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Business Graphics Analysis Pak

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If you receive a new version of TRSDOS, read the following before making any modifications to your existing software packages (applications, languages, or system utilities):

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Business Graphics Analysis Pak

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How To Use This Manual

This manual is intended to be used as both a reference tool and a learning aid for the Business Graphics-Analysis Pak.

Chapter 1 gives an overview of the package and how to use it. Chapters 2, 3, and 4 discuss general procedures that pertain to all charts. This includes instructions on preparing data for charts (Chapter 2), general information on preparing the charts themselves (Chapter 3), and information on adding and editing text on your charts (Chapter 4.)

Information pertaining to a specific chart type is found in Chapters 5 (Line Charts), 6 (Bar Charts), 7 (Pie Charts), and 8 (Scatter Charts). Chapter 9 tells how to use the Device Driver diskette to prepare the graphs you create on the Radio Shack printer or plotter supported by this program, which you intend to use. This chapter also includes information on using data files other than those created by this program.

Chapter 10 gives step-by-step examples of how to create each chart type, edit and transform data, edit chart text, and reuse chart settings.

The error and warning messages produced by the Business Graphics package are listed in Chapter 11. A detailed index and an appendix containing specific backup instructions conclude the manual.

After reading Chapter 1, decide on the type of chart with which you would like to begin, look at the sample sessions in Chapter 10, and then try creating a chart of your own. Because the Business Graphics package is completely "menu-driven," you learn as you use it. Explanatory messages displayed at the bottom of the screen help you use each menu selection. By following this course, you can start producing charts today!

Warning: Before you begin using the Business Graphics-Analysis Pak, be sure to make "backups" (copies) of the original diskettes. Use the backups as your working copies and retain the original diskettes for safety. Appendix A tells how to back up diskettes.

Contents

To Our Customers

The Business Graphics-Analysis Pak lets you create line charts, bar charts, pie charts, and scatter charts on your TRS-80 Model III screen, as well as make "hard copy" printouts on a variety of TRS-80 printers. If you have the Multi-Pen Plotter, you can produce multicolored charts on paper or draw them directly on acetate transparencies for use with an overhead projector.

This package is easy to learn and use. You select a chart type and supply your data. Then, you either can let the program create and format the chart for you or you can control all aspects of the chart format yourself by making selections from a series of menus. You can insert text anywhere on the chart, change the text, or move it freely on the screen. When you are satisfied with the appearance of the screen, you can produce a hard copy of the chart.

The Business Graphics-Analysis Pak generates four basic chart types with many variations:

- Line charts containing up to three curves, each based on up to 100 data values
- Bar charts containing up to 100 bars, each of which can be stacked with up to three segments or grouped in clusters of up to three bars, with bar and bar segment shading
- Pie charts containing up to 12 slices, each of which can be optionally shaded
- Scatter charts (X-Y plots) based on up to 100 pairs of data values (coordinate points), with or without connecting lines

The program lets you change all aspects of the chart format. You can:

- Set the chart width from 2″ to 10″ (20 to 100 character positions) and the height from 3″ to 8″ (18 to 48 lines).
- Use solid, dashed, or dotted lines for curves and any character for the plot points.
- Frame your chart.
- Control the scaling, by specifying the range to be used, and control the format of the numeric scale labels. If you prefer, you can let the program do automatic scaling based on your data.
- Provide your own time labels for plot points or bars, or you can use or revise those provided by the program. Automatic time labels (weekly, monthly, quarterly, or annual) and numbers are based upon a starting point you specify.
- Use the Multi-Pen Plotter to select any color for the curves, plot points, bar or slice outlines, shading, and text entries.

Data for the chart is supplied from a file stored on a diskette. You can enter the data at the keyboard, retrieve it from a previously stored disk file, or select a row or column from a VisiCalc™ DIF file. If you have files created by other programs (such as SCRIPSIT™ or the BASIC Interpreter), you can convert the files to an acceptable format by using a utility provided with the package.

Extensive data handling capabilities are provided. You can:

- Generate an arithmetic or geometric series of up to 100 values by supplying a starting value and a constant. The constant is used as an increment or factor.
- Change, insert, or delete data values and immediately display the results on the screen.
- Transform data by supplying a constant which is added, subtracted, multiplied, or divided.
- Fit a linear, quadratic, or exponential curve to the data and, if you wish, project the curve for a number of time periods.
- Compute an arithmetic or geometric growth projection.
- Smooth data with a moving average or consolidate it.
- Compute the logarithm of each data value.

Once you create a chart, you can save it or the settings you used to create it in a disk file. Then, you can reproduce that chart any time you wish by recalling the file that contains its settings. You can update your data files and reuse the saved chart settings to produce updated charts in the same format. The Business Graphics-Analysis Pak makes it easy.

Required Equipment

To use this package, you need a TRS-80 Model III with at least two disk drives and 48K of RAM (Random Access Memory).

One of the following Radio Shack printers/plotters is required for producing hard copies of charts you create:

- Daisy Wheel Printer II (26-1158)
- Line Printer V (26-1165)
- Line Printer VI (26-1166)
- Line Printer VIII (26-1168)
- Multi-Pen Plotter (26-1191)

Note: The design of the package allows for the future addition of support for other Radio Shack printers and output devices. This support will be made available to take advantage of new graphics features.

CHAPTER 1

Business Graphics Overview

In today's business world, there is no shortage of information — most of us receive more reports than we have time to read. Yet significant facts, buried in pages of figures, are sometimes overlooked. This is where business graphics can help you.

When you use charts to emphasize key points, highlight trends and comparisons, or summarize your findings, your message is sure to get through. This package makes it easy by displaying data pictorially, in the form of line charts, bar charts, pie charts, and scatter charts.

Pictures make data come alive, revealing the trends, comparisons, and distribution patterns that often are hidden in columns of figures. A few pictures can convey the significant facts in pages of computer reports, dramatizing key points and summarizing your conclusions.

Using Charts Effectively

The TRS-80 Business Graphics-Analysis Pak creates four basic types of charts:

- Line charts
- Bar charts
- Pie charts
- Scatter charts

Which chart you should use depends upon the type of data you have and what you want to illustrate. Some charts show trends, some stress the relationship of parts to the whole, and others highlight differences between sets of data.

Selecting A Chart Type

Before selecting a chart type, consider the message you want the chart to convey.

Line Charts — Line charts show how data changes over time and illustrate the continuous flow of change. They emphasize trends over a period of days, months, or years. Each time period on the chart's horizontal scale is associated with a data point whose value is measured on the vertical scale.

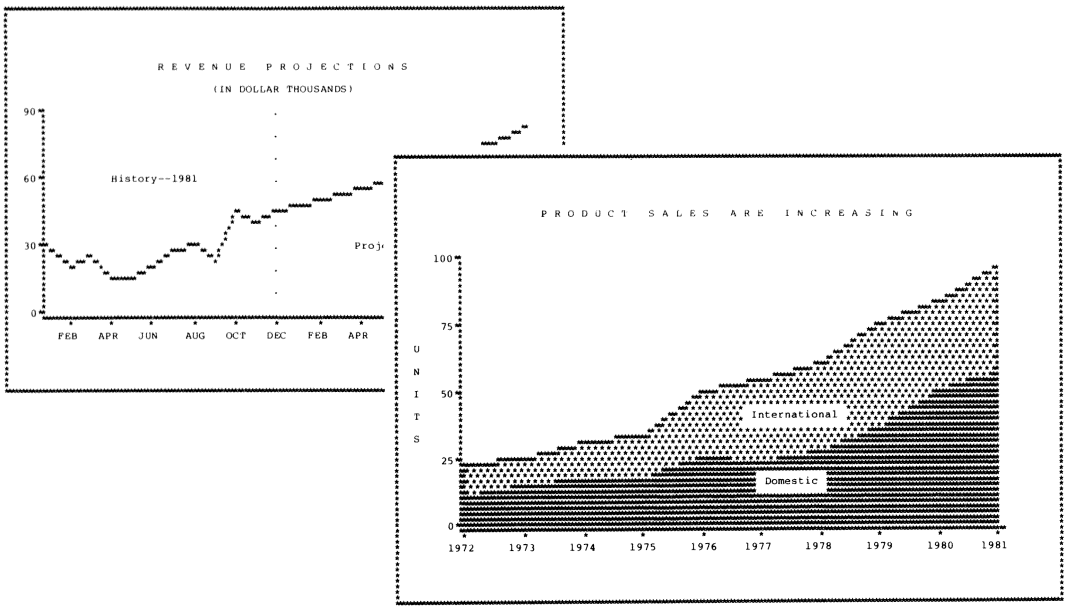


Figure 1-1. Line Charts.

Line charts are effective when you have many values to plot, since they emphasize the overall pattern, rather than individual values. You can give added impact to the curve by shading the area below it.

The line charts created with this package can contain up to three curves, each based on up to 100 data points. You can compare two or three sets of values for the same time period on one chart. For example, you might show how monthly sales of one product compare with the monthly sales of another product over a period of one or two years.

Bar Charts — Bar charts point out individual values and are effective for item-to-item comparisons. The length of each bar, measured against a vertical scale, indicates the size of each data value. Bar charts can also show variance, such as between plan and performance, or between this year's sales versus last year's sales. Bars can be segmented or clustered in groups. In all cases, bar charts emphasize individual differences.

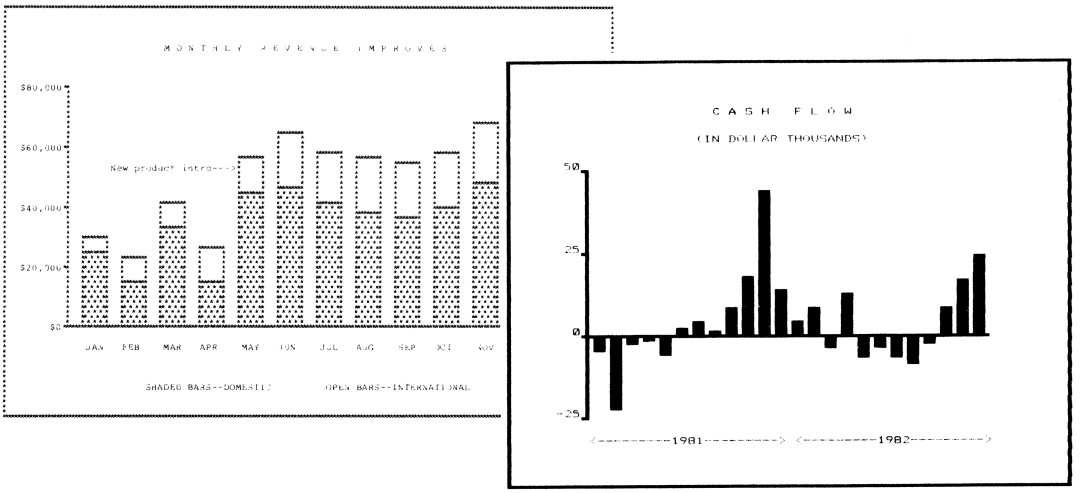


Figure 1-2. Bar Charts.

The bar charts created with this package can contain up to 100 bars. The bars can be stacked (cumulated) with up to three segments, or clustered in groups of up to three bars. Bars or bar segments can be shaded.

Pie Charts — Pie charts compare parts to a whole and show the relative size of the parts. Each "slice" represents a percentage of the total pie. Pie charts are effective in comparing a small number of items.

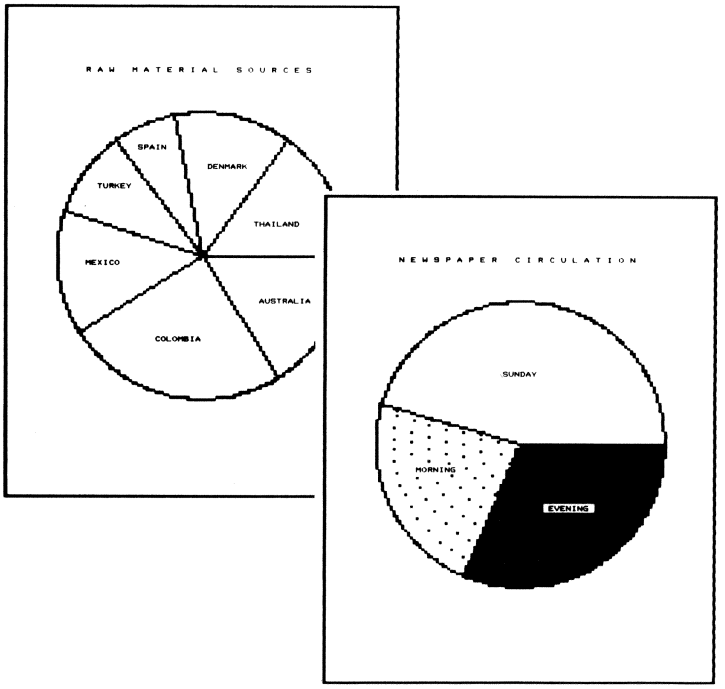


Figure 1-3. Pie Charts.

The pie charts created with this package can contain up to 12 slices, each of which can be shaded.

Scatter Charts — Scatter charts (X-Y plots) show relationships between data. Scatter charts can reveal a cause-and-effect relationship or demonstrate that no such relationship exists. For example, a scatter chart can show how a project's labor costs and sales revenue interact or show bond yields versus bond maturity dates.

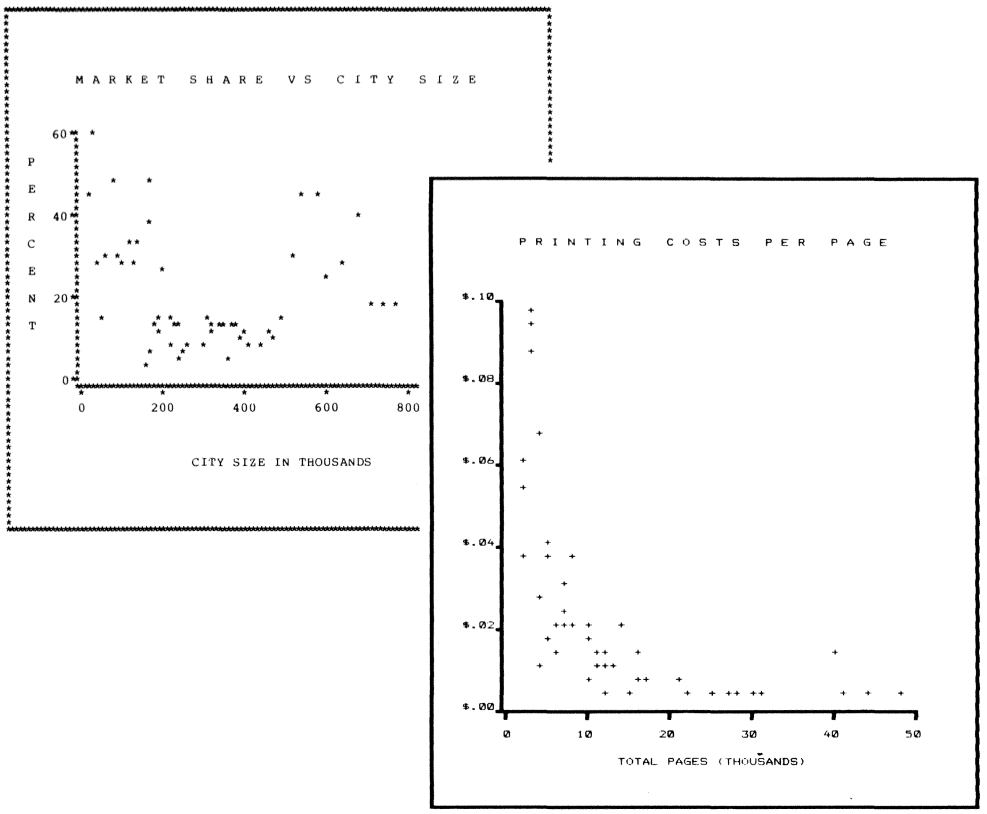


Figure 1-4. Scatter Charts.

The scatter charts created with this package can be based on up to 100 pairs of data values (coordinate points). If you wish, the points can be connected.

Scaling the Chart

Scale, the size and relationship of chart elements, can have a dramatic impact on the message a chart conveys. Consider the four line charts in Figure 1-5. These charts use the same data values but have different dimensions (sizes) or different numeric scale ranges.

