can choose options for displaying your chart.

Selection 5 prints the current chart.

Selection 6 presents a menu that assists you in plotting a chart.

If you select Define Chart Options (2), Define Axes Options (3), or Define Pie Options (4), GraphPlan displays a menu form with options for formatting charts and the current values of the options. The options are used by GraphPlan to format the chart whenever the chart is displayed, plotted, or printed.

Default Option Values

Initially, and whenever you clear a chart from memory, many of the options contain "default" values, which are provided so you don't always have to be concerned with assigning options. These default values are used to display your chart when you use the (62) SELECT GRAPH command from the main table menu. There are default values, for instance, for shading and symbols.

Moving the Cursor

To move the menu cursor down the sub-menu, press either the right cursor key (→) or the down cursor key (↓). To back the cursor up to a previous option, press either the left cursor key (←) or the up cursor key (↑). If you don't want to change the option value, just move the cursor along—you can move the cursor along by using the <Return> key as well. If you do want to change the value, enter the new information before moving the cursor. The new value will then be displayed both after the ENTER DATA prompt and in the appropriate place in the menu.

Notice that the option value you are currently looking at with the cursor is highlighted. The current option value is also displayed on the third line of the screen after the words "ENTER DATA".

Entering Data

If you attempt to enter inappropriate data into a menu, such as a meaningless alphabetic character or a number that is out of range, the cursor will refuse to move and an error message will be displayed on the top line of the screen. You must re-enter appropriate data before you can move the cursor.

To clear a menu entry, you usually enter zero. The exception is in the Define Chart Options (2) menu where you clear chart titles by entering spaces.

Moving Between Menus

To return to the Chart Options main menu from one of the sub-menus, press <CANCEL>. To return to the main table menu from the Chart Options main menu, press <CANCEL> a second time.

DISPLAY CHART — (Selection 1)

Display Chart (1) in the Chart Options menu has the same function as the DISPLAY CHART command (61) in the table menu. It enables you to display the current chart without returning to the table menu.

Recall that display is affected by data pointer mode and row or column ranges.

To cancel the display and return to the table menu, press <CANCEL>.

DEFINE CHART OPTIONS — (Selection 2)

This selection allows you to specify up to 6 rows or 6 columns of data from the GraphPlan table to be displayed as a bar graph, line graph, pie graph, or a mixture of bar and line graphs. You can provide a main title for the chart and titles for both axes. For each of the 6 possible graphs in your chart, you can assign a shading pattern (for bar or pie charts), or a symbol (for line charts). If you have a color display terminal, you can specify 8 different colors. You can "stack" line or bar graphs on top of each other. Finally, you can specify that your bar chart be displayed horizontally.

The following figure shows all the options with their default values in the Define Chart Options sub-menu:

Define Chart Options
    (message line)
ENTER DATA:

Main Title
X Axis Title
Y Axis Title

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0–6)	Symbol (0–6)	Color (1–8)
1	1	Bar	1	1	2
2		Bar	2	2	3
3		Bar	3	3	4
4		Bar	4	4	5
5		Bar	5	5	6
6		Bar	6	6	7

Stack (Y/N) . . . . N
Horizontal Bar (Y/N) . . . . N
Color (Y/N) . . . . N

The second line on the screen is used for messsages. When you move the cursor to certain options, a help message is displayed.

Notice that the default values are displayed on the menu until you substitute other values.

The "Shade", "Symbol", and "Color" options in this menu do not apply to pie charts. See the Define Pie Options menu in this chapter (Selection 4).

If you want to exist from the Define Chart Options menu, press <CANCEL>. GraphPlan will return you to the Chart Options main menu.

Description of Options

Below is a brief description of each option and its default value in the Define Chart Options menu:

Main Title Y-Axis Title X-Axis Title	Enter titles for the chart. Each title can be up to 40 characters long. To erase titles, space over them with the space bar.
	Default: Blank
Graph	Identifies the 6 possible bar/line/pie graphs in the chart.
Row/Col	Enter the row or column number for the selected graph. If the Y-axis data is contained in rows, you should enter an integer value between 1 and the number of rows in the table. If the Y-axis data is contained in columns, you should enter an integer value between 1 and the number of columns in the table. To remove a selection, type a zero. Note that you can also change the Row/Col value with the (62) SELECT GRAPH command.
	The message line prompts you to enter a zero for no choice, 1-50 for row, or 1-20 for column.
	Default: Row/Col 1 is assigned to Graph 1; Graph 2 through Graph 6 are unassigned.
Type (Bar/Line/Pie)	Enter B (Bar), L (Line) or P (Pie) to determine the type of graph. Note that you can also change the type assignment with the (62) SELECT GRAPH command. Default: Bar

Shade
(0-6)

Enter one of six different shading patterns for the selected bar graph. Each shading pattern is associated with a numeric value, as follows:

0	⬜	hollow	4	⬜	hollow
1	⬛	solid	5	▨	h(135)
2	▩	cross h	6	▤	h(0)
3	▨	h(45)			

A help message is displayed on the message line when you move the cursor to the "Shade" option. The descriptions shown after the shades are given in the message. The numbers in parentheses refer to the angle of the cross hatching.

Default: Graph 1 is assigned shading pattern #1, Graph 2 is assigned shading pattern #2, and so on.

Symbol
(0-6)

Enter one of six different symbols for the selected line graph. Each symbol is associated with a numeric value, as follows:

0	no symbol	4	X
1	*	5	#
2	+	6	$
3	0		

There is a help message when you move the cursor to the "Symbol" option — it displays the symbol corresponding to each number.

If you want the selected line graph to be displayed as a scattergram (a line graph in which data point symbols are displayed but connected lines are not drawn), you should enter L(Line) in the "Type" option, a zero value for the "Shade" option, and any value other than zero in the "Symbol" option.

If you want a line graph without symbols, enter L (Line) in the "Type" option, enter any value other than zero for the "Shade" option and zero for the "Symbol" option.

Default: Graph 1 is assigned symbol #1 Graph 2 is assigned symbol #2, and so on.

Color
(1–8)

If you have a color display, you can display your bar/line graphs color. You can enter one of eight different colors. Each color is associated with a numeric value, as follows:

1 – white	5 – cyan
2 – red	6 – yellow
3 – green	7 – magenta
4 – blue	8 – white

The "Color" options is also used to identify the pen number to plot the graph.

Stack
(Y/N)

Enter Y to stack the bar/line graphs on top of each other.

Default: N

Horizontal Bar
(Y/N)

Enter Y to draw the bar graphs horizontally.

Default: N

Color
(Y/N)

Enter Y to turn on the color display.

Default: N

The following pages expand upon some features of the Define Chart Options menu.

Axes and Row/Column Selection

The X-Axis (horizontal axis) is labeled with the row or column titles and the Y-axis (vertical axis) is labeled with the value range of the data in the cells of the row or column. When a bar chart is displayed horizontally, the axes are reversed — the X-axis becomes the vertical axis and the Y-axis the horizontal axis.

Adding Titles to the Chart

The Main Title, X Axis Title and Y Axis Title options allow you to add descriptive information to the chart. The Main Title is placed centered above the chart. The X Axis Title is placed centered below the X axis. For pie charts, the X Axis Title is placed below the Main Title and the Y Axis Title is ignored. In bar and line charts, the Y Axis Title is centered below the Main Title. The following chart shows the location of the Main Title, X Axis Title and Y Axis Title.

```
         THIS  IS  THE  MAIN  TITLE  FOR  THE  CHART
                        Y AXIS TITLE
   2000
```

(chart: bar chart titled with Y AXIS TITLE, values on Y axis 0, 1000, 2000; bars for YEAR 1 through YEAR 5; SALES legend; X AXIS TITLE below)
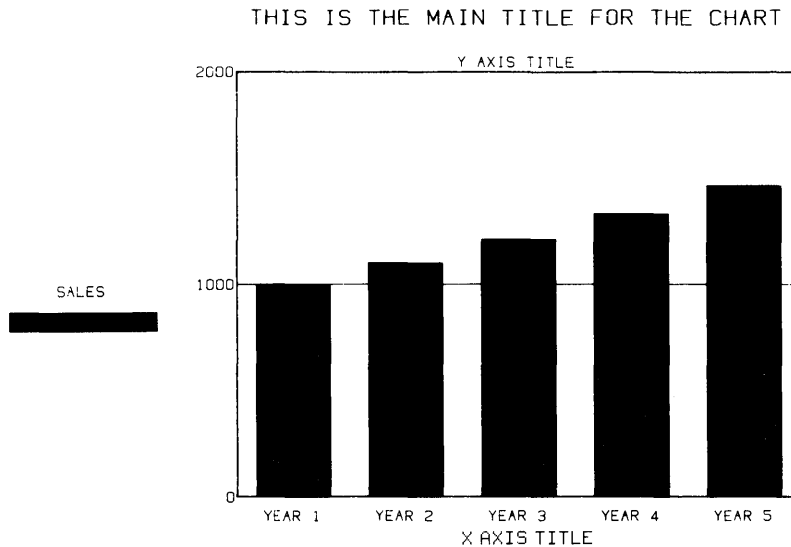
Choosing a Graph Type

GraphPlan offers a choice of three basic graph types: bar, line and pie. The following discussion will assist you in determining the type of graph best suited for your data and your application.

BAR GRAPH

Bar graphs are best for showing quantitative information, and particularly useful in showing comparisons between groups of data. For example, you could compare the sales of Region 1 with Region 2 using the table below.

ROW	FIRST QUARTER	SECOND QUARTER	THIRD QUARTER	FOURTH QUARTER
1 REGION 1	200	220	240	270
2 REGION 2	150	180	210	250

To get a comparative bar chart, you should set the "Row/Col" option for graph 1 and graph 2 in the Define Chart Options menu to the following values:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0–6)	Symbol (0–6)	Color (1–8)
1	1	Bar	1	1	1
2	2	Bar	2	2	2

The data is contained in rows, so you should set the data pointer to row mode before you display the chart. When you display the chart, the screen should look like this:
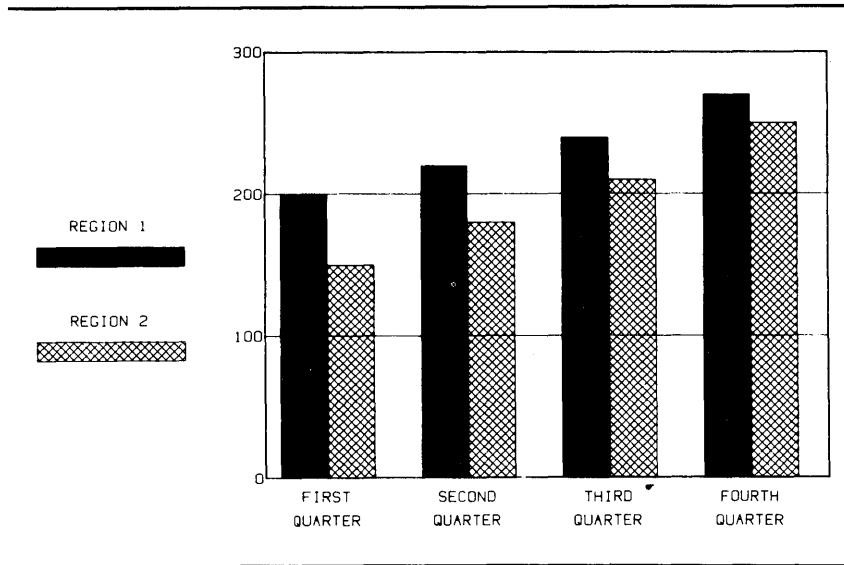
Bar charts have the following limitation. Up to 100 bars can be displayed side by side. However, if the bars are not stacked, this limits the total number of data points (values) for all graphs in the chart to 100. If you have 6 bar graphs in the chart, that means that each bar graph can only have 16 data points. This limitation can be avoided by stacking the bar graphs or changing one or more bar graphs to line graphs.

Note that the row/column titles may not completely fit on your screen display.

LINE GRAPH

Line graphs are best for showing trends or changes in data over time. For example, suppose you have the following data in a table:

ROW	QUOTA SALES ----1----	ACTUAL SALES -----2-----
1 JAN	9600	8000
2 FEB	8005	7530
3 MAR	9320	7400
4 APR	10500	9580
5 MAY	9450	8250
6 JUN	10231	10524
7 JUL	9450	7860
8 AUG	9035	8350
9 SEP	8680	7350
10 OCT	10520	10750

It is difficult to perceive trends from the data in its tabulated form. However, if you were to plot Quota Sales and Actual Sales as line graphs, you would get a better picture of what the trend looks like.

To do this, you should set the "Row/Col" option and the "Type" option of graph 1 and graph 2 to the following values:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0-6)	Symbol (0-6)	Color (1-8)
1	1	Line	1	1	1
2	2	Line	2	2	2

Since the data is contained in columns, you should set the table to column mode before displaying the chart. Your chart should look like this:
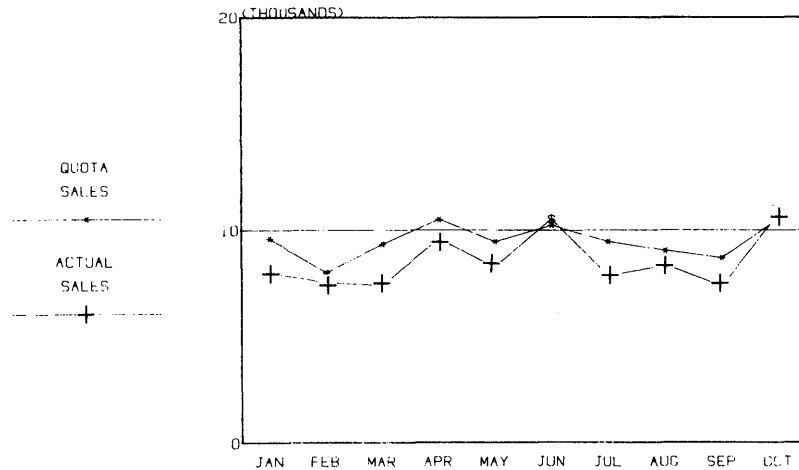
Scattergram. A scattergram is a special kind of line graph in which data point symbols are plotted but connecting lines are not drawn. It is best for showing how data points correlate with each other, and is most useful when you want to emphasize the cluttering and distribution of data points.

For example, suppose you have data for advertising expenditures and sales revenue for the year in the following table:

ROW	AD BUDGET 1	SALES REVENUE 2
1 JAN	50	225
2 FEB	55	237.5
3 MAR	75	287.5
4 APR	100	350
5 MAY	120	400
6 JUN	75	287.5
7 JUL	60	250
8 AUG	100	350
9 SEP	120	400
10 OCT	150	475
11 NOV	180	550
12 DEC	200	600

To make a scattergram that shows how revenues increased when the advertising budget was increased, you should set the "Shade" and "Symbol" options in the Define Chart Options menu as follows:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0-6)	Symbol (0-6)	Color (1-18)
1	1	Line	0	1	1
2	2	Line	0	6	2

The resulting scattergram chart looks like this:
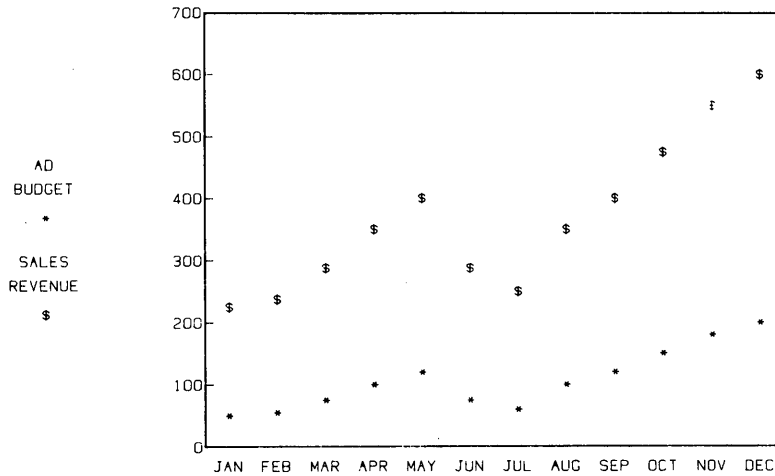
PIE GRAPH

Pie graphs are best for showing proportions, especially for representing quantitative data as a percent of the total. For example, you might use a pie chart when you want to get a percentage breakdown of sales by product line.

ROW	Medical	Peripheral	Test Equip	Computer
1 1982	120	150	250	300

To get a pie chart from the above table, you should set the "Row/Col" and "Type" options in the Define Chart Options menu to the following values:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0-6)	Symbol (0-6)	Color (1-8)
1	1	Pie	1	1	1

When you display the pie chart, set the data pointer to row mode. The screen should look like this:


```
                      COMPUTER - 36.59%



TEST EQUIP - 30.49%



                                        MEDICAL - 14.63%




              PERIPHERAL - 18.29%
```
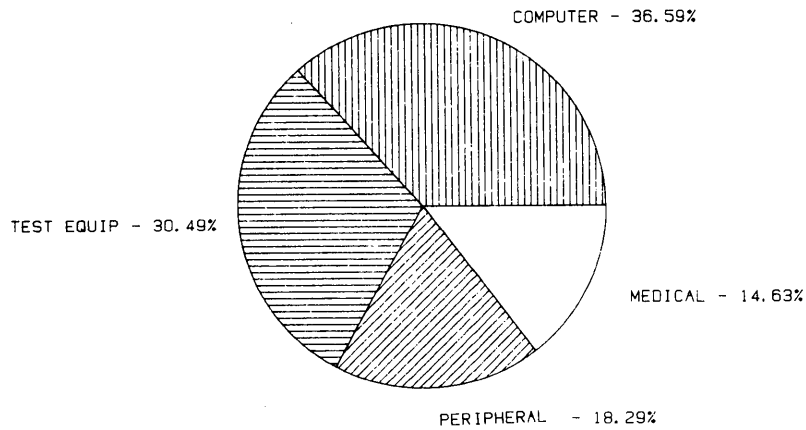
This pie chart gives a clear picture of the products that had the greatest proportion of total sales.

Here are a few things to keep in mind when you are using pie charts:

● GraphPlan can display up to 8 segments in one pie chart. If you have selected a row or column of data that has more than 8 data points, Graph-Plan will display only the first eight non-zero values. If the table is in row mode, the column titles will be used to label the pie segments. If the table is in column mode, the row titles will be used to label the pie segments.

● Pie charts cannot display values equal to zero. Also, pie charts display negative values as if they were positive.

● Since it takes the entire screen to display a pie chart, GraphPlan will not allow you to mix pie graphs with other types of graphs. Also, pie type always takes higher display priority than bar or line graphs. For example, suppose you have specified the following values for the "Type" option in the Define Chart Options menu:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0–6)	Symbol (0–6)	Color (1–8)
1	1	Bar	1	1	1
2	2	Pie	2	2	2
3	3	Line	3	3	3

When you display the chart, a pie chart will be displayed using Row 2 data.

Assigning Shading Patterns, Symbols and Colors

For non-color display terminals, GraphPlan provides six shading patterns (for bar graphs) and six symbols (for line graphs) to identify data from each graph in the chart. The "Shade" option allows you to change the shade pattern for any of the bar graphs. Similarly, the "Symbol" option allows you to change the symbol for any of the line graphs.

If your display is in color, GraphPlan provides up to eight colors (the number of colors depends on your system) to identify data from each graph in the chart. To make a solid line graph or solid bar graph in color, you should set the "Shade" option to 1. For a solid line graph, the "Symbol" option should be set to zero. For a solid bar graph, the "Symbol" option can be any number. For a solid bar graph drawn with color 2 and a solid line graph (without symbols) drawn with color 3, the Define Chart Options menu should look like this:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0-6)	Symbol (0-6)	Color (1-8)
1	1	Bar	1	1	2
2	2	Line	1	0	3

For a solid line chart without symbols, set the "Shade" option to any number but zero and the "Symbol" option to zero.

For a scattergram, set the Shade option to zero and the "Symbol" option to anything but zero.

Note that the "Shade", "Symbol", and "Color" options in the Chart Options sub-menu do not apply to pie charts. The shading patterns and colors for pie segments are specified in the Define Pie Options menu (4) which is discussed in the latter part of this chapter.