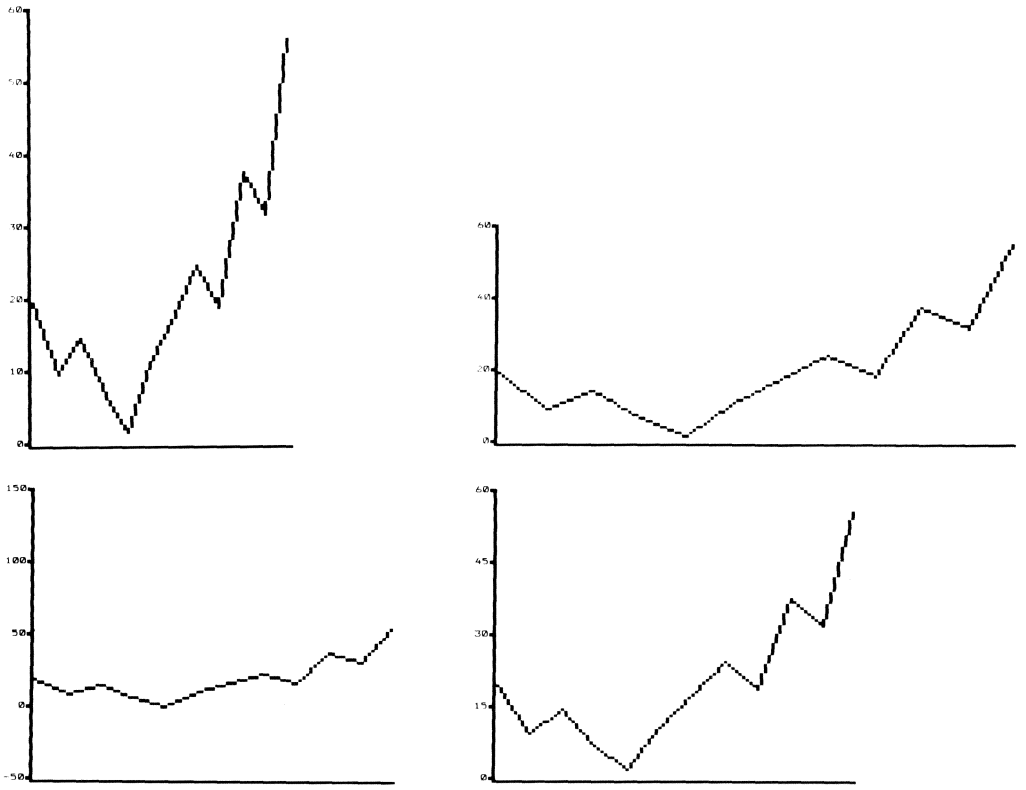


Figure 1-5. Chart Scaling.

The first two charts have the same numeric scale range but different dimensions. The first chart is tall and narrow, emphasizing the fluctuations and the growth trend in the data. The second chart is stretched out horizontally; the changes seem more gradual and the growth trend less dramatic.

The last two charts have the same dimensions but different numeric scale ranges. In the third chart, the numeric scale range is extended far beyond the actual range of the data values. In the last chart, the numeric scale range is fitted closely to the data. Again, the two charts give quite different impressions.

Keep in mind that it is the significance of the numbers, more than the numbers themselves, that you want to communicate. You should select a shape and scale that reflect the significance you want to emphasize.

When this package sets up a chart, it assigns a numeric scale range based on your data and sets the length of the vertical and horizontal axes. If the resulting chart does not convey the message you intend, you can easily adjust these factors to show the data in a format closer to your wishes.

Including Text

Using text to highlight your pictorial message can make it even more effective. If your chart of monthly sales revenue shows a 20 per cent increase over the year, the title SALES ARE UP 20% will get more attention than simply MONTHLY SALES. You can also use the text editing feature to insert notes into the chart itself. Titles and notes can help focus the viewer's attention on the point you want to emphasize.

Using The Business Graphics-Analysis Pak

The Business Graphics-Analysis Pak is contained on five diskettes — one for each chart type, plus the Device Driver Utility diskette.

The Device Driver diskette contains a file conversion program and the drivers used to configure the program diskettes for the various output devices you can use.

The four Chart diskettes are program diskettes only — they do not have the amount of space needed for storing the data used to create a chart. Store data files on a TRSDOS system diskette in Drive Ø. If you have more than two drives, you can use Drives 2 and 3 as data storage drives.

Note: The Chart diskettes are configured for use with a Line Printer VIII. If you are using a different output device, you should reconfigure the diskettes as described in Chapter 9 before using the package to produce charts.

Each Chart diskette contains a Main Menu, a Data Handling Menu, a Chart Menu for a particular type of chart, and a Chart Text Editor Menu. Figure 1-6 shows the pathways between the various menus of the Business Graphics-Analysis Pak.

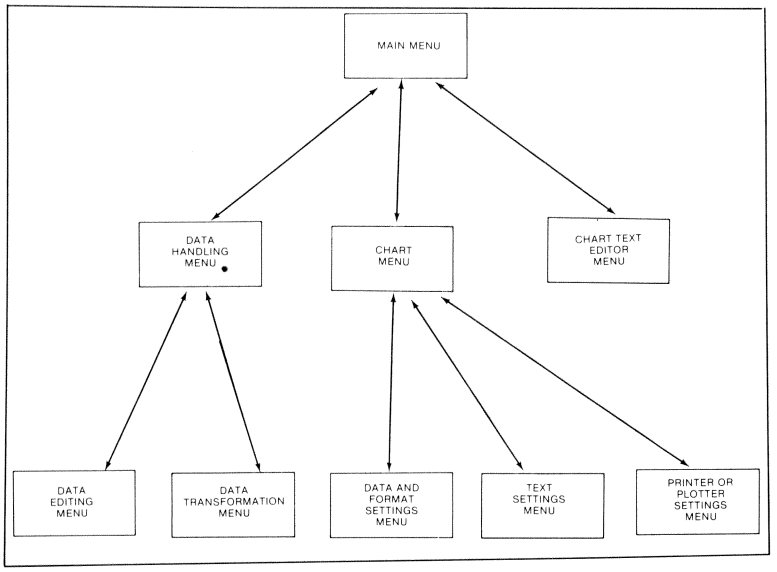


Figure 1-6. Menu Pathways.

You can see that to move from the Data Handling Menu to the Chart Menu, you must first return to the Main Menu. To move from the Data and Format Settings Menu to the Text Settings Menu, you must first return to the Chart Menu.

The Main Menu

The Main Menus on the four Chart diskettes are identical except for option 2, which states the type of chart. From the Main Menu, you can choose to:

- Enter and manipulate data using the Data Handling Menu (See Chapter 2.)

- Create, save, and view charts using the Chart Menu (See Chapters 3 and 5-8.)
- Add and change text or labels on a chart using the Chart Text Editor Menu (See Chapter 4.)

Getting Started

When you are ready to use this package, follow the general startup procedure described in the Model III Owner's Manual. Connect any printers or plotters before starting up. Be sure to use your backup copies of the program diskettes. (See Appendix A for instructions on making backups.) Also, see Chapter 9 for instructions on configuring your diskettes for the output device you are using.

To begin using the Business Graphics-Analysis Pak, follow the steps below:

1. Insert a TRSDOS system diskette into Drive 0 and close the drive door.
2. Insert a Business Graphics Program diskette into Drive 1 and close the drive door.
3. Press the computer's reset button.
4. The screen prompts you to enter the date in the format MM/DD/YY. For example, if the current date is August 4, 1982, type 08/04/82 and press (ENTER).

   Next, you are asked to enter the current time. You either can enter the time in the form HH:MM:SS (for example, 02:30:00 (ENTER)) or simply press (ENTER).
5. When the message TRSDOS Ready appears, type TRSCHART (ENTER). The Main Menu appears, and you can begin using the Business Graphics package.

Note: If you wish, you can use the TRSDOS AUTO feature to automatically load Business Graphics upon power-up or reset. At TRSDOS Ready, type:

AUTO TRSCHART (ENTER)

Repeat the process for each TRSDOS system diskette you use with the Business Graphics package. (To disengage the AUTO feature, type AUTO (ENTER) when TRSDOS Ready is displayed.)

Making Menu Selections

Whenever a menu appears on the screen, one option is flashing, and an explanatory message about that option is at the bottom of the screen. To select that option, press (ENTER). If you wish to select another option, move to the option you want by pressing either the corresponding number key or using (↑) or (↓). That option flashes, and its explanatory message appears. You can then press (ENTER) to select it.

Error and Warning Messages

If a flashing message appears at the bottom of the screen, it is a warning or error indicator. These messages are listed in alphabetical order in Chapter

11. Also listed are explanations of possible causes and remedies for each message.

Changing Diskettes

If you want to switch to one of the other diskettes to create another type of chart, you must first return to TRSDOS Ready. To do this, choose the Main Menu option and press (ENTER), or press (4) (STOP) and (ENTER). You may also press (CLEAR) and (ENTER) at anytime to return to the Main Menu. Press (CLEAR) and (ENTER) again to stop the program.

Wait until the red light on the disk drive is off, then open the door of Drive 1 and remove the program diskette. Insert the new diskette into Drive 1 and close the drive door.

Type TRSCHART (ENTER). The Main Menu of the diskette you have loaded is displayed.

You can change the TRSDOS diskettes in Drive 0 to access other files without interrupting program operation.

Ending the Session

To end the session, return to TRSDOS Ready. You can do this either by pressing (CLEAR) and (ENTER) or by selecting option 4 (STOP) and pressing (ENTER). Remove the diskettes and place them in their protective sleeves. Then, turn off the computer and the attached peripherals.

Tips for Better Looking Charts

The quality of your charts is affected by the ribbon used with the printer and by the pens and paper (or film) used with the plotter.

Printer Output — If you produce charts on a Line Printer V, VI, or VIII, replace the ribbon before it begins to fade. If you have a Daisy Wheel II Printer, use carbon ribbons to produce better quality printouts.

Plotter Output — Two types of pens are available for the Multi-Pen Plotter:

- Ball-point pens for paper
- Felt-tipped pens for transparency film

Keep the pens capped when not in use so that they will not dry out. It is a good idea to test each pen on scratch paper before using it for charts.

Heavy-weight coated paper produces better charts than does standard bond paper.

If you are using transparency film, be careful to handle it only by the edges. Fingerprints cause the pen to skip and show when the chart is projected onto a screen.

When a chart is drawn on a plotter, all portions that use Pen 1 are drawn first, then all portions that use Pen 2, and so on. If you want to produce color separations for printing, insert only one pen in the plotter and draw the chart, then move the pen to the next stall. Repeat this process until you have a separate sheet for each color.

CHAPTER 2

Preparing Chart Data

The data used to create a chart with the Business Graphics package must be supplied from a file stored on a diskette. You can create the file through the Data Handling Menu (option 1 on the Main Menu of each Chart diskette).

You can provide data for the file by:

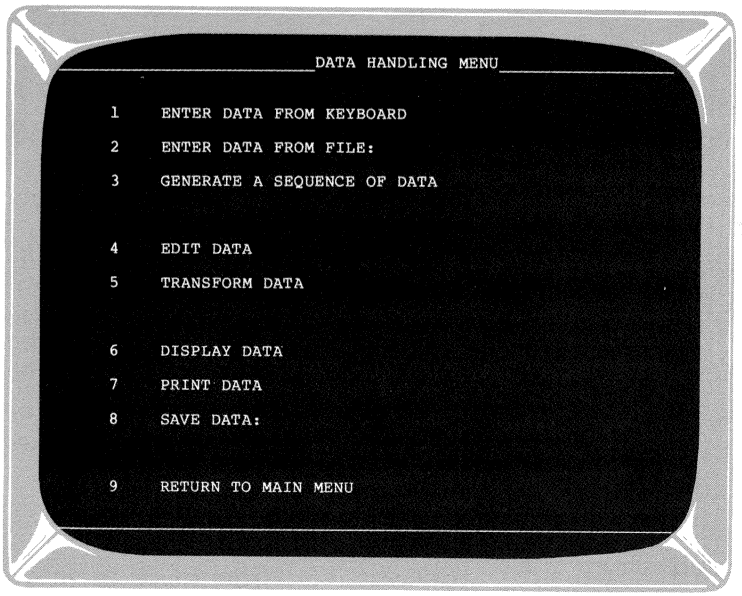
- Entering values from the TRS-80 keyboard.
- Accessing a file that previously was created and stored on a diskette.
- Letting the program generate a series of values. With this method, you supply the starting value, the constant to be added or used as a multiplier, and the number of values to be generated. The program does the rest.

You can revise the data by adding, deleting, or changing values. In addition, the Business Graphics package offers a number of mathematical functions. These range from simple arithmetic operations to trend projections, consolidations, and moving averages. For example, you can:

- Fit a trend to historical data and project it into the future
- Project growth, based on a constant increment or factor
- Compute a moving average to smooth out fluctuations and reveal the overall trend of data
- Consolidate monthly data into quarters or years

The Data Handling Menu

To access the Data Handling Menu, select option 1 from the Main Menu of one of the Chart diskettes. The screen shows:



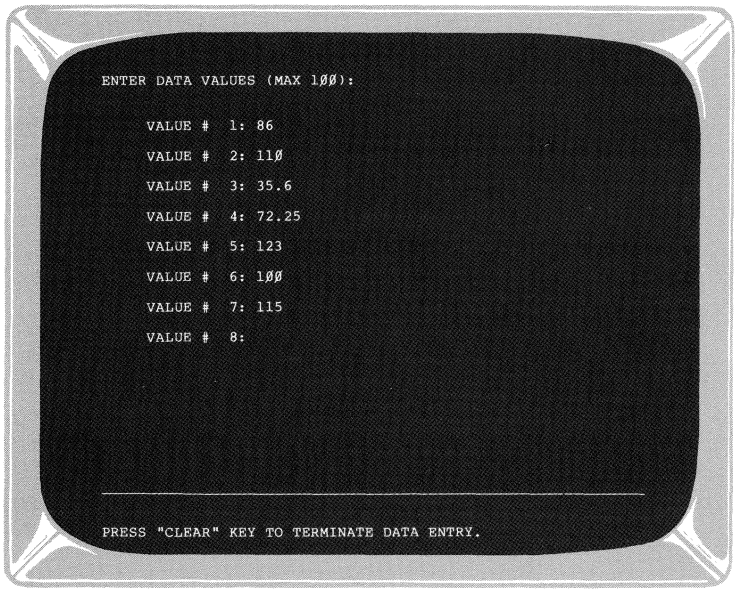
Data Handling options 1 through 3 let you enter new data from the keyboard, call data from a disk file, or generate a sequence of data. Options 4 through 8 let you edit, transform, display, print, and save the data. Option 9, the last Data Handling option, returns you to the Main Menu.

Entering Data From The Keyboard

Option 1 on the Data Handling Menu lets you enter data from the keyboard.

Choose this option (ENTERING DATA FROM THE KEYBOARD). When it is flashing, press (ENTER). The screen changes, and you are prompted to type in the first data value for the chart. The values you enter may contain up to ten characters, including any leading plus or minus sign or decimal point (positive values may range from .000000001 to 9999999999 and negative values from −.000000001 to −999999999). No commas are permitted. After you type in the value, press (ENTER). (Any data that existed in memory when you selected option 1 is lost.)

You are then prompted for another value. You can enter up to 100 values, one at a time.



To end the data entry, press (CLEAR) in response to any prompt. You return to the Data Handling Menu. (If you enter 100 values, you return to the Data Handling Menu automatically.)

To display the data, press (ENTER) when option 6 (DISPLAY DATA) is flashing. If the data overflows the screen, you can use ↑ or ↓ to scroll through it.

If the data is incorrect, press (CLEAR) to return to the Data Handling Menu. Press (ENTER) when option 4 (EDIT DATA) is flashing. At this point, you can edit according to the instructions for option 4.

When the data is correct, press (ENTER) when option 8 (SAVE DATA) is flashing. The cursor moves to the right side of the screen. Type a filename in standard TRSDOS format. (See Chapter 9 of this manual or your Model III Disk System Owner's Manual for details.)

When a menu option begins flashing again, a file has been created on Drive 0 with the filename you specified. (To load that file from a diskette, see the next section, "ENTERING DATA FROM A FILE.") The data is still available in current memory.

Entering Data From A File

Option 2 on the Data Handling Menu lets you recall data from a previously created disk file.

You can recall data from files created through the Data Handling Menu, from files in the same format created by other programs, and from VisiCalc DIF files. Several other types of files can be converted into an acceptable format through the file conversion program on the Device Driver diskette. (See Chapter 9 for details.)

When this option (ENTER DATA FROM FILE) is flashing and you press (ENTER), the cursor moves to the right and waits for you to type in a filename. Type the name of the file you want to load and press (ENTER). At this point, the data you load replaces any data that was in memory.

When the file is loaded from the diskette, option 6 (DISPLAY DATA) flashes. If you press (ENTER), the data is displayed. If the data overflows the screen, you can scroll through it using ↑ or ↓.

(If you wish to edit the data, press (CLEAR) to return to the Data Handling Menu. Then, choose option 4 (EDIT DATA) and press (ENTER). At this point, you can edit according to the instructions in option 4.)

If the file contains more than 100 values, only the first 100 are recalled, and a warning message is displayed.

VisiCalc DIF Files

You can retrieve a row or column of a VisiCalc file written in Data Interchange Format (identified by the filename followed by the extension /DIF). The file must have been saved in row or column format. DIF files cannot be used directly in the chart menus to create a picture. The row or column recalled through the Data Handling Menu must first be saved in a separate disk file.

If you specify a DIF file to the Data Handling Menu, the program responds with the number of rows and columns in the file. It asks whether you want to access a row or a column. After you respond with either ROW or COL, the program asks you to enter the row or column number. If the file is large, the program may take a few minutes to retrieve the data.

If the row or column of the DIF file contains more than 100 values, only the first 100 are recalled, and a warning message is displayed.

Generating A Sequence Of Data

Option 3 on the Data Handling Menu is used to create a series of data values. You supply the variables, and the program does the rest.

Choose option 3 (GENERATE A SEQUENCE OF DATA) and press (ENTER). When a new screen appears, you can select the sequence type — arithmetic or geometric.

Arithmetic — With this option, each successive value of the series equals the previous value plus a constant. You are asked to enter the initial data value, the constant (a positive or negative number) to be used as the increment, and the total number of values (up to 100) to be generated.

For example, if you enter 1 as the initial value, 2 as the constant, and 10 as the total number of values, the following series is generated: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19.

Geometric — When you select this option, each successive value of the series equals the previous value times a constant. You are asked to enter the initial data value, the constant (a positive or negative number) to be used as the factor, and the total number of values (up to 100) to be generated.

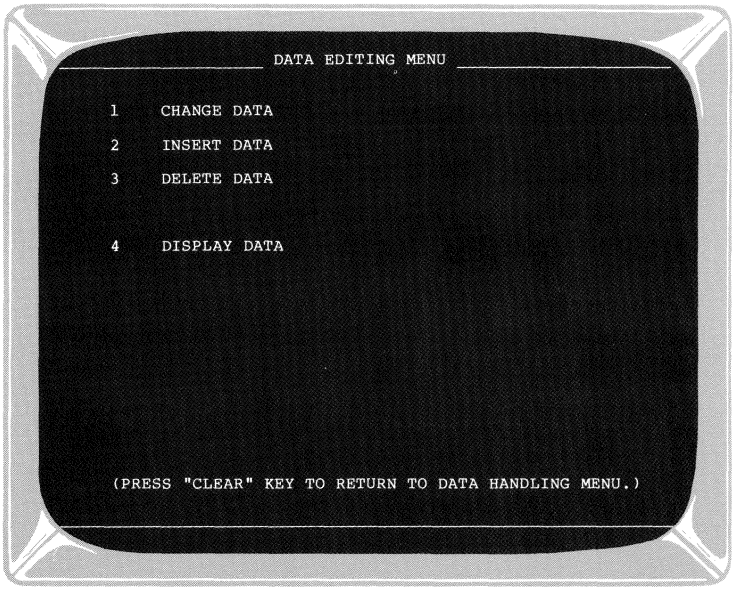
For example, if you enter 1 as the initial value, 2 as the constant, and 10 as the total number of values, the following series is generated: 1, 2, 4, 8, 16, 32, 64, 128, 256, 512.

When you enter the requested values, any data that was in memory is erased, and you return to the Data Handling Menu. You can restore the former data by pressing (CLEAR), unless you already have pressed (ENTER) after supplying the total number of values to be generated. When option 6 (DISPLAY DATA) flashes, press (ENTER) to display the data. If the data overflows the screen, you can scroll through it using ↑ or ↓.

(See Chapter 10 for an example of generating a sequence of data.)

Editing Data

Option 4 on the Data Handling Menu lets you change or delete data that is currently in memory or insert new data into the current data.



Once you've changed the data, press (CLEAR). The revised values are then displayed, and you can scroll through them using ↑ or ↓.

Press (CLEAR) again, and you are prompted to accept the changes by typing YES (or Y) and pressing (ENTER) or reject them by typing NO (or N) and pressing (ENTER). If you answer with NO, the edited data is discarded, and the original data is still available in memory. If you answer with YES, the edited data replaces the original data, which is then discarded. In either case, you return to the Data Editing Menu.

Before any changes are stored on a diskette, you must return to the Data Handling Menu by pressing (CLEAR) and save the data, using option 8 (SAVE DATA). (See Chapter 10 for an example of editing data.)

Changing Data Values

The CHANGE DATA selection on the Data Editing Menu replaces one or more current data values with new data values. When you make this selection, you are asked to enter the sequence number of the first data value to be changed. That value is displayed, and you are asked to enter the new value.

The program continues to prompt you for each successive new value. When the end of the data in memory is reached, or when you end the prompting by pressing (CLEAR), the revised data is displayed.

Inserting Data Values

The INSERT DATA selection on the Data Editing Menu inserts one or more values into the current data. You are asked to enter the sequence number at which the insertion is to begin. (The number may range from 1 to the number following the sequence number of the last current data value.) Any data values at that sequence number and beyond are moved down to accommodate the inserted values. You are prompted for the new data values, one at a time. Press (CLEAR) to display the revised data.

For example, assume that your current data consists of 10 values, and that you insert two values starting with sequence number 5. The new values are numbered 5 and 6, while the values originally numbered 5 through 10 are renumbered 7 through 12.

If you already have 100 data values in memory, the INSERT DATA selection does not work, and an explanatory message is displayed. If inserted values bring the total number of values to 100, the data is displayed immediately.

Deleting Data Values

The DELETE DATA selection of the Data Editing Menu removes one or more data values from your current data. You are asked to enter the sequence numbers of the first and last data values you wish to delete. (To delete a single value, enter its sequence number in response to both prompts.) The specified values and all values within that range of sequence numbers are deleted, and any subsequent values are moved up to close the gap in the sequence. The revised data is displayed immediately.

For example, if the current data consists of 10 values, and you delete the values from sequence numbers 2 through 4, the values originally numbered 5 through 10 are renumbered 2 through 7.

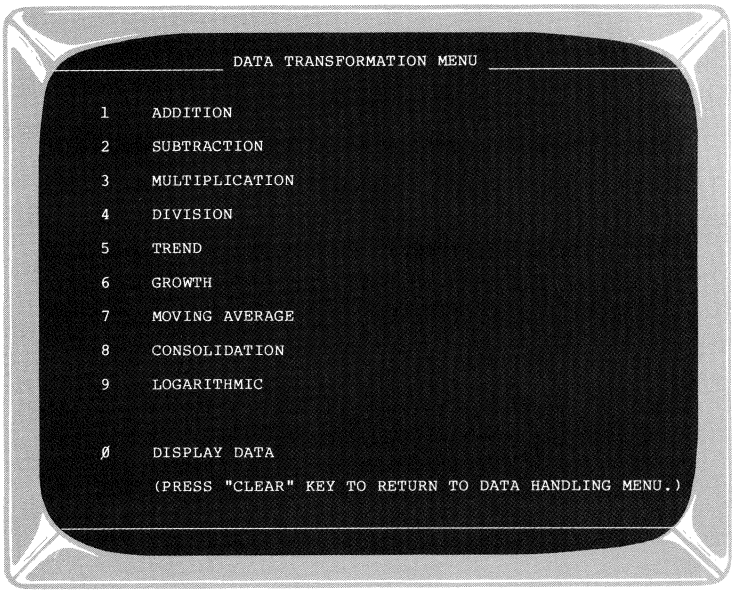
Displaying the Data

The DISPLAY DATA selection of the Data Editing Menu displays the current data without leaving the Editing Menu. Use this function to review data and check the sequence numbers of data values.

Transforming Data

Option 5 on the Data Handling Menu lets you change or combine data values by using one of nine mathematical functions built into the Business Graphics package.

Choose this option (TRANSFORM DATA) and press (ENTER). If there is data in current memory, the Data Transformation Menu is displayed. (If no data exists in current memory, this selection does not work, and an explanatory message appears.)



When a transformation function has been performed, the new data is displayed. You can scroll through it using ↑ or ↓. When you press **CLEAR**, you are prompted to accept the transformations by typing YES (or Y) and pressing **ENTER** or reject them by typing NO (or N) and pressing **ENTER**.

If you reject the transformations, they are discarded, and the original data is still available in current memory. If you accept the transformed data, it replaces the original data, which is then discarded. In either case, you return to the Data Transformation Menu.

To store the transformed data on a diskette, return to the Data Handling Menu, and select option 8 (SAVE DATA). (See Chapter 10 for an example of transforming data.)

Addition

The ADDITION function adds a constant to each data value. You are asked to enter the constant. The transformed data is then displayed.

For example, if you enter 5 as the constant, and the current data values are 10, 20, 30, 50, and 40, the transformed values are 15, 25, 35, 55, and 45.

Subtraction

The SUBTRACTION function subtracts a constant from each data value. You are asked to enter the constant. After you enter a constant, the transformed data is displayed.

For example, if you enter 5 as the constant, and the current data values are 10, 20, 30, 50, and 40, the transformed values are 5, 15, 25, 45, and 35.

Multiplication

The MULTIPLICATION function multiplies each data value by a constant. You are asked to enter the constant. The transformed data is then displayed.

For example, if you enter 5 as the constant, and the current data values are 10, 20, 30, 50, and 40, the transformed values are 50, 100, 150, 250, and 200.

Division

The DIVISION function divides each data value by a constant. After you enter the constant, the transformed data is displayed.

For example, if you enter 5 as the constant, and the current data values are 10, 20, 30, 50, and 40, the transformed values are 2, 4, 6, 10, and 8.

Trend

The TREND function calculates a trend fitted to the current data. If the data consists of fewer than 100 values, the trend can be projected for additional values. The total current and projected values may not exceed 100. The current data values are replaced by the calculated trend values. Projected values, if any, are added at the end.

Three types of trends can be generated:

- Linear (straight line)
- Quadratic (parabolic curve)
- Exponential (exponential curve)

The curve parameters are selected by the principle of least squares. That is, the program computes values that minimize the sum of the squares of the differences between the original data values and the corresponding values of the fitted trend.

When you select the trend type, you are asked to enter the number of projected values to be included, from zero to the maximum allowable. Enter a number within the specified range, and the calculated values are displayed.

The following sample sales data is used to illustrate the trend types.

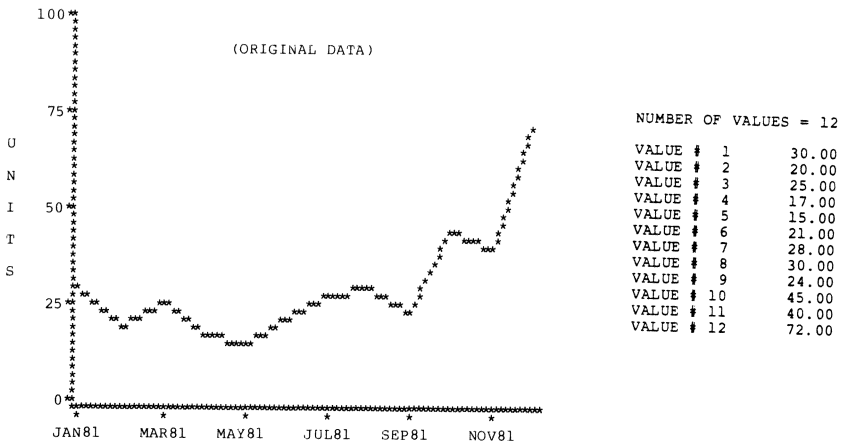


Figure 2-1. Base Data for Trend Examples.

In Figures 2-2, 2-3, and 2-4, two line charts are shown for each trend type. In the first chart of each set, a trend (depicted by a solid line) is fitted to the original data, which is shown as plus signs at the data points. In the second chart, the trend is projected for 12 months.

Linear (straight line) — The data for the two charts shown in Figure 2-2 was obtained by applying a linear trend to the sample sales data in Figure 2-1.

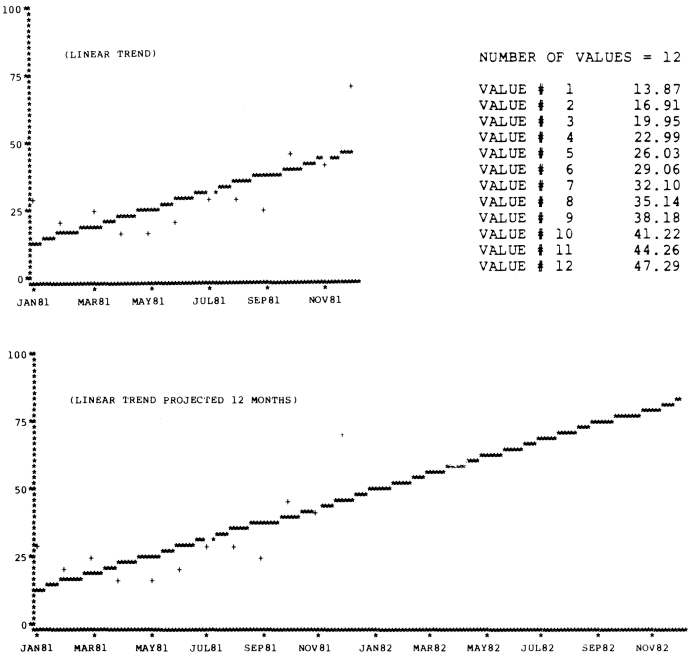


Figure 2-2. Linear Trends.

Quadratic (parabolic curve) — The data for the two charts shown in Figure 2-3 was obtained by applying a quadratic trend to the sample sales data in Figure 2-1. Note how the additional data in the projection (B) causes a change of scale and a perceived change in the shape of the curve.

A

B

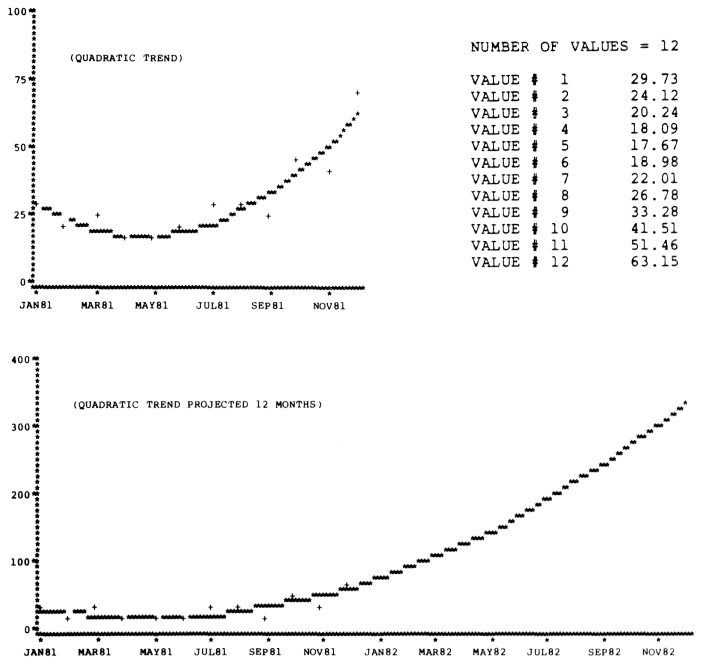


Figure 2-3. Quadratic Trends.

Exponential (exponential curve) — The data for the two charts shown in Figure 2-4 was obtained by applying an exponential trend to the sample sales data.

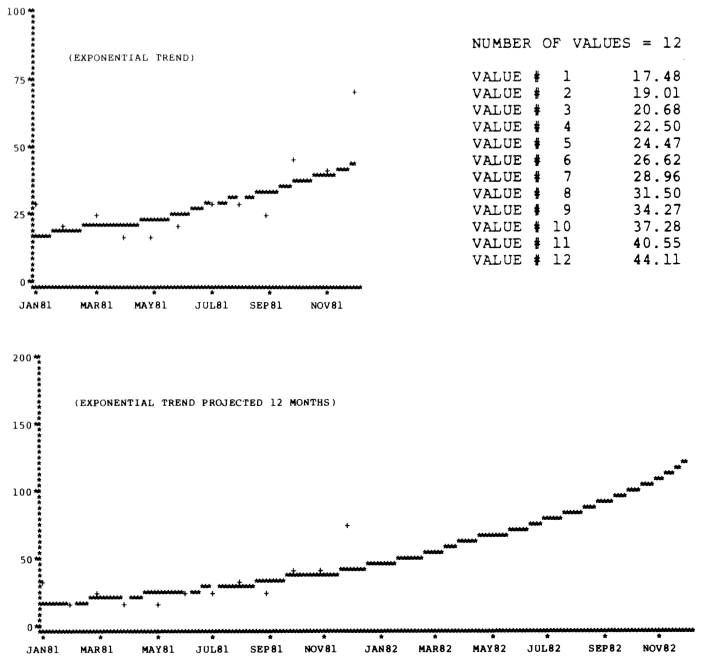


Figure 2-4. Exponential Trends.

Growth Projection

The GROWTH function projects growth in either an arithmetic or geometric pattern. This works like the arithmetic or geometric form of sequence generation (option 3 on the Data Handling Menu), except that the growth sequence begins with the last current data value.

When you select the growth type, you are asked to enter the constant and the number of values to be projected. (The number of projected values plus the number of existing values may not exceed 100.) The values are then displayed.

Arithmetic — With this growth type, each projected value equals the previous value plus a constant.

For example, assume that the current data values are 10, 20, 30, 50, and 40. If you enter 2 as the constant and 5 as the number of values to be projected, the transformed data values are 10, 20, 30, 50, 40, 42, 44, 46, 48, and 50.

Geometric — When you use this option, each projected value equals the previous value times a constant.

For example, assume that the current data values are 10, 20, 30, 50, and 40. If you enter 1.1 as the constant and 5 as the number of values to be projected, the transformed data values are 10, 20, 30, 50, 40, 44, 48.40, 53.24, 58.56, and 64.42.

Moving Average

The MOVING AVERAGE function "smooths" data by averaging each value with its nearest neighbors. You are asked for the number of values to be averaged.

For example, if you enter 3, each value is averaged with the values immediately preceding and following it. If you enter 4, each value is averaged with the two values just before it and one value following it. The transformed data is then displayed.