Stacking Graphs

The "stack" option is most useful when you want to see how each graph contributes to the total, and is most effective when working with bar charts. For example, suppose you have the sales figures for your product line from 1978 through 1981 in the table below:

ROW	MEDICAL	PERIPHERAL	TEST EQUIP	COMPUTER
1 1981	34	28	74	72
2 1980	31	22	69	64
3 1979	29	18	62	51
4 1978	25	14	58	43

If you want to compare the sales of 1978, 1979, 1980 and 1981 on a product-by-product basis, you should set the "Row/Col", "Type", "Shade", and "Stack" options to the following values:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0–6)	Symbol (0–6)	Color (1–8)
1	1	Bar	1	1	2
2	2	Bar	2	2	3
3	3	Bar	3	3	4
4	4	Bar	4	4	5

Stack (Y/N) . . . . N

When you display your chart, your screen should look like this:
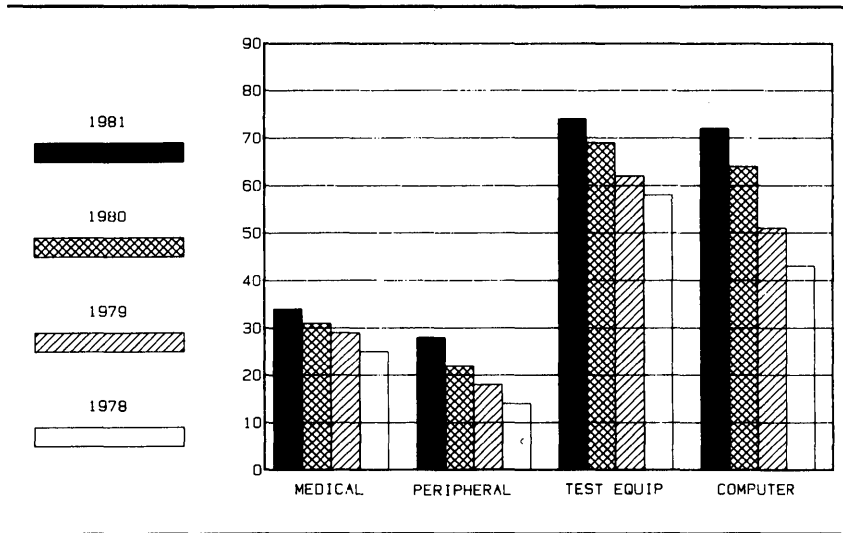
However, if you want to emphasize the total sales for each product in the four-year period, you should "stack" the bar graphs on top of each other by setting the "Stack" option to Y for yes. Your chart should now look like this:
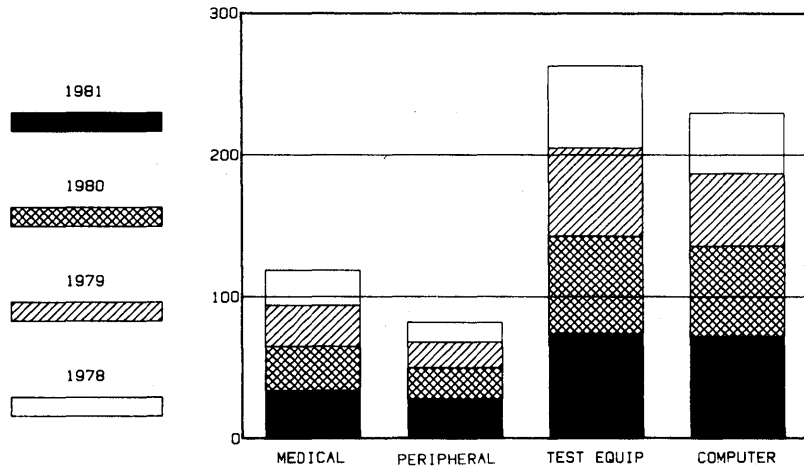
Note that you can also stack line graphs. When line graphs are stacked, each data point in graph 2 will use the corresponding data point from graph 3, and graph 3 will use graph 2, and so on. If you change the "Type" option of the above examples to "Line", your screen should look like this:
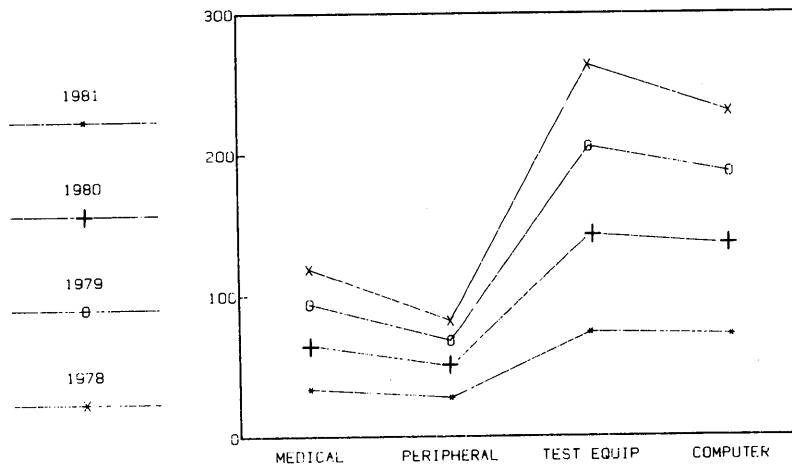
Horizontal Bar Charts

In a horizontal bar chart, the X-axis appears on the left side of the chart, and the Y-axis appears along the bottom of the chart. When your X-axis (row or column headings) is not time or numeric values, it is preferable to draw the bars horizontally.

For example, let's display the previous stacked bar chart example in horizontal mode. To do this, you should set the "Horizontal" option to Y (yes). When you display the chart, your screen should look like this:
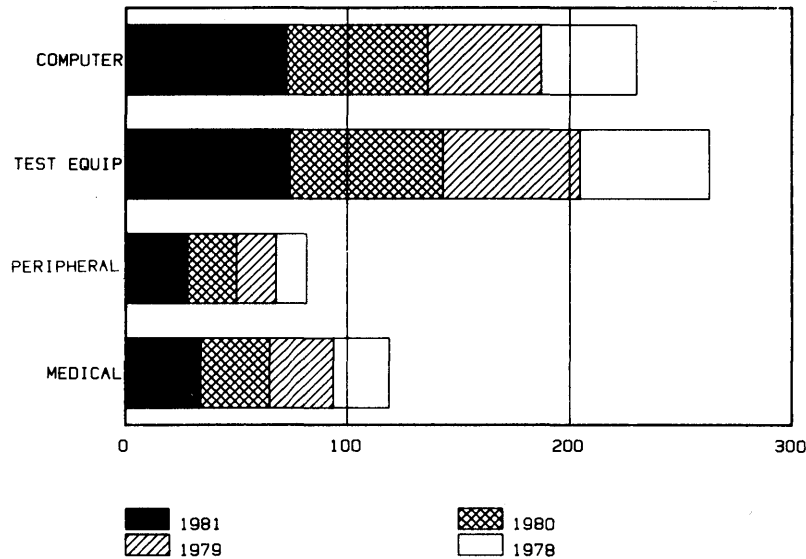
Note that the legends are placed on the bottom of the chart. For horizontal bar charts, it is a good idea to place the legends below the chart in order to provide more room for the bar graphs and the X-axis labels. To change the legend location, you should refer to the "Legend" option in the Define Axes Options (3) menu, which is described in the next section.

Here are a few things to remember when you select the horizontal bar chart option:

- The number of bars that can be displayed side by side is 16 (compared to 100 bars in vertical mode). This is because there is less room on the screen in the vertical direction than in the horizontal direction.

- You cannot have the line graphs in horizontal mode. When you mix horizontal bar graphs and line graphs together, the line graph will automatically be converted to a bar graph when you display the chart.

- For horizontal bar charts, you should set the "X Axes Type" option to Text (See "X" Axes Type" option in the Definite Axes Options menu). If you change your "X Axes Type" option to Date or Numeric, the "Horizontal" option will be ignored by GraphPlan.

DEFINE AXES OPTIONS — (Selection 3)

This selection allows you to specify whether you want your X-axis to be text, data, or numeric. You can specify linear or logarithmic scaling for both axes. The scale of the X- and Y-axes can be adjusted and you can determine the number of labeled unit and ticks on both axes. Finally, you can control the location of the legends, grid lines, and the framing of the chart.

Note that the options in the Define Axes Options menu have no effect on pie charts.

The following screen shows all the options with their default values in the Define Axes Options menu. The options are explained in the pages immediately following the screen.

Define Axes Options

ENTER DATA:

X Axes Type (T-Text, D-Date, N-Numeric) .... T
Date Type (W, M, Q, Y, MY, QY) ....
Date Start ....
Draw Frame (N-Suppress, L-Left, B-Box) .... B
Legend (N-Suppress, L-Left, R-Right, B-Bottom) L

Axes Specification	Y Axis	X Axis

Type (L-Linear, O-Log) L
Auto Scaling (Y/N) .... Y
Minimum ....
Maximum ....
Number of Major Divisions (1–10)
Number of Minor Ticks (0–5) 0
Draw Grid Lines (Y/N) .... Y   N

If you want to exit from the Define Axes Options menu, press <CANCEL>. GraphPlan will return you to the Chart Options main menu.

Description of Options

X Axes Type (T, D, N)   Enter T if you want the X-axis to be labeled with the row titles or column titles from the table. If your table is in row mode, the X-axis will be labeled with column titles. If your table is in column mode, the X-axis will be labeled with row titles.

For text labels, you may want to return to the table to shorten or abbreviate the row/column titles for proper display.

Enter D if you want date labels on the X-axis. GraphPlan will allow you to label the X-axis as days, months, quarters, years, and date combinations like month/year and quarter/year.

Enter N if you want a numeric X-axis. GraphPlan will then ask you to enter a number to identify the row/column data to be used as numeric values for the X-axis.

For horizontal bar charts, do not use "Date" or "Numeric" types — use "Text".

Default: T (text)

Date Type (W, M, Q, Y, MY, QY)	If you have entered D (Date) in the "X Data Type" option, you can now specify whether you want weekdays (W), months (M), quarters (Q), years (Y), a combination of months and years (MY), or a combination of quarters and years (QY) on your X-axis.

If you have entered T (Text) or N (Numeric) for the "X Axes Type" option, this option and the following "Date Start" option will be ignored. The message line will prompt you to move on down the menu.

Date Start   If you have entered W (weekdays) in the "Date Type" option, GraphPlan will ask you for the starting day of each week. The message "Starting weekday (1–7)?" will appear on the second line of the menu. For instance, if you enter 1, the labeling begins with Monday.

If you have entered M (months) in the "Date Type" option, GraphPlan will ask you for the starting month. The message "Starting month (1–12)?" will appear on the second line of the menu. If you want the X-axis to be labeled by month beginning with January, for example, you should enter 1 for this option.

If you have entered Q (quarters) in the "Date Type" option, GraphPlan will ask you for the starting quarter. The message "Starting quarter (1–4)?" will appear on the second line of the menu. If you want the X-axis to be labeled by quarter beginning with the first quarter, you should enter 1 for this option.

If you have entered Y (years) in the "Date Type" option, Graph-Plan will ask you for the starting year. The message "Starting year (1–9999)?" will appear on the second line of the menu.

If you have entered MY (months/years) in the "Date Type" option, GraphPlan will first ask you for the starting month and then the starting year.

If you have entered QY (quarters/years) in the "Date Type" option, GraphPlan will first ask you for the starting quarter and then the starting year.

Draw Frame
(N, L, B)

Enter N if you do not want to frame your chart.

Enter L if you only want to frame the X-axis.

Enter B if you want a double frame around the chart.

Default: B (box)

Legend
(N, L, R, B)

Enter N if you do not want legends to identify your graphs.

Enter L if you want your legends to be placed on the left side of the chart.

Enter R if you want your legends to be placed on the right side of the chart.

Enter B if you want your legends to be placed on the bottom of the chart.

Legends may be truncated, so you may want to shorten them in the table for proper display.

Default: L (left)

The following options apply to both axes. However, the options for the X-axis are ignored by GraphPlan unless you have specified a numeric X-axis. Therefore, if you have specified date type or text type, the message line will prompt you with "X-axis is not numeric . . . press RETURN to continue."

Type   Enter L if you want linear scaling on your axis.
(L, O)
              Enter O (the letter O) if you want logarithmic scaling on your axis. Logarithmic scaling is suitable if your data extends over a very large range of values.

              Default: L (linear)

Auto Scaling Enter Y if you want GraphPlan to calculate the minimum and
(Y/N)   maximum values from your data and scale them accordingly. The message line will prompt you to move the cursor past the scaling options.

              Enter N if you want to control the scaling of your axis.

              Note that the "Minimum", "Maximum" and "Number of Major Divisions" options are ignored by GraphPlan unless you have specified N in this option.

              Default: Y

Minimum   Enter values to adjust the scaling of the axis. "Minimum" option
Maximum   sets the minimum value of the axis that will appear on the chart.
Number of   "Maximum" option sets the maximum value; and the "Number
Major   of Major Divisions" option defines the number of divisions be-
Divisions   tween the minimum and the maximum on your axis.

              Note that the maximum allowed value of "Number of Major Divisions" is 10.

              "Number of Divisions" does not apply to logarithmic scales.

Number of Minor Ticks	Enter the number of minor ticks to be placed between the major divisions on the axis. Note that the maximum allowed value is 5.
	"Number of Minor Ticks" does not apply to logarithmic scaling.
	Default: 0
Draw Grid Lines	Enter Y if you want grid lines to be drawn at major divisions.
	Default: Y for the Y-axis, and N for the X-axis.

Definition of Terms

The following terms are used frequently in the discussion of Y- and X-axis options.

Legends. Legends are the row or column titles used to identify shading patterns in bar charts and symbols in line charts.

Logarithmic scaling. In logarithmic scaling the axis divisions are labeled as powers of 10. The first division is 0.1 to 1, the second 1 to 10, the third 10 to 100, and so on. (See p. 6—36 for complete details and an example of logarithmic scaling.)

Ticks. Ticks are the marks indicating subdivisions of the axes.

Choosing X Axes Type

GraphPlan allows three kinds of data types on your X-axis: text, date, and numbers.

If you want your X-axis to be labeled with row/column titles, you should select "Text" type for your X-axis. For example, suppose you want to show the sales figures by products for the year 1982 using the table below.

ROW	MEDICAL	PERIPHERAL	TEST EQUIP	COMPUTER
1	120	150	250	300

When you display your chart, your screen should look like this:
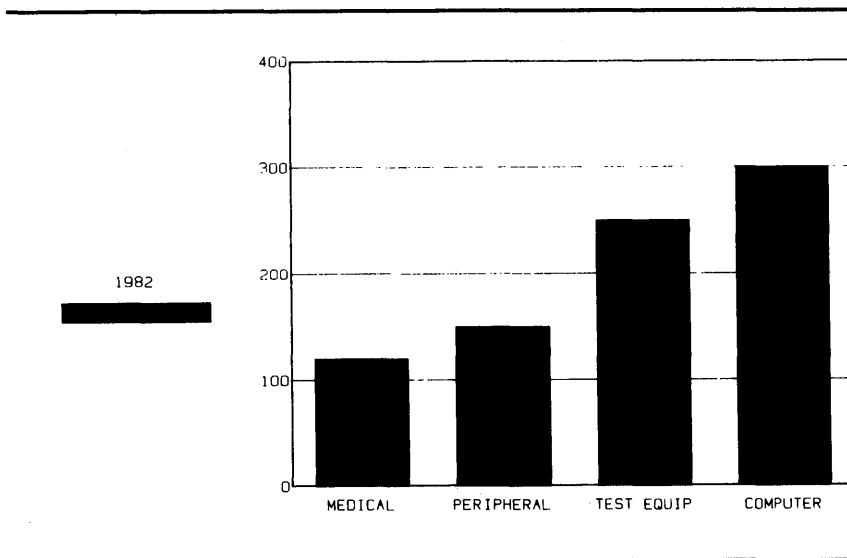
If you have many data points in the selected row/column, it is advisable to abbreviate the row/column titles so that they can fit nicely on the X-axis. This is especially true for the row titles since only one line is allowed for the description. To abbreviate the row/column titles, you need to return to the table menu and re-enter them with the (20) ROW TITLE or (25) COL TITLE command.

The "Date" option is very useful if you want date labels on your X-axis regardless of what you have entered for your row/column titles. GraphPlan offers very flexible date labeling capability. Date labels are abbreviated appropriately to allow all of the labeling to fit on the axis. For instance, 1983 is abbreviated to '83 if need be and January is abbreviated to J. For example, suppose you have your quarterly profit figures saved in the following table:

Row	Profit
1	80
2	85
3	93
4	100
5	108
6	120
7	135
8	150
9	160
10	175
11	180
12	195

You might want to create a chart that shows quarterly profit beginning at the second quarter of fiscal 1982. to do this, you should set the "X Axes Type" to Date, and "Date Start" options to the following values:

```
X Axes Type (T-Text, D-Date, N-Numeric)  .... D
Date Type (W, M, Q, Y, MY, QY)  .......... QY
Date Start  ............................. 2/1982
```

When you display the chart with the data pointer in column mode, your screen should look like this:
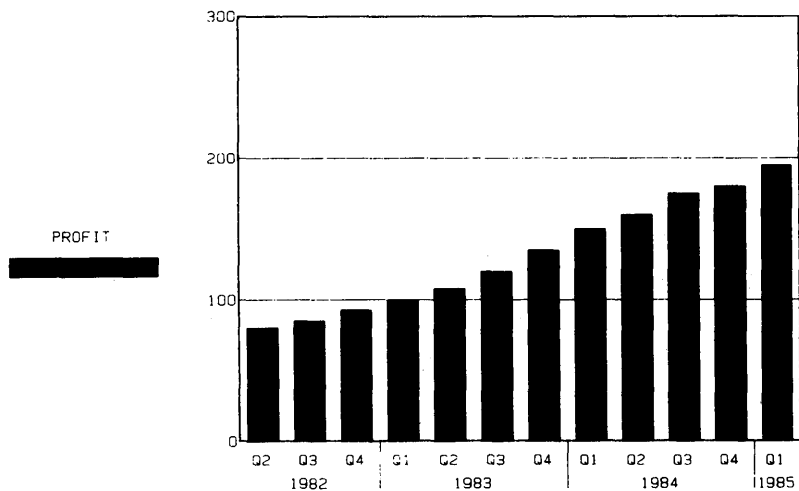
If you want to display the above examples as monthly profit, you simply set the "Date Type" and "Date Start" options to the following values:

```
X Axes Type (T-Text, D-Date, N-Numeric) .. D
Date Type (W, M, Q, Y, MY, QY) ........ M
Date Start ............................ 1
```

When you display the chart, your screen should look like this:
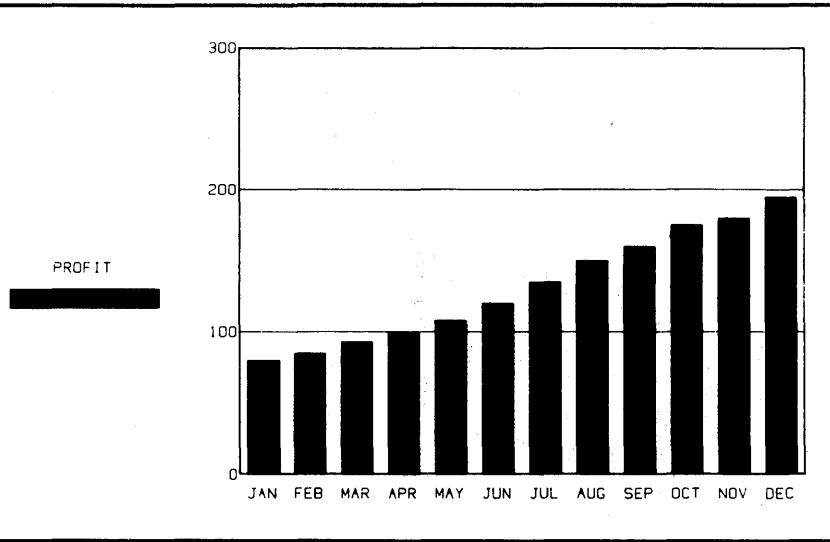
If your X-axis data consists of numbers, you should select "Numeric" option. This option is most useful if you want to represent quantities on the X-axis. For example, suppose you have the volume versus discount figures in the following table:

	ROW	1	2	3	4	5	6	7	8	9
1	VOLUME	100	200	300	400	500	600	700	800	900
2	DISCOUNT	5	10	15	20	25	35	50	60	70

You might want to create a chart that shows how discount rate changes with volume. To do this, you should set the "X Axes Type" option to N (numeric), and also select row 1 as your X-axis data. In the Define Chart Options menu, you should set the "Row/Col" option to 2 and the "Graph Type" option to Line. When you display your chart, the screen should look like this:
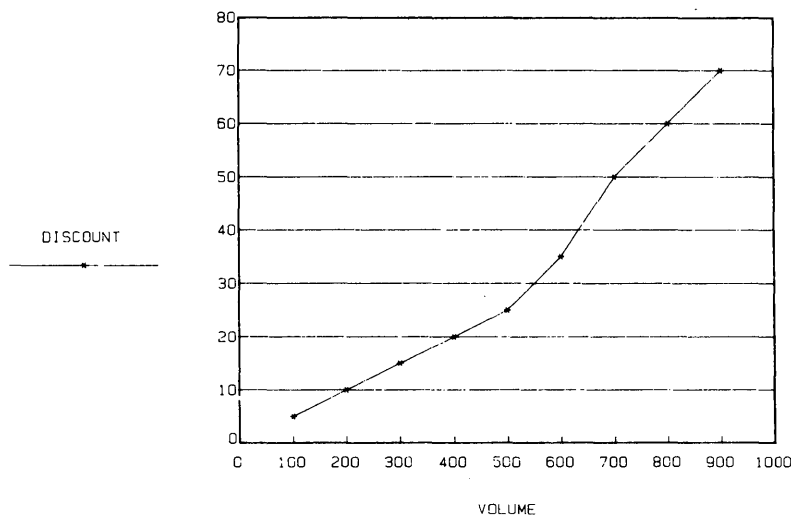
Note also that when you select a numeric X-axis, your data is considered to be continuous and cannot be represented as a bar graph. GraphPlan will automatically convert your bar graph to a line graph when you specify numeric X-axis.

Logarithmic Scaling

If your data ranges over very wide values, it may be best to use logarithmic scaling rather than linear scaling. In logarithmic mode, the axes are scaled exponentially and the divisions are labeled in "scientific" notation as follows:

$$
\begin{aligned}
1\ E{-}1 &= 0.1 \\
1\ E0 &= 1.0 \\
1\ E1 &= 10.0 \\
1\ E2 &= 100.0 \\
1\ E3 &= 1000.0
\end{aligned}
$$

Note that negative values are not displayed in logarithmic mode — negative values are simply ignored.

Notice also that when you use logarithmic scaling, values that fall between major divisions are not represented the same way as they are in linear scaling. For example, the value 0.5 in logarithmic scaling will be more than halfway between 0.1 and 1.0. Also the division from 0.1 to 1.0 takes as much space as the division 100 to 1000, which represents a far larger range. This may seem a bit disconcerting, but it is this feature of logarithmic scaling that enables you to display a large range of values in a small chart.

For example, suppose you have the shipment figures for XYZ COMPUTER from 1970 to 1979 in the table below:

ROW	XYZ COMPUTER
1	100
2	500
3	3000
4	10000
5	20000
6	50000
7	90000
8	100000
9	120000
10	150000

Since the shipment figures extend over a very large range of values, it is appropriate to display them in logarithmic scale. To do this, you should set the "X Axes Type", "Date Type", "Date Start", and "Type" options to the following values:

```
        X Axes Type (T-Text, D-Date, N-Numeric)  ...  D
        Date Type (W, M, Q, Y, MY, QY)  ..........  Y
        Date Start  .............................  70
        Draw Frame (N-Suppress, L-Left, B-Box)  ....  B
        Legend (N-Suppress, L-Left, R-Right, B-Bottom)  L

        Axes Specification          Y Axis        X Axis

        Type (L-Linear, O-Log) . . . . .  O
```

In the Define Chart Options menu, you should set the "Row/Col" option to 1 and the "Graph Type" option to Line.

When you display the chart, your screen should look like this:
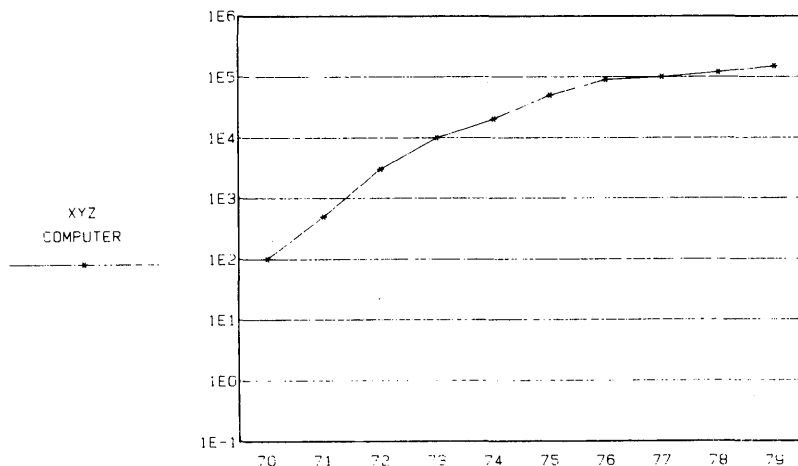
Adjusting the Scale of the X- and Y- Axes

GraphPlan automatically scales charts according to the values in the selected rows/columns. However, there are times when you might want to adjust the scaling of the chart so that only data within a specified range are displayed, or you might want to emphasize a certain part of the chart in order to show more detail. To turn off automatic scaling mode, set the "Auto Scaling" option to N (No).

For example, suppose the table below contains bank interest charges for the past 12 months:

ROW	INTEREST RATE
1 JAN	16
2 FEB	17
3 MAR	18
4 APR	17
5 MAY	18.5
6 JUN	20
7 JUL	21
8 AUG	20.5
9 SEP	20
10 OCT	18.5
11 NOV	17
12 DEC	17.5

First reset the selections in Define Axes Options to:

X Axes Type=T (Text)
Type Y Axis=L (Linear)

If you display this chart in auto scaling mode, the screen should look like this:
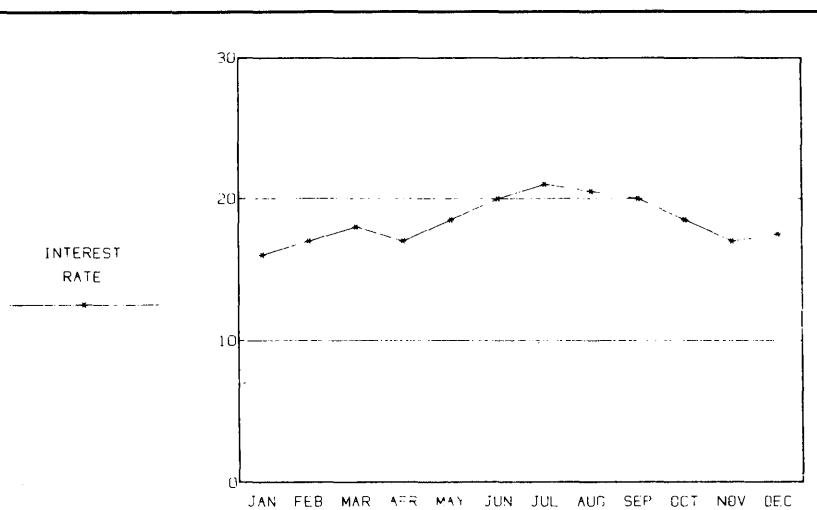
Notice that the Y-axis is scaled from 0 to 30, but all the interest rate values are clustered between 16 and 21. To take a close look at how the interest rate fluctuates, you should scale the chart from 16 to 21, with grid lines at every percent.

You should set the "Auto Scaling", "Minimum", "Maximum", and "Number of Major Divisions" options to the following values:

Axes Specification	Y Axis	X Axis
Type (L-Linear, O-Log)	L	
Auto Scaling (Y/N)	N	
Minimum	16	
Maximum	21	
Number of Major Divisions	5	
Number of Minor Ticks	0	
Draw Grid Lines (Y/N)	Y	N

When you display your chart, your screen should look like this:
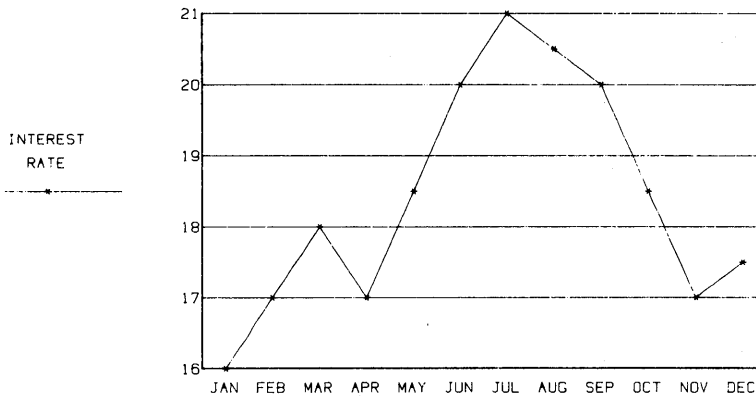
Notice that you must enter both the minimum and maximum values in order for GraphPlan to do the rescaling. Also, the maximum value must be greater than the minimum value. GraphPlan will return to auto scaling mode if you do not specify both values or if the maximum value is not greater than the minimum value.

When you reset the scaling, you may find that you no longer have multiples of 10 like 10, 20, and so on as labels for the major divisions. For instance, if you set the minimum to 10 and the maximum to 100 and specify 10 major divisions, the labels will be 10, 19, 28, 37, and so on (90 divided by 10=9). If you specify 9 divisions, the labels will be 10, 20, etc. (90 divided by 9 = 10).

DEFINE PIE OPTIONS — (Selection 4)

This selection allows you to specify shading patterns, colors, and pie segment explosions. It also allows you to determine whether data values of percentages should be included with the segments. Finally, you can sort segments by size.

As usual, the second line of the menu displays help messages.

The following screen shows all the options with their default values in the Define Pie Chart Options menu:

Define Pie Options
ENTER DATA:

Segment	Shade (1–8)	Color (1–8)	Explode (Y/N)
1	1	1	N
2	2	2	N
3	3	3	N
4	4	4	N
5	5	5	N
6	6	6	N
7	7	7	N
8	8	8	N

Print Percentages (Y/N) .... Y
Sort Pie Segments By Size (Y/N) .... N

If you want to exit from the Define Pie Options menu, press <CANCEL>. Graph-Plan will return you to the Chart Options menu.

Description of Options

Below is a brief description of each option and its default value in the Define Pie Options menu:

Segment
(1, 2, . . . 8)

A tag to identify the 8 segments in the pie chart.

Shade
(1-8)

Enter one of eight different shading patterns for the selected pie segment. Each shading pattern is associated with a numeric value, as follows. When the cursor is on "Shade" option the shade corresponding to each number is displayed in an abbreviated form as shown after each shade below. The numbers in parentheses refer to the angle of hatching.

1	☐ hollow	5	◨ h(135)
2	▨ h(45)	6	▧ ch(light)
3	▤ h(0)	7	▦ ch(dense)
4	▥ h(90)	8	■ solid

Default: Pie segment #1 is assigned shading pattern 1, pie segment #2 is assigned shading pattern 2, and so on.

Color
(1-8)

If you have a color display, you can display pie segments in eight different colors. Each color is associated with a numeric value, as follows:

1 – white   5 – cyan
2 – red   6 – yellow
3 – green   7 – magenta
4 – blue   8 – white

The "Color" option is also used to identify the pens when plotting charts.

| Explode (Y/N) | Enter Y if you want the selected pie segment to be displayed slightly larger in proportion to the other segments. This will draw attention to a particular pie segment. |
| | Default: N |

Print Percentages (Y/N)	Enter Y if you want to label each pie segment with its relative percentages.
	Enter N if you want to label each pie segment with its actual data values.
	Default: Y

| Sort Pie Segments By Size (Y/N) | Enter Y if you want the segments of the pie chart to be sorted in ascending order (smallest to largest). GraphPlan automatically sorts segments with the smallest segment starting in the three o'clock position when the pie is drawn, and continues in a clockwise direction. |
| | Default: N |

Working with Pie Charts

In a pie chart, only the first 8 non-zero cells in a row or column are displayed. Also, negative values are displayed as if they were positive, since you cannot have a value that is a negative percent of the whole.

The first segment (that is, the segment beginning at 3 o'clock on the chart) is always segment #1, the next is #2, and so on. Therefore, if you change the display, for instance, by arranging the segments in ascending order, the color or shading of the values will be changed. If value A was segment #1 and was shaded solid fill, some other value may be in segment #1 and that other value will now be shaded solid fill. If you wish to keep solid fill for value A, you need to return to the Define Pie Options menu and manually change the shading.

Pie Chart Examples

Suppose you want to get a percentage breakdown of how you spent your sales dollars in 1980, using the data in the table below:

ROW		1980 1
1	BONUS	30
2	MARKETING	150
3	ADMIN	80
4	DEVELOPMENT	100
5	MANUFACTURING	200
6	TAXES	50

If you want to emphasize the amount of sales dollars the company is spending in bonuses, you can draw attention to that segment by exploding it. To do this, you should set the "Explode" option for segment #1 in the Define Pie Options menu to the following:

Segment	Shade (1–8)	Color (1–8)	Explode (Y/N)
1	1	1	Y
2	2	2	N
3	3	3	N
4	4	4	N
5	5	5	N
6	6	6	N

In the Define Chart Options menu, you should set "Row/Col" option to 1 and the "Graph Type" option to Pie.

When you display the chart with the data pointer in column mode, the screen should look like this:


```
                        MANUFACTURING - 32.79%




                                                    TAXES - 8.20%

DEVELOPMENT - 16.39%

                                                  BONUS - 4.92%



      ADMIN - 13.11%
                              MARKETING - 24.59%
```
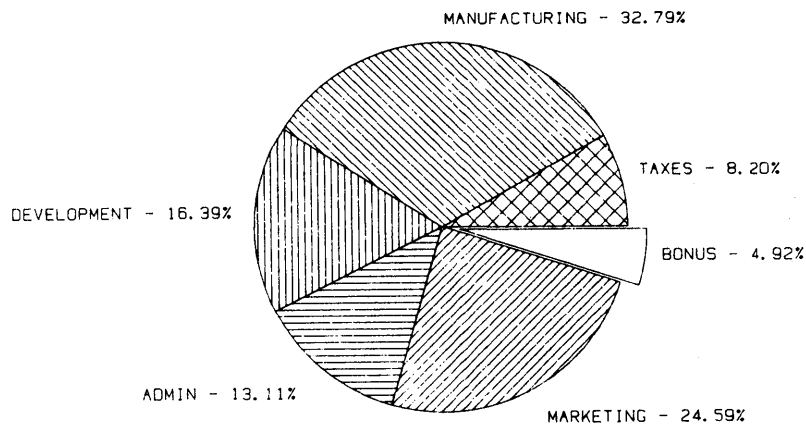
Suppose you want the pie segments of the example above to be sorted by size. You want to explode the largest segment, and also change the shading pattern to solid fill. To do this, you should set the "Shade", option of segment #6 to 8 (for solid fill), the "Explode" option to Y and the "Sort Segment by Size" option to Y. Notice that segment #6 is selected because there are 6 data values in column 1, and the largest segment will be the last segment to be displayed in the pie chart.

Segment	Shade (1-8)	Color (1-8)	Explode (Y/N)
1	1	1	N
2	2	2	N
3	3	3	N
4	4	4	N
5	5	5	N
6	8	6	Y

Print Percentages (Y/N) .... Y
Sort Pie Segments By size (Y/N) .... Y

When you display the chart, the screen should look like this:

```
                              MANUFACTURING - 32.79%



MARKETING - 24.59%


                                        BONUS - 4.92%


                                        TAXES - 8.20%

DEVELOPMENT - 16.39%

                    ADMIN - 13.11%
```
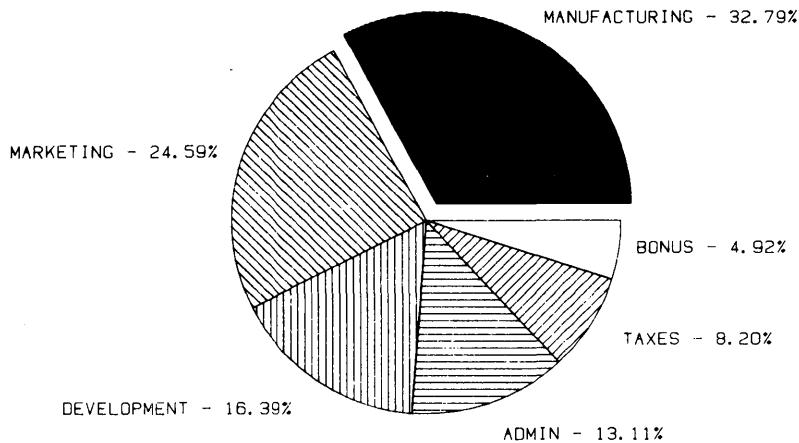
PRINT CHART — (Selection 5)

To get a printed copy of your chart, use the Print Chart selection (5) on the Chart Options main menu. The print looks as it does on the screen, including the shading and symbols. Some of the printing and plotting options available for GraphPlan are not available for GraphPlan with the GSX-86 device driver. With GSX-86, chart printing is available for one size without the option to enlarge the chart. Please refer to the *Plot a Chart* section for more details on plotting charts using GSX-86.

The following figure shows the Chart Options main menu with the selection numbers for printing and plotting.

(message line)
Enter selection:

---

1 – Display Chart
2 – Define Chart Options
3 – Define Axes Options
4 – Define Pie Options
5 – Print Chart
6 – Plot Chart

Selection 5 prints the current chart. To print the chart, you must have a current chart and a current table. The printer should be ready to print. Enter 5 after "Enter selection:". The message line displays two messages, asking if you want a full-size chart and instructing you to set the paper in the printer:

Enter a selection: **5** <Return>

    Do you want to enlarge your chart (Y/N)? **Y** <Return>

    If you answer "Y", the chart will be printed to fill an entire 8½" x 11" sheet. If you answer "N", the chart will be approximately 8½" x 5½" and you can print two charts on an 8½" x 11" sheet. Press <Return> after entering your response.

SET PRINTER AND HIT RETURN. <Return>

After you press <Return> the chart is displayed and printing begins. You can stop the print at any time by pressing <CANCEL> or <Escape>.

PLOT CHART — (Selection 6)

To plot a chart, select Plot Chart (6) from the Chart Options main menu. Graph-Plan presents the following sub-menus with default values:

Plot Chart   Press Ctrl-P to Plot
   (message line)
ENTER DATA:

    Number of Pens (1–8) 2
    Pause for Pen Change (Y/N) .... Y
    Transparency (Y/N) .... N
    Page Format 1

This menu contains default option values; if you wish to use the default values, you needn't enter any data in the menu.

Once you have selected your plotting options, loaded the table and chart, and readied the plotter, you press Ctrl-P to begin the plot (hold down the key marked CTRL or CONTROL and press the P key). To stop the plotting at any time, press <CANCEL> or <Escape>.

Please note that if you are using the GSX-86 device driver that the (1) transparency and (2) page format options are no longer available.

Description of Options

Number of   Define the number of pens to use.
Pens (1–8)

                Default: 2 pens

Pause for Pen Change (Y/N)	If the number of pens is fewer than the number of colors that you have specified in the Define Chart Options or Define Pie Options menu, then you should enter Y. Default: Y
Transparency (Y/N)	If you choose Y, the plotter will be set for transparencies. If you choose N, the plotter will be set for paper. It is recommended that you choose Y for solid bar graphs or pie segments even on paper.
Page Format (1–3)	Option 1 plots one chart 11½″ x 8″ in size. Option 2 plots two 5½″ x 8½″ charts side by side. Option 3 plots two 8½″ x 5½″ charts stacked vertically. If you select Option 2, GraphPlan displays the message "(1 – left half, 2 – right half)". Type "1" to print the chart on the left half of the sheet and "2" to print the chart on the right half. If you select Option 3, GraphPlan will display the message "(1— upper half, 2—lower half)". Type "1" to print the chart on the top half of the sheet or "2" to print the chart on the bottom half. Default: One 11″ x 8½″ chart

Number of Pens and Number of Colors

GraphPlan uses the number of pens from the plotter sub-menu and the "Color" option in the Define Chart Options or Define Pie Options menu to decide whether to stop the plotting to prompt you to change pens. This allows you to use a different color for each bar graph or pie segment.

For example, suppose you have 2 pens in your plotter, and you have selected the following values in the "Color" option for your bar graphs in the Define Chart Options menu:

Graph	Row/Col	Type (Bar/Line/Pie)	Shade (0-6)	Symbol (0-6)	Color (1-8)
1	1	Bar	1	1	2
2	2	Bar	1	2	3
3	3	Bar	1	3	4
4	4	Bar	1	4	5
5	5	Bar	1	5	6
6	6	Bar	1	6	7

Recall that the chart titles, labelling for both axes, legends, and grid lines are always drawn using pen #1. You should install pen #1 with the color you want for the chart outlines and titles.

In this example, you have defined a chart with 6 bar graphs to be drawn with 6 different colors. Since you have specified a value of 2 in the "Number of Pens" option, GraphPlan will stop the plotting after the first bar graph to prompt you to change the pen for graph 2, and again for graphs 3, 4 and so on. The prompting message will be, in this case, "Change pen for pen #2 — press any key to continue." If you had 3 pens in your plotter in this example, GraphPlan would stop the plotting at graphs 4, 5, 6, and 7 to allow you to change pens.

If you have 8 pens in your plotter, and you have specified a value of 8 in the "Number of Pens" option, GraphPlan will not stop the plotting and will automatically select the third pen for graph 2, the fourth pen for graph 3, and so on.

Pause for Pen Change

Enter Y in this option if you want GraphPlan to pause for pen changes. Enter N if you do not care to stop the plotting to change pens. In the latter case, GraphPlan will always select pen #2 (or pen #1 for plotters with only one pen) to draw the bar/ line graphs or pie segments when the corresponding "Color" option value is greater than the value you specified in the "Number of Pens" option.

Transparencies

Enter Y for plotting on transparencies and N for plotting on regular paper. When you specify transparency paper, GraphPlan slows down the plotting speed so that lines can be drawn clearly on the special transparency sheets. Refer to Customizing Notes in the front of the manual to find out the special pens and transparency papers required for your plotter.

We recommend that you set this option to Y for solid bar graphs or pie segments even though you are using regular paper. Slowing down the pen allows the ink to flow more evenly, and as a result, you get a clearer and sharper chart output.

Chapter 7

Additional
GraphPlan Commands
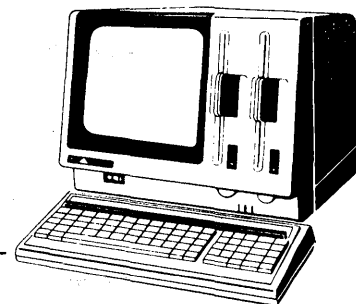
Chapter 7 covers the different modes available in GraphPlan. It also discusses other commands that will be helpful in using GraphPlan's more advanced functions, and it shows you how to maintain your charts and tables.

GraphPlan Modes

In Chapter 1, we discussed the mode indicator on GraphPlan's status line. In the course of using GraphPlan, you will be using several different modes, or states of operation. For example, when you use the COMPUTE (98) command, GraphPlan goes in and out of the Compute Mode automatically. You can see the change in mode reflected on the status line at the top of your screen.

You return to the Normal Mode by using the NORMAL (99) command. The three modes in GraphPlan are explained below.

> NORMAL — The Normal Mode is the GraphPlan default mode. It is the mode used when formatting tables, doing data entry and printing reports. When the Compute, and Protect Modes are used, GraphPlan will automatically return to the Normal Mode.
>
> COMPUTE — The COMPUTE (98) command starts computing rows and columns using the math and formula commands you have entered into your table. The Compute Mode reverts back to the Normal Mode automatically after computations are completed.
>
> PROTECT — The PROTECT (101) command turns the Protect Mode on and off. When the Protect Mode is on, a "P" is displayed on the top right corner of your screen. When the Protect Mode is on, all formulas and row and column relationships you have established in

your table are protected from tampering. With GraphPlan in the Protect Mode, you can make changes to data in your table without the fear of disturbing the underlying logic. This is useful in keeping unsophisticated users from disrupting your table.

Setting Row and Column Ranges

You can limit your data entry, computations, and chart display to a particular section of your table by using the ROW RANGE (92) and COL RANGE (93) commands. The right top corner of the screen shows the current row and column ranges. Unless otherwise specified, the range settings will default to the size of your current table. The default table size and range settings are 50 rows by 20 columns.