This function reduces the effect of fluctuations in data to show the overall trend. The higher the number of values averaged, the greater the smoothing effect. The number should be high enough to smooth out fluctuations in the data, but not so high as to suppress significant changes.

In Figure 2-5, the sample sales data used for the trend examples is smoothed with a moving average over three time periods. The original data is depicted by plus signs at the data points; the smoothed data is shown by the solid line.

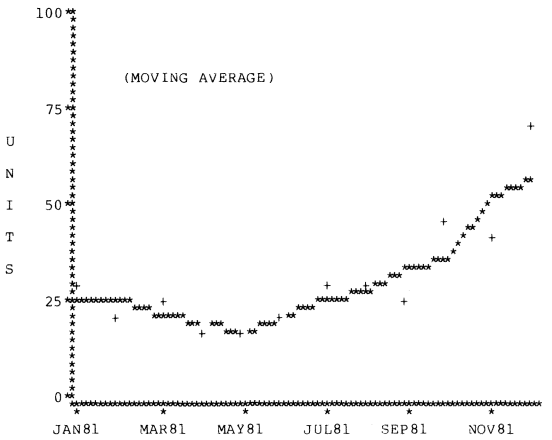


Figure 2-5. Moving Average.

The moving average was computed as shown in Figure 2-6.

Original Data	Moving Average
30.00	25.00
20.00	25.00
25.00	20.67
17.00	19.00
15.00	17.67
21.00	21.33
28.00	26.33
30.00	27.33
24.00	33.00
45.00	36.33
40.00	52.33
72.00	56.00

Figure 2-6. Moving Average Computation.

Consolidation

The CONSOLIDATION function compresses data by breaking it into consecutive sets and then summing each set. (It is typically used to consolidate monthly data into quarterly data, quarterly data into annual data, and so on.) You are asked to enter the number of values to be consolidated into each set. The transformed data is then displayed.

For example, if you use the original data values in the moving average example and enter a consolidation factor of 3, the transformed data values are 75, 53, 82, and 157. This is illustrated in the bar chart shown in Figure 2-7.

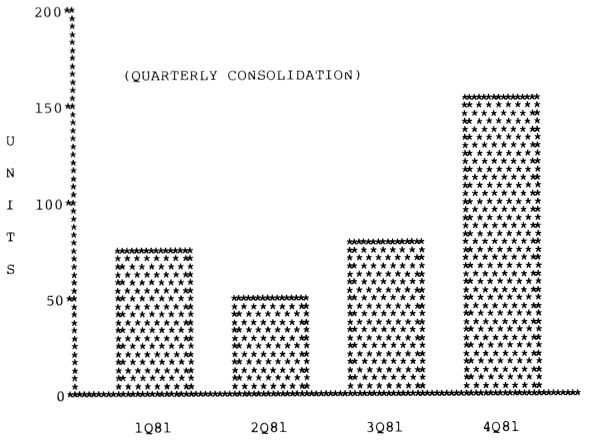


Figure 2-7. Consolidation.

Logarithmic Function

The LOGARITHMIC function calculates the common logarithm (base 10) of each data value and can be used to convert exponential growth in a series of data values to straight-line growth. The transformed data is displayed at once.

The line charts in Figure 2-8 show the effect of applying the logarithmic transformation to the data produced in the example of an exponential trend projection.

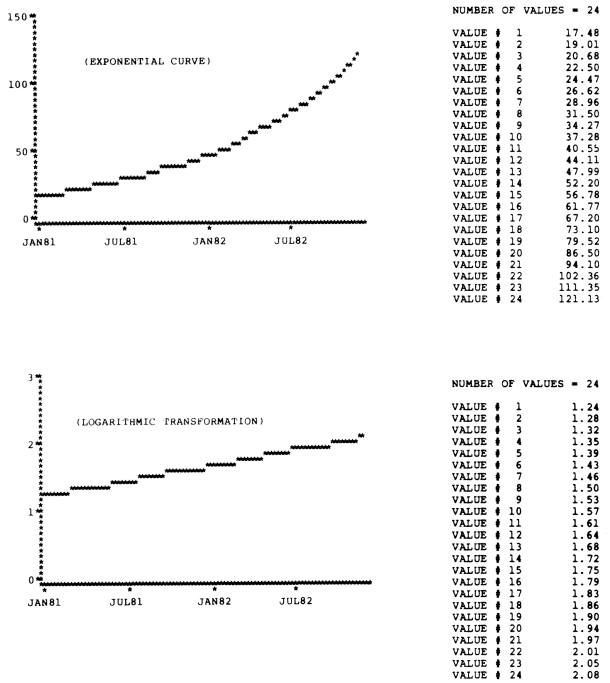


Figure 2-8. Logarithmic Exponential Trend.

Note: If you want to convert your logarithmic (base 10) results to natural logarithm (base e) results, multiply by the constant 2.30259. The MULTIPLICATION function can be selected for this purpose.

When you select the DISPLAY DATA option, the current data is displayed without leaving the Data Transformation Menu. This function is useful for previewing data before transforming it.

Displaying Data On The Screen

Option 6 on the Data Handling Menu is used to display the current data. When you choose this option (DISPLAY DATA) and press (ENTER), the display shows the total number of values in memory. If the data overflows the screen, you can scroll through it using (↑) or (↓).

Up to 11 characters can be displayed for a data value. Values are displayed with a decimal point, a leading minus sign if negative, and zero, two, or four decimal places. A number with more than 10 digits is replaced in the display with the message TOO LARGE; a number too small appears as 0. If the value contains more than six or seven digits, there may be some loss of precision.

Printing Data

Option 7 on the Data Handling Menu is used to print the current data on your printer. Data cannot be printed on a Multi-Pen Plotter.

Press (ENTER) when this option (PRINT DATA) is flashing. Now, you are asked to position the paper, turn the printer on, and press (ENTER). After you press (ENTER), printing begins.

If the printer or plotter is not ready when you press (ENTER), the program may stop. (With a Daisy Wheel II printer or dot-matrix printer that is turned on but is off-line, an error message appears. If this happens, you can correct the problem and continue.) If the program stops, press the reset button on the computer and start over. If you have not saved the revised chart in a disk file, the text changes are lost.

To stop printing, hold down (CLEAR) until printing stops.

Saving Data In A File

Option 8 on the Data Handling Menu lets you save the current data by storing it in a file on a diskette. Remember that data must be saved in a file before it can be used to produce a chart.

Choose this option (SAVE DATA) and press (ENTER). The cursor moves to the right and waits for you to type in the filename to be assigned to the data. (See Chapter 9 for valid filenames.) Press (ENTER) after you type the filename.

The save process takes several seconds. When the file has been written to the diskette, menu option 6 starts flashing. Your data is still available in current memory. If you wish to cancel the save function, press (CLEAR) instead of (ENTER). This cancels the function whether or not you have entered a filename.

Data in current memory is erased when you return to the Main Menu.

Returning To The Main Menu

Option 9 on the Data Handling Menu returns you to the Main Menu. (The return process takes a few seconds.)

You can specify this option either directly, by typing 9 (ENTER), or indirectly, by pressing (CLEAR) when the Data Handling Menu is displayed. After making your selection, you must press (ENTER) to return to the Main Menu.

Any data that has not been saved in a file is lost when the Main Menu reappears.

Caution: If you have made any changes to your data (edit, enter, generate, or transform) since last saving it in a file, you must SAVE the data (option 8) before selecting option 9 or your changes will be lost.

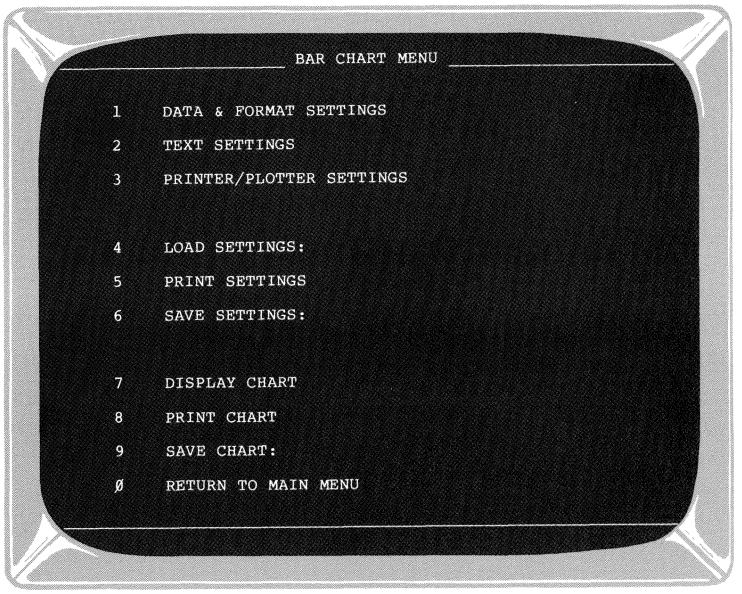
CHAPTER 3

Creating Charts

Once you have saved data in a disk file with the Data Handling Menu (Chapter 2), you are ready to create the chart itself. All settings for the chart — the data filename(s), chart format, titles, and labels — are selected or entered through the Chart Menu.

When you have set up your chart, the Chart Menu lets you display it on the screen, produce it on the printer or plotter, or save it in a disk file. You can also print or save the chart settings or load settings you have saved before.

To access a Chart Menu, select option 2 from the Main Menu of one of the Chart diskettes. The illustration below shows the Bar Chart Menu as an example.



You can supply the name of your data file(s) via option 1 on the Chart Menu and immediately produce a chart, using the default settings, or you can enter new settings.

The first two options on the menu offer different choices for the four types of charts and are discussed in Chapters 5 through 8. The remaining options are discussed in this chapter.

Output Device, Page Size, And Margins

When you select option 3 on the Line Chart, Bar Chart, or Scatter Chart Menu, the screen displays the printer or plotter for which your Chart diskette is configured, as well as the page size and margin settings. (For pie charts, page size and margins are preset, and the printer/plotter is specified from the Pie Settings Menu.)

Output Device

You can now produce your chart on dot-matrix Line Printer V, VI, or VIII, a Daisy Wheel Printer II, or a Multi-Pen Plotter. Support for other Radio Shack output devices will later be made available.

The diskettes in the Business Graphics -Analysis Pak are configured for the Line Printer VIII, which has a narrow carriage and a maximum 80-character print line. If you are using a Line Printer V or VI and want to produce a chart wider than 80 characters, you must change the device type. Also, if you are using a Daisy Wheel II or a Multi-Pen Plotter, you must reconfigure the diskette (explained in Chapter 9).

Page Size

You can adjust the page size for a line chart, bar chart, or scatter chart, but you cannot set the page height or width higher than the maximum for the device you are using.

Page Width (Chars) — You can enter the width of the page on which the chart is to be produced. The width can range from 35 to 80 character positions on the Line Printer VIII, from 35 to 67 on the Multi-Pen Plotter, and from 35 to 110 on all other printers. Defaults are 80 on the Line Printer VIII, 67 on the Multi-Pen Plotter, and 85 on all other printers.

Page Height (Lines) — You can enter the height of the page on which the chart is to be produced. The height can range from 30 to 52 lines on the Multi-Pen Plotter and from 30 to 66 lines on the printers. The defaults are 52 for the plotter and 66 for all printers.

Page Margins

Margins are automatically adjusted so that charts are centered within the specified page area. For a line chart, bar chart, or scatter chart, you can specify different margins.

Left Margin (Chars) and Right Margin (Chars) — You can specify the size of the left and right margins (between the chart and the edge of the paper) in character positions. The margins can range from 0 to 35 on the plotter, from 0 to 40 on the Line Printer VIII, and from 0 to 70 on all other printers.

If you specify both left and right margins, the chart is centered horizontally between them. If you specify only the left or the right margin, the chart is placed against whichever margin you specify.

Top Margin (Lines) and Bottom Margin (Lines) — You can specify the size of the top and bottom margins (between the chart and the edge of the paper) in lines. The margins can range from 0 to 20 on the plotter and from 0 to 36 on all printers.

If you specify both top and bottom margins, the chart is centered vertically between them. If you specify only the top or bottom margin, the chart is placed against whichever margin you specify.

Page dimensions and margins are illustrated in Figure 3-1.

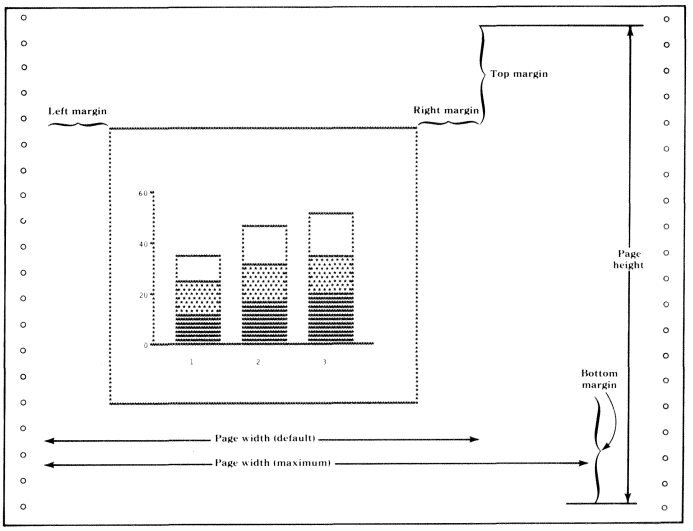


Figure 3-1. Page Dimensions and Margins.

Loading, Printing, And Saving Chart Settings

Chart settings (the data and format settings, text settings, and the printer/plotter settings) are the program instructions used to create a chart. They are all the information, other than the data values themselves, that you need to produce a chart.

Chart settings can be saved in a file on a diskette. Saved settings are useful for periodic reporting. For example, you can update the data files on which the chart is based, load the settings, and immediately produce a new chart with the updated data. However, you can also revise the settings before producing the chart, if you wish.

Load Settings

The LOAD SETTINGS option recalls from a diskette a file that contains all the settings for a chart. (This is option 4 on the Line Chart, Bar Chart, and Scatter Chart Menus and option 2 on the Pie Chart Menu.)

The cursor moves to the right and waits for you to enter a filename. Type the name assigned to the settings file and press (ENTER).

The loading process takes a few seconds. Settings can be loaded for the current chart type only.

You can review the settings by selecting the corresponding menu option. The chart settings in the file you loaded replace the default settings in the displays.

If you change the settings, only the version in the computer's memory is affected. Unless you save the changed settings, they are erased when you return to the Main Menu.

Print Settings

The PRINT SETTINGS option prints the current chart settings on the printer. (This is option 5 on the Line Chart, Bar Chart, and Scatter Chart Menus and option 3 on the Pie Chart Menu.) Note that settings cannot be printed on the plotter.

When you select this option, you are asked to position the paper, turn the printer on, and press (ENTER). After you press (ENTER), printing begins.

If your output device is a plotter, or if you are using a dot-matrix printer that is not turned on when you press (ENTER), the program stops. If this happens, press the reset button on the computer and start over. Any settings that have not been saved in a disk file are lost.

Save Settings

The SAVE SETTINGS option saves the current settings by storing them in a file on a diskette. (This is option 6 on the Line Chart, Bar Chart, and Scatter Chart Menus or option 4 on the Pie Chart Menu.) The cursor moves to the right and waits for you to type in the filename to be assigned. (See Chapter 9 for valid filenames.) Press (ENTER) after you type the filename.

The save process takes a few seconds. When the settings have been written to the diskette, SAVE SETTINGS begins flashing. The settings remain in memory. To cancel a save operation, press (CLEAR) instead of (ENTER). (This cancels the operation whether or not you have entered a filename.) Settings in current memory are erased when you return to the Main Menu.

Warning: Do not use the same filename you assigned to the chart data. If you do, the chart settings file replaces (and erases) the chart data file.

We suggest you use a filename sequence that uses extensions to differentiate between data files, settings files, and chart files. For example, you might use a filename such as SAMPLE/DAT for the data file, SAMPLE/SET for the settings file, and SAMPLE/CHT for the chart file.

Chart Output

Chart Menu selections let you:

- Display a chart on the screen
- Print or draw a chart on a printer or plotter
- Save a chart in a disk file

The chart produced is based on the current chart settings.

A chart that has been saved in a disk file can be recalled for display or printing through the Chart Text Editor Menu (discussed in Chapter 4).

Displaying a Chart

The DISPLAY CHART option generates and displays a chart, using the current settings. (This is option 7 on the Line Chart, Bar Chart, and Scatter

Chart Menus and option 5 on the Pie Chart Menu.) Several seconds elapse while the chart is prepared for display.

If the chart is larger than the screen, move the cursor (using →, ↑ ↓, or ←) to view the rest of the chart. When the cursor reaches the edge of the screen, the chart window scrolls automatically.

Press ENTER or CLEAR to return to the Chart Menu when the chart is displayed on the screen.

Printing a Chart

The PRINT CHART option generates a chart, using the current settings, and prints the chart on the printer or draws it on the Multi-Pen Plotter. (This is option 8 on the Line Chart, Bar Chart, and Scatter Chart Menus and option 6 on the Pie Chart Menu.) Several seconds elapse while the chart is being prepared for printing. You are next asked to position the paper, turn the printer/plotter on, and press ENTER.