In Chapter 3, you saw how the SET UP (109) command is used to enlarge a table. This command should not be confused with the ROW RANGE and COLUMN RANGE commands. The SET UP command affects the physical size of the entire table. The ROW and COLUMN RANGE commands are temporary "working" range limitations that give you flexibility in your data entry, computations, and printing.

By setting the row and column ranges, you can limit your calculations to affect only certain rows and columns, leaving the remaining data intact.

Computing Order

When the COMPUTE (98) command is used, GraphPlan will do computations for all rows within the row range and then for all columns within the column range, depending on the current computing order displayed on the GraphPlan status line. Initially, the computing order is displayed as "ORDER=R/C" signifying that GraphPlan will compute rows and then columns.

Suppose you have added a total column to the Five-Year Forecast table from Chapter 2. You want GraphPlan to compute this total every time you use the COMPUTE

command. GraphPlan will let you change the computational order by using the ORDER (102) command.

The ORDER command allows you to choose among four options:

1. ROW/ONLY Compute only rows.
2. COL/ONLY Compute only columns.
3. ROW/COL   Compute all rows; then all columns. This is the default computing order.
4. COL/ROW   Compute all columns; then all rows.

Let's use the Inventory table from Chapter 3 to illustrate the ORDER command.

ENTER COMMAND: **111** \<Return\>   Load table
    TABLE NAME: **INVENT** \<Return\>

Now position your cursor on row 5 and use the SUM command to get a total for each of your three columns.

ENTER COMMAND: **55** \<Return\>   Sum
    ROW BEGIN (1–50): **2** \<Return\>
    END (1–50): **4** \<Return\>

Use the ORDER (102) command to change the computing order to compute columns first and then rows.

ENTER COMMAND: **102** \<Return\>
    ROW/ONLY=1, COL/ONLY=2,
        ROW/COL=3, COL/ROW=4): **4** \<Return\>

After choosing option "4" above, GraphPlan will perform computations for all columns and then for all rows. Notice that the computing order on the status line at the top of your screen is now set to "ORDER=C/R".

Now make a change in your data, and compute your table according to the new computing order.

ENTER COMMAND: **32** <Return>
  ROW (1-50): **3** <Return>
  COL (1-20): **1** <Return>
  VALUE: **175** <Return>

ENTER COMMAND: **98** <Return>

Your screen should show the following:

```
                       MODE=NORMAL    ORDER=R/C    ROW=1-50    COL=1-20
               ROW 6   <-
ENTER COMMAND:
                 UNIT                TOTAL
ROW              COST   QUANTITY     COSTS                     16 format:
                                                              17 INSERT
               ——1——   —2——      —3——  —4—— ——5——         18 DELETE
1 ITEM           0.0     0.0        0.0                        19   rows:
2 DESKS        300.0    10.0      3,000.0                      20 ROW TITLE
3 CHAIRS       175.0    20.0      3,500.0                      21 SET TYPE
4 SHELVES      200.0     5.0      1,000.0                      22 SHOW ROWS
5 TOTAL        675.0    35.0      7,500.0                      23 REORDER
6                                                             24  cols:
7                                                             25 COL TITLE
8                                                             26 SET TYPE
9                                                             27 SHOW COLS
10                                                            28 REORDER
11                                                            29  data:
12                                                            30 ENTRY
13                                                            31 ENTER
14                                                            32 CHANGE
```

Save your new Inventory table using the SAVE TBL (112) command.

ENTER COMMAND: **112** <Return>

    TABLE NAME: **INVENT** <Return>

A message will appear telling you that the table INVENT already exists and asking if you want to continue with the save. Enter a "Y" to indicate that you do want to overwrite the existing INVENT table with the new INVENT table.

Using the FIX Command

The FIX (38) command will recalculate only the current row or column without computing other rows or columns. It allows you to manually recalculate a single row or column. Sometimes, the calculation order required to correctly update values is more complex than the simple row/column order that is permitted by the ORDER command. FIX can be used to manually supplement these calculations.

For example, if you also add a PERCENTAGE PROFIT row to the Five-Year Forecast example, then none of the compute ORDER options correctly calculate the percentage profit for the total column. Let's try it.

ENTER COMMAND: **111** <Return>   Load table

    TABLE NAME: **FORECAST** <Return>
    CHOOSE (NEW=0, CURRENT=1): **1** <Return>
ENTER COMMAND: **20** <Return>   Row title

Use the cursor keys to position your cursor on row 7.

    ROW TITLE: **PROFIT RATIO** <Return>

Press <CANCEL> to cancel the ROW TITLE command. Make sure your cursor is back on row 7.

ENTER COMMAND: **35** <Return>   Formula

Take ratio of GROSS PROFIT to SALES.

:L6/L1*100 <Return>

Row 7 now contains the ratio of the five years' GROSS PROFITS to SALES.

Now let's put a TOTAL column in column 5 to get the total for each of the four quarters. Enter the new column title and then recompute your results using the following commands:

ENTER COMMAND: **25** <Return>

Add new column title. Position your cursor on column 5.

   COL TITLE 1: **TOTAL** <Return>

   COL TITLE 2: <Return>

The second <Return> indicates that there is no second title for this column. Since this is the only column title we want to enter, press the <CANCEL> key to cancel the COL TITLE command. Position the cursor on column 5.

ENTER COMMAND: **55** <Return>   Sum

   BEGIN COL (1–20): **1** <Return>

   END (1–20): **4** <Return>

ENTER COMMAND: **98** <Return>   Compute

Your screen should show the following. Unfortunately, it is not what we wanted to do.

```
                        MODE=NORMAL   ORDER=R/C   ROW=1-50   COL=1-20
           ROW 1 (SALES) <-
ENTER COMMAND:
                                                             1 format:
ROW                                                  TOTAL   2 data:
───────────────────── ─── 1 ── ── 2── ── 3 ── ──4── ─ 5 ──  3 math:
1 SALES              1,000.0 1,100.0 1,210.0 1,331.0 4,641.0  4 graphics:
2 COST OF GOODS        450.0   495.0   544.5   599.0 2,088.5  5 print:
3 SALES AND ADM        200.0   220.0   242.0   266.2   928.2  6 status:
4 RESEARCH AND         500.0   300.0   300.0   300.0 1,400.0  7 HELP
5 TOTAL COSTS        1,150.0 1,015.0 1,086.5 1,165.2 4,416.7  8
6 GROSS PROFIT        -150.0    85.0   123.5   165.9   224.4  9 STOP
7 PROFIT RATIO         -15.0     7.7    10.2    12.5    15.4 10 utility:
8                                                           11 sort:
9                                                           12 stats:
10                                                          13
11                                                          14
12                                                          15
13                                                          16 format:
14                                                          17 INSERT
15                                                          18 DELETE
16                                                          19  rows:
17                                                          20 ROW TITLE
```

What we want to do is to calculate the combined ratio of the four quarters and the total, not the total of ratios for the four quarters. The correct order is to do rows first, then columns — including the TOTAL column — and finally, the row of profit margins. To do this, use the steps outlined below.

1. Position the data pointer to the PROFIT RATIO row.
2. Use the FIX (38) command to recalculate the profit margins.

Your new screen should show:

```
                MODE=NORMAL    ORDER=R/C  ROW=1-50        COL=1-20
          ROW 7 (PROFIT RATIO)  <-
ENTER COMMAND:
                                                     16 format:
ROW                                           TOTAL  17 INSERT
─────────────── ──1── ──2── ──3── ──4── ──5── 18 DELETE
1 SALES         1,000.0 1,100.0 1,210.0 1,331.0 4,641.0 19  rows:
2 COST OF GOODS   450.0   495.0   544.5   599.0 2,088.5 20 ROW TITLE
3 SALES AND ADM   200.0   220.0   242.0   266.2   928.2 21 SET TYPE
4 RESEARCH AND    500.0   300.0   300.0   300.0 1,400.0 22 SHOW ROWS
5 TOTAL COSTS   1,150.0 1,015.0 1,086.5 1,165.2 4,416.7 23 REORDER
6 GROSS PROFIT   -150.0    85.0   123.5   165.9   224.4 24  cols:
7 PROFIT RATIO    -15.0     7.7    10.2    12.5     4.8 25 COL TITLE
8                                                    26 SET TYPE
9                                                    27 SHOW COLS
10                                                   28 REORDER
11                                                   29  data:
12                                                   30 ENTRY
13                                                   31 ENTER
14                                                   32 CHANGE
15                                                   33 SELECT ROW
16                                                   34 SELECT COL
17                                                   35 FORMULA
```

Notice the value in row 7, column 5 is 4.8 and not 15.4.

Save your new Inventory table using the SAVE TBL (112) command.

ENTER COMMAND: **112**   <Return>

   TABLE NAME: **FORECAST**   <Return>

   A message will appear telling you that the table FORECAST already exists and asking if you want to continue with the save. Enter a "Y" to indicate that you do want to overwrite the existing FORECAST table with the new FORECAST table.

Maintaining Tables and Charts

As you have seen, all tables and charts you save are automatically put into a Graph-Plan directory. Whenever you use a load or save command, you have the option to examine the contents of a diskette by pressing the <Return> key in response to the request for a filename.

By issuing a series of <Return> keys, you can see the names of the tables and charts on disk, one at a time. The GraphPlan directory will display the names of available tables and charts, the report title information, and the table size information on line two of your screen. This helps you keep track of your tables.

You can use the LIST TBLS (116) command and the LIST CHTS (124) command to print a list of all the tables or charts on a particular disk. If you want to erase a table from your diskette, simply use the ERASE TBL (117) command — ERASE CHT (122) for charts. A prompt on the command line will ask you for the filename of the table or chart to be erased. The file will then be deleted from your disk and the GraphPlan directory.

GraphPlan table and chart names can be up to eight alpha-numeric characters. All names must start with an alpha character and may not include the following characters: . ? " / or a space. Lower case characters are automatically converted to upper case so you can type names in upper or lower case.

All CP/M and MS DOS file names are constructed from three parts:

D:FILENAME.TYP

1. An optional disk drive identification character, followed by a colon.

2. A file name of up to 8 characters.

3. An optional type identification of up to 3 characters preceeded by a period.

GraphPlan automatically assigns the file type of "TBL" to all tables and "CHT" to all charts that are saved.

Disk drives are assigned names such as disk drive A:, B:, C: and so on. If you supply a drive name, then you need to enter the colon character as well. In most cases, files should be saved on your B drive. You can change drives in GraphPlan using the SET DRIVE (108) command.

Changing Disk Drives

To save tables and charts on a specific disk drive, use the SET DRIVE (108) command to specify the drive name. That drive will be used as the data drive for all subsequent load and save operations until you change the drive with the SET DRIVE command or until you exit GraphPlan.

The SET DRIVE command will also allow you to change diskettes during a working session. Whenever you change diskettes, you should always issue a SET DRIVE command to initialize your new diskette.

Interfacing with Word Processors

You can save GraphPlan reports in a file for combining with text produced on your word processing software. The SAVE REP (85) command allows you to print reports into a file instead of to a printer.

The SAVE REP command is similar to the REPORT (83) command in that all options and titles will be included in the report. By saving the report in a file, you can include GraphPlan reports in the body of text from a word processor, enhance reports using a word processor editor, or spool reports to printers.

The SAVE REP command will not save your table in GraphPlan. To save a table for future use in GraphPlan, use the SAVE TBL (112) command.

Designing On-Screen Table Formats

Your screen will normally show 5 columns and 17 rows. Each cell has one decimal place, each column is 10 spaces wide, and each row title uses 15 spaces. Zero values are displayed on the screen.

The SET CRT (86) command allows you to change the display parameters for on-screen viewing. These changes are not reflected on the printed copy. For example, let's change the screen to show columns, each 19 spaces wide, with 3 decimal places, with 27 spaces for row titles and to omit zero values.

ENTER COMMAND: **86** <Return>   Set CRT

   DECIMAL PLACES (0–3): **3** <Return>

   ROW TITLE WIDTH (5—30): **27** <Return>

   COLUMN WIDTH (4—20): **19** <Return>

   DISPLAY ZERO VALUES (NO=0, YES=1): **0** <Return>

   Pressing <Return> after an option will cause it to default to the current setting.

Your screen should show the following:

```
              MODE=NORMAL    ORDER=R/C  ROW=1-50       COL=1-20
       ROW 1 (SALES)   <-
ENTER COMMAND:
                                                    1 format:
ROW                         YEAR 1         YEAR 2    2 data:
————————————————————————  ———————1———————  ———————2———————  3 math:
1 SALES                      1,000.000      1,100.000  4 graphics:
2 COST OF GOODS                450.000        495.000  5 print
3 SALES AND ADMINISTRATION     200.000        220.000  6 status:
  ESEARCH AND DEVELOPMENT      500.000        300.000  7 HELP
  TOTAL COSTS                1,150.000      1,015.000  8
6 GROSS PROFIT                -150.000         85.000  9 STOP
7 PROFIT RATIO                 -15.000          7.727 10 utility:
8                                                    11 sort:
9                                                    12 stats:
10                                                   13
11                                                   14
12                                                   15
13                                                   16 format:
14                                                   17 INSERT
15                                                   18 DELETE
16                                                   19  rows:
17                                                   20 ROW TITLE
```

You can change the on-screen parameters to allow financial reports that show up to trillion dollar figures with penny accuracy. Computations are accurate to 14 precision digits.

You can also design your screen display to show columns that are only 4 characters wide. This displays more columns, but numbers in each column will have to be less than four digits wide. Numbers that require more space than that allowed by your current column width will be displayed as three asterisks (***).

For an 80 column screen, 65 spaces are available for the table area. After subtracting the space required for the row title, the number of columns shown on-screen is calculated depending on the size of the columns. Note that although all columns will be the same size on the screen, your printed report can have different widths for each column.

The SET CRT command does not change any of the values in the table. Therefore, feel free to experiment with this command to design screens to suit your needs.

Your Screen Display

GraphPlan has several commands that allow you to clear your screen. These commands are explained below.

The CLR DATA (113) command allows you to clear the data from your current table within the current row or column ranges. It does not disturb the table logic, row or column titles, or print options. This command lets you use master tables, complete with logic and print options to make duplicate tables.

The RESET (114) command clears all data, logic, and options information from memory.

The REDISPLAY (115) command will redisplay your screen should it be distorted for any reason. No changes are made to your data.

The RESET CHT (123) command clears all the chart options you have set. The options are cleared whether you used the CHART OPTIONS (63) menus or the SELECT GRAPH (62) command to set them. The default options asre restored to the menus.

Saving and Loading Charts

You save charts on diskettes and reload them in the same way as you save and re-load tables. In saving and reloading charts, you have two options—you can save or load the chart alone or along with a table. To see the commands associated with saving and loading charts, enter command UTILITY (10) and press <Return>.

If you have more than one disk drive, you may need to set the drive with SET DRIVE (108) before you can save or load a chart or table.

In order to display a chart you have saved, you must load a table as well as the chart. Since the chart file contains only a set of options, you can actually use any table that has enough rows or columns to display the chart. Therefore, one chart can be used to display data from a number of tables.

If you wish to give a chart and table the same name and save both in one operation, you can use the SAVE ALL (107) command. CP/M and MS DOS add a suffix to the chart and table files to distinguish them. For instance, if you create a chart and table and save them with SAVE ALL under the name SALES, you will have on your disk two files, SALES.TBL and SALES.CHT. Let's save the table and chart called SALES, first setting the disk drive to drive A.

ENTER COMMAND: **108** <Return>   Set disk drive
   DRIVE (A–P): **A**   <Return>

ENTER COMMAND: **107** <Return>   Save all
   TABLE NAME: **SALES** <Return>

ENTER COMMAND: **106** <Return>   Load all
   TABLE NAME: **SALES** <Return>

GraphPlan keeps two directories for you which contain all the tables and charts you save — one directory for tables and one for charts. After you enter a load or save command, a message at the top of the screen directs you to "Hit RETURN to see available tables or charts". If you wish to see the names of the tables or charts in your directories, simply press <Return> and continue to press <Return> to see additional names.

During load and save operations, the second line on the screen displays the current file and the current drive. For example, if you are loading or saving SALES, which is on a diskette in drive A:

CURRENT = A:SALES   DRIVE:A

If you have not loaded a file or you are in the process of creating a new, unnamed chart or table:

CURRENT = UNDEFINED

Of course, you can save charts and tables separately with the same or different names. The SAVE CHT (121) and LOAD CHT (120) commands operate the same way as SAVE ALL and LOAD ALL and the same screen messages are displayed.

If you have loaded a chart and made changes in some of the options, you can choose whether you wish to save the chart with or without the changes. You can also save both the old chart, under its original name, and a new chart, incorporating the changes, under a different name. For example, if you have loaded the chart called SALES and changed some of the options:

1. To save the chart with changes, just use SAVE CHT and the same chart name, SALES. The old version of SALES will be replaced by the new version, incorporating any changes you have made.
2. To save the new version and the old version, use SAVE CHT with a new name for the new version, say SALES2. Now you will have two chart files, SALES and SALES2. The old version will still be there under the old name, SALES. The new version will be under the name, SALES2.

The ERASE CHT (122) command removes the chart from the disk.

ENTER COMMAND: **122** <Return>   Erase chart

CHART NAME: **SALES** <Return>

Chapter 8

Statistical Commands
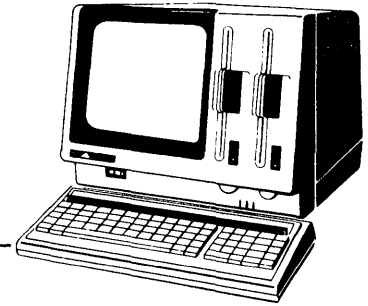
GraphPlan has built-in commands for doing statistical analysis. You can use these commands to analyze trends in forecasts, product sales, or to calculate means, standard deviations, and variances. To see the statistical commands on your screen, enter command **12** and <Return>.

Building a Product Analysis Table

Let's go through a product trend analysis based on sales data for the past five years to see how we can do a forecast for the next three years. First, set up a table reflecting the history of three products using the following data:

	1975	1976	1977	1978	1979	1980
PRODUCT A	95	110	129	148	171	190
PRODUCT B	120	110	115	125	115	120
PRODUCT C	170	155	150	138	122	125
TOTAL SALES	385	375	394	411	408	435

Select command 114 to reset the table.

Use the following commands to enter row and column descriptions.

ENTER COMMAND: **20**   <Return>   Enter row title
   ROW TITLE: **PRODUCT A**   <Return>
   ROW TITLE: **PRODUCT B**   <Return>
   ROW TITLE: **PRODUCT C**   <Return>
   ROW TITLE: **TOTAL SALES**   <Return>
   This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command.

ENTER COMMAND: **25** <Return>   Enter column title

COL TITLE 1: **1975** <Return>

COL TITLE 2:   <Return>

The second <Return> indicates that there is no title for the second line and tells MicroPlan to skip the second column title line.

COL TITLE 1: **1976** <Return> <Return>

COL TITLE 1: **1977** <Return> <Return>

COL TITLE 1: **1978** <Return> <Return>

COL TITLE 1: **1979** <Return> <Return>

COL TITLE 1: **1980** <Return> <Return>

This is the last row title, so press the <CANCEL> key to cancel the COL TITLE command.

Select command 36 (GOTO), row 1, column 1.

Now, enter data for each row of the table using the data from the chart above.

ENTER COMMAND: **30** <Return>   Data entry

VALUE: **95** <Return>

Value for row 1, column 1.

VALUE: **110** <Return>

Value for row 1, column 2.

VALUE: **129** <Return>

VALUE: **148** <Return>

VALUE: **171** <Return>

VALUE: **190** <Return>

This is the last value, so press the <CANCEL> key to cancel the data entry command.

Use the ENTRY (30) command to complete the rest of the table with the data for Product B and Product C below.

	1975	1976	1977	1978	1979	1980
PROD B	120	110	115	125	115	120
PROD C	170	155	150	138	122	125

When your data entry is complete, press the <CANCEL> key to get out of the data entry mode. Next, use the SUM (55) command to sum the data for Products A, B, and C (rows 1 through 3). The results should go in row 4, TOTAL SALES. Position the cursor on row 4.

ENTER COMMAND: **55** <Return>   Sum
   ROW BEGIN (1-50): **1** <Return>
   END (1-50): **3** <Return>

Your screen will show the following table of columns 2 through 6.

```
                    MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
          ROW 5  ·-
ENTER COMMAND:
                  1976     1977     1978     1979     1980   1 format:
ROW                                                          2 data:
         ──────── 2 ── ── 3 ── ── 4 ── ── 5 ── ── 6 ──      3 math:
1   PRODUCT A    110.0    129.0    148.0    171.0    190.0   4 graphics:
2   PRODUCT B    110.0    115.0    125.0    115.0    120.0   5 print:
3   PRODUCT C    155.0    150.0    138.0    122.0    125.0   6 status:
4   TOTAL SALES  375.0    394.0    411.0    408.0    435.0   7 HELP
5                                                            8
6                                                            9 STOP
7                                                           10 utility:
8                                                           11 sort:
9                                                           12 stats:
10                                                          13
11                                                          14
12                                                          15
13              ı                                           16 format:
14                                                          17 INSERT
15                                                          18 DELETE
16                                                          19   rows:
17                                                          20 ROW TITLE
```

Some facts are evident immediately, just from looking at the table. For example, total sales have been improving with time. Sales of Product A are increasing, while sales of Product C are declining. Sales of Product B are wobbling up and down. Let's continue with some analysis.

Set the column range, enter 93 for columns 1 through 6.

Looking at Trends

MicroPlan has various statistical commands that simplify trend analysis. For example, let's analyze the percentage growth and change from year to year for Products A, B, and C by adding the following lines. Move your cursor to row 5, then:

ENTER COMMAND: 20 <Return>   Enter row title

   ROW TITLE: % **GROWTH A** <Return>

   Row title for row 5.

   ROW TITLE: % **GROWTH B** <Return>

   Row title for row 6.

   ROW TITLE: % **GROWTH C** <Return>

   ROW TITLE: **CHANGE A** <Return>

   ROW TITLE: **CHANGE B** <Return>

   ROW TITLE: **CHANGE C** <Return>

   This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command. Make sure the cursor is positioned on row 5.

ENTER COMMAND: 132 <Return>   Percentage growth

   PERIODS (1–12): 1 <Return>

   ROW (1–50): 1 <Return>

Do the percentage growth rates for Product B.

ENTER COMMAND: 132 <Return>   Percentage growth

   PERIODS (1–12): 1 <Return>

   ROW (1–50): 2 <Return>

Percentage growth rates for Product C.

ENTER COMMAND: **132** <Return>   Percentage growth

   PERIOD (1–12); **1** <Return>

   ROW (1–50): **3** <Return>

Looking at rows 5, 6, and 7, we can see how each year's sales compare to the year before. Product A seems to be growing at about 15% per year, but grew less than that in 1980. Product B seems to be showing an erratic pattern. Product C seems to run steady in 1980.

We can get yet another view of the trend by using the DELTA (131) command. The DELTA command calculates the difference between one period and another. Put your cursor on row 8, then use the following commands.

ENTER COMMAND: **131** <Return>

The DELTA command calculates the change in your values from period to period.

   PERIODS (1–12): **1** <Return>

   Calculate the change in values over one time period.

   ROW (1–50): **1** <Return>

The DELTA calculation for Product A is shown in row 8. Do the same analysis for Products B and C as follows.

ENTER COMMAND: **131** <Return>

DELTA calculations for Product B.

   PERIODS (–12): **1** <Return>

   ROW (1–50): **2** <Return>

ENTER COMMAND: **131** <Return>

DELTA calculations for Product C.

   PERIODS (1–12): **1** <Return>

   ROW (1–50): **3** <Return>

Your screen will show the following columns 2 through 6:

```
                    MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
        ROW 11   · —
ENTER COMMAND:
                 1976     1977     1978     1979     1980   1 format:
ROW                                                         2 data:
———————————— 2 —— ——3—— ——4—— ——5—— ——6—— 3 math:
1  PRODUCT A    111.0   129.0   148.0   171.0   190.0   4 graphics:
2  PRODUCT B    111.0   115.0   125.0   115.0   120.0   5 print:
3  PRODUCT C    155.0   150.0   138.0   122.0   125.0   6 status:
4  TOTAL SALES  375.0   394.0   411.0   408.0   435.0   7 HELP
5  '⁄ GROWTH A   15.8    17.3    14.7    15.5    11.1   8
6  '⁄ GROWTH B   -8.3     4.5     8.7    -8.0     4.3   9 STOP
7  '⁄ GROWTH C   -8.8    -3.2    -8.0   -11.6     2.5  10 utility:
8  CHANGE A      15.0    19.0    19.0    23.0    19.0  11 sort:
9  CHANGE B     -10.0     5.0    10.0   -10.0     5.0  12 stats:
10 CHANGE C     -15.0    -5.0   -12.0   -16.0     3.0  13
11                                                     14
12                                                     15
13                                                     16 format:
14                                                     17 INSERT
15                                                     18 DELETE
16                                                     19   rows:
17                                                     20 ROW TITLE
```

The actual increase, in real dollar terms, of Product A has been reasonably steady. You might expect an increase of an other 15–20 units in 1981. Product B is again hard to predict, but Product C is worth studying. Perhaps there is a reason for the recent improvement in sales.

Moving Averages

GraphPlan has additional commands that let you further analyze your sales trends. The MOV AVG (133) command produces an average for as many years as needed. You can apply the moving average command to each of the three products in the Product Analysis table. Use the ROW TITLE (20) command to add the following row titles. Your cursor should be on row 11.

ENTER COMMAND: **20** <Return>   Row titles

   ROW TITLE: **6-YR AVG % A** <Return>

   Title for row 11.

   ROW TITLE: **3-YR AVG % A** <Return>

   ROW TITLE: **2-YR AVG % A** <Return>

   ROW TITLE: **2-YR AVG % B** <Return>

   ROW TITLE: **2-YR AVG % C** <Return>

   This is the last row title, so press the <CANCEL> key to cancel the ROW TITLE command.

Now let's go back to row 11 and do moving averages for Product A using three different time periods. Make sure your cursor is on row 11, then use the following commands.

ENTER COMMAND: **133** <Return>   Moving average

   PERIODS (1–12): **6** <Return>

   Calculate moving average over six time periods.

   ROW (1–50): **5** <Return>

   Calculate moving average using data from row 5.

ENTER COMMAND: **133** <Return>   Moving average

   PERIODS (1–12): **3** <Return>

   ROW (1–50): **5** <Return>

ENTER COMMAND: **133** <Return>   Moving average

    PERIODS (1–12): **2** <Return>

    ROW (1–50): **5** <Return>

Looking at the moving average in the table, you might decide that the two-year moving average is the most important. This is strictly a judgement call. Continue to do two-year moving averages for Products B and C, using the following commands.

ENTER COMMAND: **133** <Return>   Moving average

    PERIODS: **2** <Return>

    ROW (1–50): **6** <Return>

    Compute the moving average for row 6 (Product B) over 2 time periods.

ENTER COMMAND: **133** <Return>   Moving average

    PERIODS: **2** <Return>

    ROW (1–50): **7** <Return>

    Compute the moving average for row 7 (Product C) over 2 time periods.

Columns 2 through 6 of your table will show the following:

```
                    MODE=NORMAL  ORDER=R/C  ROW=1-50  COL=1-20
         COL 2 (1976 ) <-
ENTER COMMAND:
                  1976    1977    1978    1979    1980   1 format:
ROW                                                      2 data:
  ─────────────── ─2── ─3──  ─4──  ─5──  ─6──  3 math:
1  PRODUCT A       110.0   129.0   148.0   171.0   190.0  4 graphics:
2  PRODUCT B       110.0   115.0   125.0   115.0   120.0  5 print:
3  PRODUCT C       155.0   150.0   138.0   122.0   125.0  6 status:
4  TOTAL SALES     375.0   394.0   411.0   408.0   435.0  7 HELP
5  % GROWTH A       15.8    17.3    14.7    15.5    11.1  8
6  % GROWTH B       -8.3     4.5     8.7    -8.0     4.3  9 STOP
7  % GROWTH C       -8.8     3.2    -8.0   -11.6     2.5 10 utility:
8  CHANGE A         15.0    19.0    19.0    23.0    19.0 11 sort:
9  CHANGE B        -10.0     5.0    10.0   -10.0     5.0 12 stats:
10 CHANGE C        -15.0    -5.0   -12.0   -16.0     3.0 13
11 6-YR AVG % A      0.0     0.0     0.0     0.0    12.4 14
12 3-YR AVG % A      0.0    11.0    15.9    15.8    13.8 15
13 2-YR AVG % A      7.9    16.5    16.0    15.1    13.3 16 format:
14 2-YR AVG % B     -4.2    -1.9     6.6     0.3    -1.8 17 INSERT
15 2-YR AVG % C     -4.4    -6.0    -5.6    -9.8    -4.6 18 DELETE
16                                                       19  rows:
17                                                       20 ROW TITLE
```

Remember, there is no single way to look at the past results. These are only suggestions. In rows 11 through 15, you are fishing for insight—looking for ways to improve the future forecast by understanding past results.

Additional Statistical Commands

If you are working with more massive data, for example 20 years of data rather than 5, you may want to use some other statistical attributes in your data.

The MEAN (135) command calculates the average values for a series of rows or columns. In our example, the MEAN command could give you the average sales for Products A, B, and C. The SIGMA (136) command calculates the standard deviation for a series of rows or columns. The MAX (141) and MIN (142) commands

give you the largest and smallest values in a series of rows or columns. The TOTAL (144) command adds up all values in a series to give you a total. TOTAL is similar to the SUM (55) command. In essence, these commands can give you a quick feeling for your data.

Many of GraphPlan's statistical commands enable you to do basic mathematical functions such as exponentials, logarithms, and variances. These commands perform their particular function on the rows or columns you specify through the command prompts. The results of each function will be placed in the row or column indicated by your cursor and data pointer. These commands are discussed further in the Command Reference Section.

Exponential Smoothing

In time trend forecasting, each historical value is given equal weight. It is often advisable, however, to give additional weight to more recent data. Data from 1979–1982, for example, may be more relevant to 1983–1986 forecasting than, say, data from 1970 to 1973. The SMOOTH (134) command assigns more weight to the most recent data.

In exponential smoothing, you can vary the weighing factor by specifying a smoothing constant as a percentage, from 0% to 100%. A higher percentage value assigns more weight to recent data. A smoothing constant expressed as 25%, for example, assigns more weight to recent data than a constant percentage of, say, 5%. In most cases, the smoothing factor should be between 5% and 25%.

Quarterly Forecasts and Seasonality

There is no reason that you have to put the years in columns and the forecast products in rows, unless it is convenient. Some models are better suited for running lengthwise. For example, you can do a quarterly interpretation of the Product Analysis table as shown in the table below.

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QUARTERLY FORECASTS
WITH SEASONALITY

	PRODUCT A	PRODUCT B	PRODUCT C
	—1—	—2—	—3—
1 1ST QTR 1979	26.5	17.1	19.4
2 2ND QTR 1979	33.8	22.7	26.5
3 3RD QTR 1979	51.1	32.2	34.7
4 4TH QTR 1979	59.6	43.0	41.4
5 1979 TOTAL	171.0	115.0	122.0
6 1ST QTR %	15.5	14.9	15.9
7 2ND QTR %	19.8	19.7	21.7
8 3RD QTR %	29.9	28.0	28.4
9 4TH QTR %	34.9	37.4	33.9
10 1ST QTR 1980	29.1	18.5	19.2
11 2ND QTR 1980	39.1	25.2	25.7
12 3RD QTR 1980	52.4	31.5	34.0
13 4TH QTR 1980	69.4	44.8	46.1
14 1980 TOTAL	190.0	120.0	125.0
15 1ST QTR %	15.3	15.4	15.4
16 2ND QTR %	20.6	21.0	20.6
17 3RD QTR %	27.6	26.3	27.2
18 4TH QTR %	36.5	37.3	36.9

19		1981 FORECAST		
20 1981 TOTAL		214.7	120.0	112.5
21 1ST QTR (15%)		32.2	18.0	16.9
22 2ND QTR (21%)		45.1	25.2	23.6
23 3RD QTR (27%)		58.0	32.4	30.4
24 4TH QTR (37%)		79.4	44.4	41.6

Notice that the 1979 and 1980 year totals are equal to those year totals in the previous Product Analysis table. The addition of quarterly data allows you to add seasonality components into your forecasts. To understand the seasonality pattern for Products A, B, and C, build the Quarterly Forecast table using the commands outlined below.

First, label the row and column titles using the ROW TITLE (20) and COL TITLE (25) commands. Next enter data for each product for each quarter using the ENTRY (30) command in rows 1 through 4. Use the TOTAL (144) command to calculate the 1979 year totals for each product as follows. Make sure the cursor is on row 5. Set the column range (93) to rows 1 through 3.

ENTER COMMAND: **144** <Return>   Total command
   ROW BEGIN (1–50): 1 <Return>
   END (1–50): **4** <Return>

Use the Formula (35) command to calculate each quarter's sales results as a percentage of the entire year's sales. Make sure your cursor is on row 6 then:

ENTER COMMAND: **35** <Return>   Formula
   :L1/L5*100

ENTER COMMAND: **35** <Return>   Formula
   :L2/L5*100

ENTER COMMAND: **35** <Return>   Formula

  :L3/L5*100

ENTER COMMAND: **35** <Return>   Formula

  :L4/L5*100

Use the same procedure to enter the data in rows 10 through 13, calculate the totals in row 14, and figure the ratios for the 1980 sales figures in rows 15 through 18.

At this point, you have identified seasonal sales patterns. Quarterly sales run about 15, 21, 27, and 37 percent, respectively, of annual totals. Unless there are reasons to assume a difference in 1981 sales figures.

The 1981 Quarterly Sales Forecast

To do the quarterly sales forecast for 1981, position your cursor on row 20 and enter the 1981 sales figures from the Product Analysis table with the following commands. Position your cursor on row 20.

ENTER COMMAND: **30** <Return>   Data entry

    VALUE: **214.7** <Return>

    1981 forecast for Product A.

    VALUE: **120** <Return>

    1981 forecast for Product B.

    VALUE: **112.5** <Return>

    1981 forecast for Product C.

    This is the last value to be entered, so press the <CANCEL> key to cancel the ENTRY command.

GraphPlan has several different ways to produce a percentage breakdown like the one in rows 21 through 24. One simple way is to use the MULT K (53) command to multiply each value by a constant number as follows:

ENTER COMMAND: **53** <Return>

    VALUE: **.15** <Return>

    ROW (1–50): **20** <Return>

Multiply row 20 by .15 and put the results in row 21.
Continue with this command (53) through row 24 using the percentage from the row title.

Correlation

Sometimes sales analysis unlocks some short cuts. Occasionally you may discover that your sales figures follow some easily estimated or readily available statistics. For example, in the table below, you might be having trouble understanding the up and down performance of Product 100.

```
                          MODE=NORMAL  ORDER=R/C  ROW =1-50 ,COL=1-20
          ROW 1 (PRODUCT 100)  <-
ENTER COMMAND:
ROW               YEAR 1    YEAR 2   YEAR 3    YEAR 4    YEAR 5   1 format:
───────────────   — 1 —    —2—     —3—      —4 —     — 5 —   3 math:
1 PRODUCT 100        75.0     100.0    125.0     100.0      75.0   4 graphics:
2                                                                  5 print:
3 INDUSTRY SALE  50,000.0 60,000.0 75,000.0 65,000.0 55,000.0   6 status:
4 HOUSING START   2,000.0  1,700.0  1,400.0  1,750.0  1,950.0   7 HELP
5 EXPERT FORECA  55,000.0 70,000.0 90,000.0 80,000.0 60,000.0   8
6                                                                  9 STOP
7 (L1/L3)*1000       1.5      1.7      1.7      1.5       1.4 10 utility:
8 (L1/L4)*1000      37.5     58.8     89.3     57.1      38.5 11 sort:
9 (L1/L5)*1000       1.4      1.4      1.4      1.3       1.3 12 stats:
10                                                               13
11                                                               14
12                                                               15
13                                                               16 format:
14                                            \                  17 INSERT
15                                                               18 DELETE
16                                                               19  rows:
17                                                               20 ROW TITLE
```

Looking for clues to Product 100, you might find a trade magazine that lists several sets of number. One set of numbers tracks the whole industry's sales, another tracks housing starts, and a third presents a well-known industry expert's forecast for the whole market. The three sets of numbers are shown above in rows 3 through 5.

With these numbers on the screen, you begin to see a relationship between the industry total sales and your Product 100 sales. Product 100 seems to go up and down with the industry.

This kind of relationship is called "correlation". Sophisticated econometric models are based upon observed correlations between different market factors. When the correlation between two different factors is good enough, statistical analysis can produce a numerical formula that relates one to the other. If the sales of your company are correlated to housing starts or some other well-known indicator, you may be able to forecast your own sales by using a published forecast of that indicator, and multiplying it or dividing it by a single number.

Even without statistical analysis, some correlations become clear almost immediately. You might try, for example, laying out the data as shown in the table above. You can then look for possible indicators that move up and down with your sales.

In the example above, a simple formula was used to show how the industry sales and housing starts relate to Product 100. Past sales are divided by each factor and then multiplied by 1000 to make the relationship easier to read. The row title includes the formula used. There is no particular magic to this kind of formula. You can multiply or divide the rows, as necessary, looking for an easy way to read the relationship.

Using this kind of information provides a good first step on the way to a sound forecast. For example, looking at the table above, let's assume that the industry sales forecast went as follows:

	—6—	—7—	—8—	—9—
INDUSTRY SALES	70,000	90,000	100,000	90,000

In this case, knowing the above numbers would give you a clue to your own sales. Looking back at your formula, your sales, divided by industry sales and multiplied by 1000, are likely to land within some predictable range. This is true because of simple algebra:

(your sales/industry sales) * 1000 = (roughly) 1.5

(your sales) = (industry sales * 1.5)/1000

So that in the year 6 you would expect to sell approximately:

(your sales) = (70,000 * 1.5)/1000 = 105

Using GraphPlan, you can enter the industry sales forecast into one row of your model. This is probably a trial row, used as a point of reference. It is seldom a forecast in itself.

You can use the FORMULA (35) command to make a row that is equal to the industry sales forecast times 1.5, divided by 1000 using the following steps:

ENTER COMMAND: **33** <Return>   Select row 10
   ROW (1–50): **11** <Return>

ENTER COMMAND: **35** <Return>   Formula
   :**(L3*1.5)/1000** <Return>

This formula gives you the first indication of a possible forecast, which appears in line 10 of the report below.

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FUNDAMENTALS OF CORRELATION
SAMPLE REPORT

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
	—1—	—2—	—3—	—4—	—5—
1 PRODUCT 100	75.0	100.0	125.0	100.0	75.0
3 INDUSTRY SALES	50,000.0	60,000.0	75,000.0	65,000.0	55,000.0
4 HOUSING STARTS	2,000.0	1,700.0	1,400.0	1,750.0	1,950.0
5 EXPERT FORECAST	55,000.0	70,000.0	90,000.0	80,000.0	60,000.0
7 (L1/L2)*1000	1.5	1.7	1.7	1.5	1.4
8 (L1/L3)*1000	37.5	58.8	89.3	57.1	38.5
9 (L1/L4)*1000	1.4	1.4	1.4	1.3	1.3

	YEAR				
	—6—	—7—	—8—	—9—	—10—
10	FUTURE FORECAST FOR PRODUCT 100				
11 REFERENCE	105.0	135.0	150.0	135.0	0.0

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Chapter 9

Ranking & Sorting
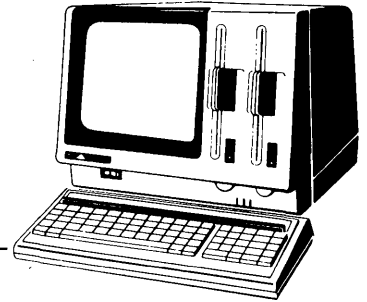
This chapter describes how to use the RANK and SORT commands in GraphPlan. The rank and sort features let you manipulate entire tables or the data within the tables, depending on the numeric value or depending on the row and column titles.

How to Use RANK

Suppose you have already created a table in which you wish to use the RANK (72) command. This means the table already has row and column titles and data values. For example, the following table for "Fortune 500 Companies" shows sales for one year. The row titles are the names of Fortune 500 companies and the columns show the sales in hundreds of thousands of dollars for the year and the percentage increase over the year 1977.

Create a table as shown on the next page.

Now let's add a new column in the table, using the COL TITLE (25) command and call it "Rank". This is where the column rankings will be placed.

Now your screen should look like this:

	FORTUNE 500 COMPANIES		
	SALES ($000.000)	% CHGE 1977	RANK
1 GENERAL MOTORS	63221.0	15.0	0.0
2 EXXON	60335.0	11.3	0.0
3 FORD MOTOR	42784.0	13.1	0.0
4 A T & T	40993.0	12.3	0.0
5 MOBIL	34736.0	8.1	0.0
6 IBM	21076.0	16.2	0.0
7 GENERAL FOODS	5376.0	9.5	0.0
8 RALSTON PURINA	4058.0	8.0	0.0
9 CONTINENTAL CORP	3059.0	10.3	0.0
10 CBS	3242.0	16.8	0.0

The next step is to set the column range for columns 1 through 3 and set the row range for rows 1 through 10 so only those columns and rows are affected. Use commands COLUMN RANGE (93) and ROW RANGE (92) to set the ranges.

To rank the first column, "Sales", and place the ranking in column 3, you first place the cursor in column 3.

ENTER COMMAND: **72** <Return>   Rank
   COL # (OR USE ROW TITLE =CR): **1** <Return>
   DESCENDING =0, ASCENDING = 1 (0–1): **0** <Return>

The sequence of responses shown above causes GraphPlan to search through the data values in Column #1 (titled "Sales") and identify the cell with the greatest value. This value will have the lowest ranking number, rank number 1. GraphPlan then looks for the next highest data value and gives it number 2, and so on.

The ranking takes place quickly, and the rankings appear in column 3. GraphPlan then moves the cursor to column 4 for the next command.

Your screen should look like this:

	FORTUNE 500 COMPANIES		
	SALES ($000.000)	% CHGE 1977	RANK
1 GENERAL MOTORS	63221.0	15.0	1.0
2 EXXON	60335.0	11.3	2.0
3 FORD MOTOR	42784.0	13.1	3.0
4 A T & T	40993.0	12.3	4.0
5 MOBIL	34736.0	8.1	5.0
6 IBM	21076.0	16.2	6.0
7 GENERAL FOODS	5376.0	9.5	7.0
8 RALSTON PURINA	4058.0	8.0	8.0
9 CONTINENTAL CORP	3059.0	10.3	10.0
10 CBS	3242.0	16.8	9.0

Let's try the same command again, but using "ascending" for the ranking nstruction instead of "descending" and using column 2 for the data to be ranked. Move the cursor to column 3 for the new ranking figures.