If the printer or plotter is not ready when you press ENTER, the program may stop. (With a Daisy Wheel II printer, or a dot-matrix printer that is turned on but is off-line, an error message appears. You can correct the problem and continue.) If the program stops, press the reset button on the computer and start over. If you have not saved the chart in a disk file, it is lost.

To stop printing, hold down CLEAR until printing stops. On some printers, a few lines may be printed before the printing stops.

CLEAR does not stop the plotter, since (in most cases) the buffer contains the instructions for the entire picture.

Warning: If you turn the Multi-Pen Plotter off before the picture is finished, be sure to return the pen to its stall before you turn the plotter back on. Failure to do this may result in damage to the plotter.

Saving a Chart

The SAVE CHART option generates a chart, using the current settings, and saves it in a disk file. (This is option 9 on the Line Chart, Bar Chart, and Scatter Chart Menus and option 7 on the Pie Chart Menu.)

After you select this option, the cursor moves to the right and waits for you to type in the filename to be assigned. (See Chapter 9 for valid filenames.) Press ENTER after you type the filename.

Just as when saving chart settings, you should use a filename sequence with extensions to differentiate between data files, settings files, and chart files. For example, you might use a filename such as SAMPLE/DAT for the data file, SAMPLE/SET for the settings file, and SAMPLE/CHT for the chart file.

The save process takes several seconds. When the chart has been written to the diskette, SAVE CHART starts flashing. To cancel the save function, press CLEAR instead of ENTER. (This cancels the function whether or not you have entered a filename.)

Returning To The Main Menu

The RETURN TO MAIN MENU option displays the Main Menu. (This is option 0 on the Line Chart, Bar Chart, or Scatter Chart Menus, and option 8 on the Pie Chart Menu.)

The return process takes a few seconds. If the current version of the chart or the chart settings have not been saved, they are lost when you return to the Main Menu.

Note You can also return to the Main Menu from a Chart Menu by pressing (CLEAR) and (ENTER).

CHAPTER 4

Editing Chart Text

Charts saved in a disk file are accessed through the Chart Text Editor Menu. This menu lets you add, change, or move text anywhere in your chart while the picture is displayed. For instance, you can:

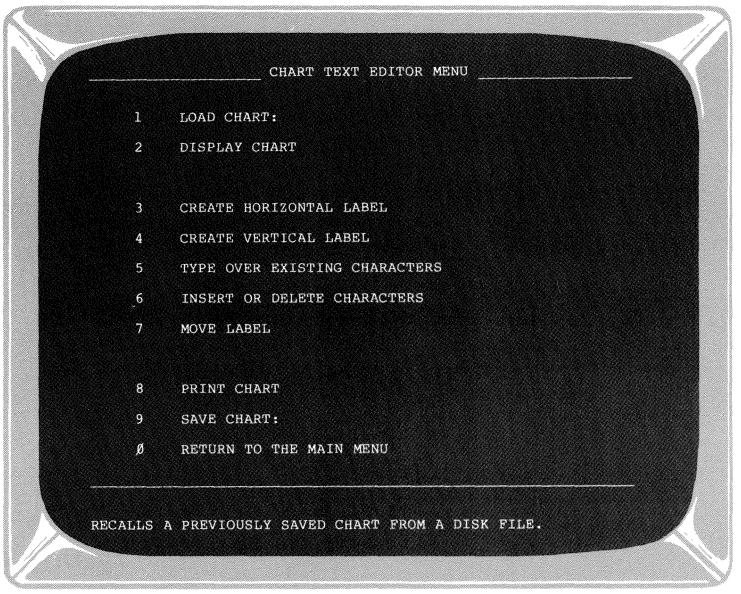
- Add titles
- Supply special labels
- Insert notes in or around the picture
- Change or delete any of the text in the chart
- Move text freely about the chart

When you are satisfied with the chart and its labels, you can save the chart in a disk file or produce a hard copy version on a printer or plotter.

The Chart Text Editor Menu also is used to display or print any chart you have saved on a diskette.

The Chart Text Editor Menu

The Chart Text Editor Menu is accessed from the Main Menus of the four Chart diskettes. After you load the Business Graphics package, the Main Menu for the chart type you are using appears. Use ↑ to move the cursor to option 3, which begins to flash. Press ENTER, and the Chart Text Editor Menu is displayed.



The Chart Text Editor Menu has two parts:

- General functions
- Editing functions

General Text Editor Functions

The general functions perform such tasks as loading a chart from a diskette, displaying it on the screen, saving it on a diskette, printing a chart on the printer/plotter, or returning to the Main Menu. The general functions are options 1, 2, 8, 9, and 0 on the Chart Text Editor Menu.

Loading a Chart

Option 1 on the Chart Text Editor Menu (LOAD CHART) loads (recalls) a chart from a diskette file. This option is flashing when the Chart Text Editor Menu is first displayed. You must load a chart before you can select any other option on the Chart Text Editor Menu (except RETURN TO THE MAIN MENU).

After you press (ENTER), the cursor moves to the right and waits for you to type in the name of the file you want to load. Type the filename and press (ENTER). The load process takes a few seconds.

Displaying the Chart

Option 2 on the Chart Text Editor Menu (DISPLAY CHART) should be your next selection after you load the chart. You must display the chart and position the cursor before you can select other menu options to add, change, or move chart text.

If all of the chart is not visible on the screen, move the cursor (by pressing (↑), (↓), (←), or (→)) to view the rest of the chart. When the cursor reaches the edge of the screen, the chart window scrolls automatically.

To return to the Chart Text Editor Menu when the chart is displayed, press (ENTER) or (CLEAR).

Printing the Chart

Option 8 on the Chart Text Editor Menu prints the chart on the printer or draws it on the plotter.

After you select this option (PRINT CHART), several seconds may elapse while the chart is being prepared for printing. Then, you are prompted to position the paper, turn the printer/plotter on, and press (ENTER).

If the printer or plotter is not ready when you press (ENTER), the program may stop. (With a Daisy Wheel II or dot-matrix printer that is off-line, an error message appears. If this happens, correct the problem by putting the printer on-line, then continue.) If the program stops, press the reset button on the computer and start over. If you have not saved the revised chart in a disk file, the text changes are lost.

To stop printing, hold down (CLEAR) until printing stops. On some printers, a few lines may be printed before the printing stops.

(CLEAR) stops the plotter from receiving additional data, but completes processing data already received.

Note: If you turn the Multi-Pen Plotter off before the chart is finished, be sure to return the pen to its stall before you turn the plotter back on. Failure to do this may result in damage to the plotter.

Saving the Chart

Once you've made the changes, option 9 on the Chart Text Editor Menu lets you save the modified chart in a diskette file.

When you select this option (SAVE CHART), the cursor moves to the right and waits for you to type in the filename to be assigned. (See Chapter 9 for valid filenames.) Type the filename and press (ENTER).

The save process takes several seconds. When the chart has been saved in a diskette file, option 2 (DISPLAY CHART) begins flashing. The chart remains in memory.

To cancel the save function, press (CLEAR) instead of (ENTER). (This cancels the function whether or not you have entered a filename.) If you don't save the current chart, the editing changes are erased when you return to the Main Menu or load another chart.

Returning to the Main Menu

The Main Menu is redisplayed when you select option 0 on the Chart Text Editor Menu. The return process takes a few seconds.

If the current version of the chart has not been saved, the text changes are lost upon returning to the Main Menu.

Pressing (CLEAR) when a Chart Text Editor Menu is displayed is another way to select the RETURN TO MAIN MENU option. After pressing (CLEAR), press (ENTER) to display the Main Menu.

Editing Functions

The editing functions are the operations that change the chart labels. These functions create new labels (both horizontal and vertical), type over existing labels, insert or delete characters, and move labels. They are options 3 through 7 on the Chart Text Editor Menu.

Before you can select any of the editing functions, you must load and display the chart (using options 1 and 2) and position the cursor on the screen.

If you want to create new text, position the cursor where the text is to begin. If you want to change, delete, or move existing text, position the cursor anywhere on that line of text.

If the text you enter or move overlays part of the chart, that part of the chart is erased to provide a blank background for the lettering. This blank background is preserved on the printer but not on the plotter. (On the plotter, characters are drawn over the chart elements.) If you later move or delete the text, the "hole" (blank background) remains on the screen but not in the printed chart.

If the text you enter or move overlays other text, you are asked to move the entry to another location. (See "Overlapping Labels" for details.)

Each label produced by the Business Graphics-Analysis Pak is entered individually. The horizontal-axis labels for bars or data points, for example, are a series of separate entries. If you want to change, delete, or move the

labels, you must do so one at a time. If you delete or suppress all labels when you create the chart, you can enter the labels as one line of text.

Each character cell on the TRS-80 screen uses the space of two vertical lines. When you enter text, the screen displays the characters in the center of the character cells. When printed, the characters are slightly higher. (On the Multi-Pen Plotter, some program-supplied labels are printed in the lower part of the cell.)

Text entered through the Chart Text Editor Menu is not affected by the page size and page margins established in the printer/plotter settings. You can enter text up to the full screen size (11" by 11") — that is, as far as the cursor can move. If the text exceeds the maximum page width of the output device, the label is truncated on a Multi-Pen Plotter. On a printer, the line "wraps around" (continues on the next line).

If a page size of less than 110 characters by 66 lines is in effect, dashed lines on the screen indicate the page boundaries. (The dashed lines do not appear on printed copies.) The page begins at the bottom-left corner of the screen, where the cursor is first positioned. The dashed lines appear only at the top and/or right of the display.

If you are doing extensive editing, it is a good idea to save the chart periodically, preferably using a new name.

During the editing process, use (ENTER) to move back and forth between the Chart Text Editor Menu and the displayed chart. In most cases, pressing (CLEAR) when the chart is displayed also makes the editing change and returns you to the Menu. (If you have selected option 2, `INSERT OR DELETE CHARACTERS`, pressing (CLEAR) deletes characters. You must press (ENTER) to return to the Menu.) When the Menu is displayed, pressing (CLEAR) selects option 0 (`RETURN TO MAIN MENU`).

When you finish editing the chart text, you can:

- Display the chart with option 2
- Print the chart with option 8
- Save the chart with option 9

If you do not save the edited chart, the editing changes are discarded when you return to the Main Menu or load another chart. (See Chapter 10 for an example of chart text editing.)

Creating New Labels

You can insert horizontal or vertical lines of text on a previously created chart by selecting menu option 3 or 4 of the Chart Text Editor Menu (`CREATE HORIZONTAL LABEL` or `CREATE VERTICAL LABEL`).

Before selecting one of these options, display the chart (using option 2) and position the cursor where you want the label to begin. Next, press (ENTER) to return to the Chart Text Editor Menu.

The maximum length of the label is 64 characters. To add new horizontal text, select option 3. To add new vertical text, select option 4. If the chart was created for a printer, the chart is displayed immediately.

If the chart was created for a plotter, the color selection menu appears:

```
LABEL COLOR:
    1  BLACK        4  GREEN
    2  RED          5  VIOLET
    3  BLUE         6  ORANGE
```

Each color corresponds to the indicated pen stall. (For example, if you select `RED`, the pen in stall 2 is used.) After you select a color, your chart is displayed.

Type in the characters you want and press (ENTER). Until you press (ENTER), you can correct any errors by using ← or ↑ and re-entering the text. You cannot erase characters you have entered, although you can blank them out by backing up and spacing over them. If you want to delete characters or move the label, you must return to the Chart Text Editor Menu and select option 6 or 7 (`INSERT OR DELETE CHARACTERS` or `MOVE LABEL`).

If the entry overlaps existing text, you are asked to move your new text. (See "Overlapping Labels" for details.)

Typing Over Existing Characters

Option 5 on the Chart Text Editor Menu lets you change existing characters in a label or title.

Before selecting this option, display the chart (using option 2) and position the cursor anywhere a change is needed on the label. Press (ENTER) to return to the Chart Text Editor Menu.

When you select option 5 (`TYPE OVER EXISTING CHARACTERS`), the chart is displayed again. Move the cursor (using ↑, ↓, ←, or →) to the first character you want to change. Type over the text currently displayed. If you wish, you can extend the length of the label.

After you make all the desired changes, press (ENTER). If your new text overlaps existing text, you are asked to move your entry. (See "Overlapping Labels" for details.)

Inserting or Deleting Characters

Option 6 on the Chart Text Editor Menu lets you insert characters into or delete characters from an existing label or title.

Before choosing this option (`INSERT OR DELETE CHARACTERS`), display the chart (using option 2) and position the cursor anywhere you want to make an insertion or deletion on the label. Next, press (ENTER) to return to the Chart Text Editor Menu.

When you select option 6, the chart is displayed. You can make any number of insertions and deletions on the label.

To delete characters, move the cursor to the desired point on the label (using ↑, ↓, ←, or →). Press (CLEAR) for each character you want to remove. (To delete an entire label, move the cursor to the first character.) As characters are deleted, the space is closed up. Any remaining characters are moved to the left in horizontal text or moved up in vertical text.

To insert characters, move the cursor to the desired point (using ↑, ↓, ←, or →) — anywhere from the first character of the label to the position

following the last character. Type the characters you want to insert. If you are not at the end of the text, the characters under and beyond the insertion are moved ahead — to the right in horizontal text or down in vertical text.

If the insertion moves the label over part of the picture, you can back the label out and restore the picture (anytime before you press (ENTER)) by deleting characters.

After you make all the desired changes, press (ENTER). You are asked to move the label if changes cause it to overlap existing text. (See "Overlapping Labels" for details.)

Moving Labels

Option 7 on the Chart Text Editor Menu lets you move an entire label to another location.

Before you select this option (MOVE LABEL), display your chart (using option 2) and position the cursor anywhere on the label that you wish to move. Press (ENTER) or (CLEAR) to return to the Chart Text Editor Menu.

When you select option 7, the chart is displayed. Now, when you press the arrow keys, the label moves with the cursor. The chart scrolls automatically if you reach the edge of the screen.

If you move the text across the picture, part of the picture will be suppressed to provide a blank background for the lettering. As you move the text around, the blank background moves with it and the picture reappears. The blank background is preserved on the printer but not on the plotter.

When the text is where you want it, press (ENTER). You can place the label anywhere — inside or outside the chart — as long as it does not overlap another label. (See "Overlapping Labels" for details.)

Overlapping Labels

If you try to create, change, or move a label so that it overlaps existing text, the Business Graphics package rejects your entry. When you press (ENTER) or (CLEAR), an error message is displayed. It instructs you to move the label.

You cannot change, delete, or manipulate the text in any way before you move the label. Pressing any key on the keyboard automatically selects option 7 (MOVE LABEL) and redisplays the chart. Move the label (using (↑), (↓), (←), or (→)) so that it no longer overlaps any other text. Then, press (ENTER). Once the label is accepted, you can delete it, change it, or make another menu selection.

If you are instructed to move the label, but you cannot see any overlapping, you have run into a blank space in a label or title. This could happen if you entered a blank title to preserve space for legends or notes within the chart frame, or if you eliminated unwanted text by spacing over it, rather than by deleting characters. After you move the label you just entered, you can correct the blank label.

To delete a blank label, position the cursor where the overlap message first was displayed. Then select option 5 (TYPE OVER EXISTING CHARACTERS). If a label exists at the cursor's position, the chart is displayed. Move the cursor as far as you can by using (←) or (↑). When the cursor does not move, you are

at the beginning of the label. Return to the Chart Text Editor Menu and select option 6 (INSERT OR DELETE CHARACTERS). When the chart is displayed, press (CLEAR) repeatedly to delete the blanks.

CHAPTER 5

Using The Line Chart Diskette

In a line chart, sequential values (usually time-related) are plotted against a numeric scale. In most cases, line charts show the flow of change from one time period to the next. Each time period or item number on the horizontal scale is associated with a data point, whose value is indicated on the vertical scale.

Line charts created with the Business Graphics package can contain up to three curves, each representing up to 100 values. A curve can be represented by individual data points or by a line that connects the points. Curve lines can be shaded. If you have the Multi-Pen Plotter, you can use a different color for each curve.

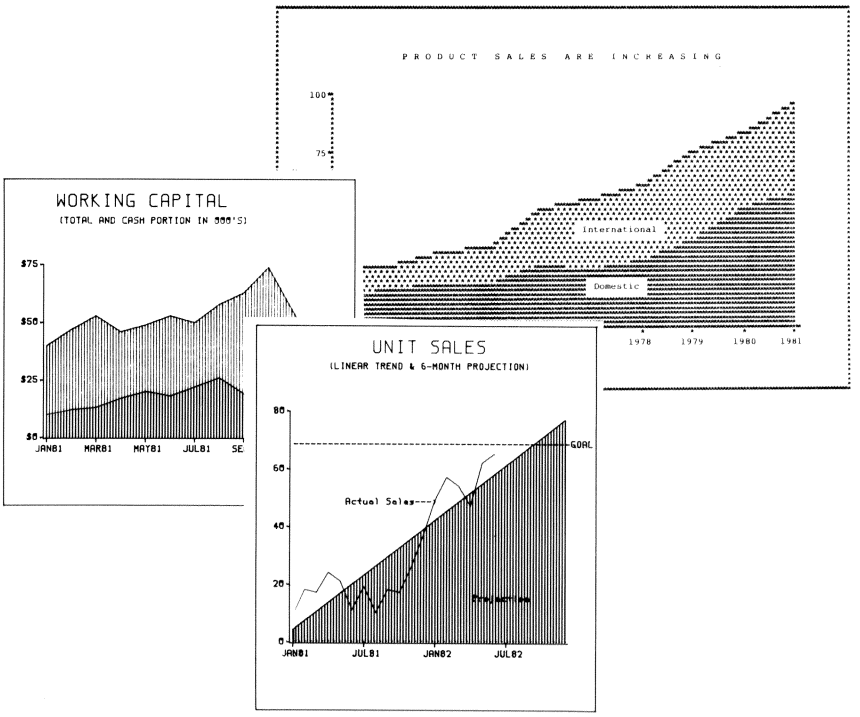
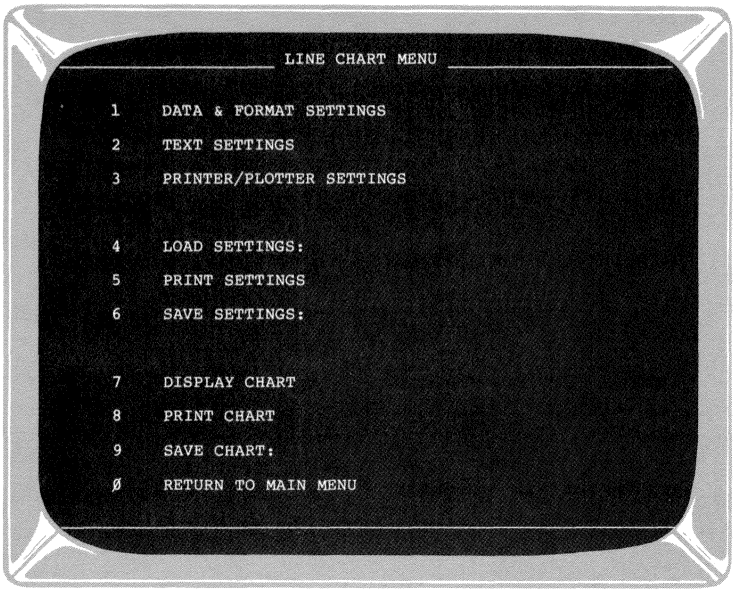


Figure 5-1. Line Charts.

The Line Chart Menu

Line charts are created through the Line Chart Menu which is accessed through the Main Menu of the Line Chart diskette.



All Line Chart Menu choices, except options 1 and 2, are the same as on all Chart menus and are described in Chapter 3. Option 1 of the Line Chart Menu lets you enter data filenames and control the curve formats and parameters of the axes for the chart. Option 2 lets you enter titles and labels or request a chart frame. These two options are described in this chapter.

A line chart can contain up to three curves, each based on the data from one file. The values in each file are charted as a series of data points usually connected by a solid, dashed, or dotted line. The values are plotted sequentially, with each curve beginning at the vertical axis.

You can specify up to three data files. The files do not have to contain the same number of values. If a file contains more than 100 values, only the first 100 are used.

The elements of a line chart are illustrated in Figure 5.2.

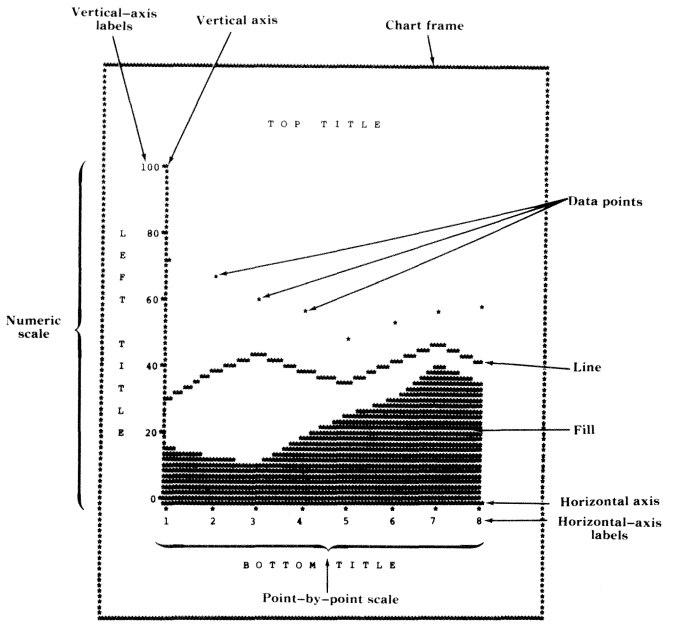
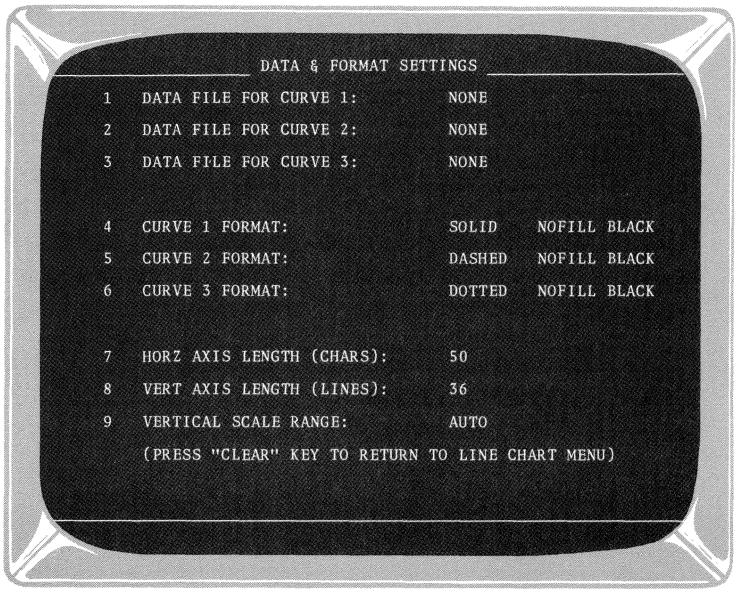


Figure 5-2. Elements of a Line Chart.

The chart and chart settings you create or change through the Line Chart Menu affect only the data currently in the computer's memory. If you do not save the settings or the chart, both are lost when you return to the Main Menu.

Data And Format Settings

When you select option 1 on the Line Chart Menu, the Data & Format Settings Menu and default settings are displayed as shown below. Options 1 through 3 on the Data & Format Settings Menu let you specify the data files to be used. Options 4 through 6 access the Curve Format Menu. Options 7 through 9 let you specify the parameters of the axes.



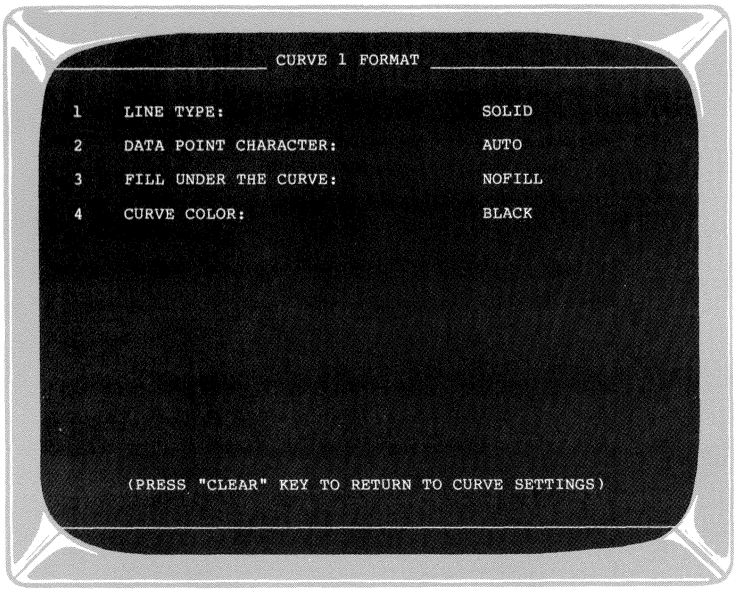
Data Filenames

A line chart can be based on up to three files, each represented by a curve. When you select option 1, 2, or 3 on the Data & Format Settings Menu, the cursor moves to the right and waits for you to type in the name of the file. Press (ENTER) after the filename.

You can delete a filename by typing NONE (the default setting) and pressing (ENTER). If you do not enter a filename for curve 1, or if you enter a filename for curve 3 but not for curve 2, no line chart can be produced. Chart settings can be saved, if desired.

Curve Formats

Options 4, 5, and 6 control the curve formats, that is, how you want the curves to look. When you select one of these options, the Curve Format Menu and default settings are displayed, as shown for curve 1, following.



You can select and change any of the settings.

Line Type — This option specifies the type of line that is to connect the data points in the curve. Select one of the following:

SOLID — Default setting for Curve 1
DASHED — Default setting for Curve 2
DOTTED — Default setting for Curve 3
NOLINE — No connecting line

The SOLID, DASHED and DOTTED line types are illustrated in Figure 5-3. A curve without connecting lines (NOLINE) is shown in Figure 5-4. If you want shading under the curve, you must select SOLID as the line type. (For details on shading, see the section, "Fill Under the Curve," below.)

Data Point Character — This option lets you select the symbol to be printed at each data point. You can enter any character, such as *. If you use AUTO (the default setting), the data points are marked by the character used for the line.

Fill Under the Curve — This option lets you shade below the curve to the bottom border (the horizontal axis). Select DARK, LIGHT, or NOFILL (default setting). Shading types are illustrated in Figure 5-4. Shading can be drawn under solid lines only. If the line type is DASHED, DOTTED, or NOLINE, any shading request is ignored and a warning message is displayed. On a Multi-Pen Plotter, shading is drawn with the same pen that was used for the curve.

If the curve is shaded, any special data point character changes back to the default setting (AUTO) and a message is displayed.

If a line chart contains more than one curve, fill can be used effectively as long as the curves do not cross. (If you fill under curves that cross, the chart may be impossible to read.) Dark shading could be used for the bottom curve, light shading for the middle curve, and no shading for the top curve. When colored shading is used, the colors should also go from dark to light.

Curve Color (Multi-Pen Plotter only) — This option refers to the pen color to be used. Select one of the following:

1	BLACK	4	GREEN
2	RED	5	VIOLET
3	BLUE	6	ORANGE

If you do not specify a color, BLACK is used. The color keyword corresponds to the indicated pen stall. For example, if you select `RED`, the pen in stall 2 is used.

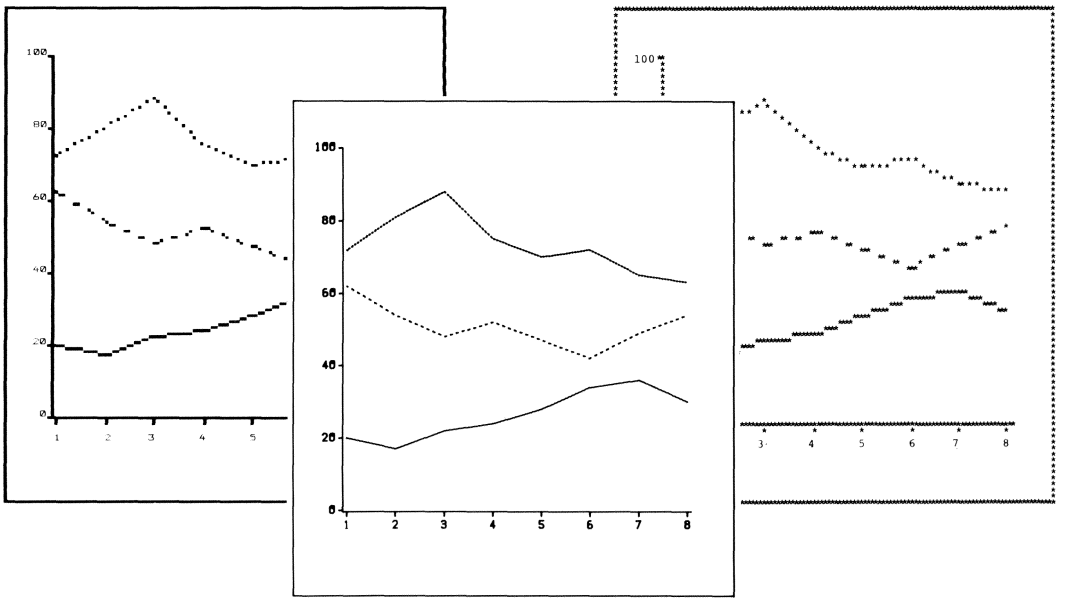


Figure 5-3. Line Types.

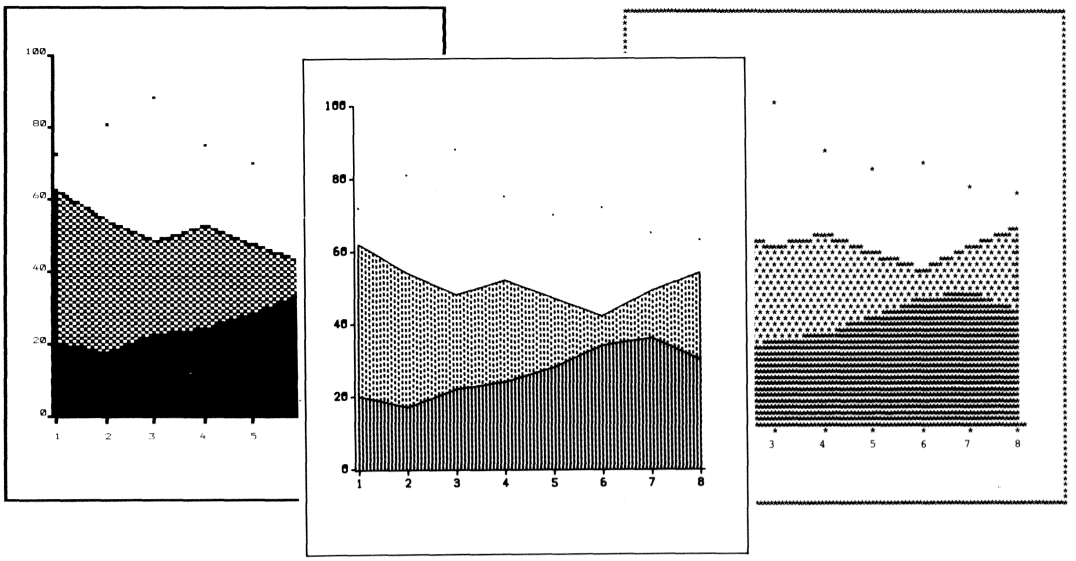


Figure 5-4. Shading/Unconnected Points.

Axis Parameters

Options 7-9 on the Data & Format Settings Menu let you specify the length of the horizontal and vertical axes and the range of the numeric scale.

Horizontal Axis Length (Characters) — This option lets you enter the maximum width of the space in which the curves are to be drawn. The

default setting is 50 character positions (5″). You may enter any whole number from 20 to 100. If necessary, the length is reduced so that a label can be printed at the end of the border. (See "Horizontal-Axis Labels" under "TEXT SETTINGS" for more details.)

Vertical Axis Length (Lines) — This option specifies the height of the space in which the curves are drawn. The default setting is 36 lines (6″). You may enter any even multiple of 6, from 18 to 48. Labels are printed on every sixth line, marking off from three to eight intervals on the numeric scale. (See "Vertical Scale Range" below for further details.)

Vertical Scale Range — This option specifies the lower and upper limits for the numeric scale along the vertical axis. If you use the default setting (AUTO), the program computes a range based on the data in your files.

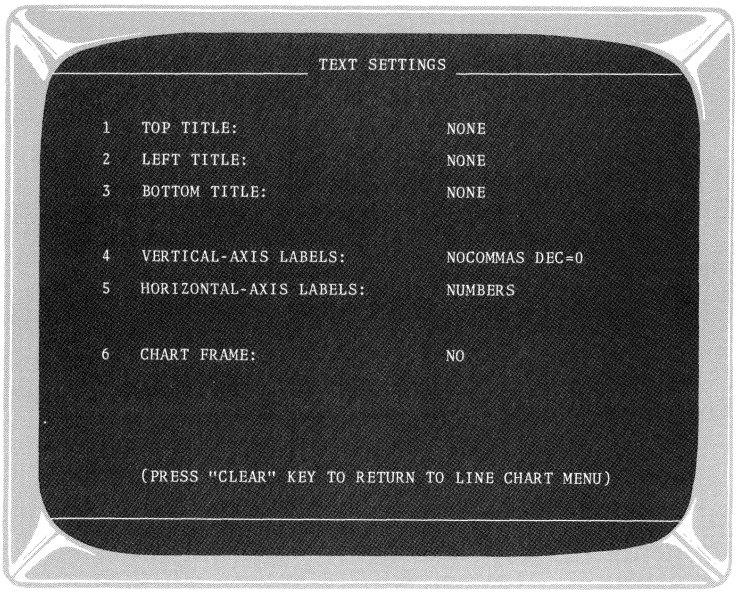
To control the range, enter the lower limit of the scale, a blank or comma, and the upper limit. (If any data values fall outside that range, an error message appears, and no chart is produced.) You can restore automatic scaling by entering AUTO.