ENTER COMMAND: **72** <Return>   Rank
   COL # (OR USE ROW TITLE = CR): **2** <Return>
   DESCENDING = 0, ASCENDING = 1 (0-1): **1** <Return>

Since "ascending" has been selected, GraphPlan will sequence the data values in column 2 in ascending order. The lowest value, or first value in the sequence will have a ranking value of 1. The next value in the sequence will have a ranking value of 2, and so on. In this example, the lowest data value in the table is in row 8, which has a value of 8.0. The screen now looks like this:

	FORTUNE 500 COMPANIES		
	SALES ($000.000)	% CHGE 1977	RANK
1 GENERAL MOTORS	63221.0	15.0	8.0
2 EXXON	60335.0	11.3	5.0
3 FORD MOTOR	42784.0	13.1	7.0
4 A T & T	40993.0	12.3	6.0
5 MOBIL	34736.0	8.1	2.0
6 IBM	21076.0	16.2	9.0
7 GENERAL FOODS	5376.0	9.5	3.0
8 RALSTON PURINA	4058.0	8.0	1.0
9 CONTINENTAL CORP	3059.0	10.3	4.0
10 CBS	3242.0	16.8	10.0

A review of the ranking in column 3 shows that row 8, "Ralston Purina", which has a value of 8.0, has the lowest rank (rank = 1). The highest rank identifies the "CBS" line (rank = 10) with a value of 16.8.

Ranking by rows is done in a similar manner. Assume that you need to rank using row mode and your table contains products and quarterly production as follows:

```
=============================================================================
                        ABC CORPORATION
                   SALES PROJECTIONS  (000s)

                        1Q         2Q         3Q        4Q      YEAR
                      UNITS      UNITS      UNITS     UNITS     TOTAL
           -----------------------------------------------------------
1 PRODUCT A           100.0      115.0      132.2     152.1    499.3
2 PRODUCT B           100.0      101.0      102.0     103.0    406.0
3 PRODUCT C           100.0      115.0      130.0     145.0    490.0
4 PRODUCT D            10.0       11.0       12.0      13.0     46.0
5
6
7
8
9
10
11
12 TOTAL              310.0      342.0      376.2     413.1   1441.3
=============================================================================
```

This time instead of creating a column title "Rank", you create a row title "Rank" and place the row title in row 15, which was previously blank. This is the row where GraphPlan will place the rankings for the comparisons between columns. Set the row range for the table for rows 1 through 5 using the ROW RANGE (92) command. Then set the column range for columns 1 through 4 using COLUMN RANGE (93).

The next two examples show how to rank by row in both ascending and descending order. Suppose you wish to rank the columns based on the value or row 12, the "Total" row. The ranking values are to be placed in row 15, which is titled "Rank". The cursor should remain in row 15.

ENTER COMMAND: **72** <Return>   Rank
   ROW # (OR USE COL TITLE = CR): **12** <Return>
   DESCENDING = 0, ASCENDING = 1 (0-1): **0** <Return>

Since "descending" was specified, GraphPlan will identify the highest data value in row 12 ("Total"), which is the total for column "4Q". This total value receives a ranking value of 1. The next highest value ("3Q") receives a rank of 2, and so on. Notice that the data values in the table have not been disturbed, and the ranking values have been inserted by GraphPlan into the proper row. The screen now looks like this:

```
                     ABC CORPORATION
                 SALES PROJECTIONS  (000s)

                  1Q        2Q        3Q        4Q      YEAR
                 UNITS     UNITS     UNITS     UNITS    TOTAL

 1 PRODUCT A     100.0     115.0     132.2     152.1   499.3
 2 PRODUCT B     100.0     101.0     102.0     103.0   406.0
 3 PRODUCT C     100.0     115.0     130.0     145.0   490.0
 4 PRODUCT D      10.0      11.0      12.0      13.0    46.0
 5
 6
 7
 8
 9
10
11
12 TOTAL        310.0     342.0     376.2     413.1  1441.3
13
14
15 RANK           4.0       3.0       2.0       1.0     0.0
```

If you select "ascending", you use the following command sequence:

ENTER COMMAND: **72** <Return>   Rank
    ROW # (OR USE COL TITLE = CR): **12** <Return>
    DESCENDING = 0, ASCENDING = 1 (0–1): **1** <Return>

Selecting "ascending" causes GraphPlan to find the lowest value in row 12 (Total) and give it a ranking of 1. Thus the value in "1Q" receives a ranking of 1. The next largest number, which is in "2Q", receives a ranking value of 2, and so on. These ranking values are placed in row 15 under "Rank". Now your screen looks like this:

ABC CORPORATION
SALES PROJECTIONS   (000s)

	1Q UNITS	2Q UNITS	3Q UNITS	4Q UNITS
1 PRODUCT A	100.0	115.0	132.2	152.1
2 PRODUCT B	100.0	101.0	102.0	103.0
3 PRODUCT C	100.0	115.0	130.0	145.0
4 PRODUCT D	10.0	11.0	12.0	13.0
5				
6				
7				
8				
9				
10				
11				
12 TOTAL	310.0	342.0	376.2	413.1
13				
14				
15 RANK	1.0	2.0	3.0	4.0

GraphPlan can also sort in ascending or descending order based on alphabetic characters instead of numbers. To do this, simply press <Return> (indicated as "CR" in the command prompt on the screen) instead of indicating a row or column number. For example, suppose the cursor is in row 15 and you wish to rank by column title.

ENTER COMMAND: **72** <Return>
   ROW # (OR USE COL TITLE = CR): <Return>
   DESCENDING = 0, ASCENDING = 1 (0–1): **0** <Return>

This causes GraphPlan to find the column title with the "highest value" and give it a ranking of 1. The next highest receives a ranking of 2, and so on. When GraphPlan ranks titles alphabetically, alpha characters are ranked higher than numeric characters. Your screen now looks like this:

```
                         ABC CORPORATION
                    SALES PROJECTIONS   (000s)

                       1Q         2Q         3Q         4Q
                     UNITS      UNITS      UNITS      UNITS

1 PRODUCT A          100.0      115.0      132.2      152.1
2 PRODUCT B          100.0      101.0      102.0      103.0
3 PRODUCT C          100.0      115.0      130.0      145.0
4 PRODUCT D           10.0       11.0       12.0       13.0
5
6
7
8
9
10
11
12 TOTAL             310.0      342.0      376.2      413.1
13
14
15 RANK                4.0        3.0        2.0        1.0
```

To rank row titles, you use the RANK command in a similar manner, placing the cursor in column mode. You leave the cursor in the column that is to receive the ranking information.

How to Use SORT

So far, you have seen the ranking capabilities of GraphPlan which let you rank rows or columns of your table according to the data values in the table or according to the row or column titles. This is useful if you wish to obtain a ranking only and leave the data in the table undisturbed. If you need to rearrange the table itself and sort all the data in the table or data in certain rows and columns, you can do so by using command SORT (71).

For instance, suppose your table of products and quarterly production looks like this:

	1Q UNITS	2Q UNITS	3Q UNITS	4Q UNITS	YEAR TOTAL
ABC CORPORATION SALES PROJECTIONS (000s)					
1 PRODUCT A	100.0	115.0	132.2	152.1	499.3
2 PRODUCT B	100.0	101.0	102.0	103.0	406.0
3 PRODUCT C	100.0	115.0	130.0	145.0	490.0
4 PRODUCT D	10.0	11.0	12.0	13.0	46.0
5					
6 TOTAL	310.0	342.0	376.2	413.1	1441.3

To sort the rows, first set the row range for rows 1 through 4 and column range for columns 1 through 4. Then place the cursor in column 1 and use the SORT command as follows:

ENTER COMMAND: **71** <Return>   Sort
    COL # (OR USE ROW TITLE = CR): <Return>
    DESCENDING = 0, ASCENDING = 1 (0–1): **0** <Return>

The table will be sorted by row title and all the data associated with each row will be moved as well. Your screen now looks like this:

	1Q UNITS	2Q UNITS	3Q UNITS	4Q UNITS	YEAR TOTAL
ABC CORPORATION					
SALES PROJECTIONS (000s)					
1 PRODUCT D	10.0	11.0	12.0	13.0	46.0
2 PRODUCT C	100.0	115.0	130.0	145.0	490.0
3 PRODUCT B	100.0	101.0	102.0	103.0	406.0
4 PRODUCT A	100.0	115.0	132.3	152.1	499.3
5					
6 TOTAL	310.0	342.0	376.2	413.1	1441.3

Put the table back into its previous order by using the SORT command and selecting "ascending" order.

Sorting by column titles is similar. First, put the cursor in row mode. To rearrange the table so that the column titles are in descending order, set the column range (93) for columns 1 to 4 and row range (92) to rows 1 to 6. The top line of your screen should look like this:

Mode = normal order = R/C Row = 1-6 Col = 1-4

To sort the table by column title, use the following command sequence:
Be in Row Mode

ENTER COMMAND: **71** <Return>   Sort
ROW # (OR USE COL TITLE = CR): <Return>
DESCENDING = 0, ASCENDING = 1 (0-1): **0** <Return>

Your screen now looks like this:

```
                           ABC CORPORATION
                    SALES PROJECTIONS   (000s)

                     4Q        3Q        2Q        1Q      YEAR
                    UNITS     UNITS     UNITS     UNITS    TOTAL

1 PRODUCT A         152.1     132.3     115.0     100.0    499.3
2 PRODUCT B         103.0     102.0     101.0     100.0    406.0
3 PRODUCT C         145.0     130.0     115.0     100.0    490.0
4 PRODUCT D          13.0      12.0      11.0      10.0     46.0
5
6 TOTAL             413.1     376.2     342.0     310.0   1441.3
```

The SORT command works similarly when you are sorting by data values. For example, assume your table is back in its original order. Repeat with ascending order. Now, instead of sorting by row or column title in the table you can determine the sort by the data values in a row or column of the table. Let's sort the data based on the data in column "3Q" of the original table as shown on page 9-9. The sort will be done in ascending order. By inspection, you would expect "Product D" to be first, since it has the lowest value, and "Product A" would be last. This is how GraphPlan does the sort:

Set the row range (92) to rows 1 to 4.

Place the cursor in column mode.

ENTER COMMAND: **71** <Return>   Sort

   COL # (OR USE ROW TITLE = CR): **3** <Return>

   DESCENDING = 0, ASCENDING = 1 (0-1): **1** <Return>

Your screen now loks like this:

	1Q UNITS	2Q UNITS	3Q UNITS	4Q UNITS	YEAR TOTAL
ABC CORPORATION					
SALES PROJECTIONS (000s)					
1 PRODUCT D	10.0	11.0	12.0	13.0	46.0
2 PRODUCT B	100.0	101.0	102.0	103.0	406.0
3 PRODUCT C	100.0	115.0	130.0	145.0	490.0
4 PRODUCT A	100.0	115.0	132.3	152.1	499.3
5					
6 TOTAL	310.0	342.0	376.2	413.1	1441.3

If you wish to sort the table based on data from a row, you first put the cursor in row mode. For example, let's select the first row, containing the data for "Product D", and use it to order the columns in descending order.

ENTER COMMAND: **71** <Return>   Sort

   ROW # (OR USE COL TITLE = CR): **1** <Return>

   DESCENDING = 0, ASCENDING = 1 (0–1): **0** <Return>

After the reordering, the screen looks like this:

```
                          ABC CORPORATION
                      SALES PROJECTIONS  (000s)

                      4Q        3Q        2Q        1Q      YEAR
                     UNITS     UNITS     UNITS     UNITS    TOTAL
_____
1 PRODUCT D          13.0      12.0      11.0      10.0      46.0
2 PRODUCT B         103.0     102.0     101.0     100.0     406.0
3 PRODUCT C         145.0     130.0     115.0     100.0     490.0
4 PRODUCT A         152.1     132.3     115.0     100.0     499.3
5
6 TOTAL             413.1     376.2     342.0     310.0    1441.3
```

In summary, the RANK and SORT commands allow you to:

1. Assign a ranking to rows and columns of data within a table and to the descriptions used in the table.
2. Sort the table itself based on data values or row and title descriptions.

By controlling the row and column ranges of the table (using the ROW RANGE (92) and COL RANGE (93) commands), you can control the amount of data you rank or sort.

SECTION III

Command Reference
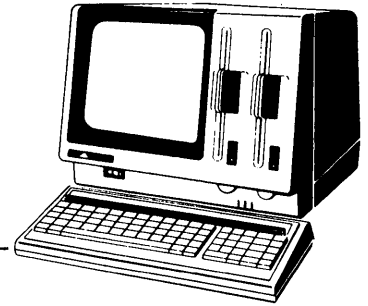
The Command Reference Section is a convenient, quick reference that provides you with a detailed explanation for each GraphPlan command. The reference section outlines the prompts and defaults associated with each command. In addition, the command reference section will help you locate related information in the preceding tutorial sections.

How to use this Reference

The GraphPlan commands are organized by their menu grouping. The command number, command name, screen prompts, defaults, and a description are given for each command.

GraphPlan memorizes your commands for "what-if" analysis. In the NORMAL mode, commands are stored in your table logic for recalculation.

Throughout this section, the notation **T** means this command can be stored in your tables.

Main Menu

1 format:

Display format commands: enter row and column titles, set row and column print options, look at options, insert and delete rows and columns, and reorder rows and columns. (Page 10-3)

2 data:

Display data entry commands: enter data, select row and column modes, fix, nullify, and go to commands. (Page 10-7)

3 math:

Display math commands: arithmetic functions, formula, plug, cumulate, negate, get, ceiling, floor, and row and column summation commands. (Page 10-10)

4 graphics:

Display graphing commands: display charts, select rows or columns for graphics, display chart options menus, print and plot charts. (Page 10-15)

5 print:

Display print commands: set report titles and options, and print reports, and send reports to printer or disk files. (Page 10-19)

6 status:

Display status commands: range settings, mode selection, and computing order. (Page 10-23)

7 HELP

WHICH COMMAND (1–200):

Gives brief on-screen description for each command by entering command number or command alpha code. Description will appear at the bottom of the screen. (Page 1-12)

9 STOP

OK TO ERASE CURRENT DATA?
VERIFY (Y OR N):

Exit to operating system. The current table logic, if any, is **NOT** automatically saved. (Page 1-14)

10 utility:

Display utility commands: save and load tables and charts, enlarge table size, select drive, reset, and redisplay screen. (Pages 10-24)

FILE 22-C/CONTINUED/10-3

11   sort:

Display sort and rank commands: rank data and row/column titles in ascending or descending order. Sort table by data values and row/column titles in ascending or descending order. (Page 10-18)

12   stats:

Display statistical commands: delta, mean, variance, standard deviation, logarithms, exponentials, minimums and maximums, moving averages, exponential smoothing, and powers. (Page 10-29)

Format Commands

16   format:

Display format commands: enter row and column titles, set row and column print options, look at options, insert and delete rows and columns, and reorder rows and columns.

17   INSERT

Insert row or column by moving last row/column of the current table to the row or column indicated by the data pointer. Any logic reference is automatically maintained. (Pages 3-14 – 3-15)

18   DELETE

   VERIFY (Y OR N):

Delete row or column indicated by the data pointer by moving it to the last row or column of the current table. Requires positive verification before deleting. Any logic reference is automatically maintained. (Page 3-15)

19   rows:

Row section of format commands.

20 ROW TITLE

Use cursor keys to select a row (UP, DOWN, CANCEL)

Enter or change row titles. Each title entered is placed in the row indicated by the data pointer. Continues prompting for sequential titles until command is cancelled. Use cursor keys to select the desired row.

Can enter up to 40 characters for each row title. The quote mark (") is an illegal character and should not be used in row title descriptions. Notice that if you have more than 15 characters, in your row title, the description will be truncated on the screen to the 15 character default. Use the SET CRT (86) command to adjust the screen format. The entire row description will be remembered for use in printing. Notice that row titles may be truncated on charts. (Pages 1-12, 2-2, 3-7, 7-5, 8-1, 8-4, 8-7).

21 SET TYPE

ROW (1–50):

TYPE (DATA = 0, SUBT = 1, HEAD = 2, NOTE = 3, OMIT = 4):
  Default 0

UNDERLINE (NO = 0, [-] = 1, [=] = 2, [__] = 3):
  Default 0

TRAILING BLANK LINES (NEW PAGE = 9):
Use this option to indicate page breaks in printed report
  Default 0

DECIMAL PLACES (0–3, OFF = 4):
  Default global setting (see OPTIONS (81) command)

FORMAT (NO = 0, [%] = 1, [$] = 2, NO, = 3):
Option 3 indicates no commas to be used in values.
  Default 0

Sets print specifications for designated row. Continues prompting for row numbers until command is cancelled. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. (Pages 5-1 – 5-4)

22   SHOW ROWS

Display the current print options and commands for each row shown on the screen. To display settings for rows not shown on the screen, move the screen to the desired location and re-enter SHOW ROWS (22) command. To recover original display, press any cursor key. To print these options and command logic, use the PRINT TBL (118) command. (Pages 2-9, 4-7 – 4-8, 5-5)

23   REORDER

   OLD NUMBER (1–50):   NEW NUMBER (1–50):

Move old row into position of new row and vice versa. Other rows will be adjusted as necessary. Used to swap, insert, or delete rows. Can also use INSERT (17) command or DELETE (18) command to insert or delete rows. Any logic reference is automatically maintained. (Page 3-15)

24   cols:

Column section of format commands.

25   COL TITLE

   1:
   2:
   Use cursor keys to select a column (RIGHT, LEFT, CANCEL)

Enter or change column titles. Each title entered is placed in the column indicated by the data pointer. Continues prompting for sequential titles until command is cancelled. Use the cursor keys to select a column.

Can enter up to 20 characters for each column title. Each line of the column title is automatically right justified in the column. The quote mark (") is an illegal character and should not be used in column titles. Notice that if you have more than 10 characters in your column title, the description will be truncated on the screen to the 10 character default. Use the SET CRT (86) command to adjust the screen format if desired. The entire column description will be remembered for use in printing. Notice that column titles may be truncated on charts. (Pages 2-4, 3-8, 7-6, 8-2)

26 SET TYPE

COLUMN (1–20):

COLUMN WIDTH (4–20):
   Default global setting (see OPTIONS (81) command)

DECIMAL PLACES (0–3, OFF = 4):
   Default global setting (see OPTIONS (81) command)

FORMAT (NO = 0, [%] = 1, [$] = 2, NO, = 3):
   Default 0

Set print specifications for designated column. Continues prompting for column numbers until command is cancelled. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. (Pages 5-1, 5-2, 5-6)

27 SHOW COLS

Display the current print options and commands for each column shown on the screen. To display settings for columns not shown on the screen, scroll the screen to the desired location and re-enter SHOW COL (27) command. To recover original display, press any cursor key. To print these options and command logic, use the PRINT TBL (118) command. (Pages 4-7, 5-7)

28 REORDER

OLD NUMBER (1-20):   NEW NUMBER (1-20):

Move old column into position of new column and vice versa. Other columns will be adjusted as necessary. Use to swap, insert, or delete rows. Can also use INSERT (17) command and DELETE (18) command to insert or delete columns. Any logic reference is automatically maintained. (Pages 3-15, 3-16)

Data Commands

29 data:

Display data entry commands: enter data, select row and column modes, fix, nullify, and go to commands.

30 ENTRY (T)

VALUE:

One step data entry for entering individual values, cell by cell. Use the cursor keys to select location of entry. Data can only be entered within current row and column ranges. Pressing <Return> instead of a specific value will repeat the last value entered. Action is the same as the VALUE ("0") option in the ENTER (31) command. (Pages 3-4, 3-10)

31 ENTER (T)

CHOOSE (VALUE = 0, CONSTANT = 1, GROW = 2, INCR = 3): **0**

VALUE:

Continues prompting for individual values within current row and column ranges until command is cancelled. Pressing <Return> will repeat last value entered. Same action as ENTRY (30) command.

or
CHOOSE (VALUE = 0, CONSTANT = 1, GROW = 2, INCR = 3): **1**

BASE VALUE:

Prompts for a base value. Same value will be entered for entire row or column within row and column ranges.

or
CHOOSE (VALUE = 0, CONSTANT = 1, GROW = 2, INCR = 3): **2**

BASE VALUE:

RATE:
Prompts for a base value and growth rate. Value will grow by percentage specified, within current row and column ranges.

or

CHOOSE (VALUE = 0, CONSTANT = 1, GROW = 2, INCR = 3): **3**

BASE VALUE:

RATE:

Prompts for a base value and amount of increase. Value will increase by rate specified for row or column within current row and column ranges.

Enter row or column values in table within current row and column ranges. Constant, grow, and increase options allow quick entry. Cursor keys allow individual data entry. Default value is the 0 option (VALUES). (Pages 2-6, 2-7, 3-1 – 3-3, 4-1, 4-15, 4-17)

32 CHANGE

ROW (1–50):   COLUMN (1–20):

VALUE:

Change a single value in the table. (Pages 2-11, 4-15, 7-4)

33 SELECT ROW

ROW (1–50):

Move the data pointer to a new row of the table and put GraphPlan into row mode. You may also use the up and down arrow cursor keys to move the data pointer. If you are in column mode, the down cursor arrow will put you in row mode. (Page 1-11)

34 SELECT COL

COLUMN (1–20):

Move the data pointer to a new column of the table and put GraphPlan into column mode. You may also use the left and right arrow cursor keys to move the data pointer. If you are in row mode, the right cursor arrow will put you in column mode. (Pages 1-11, 3-1)

END 22-D/NEC GRAPH/10-8

35 FORMULA (T)

Use a formula to calculate the results for a row or column. Depending on whether GraphPlan is in the row or column mode, formulas may reference a row or column (L), values (Vr,c) or positive constants. Negative numbers are not allowed in GraphPlan formulas except as an expression, (0–1 = –1). Formulas may contain arithmetic functions +, –, *, and /, and may be up to 40 characters long. Results are stored in the row or column indicated by the data pointer. (Pages 4-9, 4-11, 8.12)

36 GOTO

  ROW (1–50):   COLUMN (1–20):

Position the screen with designated row and column in the upper left corner of the display. GraphPlan will always display a full screen. Thus GOTO may also be used to display the last screenfull of the top right, bottom left, or bottom right of the table. For example, if you GOTO the first row number and the last column number of the table, GraphPlan displays the last full screen of the top right corner of the table. Cursor keys can also be used to move around the table. (Page 1-11)

37 PLUG (T)

  ROW (1–50):   COLUMN (1–20):

Use a formula to calculate results for a particular cell. Differs from the FORMULA command in that results are stored in the cell designated by the above prompts. PLUG formulas may reference table values (Vr,c) or positive constants. Negative numbers are not allowed except as an expression (0–1 = –1). PLUG formulas may contain arithmetic functions +, –, *, and /, and may be up to 40 characters long. PLUG formulas cannot reference a row or column.