With automatic scaling, the program extends the range, if necessary, to provide better scale labels. If you specify the range, you may also want to specify the length of the vertical axis. For best scale results, the range should divide evenly by the number of intervals.

The label multiple is the total range divided by the number of intervals. For example, if your numeric scale ranges from 0 to 100, an axis length of 24 or 30 (four or five intervals) produces labels that are multiples of 25 or 20 (100/4 or 100/5). If the range is 150 to 300, an axis length of 18 or 36 (three or six intervals) produces labels that are multiples of 50 or 25 (150/3 or 150/6).

Text Settings

Option 2 on the Line Chart Menu lets you supply titles, control the labels of the axes, and request a frame for the line chart. The default settings are shown on the screen.



If you save the chart in a disk file, you can insert, change, move, or delete text. This is done through the Chart Text Editor as described in Chapter 4.

Titles

You can supply up to three titles, one each centered at the top, left, and bottom of the line chart. Top and bottom titles can be enlarged. If you are using the Multi-Pen Plotter, you can also select the color for each title.

When you select option 1, 2, or 3 from the Text Settings Menu, the choices for that title (top, left, or bottom) are displayed.

Title — You can enter up to 50 characters for the top or bottom title, and up to 25 characters for the left title. (Any blanks entered before or after the text are retained.) If the top or bottom title exceeds the chart width (length of the horizontal axis), or if the left title exceeds the chart height (length of the vertical axis), some characters at the end are lost and a warning message appears.

You can delete the title by typing NONE (ENTER).

Left titles are printed vertically and require two lines for each character. For example, a 10-character left title requires 20 lines.

Color (Multi-Pen Plotter only) — This option refers to the pen color to be used to write the title. Select one of the following:

1	BLACK	4	GREEN
2	RED	5	VIOLET
3	BLUE	6	ORANGE

If you do not specify a color, BLACK is used. The color number corresponds to the indicated pen stall. For example, if you select BLUE, the pen in stall 3 is used.

Character Size/Spacing — This option can be used to enlarge the top or bottom title. (The left title cannot be enlarged.) On a Multi-Pen Plotter, the character size is doubled. On a printer or on the screen, a space is inserted between characters. Select DOUBLE for an oversize title. The default setting is NORMAL.

Vertical-Axis Labels

Option 4 from the Text Settings Menu lets you control the format of the numeric scale labels which are printed to the left of the vertical axis. (See "Vertical Scale Range" under "DATA AND FORMAT SETTINGS" for details.) The following settings are available:

Commas Inserted — Type YES and press (ENTER) to have commas inserted in values of 1000 or more (for example, to print 1000000 as 1,000,000). NO is the default setting.

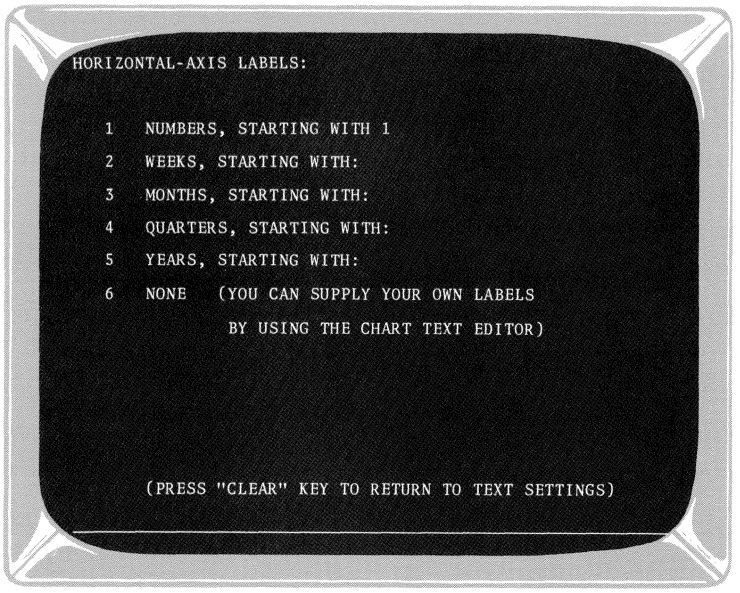
Number of Decimal Places — Enter the number of digits (0, 1, or 2) to be printed to the right of the decimal point. The default setting is 0, which means that no decimal points are printed.

Leading Character — You can enter one character, such as a dollar sign, to be printed immediately to the left of the scale label. NONE is the default setting.

Horizontal-Axis Labels

Option 5 from the Text Settings Menu lets you specify the type of labels to be printed along the horizontal axis (the point-by-point or time scale).

The menu choices are displayed:



Numbers, Starting with 1 (default setting) — This option refers to the sequence numbers of the data values. If you do not want the sequence to start with 1, select option 5 (YEARS, STARTING WITH:).

Weeks, Starting With — Enter a starting week in the form nnWyy, where nn is the week number from 1 to 52, and yy is the last two digits of the year. (If more than two digits are entered for the year, only the last two are used.) For example, enter 1W82 if the first data value is for the first week of 1982. The week number is increased by 1 for each data point. When week 52 is reached, the week number returns to 1 and the year number is increased by 1 for the next data point.

Months, Starting With — Enter a starting month in the form mmmyy, where mmm is the first three letters of the month and yy is the last two digits of the year. (If more than two digits are entered, only the last two are used.) For example, enter JAN82 if the first data value is for January, 1982. Data points are labeled consecutively through December. For the next data point, the month is set back to January and the year number is increased by 1.

Quarters, Starting With — Enter a starting quarter in the form nQyy, where n is the quarter number from 1 to 4, and yy is the last two digits of the year. (If more than two digits are entered for the year, only the last two are used.) For example, enter 2Q82 if the first data value is for the second quarter of 1982. The quarter number is increased by 1 for each data point. When quarter 4 is reached, the quarter number returns to 1 and the year number is increased by 1 for the next data point.

Years, Starting With — Enter a starting year in the form yy, where yy is the last two digits of the year. (If more than two digits are entered, only the last two are used.) For example, enter 80 if the first data value is for 1980. The

number is increased by 1 for each data point. Yearly labels are simply sequence numbers with a specified starting point. Any 2-digit number can be used to begin the sequence.

None — No labels or tick marks are printed along the horizontal axis.

If there is enough room, every data point or every other data point is ticked and labeled (unless NONE is selected). Otherwise, the interval between labels (and tick marks) depends on the type of label requested:

Label Type	Interval
Numeric and Annual	1, 2, 5, 10, 20, or 40
Weekly	1, 2, 4, 13, 26, or 52
Monthly	1, 2, 6, 12, 24, or 48
Quarterly	1, 2, 4, 8, 20, or 40

If you want to supply your own labels through the Chart Text Editor Menu (described in Chapter 4), you can obtain tick marks by selecting one of the standard label types. You can then replace the labels the program supplies with labels of your own.

Chart Frame

You can have a box drawn around your line chart to frame it. Select option 6 from the Text Settings Menu and enter YES if you want to frame the chart. No frame is drawn by default.

CHAPTER 6

Using The Bar Chart Diskette

In a bar chart, the length of each bar or bar segment represents the value of the corresponding data item as measured against the vertical scale. Bar charts emphasize individual data values and make it easy to compare one item to another.

Bar charts created by the Business Graphics-Analysis Pak can have up to 100 bars, each representing one value. Bars can also be stacked into two or three segments, or clustered into groups of two or three bars each. (Because stacked and grouped bars must be wider to allow for shading, the maximum number of stacked bars is 49. Up to 19 2-bar groups or up to 14 3-bar groups can be produced.)

Bars that represent positive values extend upward from the base line; those that represent negative values extend downward. Bars or bar segments can be shaded. If you have a Multi-Pen Plotter, you can use a different color for each set of bars or segments.

See Figure 6.1 for some sample bar charts.

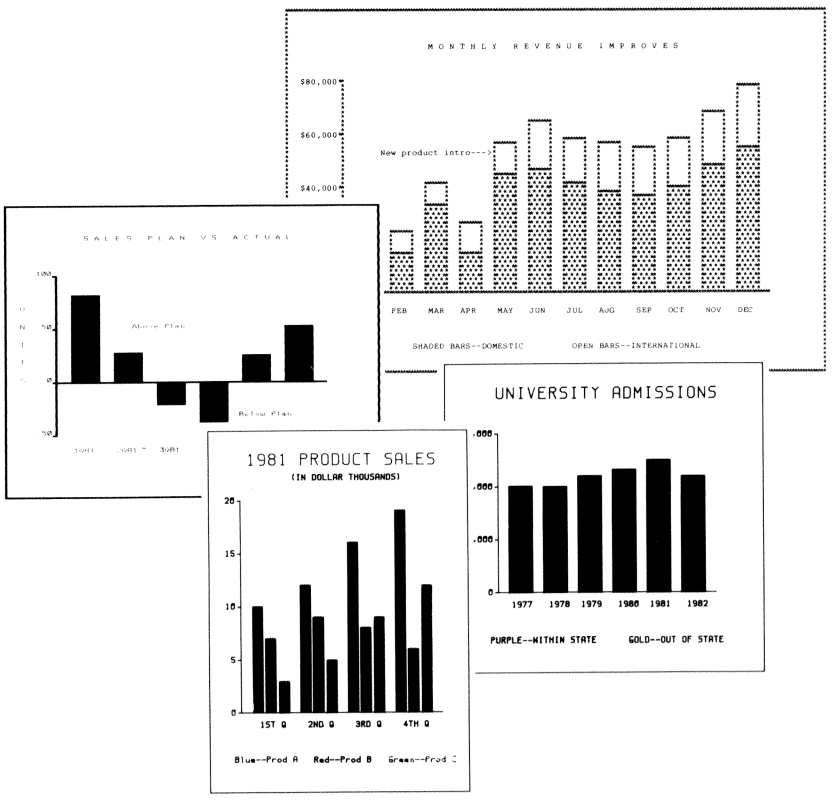
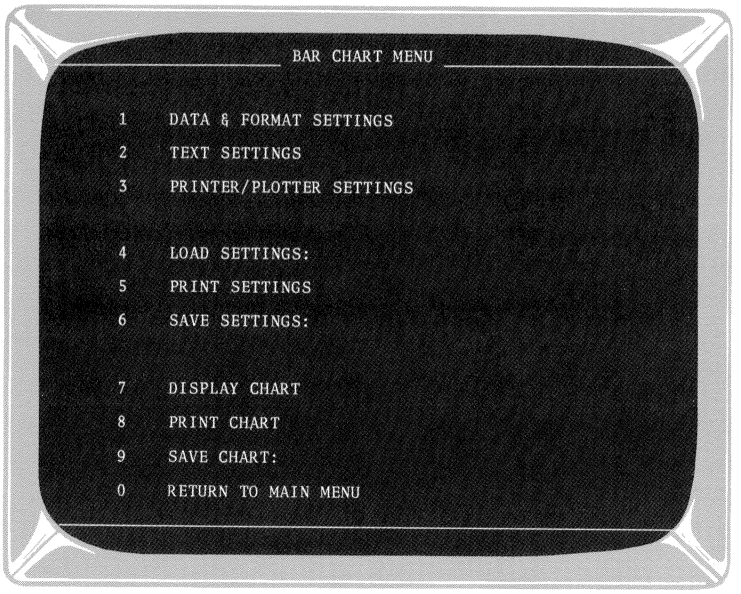


Figure 6-1. Bar Charts.

The Bar Chart Menu

Bar charts are created through the Bar Chart Menu which is accessed through the Main Menu of the Bar Chart diskette.



All Bar Chart Menu choices, except options 1 and 2, are the same as on all Chart menus and are described in Chapter 3. Option 1 of the Bar Chart Menu lets you enter data filenames and control the bar format and parameters of the axes for the chart. Option 2 lets you enter titles and labels or request a chart frame. These two options are described in this chapter.

A bar chart can be based on the data in up to three files. If more than one file is used, the files need not be the same length; the program automatically fills out the shorter files with zeros. In such a case, a message to that effect is displayed.

If one file is used, a bar is produced for each value, beginning at the left of the chart. Up to 100 bars can be drawn. If the file contains more than 100 values, only the first 100 are used.

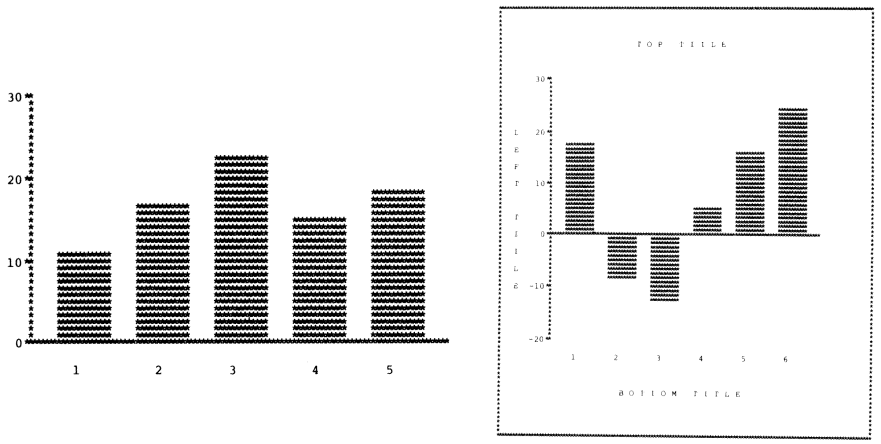
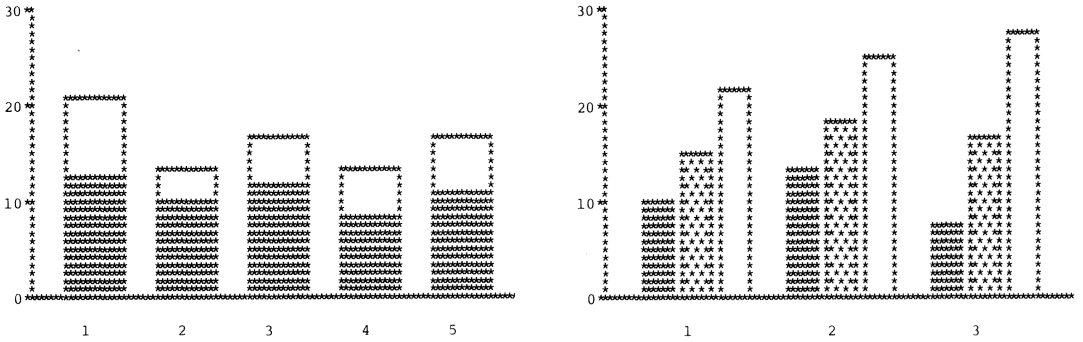


Figure 6-2. Positive vs. Negative Bar Charts

If all values are positive, the bars extend upward from the horizontal axis. If all values are negative, the bars extend downward. If the file contains both positive and negative values, the positive bars extend upward from the axis and the negative bars extend downward, with the horizontal axis representing zero.

If two or three files are used, the data is presented stacked (segmented), as in A below or grouped (clustered) bars, as in B.



A **B**

Figure 6-3. Stacked vs. Grouped Bars.

With stacked bars, the data in the first file corresponds to the first (bottom) segment of each bar. With grouped bars, the data from the first file corresponds to the first (left) bar in each group. If any of the files contains negative values, you cannot use the stacked format; there is no way to depict negative segments. The grouped format can show both positive and negative values.

If one of the data values is very small in proportion to the other values, the corresponding bar or bar segment may not be visible, depending on the particular display, printer, or plotter. A warning message is printed in such a case.

The elements of a bar chart are illustrated in Figure 6-4.

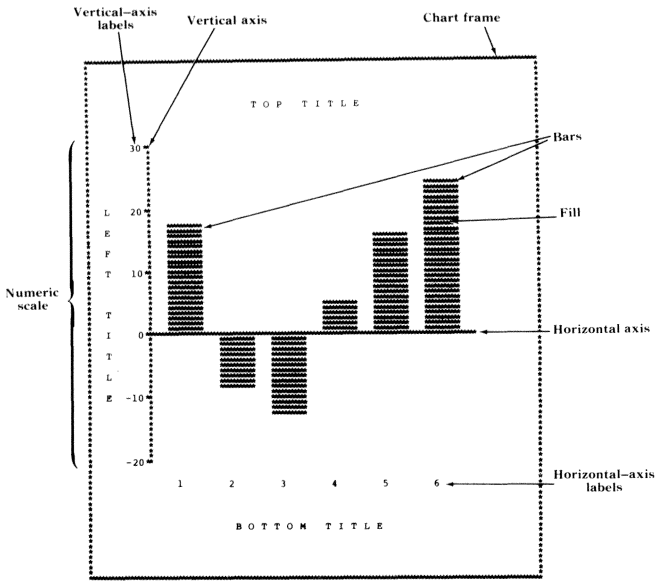


Figure 6-4. Elements of a Bar Chart.

The chart and chart settings you create or change through the Bar Chart Menu affect only the data currently in the computer's memory. If you do not save the settings or the chart, both are lost when you return to the Main Menu.