Like other GraphPlan commands, the actual PLUG formula is stored in the row or column indicated by the data pointer and replaces any previous command associated with that row or column. You may elect to move the data pointer to an unused row or column before issuing the PLUG command. (Pages 4-9, 4-13, 4-14)

38   FIX R/C

Recompute only the current row or column, without computing other rows and columns. Use cursor keys or SELECT ROW or SELECT COL commands to move the data pointer to the row or column to be computed before using the FIX command. Similar to COMPUTE (98) command except it applies to a single row or column. (Page 7-5, 7-7)

39   NULLIFY (T)

    VERIFY (Y OR N):

Nullify a command associated with a row or column without affecting the data. Applies to the current row or column, designated by the data pointer. Use cursor keys or SELECT ROW or SELECT COL commands to move the data pointer to the right row or column before using NULLIFY. (Page 4-9)

Math Commands

40   math:

Display math commands: arithmetic functions, formulas, plug, cumulate, negate, get, floor, ceiling, and row and column summation commands. (Page 4-1)

41   ADD (T)

    ROW (1–50):   ROW (1–50):

    or
    COLUMN (1–20):   COLUMN (1–20):

Add one row or column of values to another row or column, and store the results in the row or column indicated by the data pointer. RESULT ← row/col 1 + row/col 2. (Page 4-2)

42   SUB (T)

    ROW (1–50):   ROW (1–50):

    or
    COLUMN (1–20):   COLUMN (1–20):

Subtract one row or column of values from another row or column. First prompt is for the row or column to subtract from. Second prompt asks for the row or column to subtract. In other words, row/col 1 (first prompt) minus row/col 2 (second prompt) equals the result. Store the results in the row or column indicated by the data pointer. RESULT ← row/col 1 − row/col 2. (Pages 2-8, 4-2)

43 MULT (T)

ROW (1–50):   ROW (1–50):

or
COLUMN (1–20):   COLUMN (1–20):

Multiply one row or column of values by another row or column, and store the results in the row or column indicated by the data pointer. RESULT ← row/col 1 * row/col 2. (Pages 3-11, 4-2)

44 DIV (T)

ROW (1–50):   ROW (1–50):

or
COLUMN (1–20):   COLUMN (1–20):

Divide one row or column of values by a second row or column, and store the results in the row or column indicated by the cursor and data pointer. RESULT ← row/col 1 / row/col 2. (Page 4-3)

45 NEGATE (T)

ROW (1–50):

or
COLUMN (1–20):

Negate a row or column of values and store the results in the row or column indicated by the data pointer. Positive values become negative and negative values become positive. Negative values are preceded by minus signs. RESULT ← − (row/col). (Page 4-3)

46 INVERSE (T)

ROW (1–50):

or
COLUMN (1–20):

Compute the inverse for a row or column of values and store the results in the row or column indicated by the cursor and data pointer. Values will be rounded to one decimal place on the screen unless otherwise set with the SET CRT (86). RESULT $\leftarrow$ 1/(row/col). (Page 4-3)

47 INTEGER (T)

ROW (1–50):

or
COLUMN (1–20):

Compute the integer part of a row or column of values by dropping the fractional portion of values and converting values to whole numbers. Results are stored in the row or column indicated by the data pointer. RESULT $\leftarrow$ INT(row/col). (Page 4-3)

48 ROUND (T)

ROW (1–50):

or
COLUMN (1–20):

Round a row or column of values to the nearest whole number and store the results in the row or column indicated by the cursor and data pointer. Number of decimal places can be changed on the screen using the SET CRT (86) command and can be changed on printed reports using the OPTIONS (81) or SET TYPE (21, 26) commands. RESULT $\leftarrow$ INT (row/col + 0.5). (Page 4-3)

49 CUMULATE (T)

    VALUE: ROW (1–50):

    or
    VALUE: COLUMN (1–20):

Compute cumulative sums for a row or column and store the results in the row or column indicated by the data pointer. Cumulate prompts for beginning value to accommodate a beginning balance. If there is no beginning value, enter "0" in response to the VALUE prompt. Use CUMULATIVE for ending balance calculations. $RESULT_t \leftarrow RESULT_{t-1} + row/col_t$. (Page 4-4)

50 ABSOLUTE (T)

    ROW (1–50):

    or
    COLUMN (1–20):

Compute the absolute value of a row or column and store the results in the row or column indicated by the cursor and data pointer. If a value is negative, the result is positive. If the value is positive the result is positive. $RESULT \leftarrow ABS(row/col)$. (Page 4-3)

51 ADD K(T)

    VALUE: ROW (1–50):

    or
    VALUE: COLUMN (1–20):

Add a constant value to a row or column and store the results in the row or column indicated by the cursor and data pointer. $RESULT \leftarrow row/col + value$. (Page 4-3)

52   SUB K (T)

VALUE: ROW (1–50):

or
VALUE: COLUMN (1–20):

Subtract a constant value from a row or column and store the results in the row or column indicated by the cursor and data pointer. RESULT ← row/col – value. (Page 4-3)

53   MULT K (T)

VALUE: ROW (1–50):

or
VALUE: COLUMN (1–20):

Multiply a row or column by a constant value and store the results in the row or column indicated by the data pointer. RESULT ← row/col * value. (Pages 2-6, 2-7, 4-3, 4-16, 8-14)

54   DIV K (T)

VALUE: ROW (1–50):

or
VALUE: COLUMN (1–20):

Divide a row or column by a constant value and store the results in the row or column indicated by the data pointer. RESULT ← row/col / value. (Page 4-3)

55   SUM (T)

ROW BEGIN (1–50):   END (1–50):

or
COLUMN BEGIN (1–20):   END (1–20):

Sum a consecutive series of rows or columns and store the results in the row or column indicated by the data pointer. RESULT ← SUM (row/col 1 THROUGH row/col 2). (Pages 2-8, 4-4, 7-6, 8-3)

56 GET (T)

ROW (1–50):

or
COLUMN (1–20):

Get values from a row or column in the current table and store the results in the row or column indicated by the data pointer. RESULT ← row/col. (Page 4-5)

57 FLOOR (T)

VALUE: ROW (1–50):

or
VALUE: COLUMN (1–20):

Compare row or column values to a designated value. If any row or column value is less than the designated value, then the result is the new value. Otherwise, result is row or column value. Store the results in the row or column indicated by the data pointer. Use for simple if then calculations. RESULT ← MAX (row/col, value). (Page 4-5)

58 CEILING (T)

VALUE: ROW (1–50):

or
VALUE: COLUMN (1–20):

Compare row or column values to a designated value. If row or column value is greater than designated value, then the result is the new value. Otherwise result is row or column value. Store the results in the row or column indicated by the cursor and data pointer. Use for simple "if/then" calculations. RESULT ← MIN (row/col, value). (Pages 4-5, 4-6)

Graphics Commands

60 graphics:

Display graphing commands: display charts, select rows or columns for graphing and display the chart options menus, print and plot charts. (Pages 2-12 – 2-15, 6-1)

61   DISPLAY

Display the current chart. To display a chart reloaded from the disk, a table must be loaded or there must be a current table. To display a chart composed of graphs of rows of data, the data pointer must be in row mode. To display a chart composed of graphs of columns of data, the data pointer must be in column mode. To return to the table display, press <CANCEL> (Pages 2-12, 6-3, 6-5)

62   SELECT

Row (1–50) for Graph 1:

or
Col (1–20) for Graph 1:

and
Choose (Bar = 1, Line = 2, Pie = 3):

Can build charts using the default values for symbol, shading, color, axis divisions, X-axes type, axis scaling, legends, grid lines, and pie chart labeling.

Can select rows or columns of data to be displayed as graphs in a chart and select graph type (bar, line, or pie). Prompting continues until command is canceled or 6 graphs have been selected. Can select rows or columns in two ways: (1) Place data pointer in row or column mode and enter the row or column number when prompted; (2) Place data pointer on the row or column to be selected for graphing and press <Return> when prompted. A <Return> response to a prompt for row or column may change the current row or column for that graph.

Can mix line and bar type graphs in a chart, but pie type cannot be mixed with bar or line types.

Row or column selections and graph types are entered into the OPTIONS (63) menu. (Pages 2-12, 6-1, 6-4)

63   OPTIONS

Display main chart options menu. The main chart options menu contains selections which (1) display or print a chart, or (2) display sub-menus from which to choose chart options and plot charts. Can use OPTIONS sub-menus to alter row/column and graph type selections made with SELECT (62) command.

On the main chart options menu, enter the number of one of the 6 selections and press <Return>. In the sub-menus, use the cursor keys to move up and down in the menus or <Return> to move down. When the cursor is resting on a option, can change the value.

Selection 1 – Display Chart. Displays chart according to selections made with either the SELECT (62) command or the OPTIONS (63) command and the current setting of the data pointer. If the data pointer is in column mode, graphs of column data are displayed. If the data pointer is in row mode, graphs of row data are displayed. To return to the main OPTIONS menu, press <CANCEL>. (Page 6-5)

Selection 2 – Define Chart Options. Displays a sub-menu from which to choose rows or columns and graph type. For bar and line graphs, can also choose shade, symbol and color for each graph. Can choose stack option or horizontal bar chart option and color option. To return to the main OPTIONS menu, press <CAN-CEL>. (Page 6-5)

Selection 3 – Define Axes Options. Displays a sub-menu from which to choose (for bar or line graphs) X Axes type, framing, legend placement, and X- and Y-axis specifications. For axes, can choose linear or logarithmic scaling. For linear scaling can alter minimum and maximum values, number of major and minor divisions, and grid lines. For logarithmic scaling, can alter minimum and maximum values. To return to the main OPTIONS menu, press <CANCEL>. (Page 6-25)

Selection 4 –Define Pie Options. Displays a sub-menu from which to choose shade, color, explosion of segments, labeling of segments, and ordering of segments. To return to the main OPTIONS menu, press <CANCEL>. (Page 6-41)

Selection 5 – Print Chart. Prints a chart from the current table. Printer should be ready. Normal chart is approximately 8.5″ × 5.5″. Can choose to expand chart to a full page size. To being printing, press <Return>. To cancel a print, press <Escape> or <CANCEL>. After printing, GraphPlan returns to the table display. (Pages 2-18, 6-46)

Selection 6 – Plot Chart. Displays a sub-menu from which to choose plot options. Can choose number of pens, whether to pause for pen change, and whether plotting is done on paper or transparencies. Can plot one full-size chart or two smaller charts placed side by side or stacked vertically on one sheet. To begin plotting, press <Ctrl-P>. To cancel a plot, press <Escape> or <CANCEL>. After plotting, GraphPlan returns to the table display. (Page 6-48)

To return to the table display from the main OPTIONS menu, press<CANCEL>.

70 sort:

71 SORT

COL # (OR USE ROW TITLE = CR):

or
ROW # (OR USE COL TITLE = CR):

and
DESCENDING = 0, ASCENDING = 1 (0–1):

Sort the data and row/column titles of a table in descending or ascending order. Table can be sorted based on the data in the table or the row/column titles in the table.

Enter row/column number or press <Return> to choose the row or column on which the data pointer is resting. Choose ascending or descending order. (Pages 9-9 – 9-13)

72 RANK

COL # (OR USE ROW TITLE = CR):

or
ROW # (OR USE COL TITLE = CR):

and
DESCENDING = 0, ASCENDING = 1 (0–1):

Rank data values in a row/column in ascending or descending order, placing ranking numbers in a row/column. Rank row/column titles alphabetically in ascending or descending order, placing ranking numbers in a row/column. Data in the table is left undisturbed.

Enter row/column number or press <Return> to choose the row or column on which the data pointer is resting. Choose ascending or descending order. (Pages 9-1 – 9-8)

Print Commands

80 print:

Display print commands: set report and title options, print reports and send reports to printer or disk files.

81 OPTIONS

TOP MARGIN (0–50):
   Default 0

LEFT MARGIN (0–50):
   Default 0
Paper adjustment options for printers with automatic paper feed.

ENHANCEMENT (0–3):
   Default 0

ROW TITLE WIDTH (4–40):
   Default 20

COLUMN WIDTH (4–20):
   Default 10

COLUMNS PER PAGE (1—20):
   Default 10

DECIMAL PLACES (0–3):
   Default 1

OMIT ZERO ROWS (NO = 0, YES = 1):
   Default 0

SUPPRESS ZERO VALUES (NO = 0, [-] = 1, [ ] = 2):
   Default 0

PRINT ROW TITLE AFTER WHICH COLUMN (0–9):
   Default 0

NEGATIVE NUMBERS (–N = 0, N– = 1, (N) = 2):
Default 0

PAGE CONTROL (OFF = 0, FEED = 1, PAUSE = 2):
Default 0

OMIT COMMAS (NO = 0, YES = 1):
Default 0

DOUBLE SPACE (NO = 0, YES = 1):
Default 0

OMIT LINE NUMBERS (NO = 0, YES = 1):
Default 0

Set global report options. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. Option settings are saved with the SAVE TBL (112) command. To print these options use command 118 PRINT TBL. (Pages 5-1, 5-8, 5-15)

82 TITLES

PAGE NUMBER (0–999):
Default 0

DATE (YEAR AS YY):
Default 0

MONTH (1–12):
Default 0

DAY (1–31):
Default 0

ROW-RANGE BEGIN (1–50):END (1–50):
Default 50

COL-RANGE BEGIN (1–20): END (1–20):
Default 20

Setting row and column ranges will set the ranges for the entire table. If, after you print, you wish to continue working with the whole table, change the row and column ranges to their original settings using the ROW RANGE (92) and COL RANGE (93) commands.

TITLE 1:
TITLE 2:
TITLE 3:
SET PAPER; HIT RETURN

Set global title options. A <Return> response to any prompt allows the current setting for that option to remain unchanged. The current or default setting is displayed in the upper right corner of the screen. To print these options use the PRINT TBL (118) command. These options are saved with the SAVE TBL (112) command. The three title lines are stored in the program directory for reference in subsequent LOAD TBL (111) commands.

Each report title can be up to 40 characters. The quote mark (") is an illegal character and should not be used in titles. To set titles without immediately printing out the report, cancel this command once the title options have been entered. To print a report check to see that printer is connected and turned on, and paper adjusted before you press <Return>. (Pages 2-16, 5-11, 5-15)

83 REPORT

SET PAPER; HIT RETURN

Send report to printer. Report options and titles should be set before printing reports. Check to see that printer is connected and turned on, and paper adjusted before you press <Return>. (Pages 5-15, 7-10)

84 SHOW OPTS

Display report options and title information on screen. To recover the original display, press any cursor key. To print these options use command (118) PRINT TBL. (Page 5-14)

85   SAVE REP

OUTPUT NAME:
Hit RETURN to see the available tables or charts.

Save GraphPlan table with options and titles to a disk file. Can interface with word processors, or spool output to printer. The files are standard ASCII carriage-return-delineated files. Can press <Return> to see available tables on current disk. If you choose a file name that already exists, GraphPlan will write over the existing file. Files saved under this command cannot be read by the LOAD TBL (111) command. (Page 7-10)

86   SET CRT

DECIMAL PLACES (0–3):
  Default 1

ROW TITLE WIDTH (5–30):
  Default 15

COLUMN WIDTH (4–20):
  Default 10

DISPLAY ZERO VALUES (NO = 0, YES = 1):
  Default 0

Set CRT display options that will be shown on the screen. Row titles may be up to 40 characters on a printed report, however, only a maximum of 30 characters will be shown on the screen. SET CRT settings do **NOT** affect the printed report. Current settings for the SET CRT options are displayed in the upper right corner of the screen. (Page 7-11)

Status Commands

90   status:

Display status commands: range settings, mode selection, and computing order.

91   range:

Range selection commands for rows and columns. (Page 6-2).

92   ROW RANGE

ROW BEGIN (1–50):   END (1–50):
    Default 50

Set row range to restrict computations and charts data entry to affect only a portion of the table. Impacts calculations, printed reports, charts and general data manipulation. Change of row range is reflected on the status line. (Pages 6-2, 7-2, 9-2, 9-5)

93   COL RANGE

COL BEGIN (1–20):   END (1–20):
    Default 20

Set column range to restrict computations and data entry to affect only a portion of the table. Impacts calculations, charts, printed reports and general data manipulation. Change of column range is reflected on the status line. (Pages 2-15, 6-2, 7-2, 9-2 – 9-5)

95   mode:

Mode selection commands. (Page 7-1)

98   COMPUTE

Set mode to compute. Recompute table according to the order specified on the GraphPlan status line to see the impact of any changes. Computations are done only within the range limit as specified on the status line. (Pages 2-11, 4-15, 4-16, 4-18, 7-1, 7-2)

101 PROTECT

Turns protect mode on and off. A "P" will be displayed in the upper right corner to indicate that the protect mode is on. While in the protect mode, changes can be made to the data without affecting the underlying table logic. (Pages 7-1, 7-2)

102 ORDER

(ROW/ONLY = 1, COL/ONLY = 2,
ROW/COL = 3, COL/ROW = 4):
    Default 3

Select the order in which the COMPUTE (98) command performs calculations. Current computing order is displayed on the GraphPlan status line. For example, ROW ONLY performs calculations only on those commands associated with rows; ROW/COL computes row commands and then column commands. (Page 7-3)

Utility Commands

105 utility:

Display utility commands: load and save tables and charts, list, print, erase, redisplay screen, and clear and reset tables. (Page 7-14)

106 LOAD ALL

TABLE NAME:
Hit RETURN to see the available tables or charts.

Load table and associated chart from disk. For purposes of loading, chart and table have the same name. Press <Return> to see the names of available tables/charts on the current disk. Keep pressing <Return> to see more tables/charts. Enter name of table/chart to load. (Page 7-14)

107 SAVE ALL

TABLE NAME:
Hit RETURN to see the available tables or charts.

Save both table AND chart onto disk for permanent storage. Referenced by table name. Press <Return> to see the available tables/charts on the current disk. Keep pressing <Return> to see more tables/charts. If the name of a table already on the disk is specified, GraphPlan will display the following message:

Your file already exists. Continue with save?
VERIFY (Y OR N):

Choose "Y" to overwrite existing table/chart and "N" to give the table/chart another name. If you choose a filename that already exists, GraphPlan will write over the existing file. (Page 7-14)

108 SET DRIVE

DRIVE (A-P):
Default A

Select disk drive for saving and loading tables and charts. Current drive is used for saving and loading files unless otherwise specified. Current drive is displayed on the GraphPlan status line when loading or saving tables or charts. (Pages 2-20, 7-10, 7-14)

109 SET UP

OK TO ERASE CURRENT DATA?
VERIFY (Y OR N)

NUMBER OF COLUMNS (1–99):   ROWS (1–200):
VERIFY (Y OR N):

Enlarge current GraphPlan table to a greater number of rows or columns. With 64K of RAM, each table can have approximately 1000 entries; 16-bit machines generally permit larger tables. (Pages 2-2, 3-6, 3-13, 7-2). Destroys all table information.

110 tables:

Display table commands: load, save, list, reset and clear.

111 LOAD TBL

>TABLE NAME:
>Hit RETURN to see available tables or charts.

Load table from disk. Press <Return> to see the names of available tables on the current disk. Keep pressing <Return> to see more table names. Enter the name of table to load. GraphPlan will clear the screen and display the specified table.

If the dimensions of a new table are smaller than the dimensions of current table, the following message is displayed:

>New table is smaller than current table dimensions. Enlarge?
>CHOOSE (NEW = 0, CURRENT = 1):

GraphPlan will clear the screen and display the specified table. (Pages 3-12 – 3-14)

112 SAVE TBL

>TABLE NAME:
>Hit RETURN to see the available tables or charts.

Save table onto disk for future use. Row and column descriptions, data, logic, and all print options will be saved as part of the table. Press <Return> to see the names of available tables on the current disk. If the name of a table already on the disk is specified, GraphPlan will display the following message:

>Your file already exists. Continue with save?
>VERIFY (Y OR N):

Choose "Y" to overwrite existing table, and "N" to give the current table another name. If you choose a file name that already exists, GraphPlan will write over the existing file. (Pages 2-20, 3-12, 3-14, 7-4, 7-5, 7-8, 7-10)

113 CLR DATA

>OK TO ERASE CURRENT DATA?
>VERIFY (Y OR N):

Clear all data from current table within row and column ranges. Row and column titles, printing options, and table logic, if any, remain intact; only values in the table are replaced with zeros. (Page 7-13)

114 RESET

> OK TO ERASE CURRENT DATA?
> VERIFY (Y OR N):

Delete all current information in table. Reset table values to zero, row and column titles to blanks. Erase table logic. (Pages 2-20, 3-1, 3-12, 4-1, 7-13)

115 REDISPLAY

Clear screen and redisplay table, menu, and status information. No changes are made to data. (Page 7-13)

116 LIST TBLS

> SET PAPER; HIT RETURN

Provide a printed listing of names, titles, and sizes of tables currently on disk. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>. (Page 7-9)

117 ERASE TBL

> TABLE NAME:
> Hit RETURN to see the available tables or programs.

Delete a saved table from disk permanently. Can press <Return> to see available tables on current disk. (Page 7-9)

118 PRINT TBL

> SET PAPER; HIT RETURN

Print a description of current table. Listing will include row/column titles, table commands, and global options. The PRINT TBL command will always start with row 1, column 1 regardless of the current range settings. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>. (Page 5-15)

119 charts:

Display graphing utility commands: Load, save, and erase charts, reset chart menus and graph selections, and print a listing of chart files. (Pages 7-14, 7-15)

120   LOAD CHT

CHART NAME:
Hit RETURN to see available charts.

Load chart from disk. Press <Return> to see names of available charts on the current disk. Keep pressing <Return> to see more chart names. Enter the name of chart to load. To display the chart, must also load a table, or have a current table. (Page 7-15)

121   SAVE CHT

CHART NAME:
Hit RETURN to see available charts.

Save chart onto disk for future use. Row or column numbers and all chart options are saved in the chart file. Press <Return> to see the names of available charts on the current disk. If the name of a chart already on the disk is specified, GraphPlan will display the following message:

Your file already exists. Continue with save?
VERIFY (Y OR N):

If you choose a filename that already exists, GraphPlan will write over the existing file. (Pages 2-20, 7-15)

122   ERASE CHT

CHART NAME:
Hit RETURN to see available charts.

Delete a saved chart from disk permanently. Can press <Return> to see available charts on current disk. (Pages 7-9, 7-15)

123   RESET CHT

OK TO ERASE CURRENT DATA?
VERIFY (Y OR N):

Delete all row and column selections and graph type selections. Reset chart option values in menus to default. (Page 2-20, 7-13)

124   LIST CHT

SET PAPER; HIT RETURN

Provide a printed listing of names, titles and sizes of charts currently on disk. Make sure printer is connected and turned on, and paper adjusted before pressing <Return>.

Statistical Commands

130   stats:

Display statistical commands: delta, mean, variance, standard deviation, logarithms, exponential, minimums and maximums, moving averages, exponential smoothing, and powers. (Page 8-1)

131   DELTA (T)

PERIODS (1–12):

ROW (1–50):

Calculate the change in value between periods of a row or column. $RESULT_t \leftarrow$ $row/col_t - row/col_{(t-period)}$. (Page 8-5)

132   % GROWTH (T)

PERIODS (1–12):

ROW (1–50):

Calculate the % rate of growth in values between periods of a row or column. $RESULT_t \leftarrow PCT$ (row/col, period). (Pages 8-4, 8-5)

133   MOV AVG (T)

PERIODS (1–12):

ROW (1–50):

Compute the moving average for a row or column. The average is calculated over a variable number of periods. $RESULT_t \leftarrow (row/col_t + row/col_{t-1} + row/col_{t-period+1}, \ldots)/period$ (Pages 8-7, 8-8)

134   SMOOTH (T)

% RATE:

ROW (1–50):

Compute exponential smoothing for a row or column. The "f" is a smoothing coefficient entered as a percentage. $RESULT \leftarrow f/100 * RESULT_{(t-1)} + (1-f)/100 * row/col_t$. (Page 8-10)

135 MEAN (T)

    ROW (1–50):

    END (1–50):

Calculate the mean values for a series of rows or columns. Mean values are calculated row by row or column by column. RESULT ← MEAN (row/col 1 through row/col 2). (Page 8-9)

136 SIGMA (T)

    ROW BEGIN (1–50):

    END (1–50):

Compute the standard deviation for a series of rows or columns. RESULT ← SIGMA (row/col 1 through row/col 2). (Page 8-9)

137 VARIANCE (T)

    ROW BEGIN (1–50):

    END (1–50):

Compute the variances for a series of rows or columns. RESULT ← VARIANCE (row/col 1 through row/col 2).

138 LOG (T)

    ROW (1–50):

Compute the natural logarithm for a row or column. RESULT ← LOG (row/col).

139 EXP (T)

    ROW (1–50):

Calculate the exponents for a row or column of values. RESULT ← EXP (row/col).

140 POWER (T)

ROW (1–50):

ROW (1–50):

Raise values in row or col 1 to the power of the values in row or col 2. RESULT ←
(row/col 1↑ row/col 2).

141 MAX (T)

ROW BEGIN (1–50):

END (1–50):

Find the largest value in a series of rows or columns. RESULT ← MAX (row/col
1 through row/col 2). (Page 8-9)

142 MIN (T)

ROW BEGIN (1–50):

END (1–50):

Find the smallest value in a series of rows or columns. RESULT ← MIN (row/col
1 through row/col 2). (Page 8-9)

143 COUNT (T)

ROW BEGIN (1–50):

END (1–50):

Count the number of values included in the mean, sigma, and variance calculations.
RESULT ← COUNT (row/col 1 through row/col 2).

144 TOTAL (T)

ROW BEGIN (1–50):

END (1–50):

Calculate the total of values for a series of rows or columns. Result is the same as
SUM. RESULT ← SUM (row/col 1 through row/col 2). (Pages 8-10, 8-12)

Appendix A

Alternate Command Keys

GraphPlan responds to alpha characters that are codes for the regular numeric commands. So, if it is easier for you, simply use a "+" for the ADD (41) command, an "F" for the FORMULA (35) command, or any of the other single keystroke codes. Of course, the regular GraphPlan menu will still be available to provide you with a constant reference.

+	ADD	I	INVERSE
−	SUBTRACT	K	SORT
*	MULTIPLY	L	LOG
/	DIVIDE	M	MEAN
%	sort:	N	NULLIFY
=	GET	P	PLUG
$	CUMULATE	Q	CHANGE
$\wedge$	EXP	S	SUM
A	ADD K	V	VARIANCE
B	SUB K	X	FIX R/C
C	MULT K	<	RANK
D	DIV K		
E	ENTER		
F	FORMULA		
G	GOTO		

Appendix B

GraphPlan Customization Notes

This memo assists dealers in customizing GraphPlan version 4 to specific systems. Features supported include:

1. Display attributes, table sizes, and identification.
2. CRT feature control.
3. Keyboard customization.
4. Function key customization.

GPSETUP.FIL

GPSETUP.FIL is a CP/M file used to store customized parameters for GraphPlan. The GPSETUP.FIL is one of the files on the GraphPlan system diskette. It contains numbers that allow you to customize GraphPlan to your microcomputer system and terminal.

You can change the contents of the GPSETUP.FIL by using any CP/M editor or word processor.

Technically, the contents of GPSETUP.FIL are a series of numbers. These numbers must be separated by commas or placed on individual lines of the GPSETUP.FIL. These numbers are used to tell GraphPlan what specific features are available on the hardware and how to use them.

The following is a sample printout of the GPSETUP.FIL.

Sample GPSETUP.FIL
"GraphPlan"
50,20
15,10,1,""
0,0,0
"Televideo"
9,80,24
2,27,0,0,0,61,32
0,0,0,0,0,0
27,41,0
27,40,0
27,41,0
27,40,0
0
27,40,0
0
27,40,0
27,41,32,0
27,41,0
27,40,32,0
27,40,0
27,40,0
27,89,0
27,84,0
11,10,12,8,30
27,127,13
"COMMAND KEY"
37
65,51, 66,52, 67,53, 68,54, 69,30, 70,35, 71,36, 72,79, 73,46, 74,79
75,71, 76,138,77,135,78,39, 79,79, 80,37, 81,32, 82,67, 83,55, 84,68
85,79, 86,137,87,79, 88,38, 89,79, 90,79, 43,41, 45,42, 42,43, 47,44
36,49, 37,70, 60,72, 61,56, 62,73, 94,139,64,74

"FUNCTION KEY SECTION"
1,–1,16
64,111,65,31,66,98,67,83,68,33,69,20,70,21,71,9
72,112,73,32,74,96,75,81,76,34,77,25,78,26,79,108

Setup Parameters

This section controls the initial GraphPlan table size, the row title display area, the column sizes, the number of decimal places, handling of zeroes and print page margins.

    "GraphPlan"
    ROW.N,COL.N
    ROW.SIZE, COL.SIZE, DEC.SIZE, DATA.DRIVE
    OMIT.ZERO, TOP.MARGIN, LEFT.MARGIN

Example:

    "GraphPlan"
    50,20
    15, 10, 1, "A:"
    0, 0, 0

ROW.N and COL.N are the initial table size for GraphPlan. Normally, these are set at 50 rows and 20 columns. They can be set to smaller values for small machines or larger values for 16-bit machines with larger memory capacity. In 8-bit CP/M systems, GraphPlan can normally accommodate approximately 1000 entries (i.e. 50 times 20 equals 1000) per table. Of course, the GraphPlan SETUP command allows the user to dynamically set the table sizes.

ROW.SIZE is the row title display area. Normally, 15 spaces are used. You can set it to any value from 5 to 40.

COL.SIZE is the size for each column. 10 is the default.

DEC.SIZE is the number of decimal places. 1 is the default.

DATA.DRIVE is the name of the drive for storing GraphPlan tables. If this value is set to select drive "B", then GraphPlan will automatically store and retrieve GraphPlan tables from drive B.

OMIT.ZERO is treatment of zero values on the screen. A value of –1 says to display zeroes as blanks. 0 is the default.

TOP.MARGIN is the number of lines to skip at the top of a page.

LEFT.MARGIN is the number of columns to skip at the left side of a page. (Top and left margins support printers with single page sheet feeders.)

CRT Control Features

This section describes the CRT interface for GraphPlan. Specific features include cursor control, highlighting, screen clear and line clear.

Normally, for an application like GraphPlan to instruct the CRT to clear the screen, a special command is sent by GraphPlan to the CRT. This command might be the number 5 or a string of numbers starting with a 27 followed by an 89. Unfortunately, this command varies for each system and terminal. However, you can look up the appropriate commands in your system or terminal CRT interface section and enter the command sequence into GPSETUP.FIL.

Screen Size
> "Terminal/System name"
> CRT.TYPE, CRT.WIDTH, CRT. LENGTH

Example:
> "DEC VT/100"
> 0, 80, 24

CRT.TYPE is used to identify specific terminals that may require special adjustments. Use 1 for Hazeltine terminals. Otherwise, any value is OK.

CRT.WIDTH and CRT.LENGTH control the screen size. Most terminals display 80 columns by 24 rows. 132 column screens are fully supported.

Cursor Addressing
 FORMAT, LEAD.IN, LEAD.IN-2, LEAD.IN-3, DELIMITER
 ADDR.CURSOR, ADDR.OFFSET

Example:

 1, 27, 38, 97, 121
 67, 0

These numbers control positioning of the cursor at specific locations on the screen. GraphPlan supports 3 techniques for cursor addressing. They are:

 0. Hazeltine x, y format
 1. ANSI standard
 2. y, x format (most popular)

The *Hazeltine* format uses the following command structure for cursor addressing:

 ESC ADDR.CURSOR x-value y-value

In GPSETUP.FIL, the numbers would be set as follows:

settings	*description*
FORMAT = 0	select Hazeltine format.
LEAD.IN = 27	use ESC for lead-in.
LEAD.IN-2 = 0	2nd lead-in set to null.
LEAD.IN-3 = 0	
DELIMITER = 0	set to null.
ADDR.CURSOR = 17	address cursor command.
ADDR.OFFSET = 96	address offset.

You can use the Hazeltine format for any terminal that closely matches the Hazeltine format by substituting the correct values. For example, if your terminal uses the x, y format, but uses a different command for cursor addressing, the correct value may be entered into GPSETUP.FIL in place of the original value.

The *ANSI standard* uses the following command structure:

LEAD.IN LEAD.IN-2 LEAD.IN-3 y-value DELIMITER x-value
ADDR.CURSOR

For example, the HP-2621A would use the following settings:

settings	descriptions
FORMAT = 1	select ANSI standard.
LEAD.IN = 27	use ESC for lead-in.
LEAD.IN-2 = 38	2nd lead-in character.
LEAD.IN-3 = 97	3rd lead-in character.
DELIMITER = 121	delimiter.
ADDR.CURSOR = 67	address cursor command.
ADDR.OFFSET = 0	address offset.

If your terminal follows the ANSI standards, you can use this format by changing selected values to suit your terminal. If your terminal uses less than 3 lead-in characters, then the remaining values should be set to zero.

The *most popular* format is the abbreviated y, x format:

ESC ADDR.CURSOR y-value x-value

For example, the Televideo terminal would use the following values:

settings	descriptions
FORMAT = 2	select y, x format.
LEAD.IN = 27	use ESC for lead-in.
LEAD.IN-2 = 0	2nd lead-in character.
LEAD.IN-3 = 0	3rd lead-in character.
DELIMITER = 0	delimiter.
ADDR.CURSOR = 61	address cursor command.
ADDR.OFFSET 2= 32	address offset.

As with all 3 methods for cursor addressing, you can set the individual values to suit your system or terminal.

Printer Features

Printer features are supported. There are an initialization, termination and 4 enhancements that you may implement for any printer. These features can be used to select compressed, expanded or alternate fonts, to issue paper feed messages and for other printer control uses.

PRINTER.INIT	0	Initialization string.
PRINTER.END	0	Termination string.
ENHANCE.0	0	Zeroth enhancement.
ENHANCE.1	0	First enhancement.
ENHANCE.2	0	Second enhancement.
ENHANCE.3	0	Third enhancement.

Each line can contain as many numbers as necessary and must be terminated by a zero. At minimum, each line must contain a zero.

The initialization sequence and one of the enhancement choices are sent to the printer at the beginning of every command that uses the printer. The end sequence is sent to the printer at the end of every command that uses the printer. The choice of enhancement is set in the OPTIONS command.

Initialization is used to send special Paper Load instructions or LPI commands. Each enhancement generally controls various CPI choices. The end sequence resets the printer to its original state.

Highlighting

You can highlight each portion of the GraphPlan display screen using features available in your system. For example, you can display the titles and the GraphPlan menu in reverse video and blink the status line.

	Example – Adds	
INITIAL.SET	27, 91, 48, 0	CRT initialization.
END.SET	0	CRT ending set.
DEF.SET	14, 0	Default setting.
PROMPT.ON	0	Not used.
STATUS.ON	15, 0	GraphPlan status line.
MESSAGE.ON	15, 0	Message line.
ROW.ON	0	Not used.

TBL.ON	15, 0	Row and column title area.
POINTER.ON	14, 32, 0	Row/column pointer.
DATA.ON	0	Data area.
DPOINTER.ON	15, 32, 0	Data pointer.
NEGATIVE.ON	0	Negative values.
MENU.ON	15, 0	Menu area.

Each line can contain as many numbers as necessary and must be terminated by a zero. At minimum, each line must contain a zero.

The numbers are commands that are sent to the CRT to select specific features such as reverse, blink, underline, color or other highlighting activities.

The INIT SET sequence is sent to the CRT at the beginning of every GraphPlan session. The END.SET sequence is sent to the CRT at the end of every GraphPlan session. Other sequences are sent to the CRT prior to displaying that section of the GraphPlan screen. The DEF.SET sequence is sent to the CRT at the completion of any display on the CRT.

For example, whenever a message is printed on line 1 of the CRT, GraphPlan will send the MESSAGE.ON sequence to the CRT, followed by the message and the DEF.SET sequence.

For POINTER.ON and DPOINTER.ON, a space (32 decimal or 20H) needs to be inserted. If the highlighting feature used to distinguish the data pointer already occupies a space on the CRT, then the space should be omitted.

Clear screen and line

CLEAR.SCREEN	27, 84, 0
CLEAR.LINE	27, 89, 0

The clear screen and clear to end of line sequence is handled the same way as highlighting. A sequence of numbers is sent to the CRT to clear the screen or to clear the line. These sequences must be terminated by a zero value.

Keyboard Customization

GraphPlan allows single keystroke cursor control. In addition, you can customize the alphabetic portion of the keyboard to generate specific GraphPlan commands. You can match specific keys to functions in GraphPlan by looking up the values generated by a key and entering the values into GPSETUP.FIL as follows:

Cursor control

GraphPlan has been customized so that the cursor keys with arrows that point up, down, right, and left have been activated to move the data pointer.

Backspacing

    ESC.KEY, BACKSPACE, CR.KEY

Example:

    27, 127, 9

Backspacing is used to correct typing errors. Different keys are used on different systems to handle backspacing. For example, you can choose the BACK key, the DEL key, or the RUBOUT key depending on your keyboard. (If not defined for other uses, 8H is always used as the backspace key. In the current example, both 8H and the DEL key would perform backspacing.)

ESC.KEY can be used to capture a two character cursor key. In other words, if the cursor keys generate 2 ASCII characters, ESC.KEY should be set to the value of the first key. The CR.KEY is an alternate carriage return key. 0CH by default, is always the carriage return key. CR.KEY defines an alternate key (TAB in the above example.)

Command Key Synonyms

This section allows you to map any alphabetic keystroke into specific GraphPlan commands. This provides each GraphPlan with an alphabetical synonym. For example, the S key can be trained to map into the SUM command (55) in Graph-Plan. Normally, the S key generates a decimal 83 (or 53H). In the example below, it has been mapped into a 55 for SUM.

> "Command key section"
> COUNT
> KEY1, COMMAND1
>
> .
> .
> .
>
> KEYN, COMMANDN

Example:

> "Command key section"
> 3   3 keys.
> 43, 41   + key, GraphPlan ADD (41)
> 45, 42   – key, GraphPlan SUB (42)
> 83, 55   S key, GraphPlan SUM (55)

You can specify as many keys as you wish. Note, only alphabetic keys can be used since numeric keys interfere with normal GraphPlan command entry conventions.

Function Key Section

Please set as follows:

> "Function key section"
> 0,0,0
>
> FUNCTION.INIT
> FUNCTION.END   (true = –1 or false = 0)
> #-OF-KEYS

Appendix C

Error Messages

CP/M ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
BDOS ERROR on d*: BAD SECTOR	Operating system cannot get information from diskette because disk being accessed is not correctly formatted.	Format disk correctly according to operating system manual.
	Operating system cannot get information from diskette because disk has physical defect (dust, finger prints, manufacturer's defect).	Press "R" to re-try command. If error persists, reboot system and re-try command. If error persists and is on data diskette, format new diskette and re-try command. If error is on systems disk make new working disk from master and re-try command. If error still occurs check disk drive for malfunction.
*d = drive name		
BDOS ERROR on d: SELECT	Drive does not exist.	Reboot system and designate correct disk drive. Check to make sure that disk drive cables are properly connected.

CP/M ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
BDOS ERROR on d: READ ONLY (R/O)	Newly inserted diskette was accessed without ‡C command being issued to clear the drive.	Press any key to recover. Press ‡C and then re-try command.
	Operating system is trying to write to disk that has been designated as "read only."	Press any key to recover from error. Check diskette for write protect tab: For 5 ¼" diskettes remove tab to make diskette read/write. For 8" diskettes install tab to make diskette read/write.
	Operating system is trying to write to disk that has been designated as "read only" with the CP/M STAT command.	Change disk designation with STAT command.
DISK WRITE ERROR	Operating system is trying to write to a disk that is full. Operating system can read disk, but has no room to write.	Check available diskette space. Most likely an additional diskette will be needed to provide more storage space.

EXECUTION ERROR MESSAGES		
ERROR MESSAGE	CAUSE	CORRECTION
CM ERROR	The program file specified in a chaining statement could not be found in the directory.	Problem with system disk. Use master diskette to make new system disk. If error persists, contact your dealer.
DW ERROR	Disk full. No diskette space left.	Check available diskette space. Most likely an additional diskette will be needed to provide more storage space.
DZ ERRO	A division by zero was attempted.	Check logic and correct.
ME ERROR	Diskette directory is full causing an error while attempting to save a file.	Check available diskette directory space. Most likely an additional diskette will be needed to provide more storage space.
OE ERROR	Open file errror. Has no affect on program.	Enter next command to clear error message on screen.
OF ERROR	Arithmetic overflow. A number used in a calculation was too large.	Locate number causing over-flow and correct. Re-try calculation.
OM ERROR	System has insufficient memory to complete action.	Break up action causing problem (table size, program, calculation) into smaller pieces.

GRAPHPLAN ERROR MESSAGES

ERROR MESSAGE	CAUSE	CORRECTION
"The contents of this file are incorrect. (e.g. old version)"	Table was not saved properly due to full or defective diskette.	Re-save table. Check operating system directory to confirm save. Use new data diskette if necessary.
"New table is smaller than current table dimensions. Enlarge?" 0=New. 1=Current	Table being loaded (new table) has smaller matrix than table shown on the screen (current table).	Decide which table size is desired, then answer MicroPlan query with an "0" for new table or "1" for the current table.
"Cannot display/print/plot chart. Zero data in all selected rows/cols."	Row/col numbers selected for the 6 possible graphs are all zeros. Or no rows/cols selected for graphing. Or, for pie graph, there are less than 2 non-zero values in selected row/column. Or table with data has not been loaded.	Enter non-zero data values in selected rows/columns, or change row/column numbers for graph selection so data in rows/columns are not all zero values.
"Cannot display/print/plot chart. Zero row/col data for numeric X-axis."	Row/col number selected for numeric X-axis contains all zero values.	Enter non-zero values in the selected row/column, or change row/column selection so that not all values are zero.
"No help files available."	Due to limited disk space on this machine format, help files have been deleted.	Informative error message—no corrective action necessary.

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Advanced Personal Computer

NEC
NEC Information Systems, Inc.

USER'S COMMENTS FORM

Document: GraphPlan

Document No.: 819-000105-3001 REV. 00

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