Data And Format Settings

When you select option 1 on the Bar Chart Menu, the Data & Format Settings Menu and default settings are displayed, as shown below. Options 1 through 3 on this menu let you specify the data files. Options 4 through 6 control the bar formats. Option 7 specifies the layout for multiple bar sets. Options 8, 9, and 0 control the axis parameters.

```
                DATA & FORMAT SETTINGS

1   DATA FILE FOR BAR SET 1:        NONE
2   DATA FILE FOR BAR SET 2:        NONE
3   DATA FILE FOR BAR SET 3:        NONE
4   BAR SET 1 FORMAT:               DARK   BLACK
5   BAR SET 2 FORMAT:               LIGHT  BLACK
6   BAR SET 3 FORMAT:               NOFILL BLACK
7   LAYOUT FOR MULTIPLE BAR SETS:   STACKED

8   HORZ AXIS LENGTH (CHARS):       50
9   VERT AXIS LENGTH (LINES):       36
0   VERTICAL SCALE RANGE:           AUTO
    (PRESS "CLEAR" KEY TO RETURN TO BAR CHART MENU)
```

Data Filenames

A bar chart can be based on up to three files. When you select option 1, 2, or 3 on the Data & Format Settings Menu, the cursor moves to the right and waits for you to type in the name of the file. Press (ENTER) after the filename.

Bar Set 1 is used for the first (bottom) segment of a stacked bar or the first (left) bar of a group of bars. Bar Set 2 is used for the second segment of a stacked bar or the second bar of a group of bars. Bar Set 3 is used for the third segment or bar.

You can delete a filename by typing NONE (the default setting) and pressing (ENTER). If you do not enter a filename for Bar Set 1, or if you enter a filename for Bar Set 3 but not for Bar Set 2, a bar chart cannot be produced.

Bar Formats

Options 4, 5, and 6 on the Data & Format Settings Menu control the bar format, that is, how you want the bars to look. When you select one of these options, the default settings for that bar set are displayed. You may select and change any of the settings.

Fill Type — This option refers to the type of shading inside the bar. Select one of the following:

DARK — The default for Bar Set 1
LIGHT — The default for Bar Set 2
NOFILL — The default for Bar Set 3

Sample shading types are illustrated in Figure 6-5 and depend upon the particular display, printer, or plotter.

Printed bars must be at least 1 1/2 character positions wide for shading to be visible. Narrower bars appear to be solid. Light shading is not recommended for minimum-width stacked bars since it is hard to tell the fill from the line between segments. This can also be a problem with small segments.

With a Multi-Pen Plotter, fill consists of vertical lines drawn at 1/40″ intervals. Solid lines are drawn for DARK fill and dashed lines are drawn for LIGHT fill. Unless there is some space between the bars, it is generally best to omit the fill (by selecting NONE). Shading is recommended when bars are spaced.

Dark fill slows production of the chart on the screen or the printer.

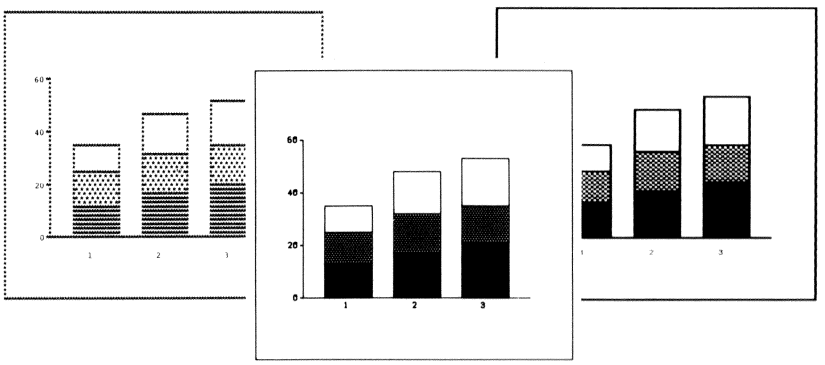


Figure 6-5. Bar Shading.

Color (Multi-Pen Plotter only) — This option refers to the pen color to be used. Select one of the following:

1	BLACK	4	GREEN
2	RED	5	VIOLET
3	BLUE	6	ORANGE

If you do not specify a color, BLACK is used. The color keyword corresponds to the indicated pen stall. For example, if you select `VIOLET`, the pen in stall 5 is used.

Layout For Multiple Bar Sets

If your chart is based on two or three data files, you can select either stacked or grouped layout as shown in Figure 6-6.

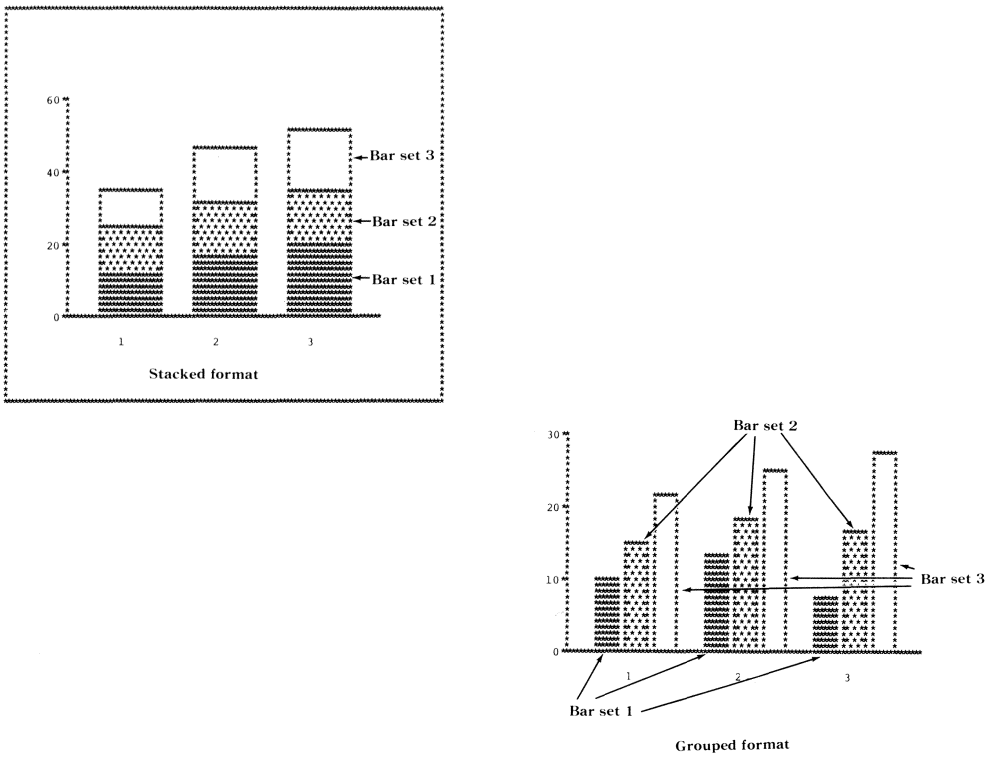


Figure 6-6. Layout for Multiple Bar Sets.

Stacked — When bars are stacked, each bar represents the sum of the corresponding data values in the files. The bottom segment is Bar Set 1, the second segment is Bar Set 2, and the top segment is Bar Set 3. Data values must be positive.

If the data values vary widely, only the bottom segment can be compared accurately across the bars. For this reason, it is generally best to assign the most important data to Bar Set 1 if stacked format is used.

If all data is of equal importance, try to place the data with the least variation in the bottom segment and the data with the most variation in the top segment.

Grouped — When bars are grouped, each bar represents one data value:

- The first bar (left) in each group is Bar Set 1
- The second bar is Bar Set 2
- The third bar is Bar Set 3

Both positive and negative values can be depicted by grouped bars.

Because all bars start from the horizontal axis, grouped format makes it easy to compare the bars.

Axis Parameters

Options 8, 9, and 0 on the Data & Format Settings Menu let you specify the length of the horizontal and vertical axes and the range of the numeric scale.

Horizontal Axis Length (Characters) — This option specifies the maximum width of the space in which the bars are to be drawn. Enter any whole number from 20 to 100 and press (ENTER). Bar width and spacing are adjusted automatically to fit within the horizontal-axis length.

If you do not specify the horizontal axis length, it is 50 character positions (5″).

The width of the bars is a multiple of 1/2 of a character position. The minimum bar width is 1/2 character. For stacked or grouped bars, the minimum width is 1 1/2 characters.

The space between bars also is a multiple of 1/2 of a character position. The space between standard and stacked bars is never more than 1/2 of the bar width. The space between groups of bars equals the bar width. The space between bars within a group is 1/2 character position.

If there is enough room, spaces are inserted between the bars, before the first bar, and after the last bar. Thus, the number of spaces in a bar chart is one more than the number of bars.

The following table shows the calculated width of the bars and spaces and the actual length of the horizontal axis with various numbers of standard bars. The default horizontal axis length (50 characters maximum) is assumed.

Number of Bars	Bar Width	Space Width	Actual Length of Horizontal Axis
5	6	3	48
10	3	1½	46½
15	2	1	46
20	1½	½	40½
30	1	½	45½
40	1	0	40
50	1	0	50
60	½	0	30

Figure 6-7. Bar Width.

Vertical Axis Length (Lines) — This option specifies the height of the space in which the bars are drawn. The default setting is 36 lines (6″). You may enter any even multiple of 6, from 18 to 48. Labels are printed on every sixth line, marking off from three to eight intervals on the numeric scale. (See "Vertical Scale Range" below for additional details.)

Vertical Scale Range — This option specifies the lower and upper limits for the numeric scale along the vertical axis. With the default setting (AUTO), the program computes a range based on the data in your files, including zero.

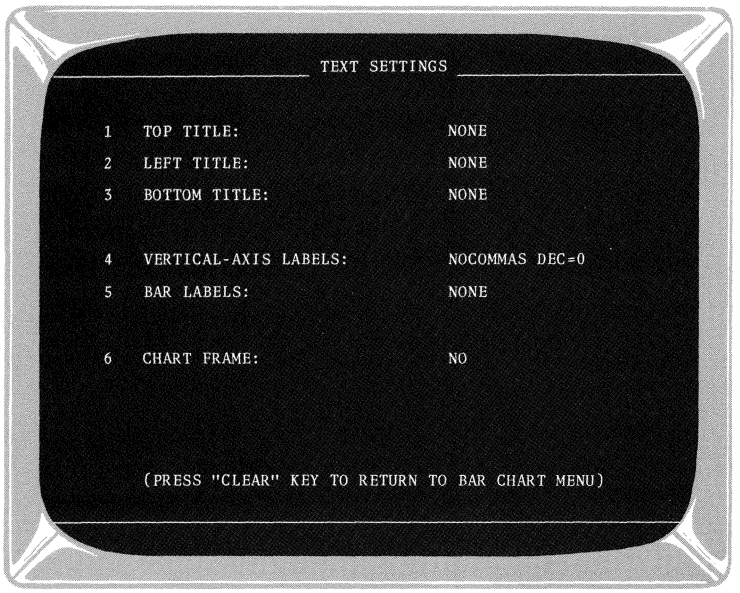
To control the range, enter the lower limit of the scale, a blank or comma, and the upper limit. If any data values fall outside that range, an error message appears, and no chart is produced. You can restore automatic scaling by typing AUTO (ENTER).

With automatic scaling, the program extends the range, if necessary, to provide better scale labels. If you specify the range, you may also want to specify the length of the vertical axis. For best scale results, the range should divide evenly by the number of intervals.

The label multiple is the total range divided by the number of intervals. For example, if your numeric scale ranges from 0 to 100, an axis length of 24 or 30 (four or five intervals) produces labels that are multiples of 25 or 20 (100/4 or 100/5). If the range is -50 to 100, an axis length of 18 or 36 (three or six intervals) produces labels that are multiples of 50 or 25 (150/3 or 150/6) and that include zero. An axis length of 30 produces labels that are multiples of 30 (150/5). (The horizontal axis at zero would not be labeled in this case.)

Text Settings

To supply titles, labels, and a frame for a bar chart, select option 2 (TEXT SETTINGS) from the Bar Chart Menu. The Text Settings Menu and default settings are displayed, as shown below.



Titles

You can supply up to three titles, one each centered at the top, left, and bottom of the bar chart. Top and bottom titles can be enlarged. If you are using the Multi-Pen Plotter, you can also select the color for each title.

When you select option 1, 2, or 3, the choices for that title line are displayed. You can change any of the settings.

Title — You can enter up to 50 characters for the top or bottom title, and up to 25 characters for the left title. (Any blanks entered before or after the text are retained.) If the top or bottom title exceeds the chart width, or if the left title exceeds the length of the vertical axis, some characters at the end are lost. A warning message is printed in that case.

You can delete the title by typing NONE (ENTER).

Left titles are printed vertically and require two lines for each character. For example, a 10-character left title requires 20 lines.

Color (Multi-Pen Plotter only) — This option refers to the pen color to be used. Select one of the following:

```
1  BLACK          4  GREEN
2  RED            5  VIOLET
3  BLUE           6  ORANGE
```

If you do not specify a color, BLACK is used. The color keyword corresponds to the indicated pen stall. For example, if you select ORANGE, the pen in stall 6 is used.

Character Size/Spacing — This option can be used to enlarge the top or bottom title. (The left title cannot be enlarged.) On a Multi-Pen Plotter, the title's character size is doubled. On a printer or on the screen, a space is inserted between characters. The default setting is NORMAL.

Vertical-Axis Labels

Option 4 on the Text Settings Menu lets you control the format of the numeric scale labels which are printed to the left of the vertical axis. (See "Vertical Scale Range" under "DATA AND FORMAT SETTINGS" for details.)

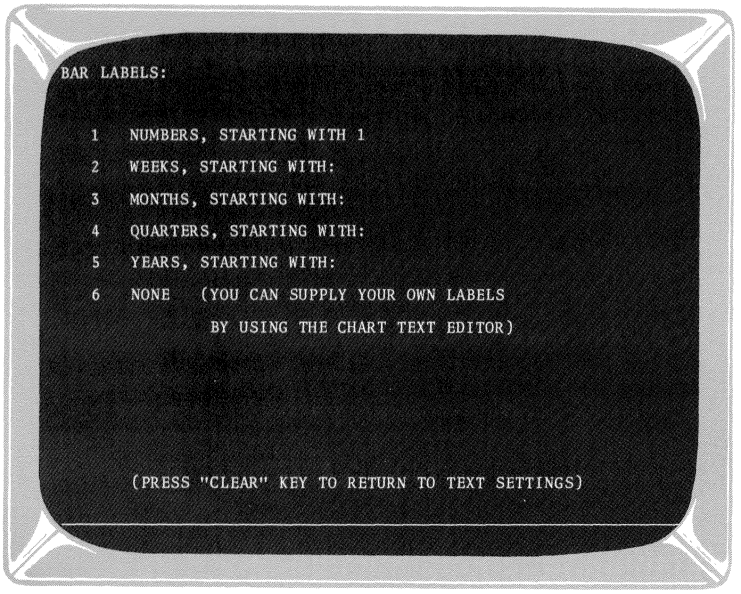
Commas Inserted — Type YES (ENTER) to have commas inserted in values of 1000 or more (for example, to print 1000000 as 1,000,000). NO is the default setting.

Number of Decimal Places — Enter the number of digits (0, 1, or 2) to be printed to the right of the decimal point. The default setting is 0, which means that no decimal points are printed.

Leading Character — You can enter one (such as a dollar sign) to be printed to the immediate left of the scale labels. NONE is the default setting.

Bar Labels

Option 5 on the Text Settings Menu lets you specify the type of bar labels to be printed at the bottom of the chart, centered under the bar or bar group. When you select Option 5, the Bar Label Menu and default settings are displayed, as shown below.



Numbers, Starting With 1 — This option refers to the sequence numbers of the bars or bar groups. If you do not want the sequence to start with 1, select option 5 (YEARS, STARTING WITH:).

Weeks, Starting With — Enter a starting week in the form nnWyy, where nn is a week number from 1 to 52, and yy is the last two digits of the year. (If more than two digits are entered for the year, only the last two are used.) For example, enter 1W82 for the first week of 1982. The week number is increased by 1 for each bar (or group of bars). When week 52 is reached, the week number returns to 1 and the year number is increased by 1 for the next bar or bar group.

Months, Starting With — Enter a month in the form mmmyy where mmm is the first three letters of the month and yy is the last two digits of the year. (If more than two digits are entered, only the last two are used.) For example, enter JAN82 if the first data value is for January, 1982. Bar or bar groups are labeled consecutively through December. For the next bar or bar group, the month is set back to January and the year number is increased by 1.

Quarters, Starting With — Enter a quarter in the form nQyy where n is the quarter number from 1 to 4 and yy is the last two digits of the year. (If more than two digits are entered for the year, only the last two are used.) For example, enter 2Q82 if the first data value is for the second quarter of 1982. The quarter number is increased by 1 for each bar or bar group. When quarter 4 is reached, the quarter number returns to 1 and the year number is increased by 1 for the next bar or bar group.

Years, Starting With — Enter a starting year in the form yy, where yy is the last two digits of the year. (If more than two digits are entered, only the last two are used.) For example, enter 80 if the first data value is for 1980. The number is increased by 1 for each bar or bar group. Yearly labels are simply sequence numbers with a specific starting point. Any 2-digit number can be used to begin the sequence.

None (default setting) — If you do not require labels or if you want to enter you own labels through the Chart Text Editor Menu (described in Chapter 4), select NONE.

If there is enough room, every bar or group of bars, or every other bar or bar group, is labeled (unless NONE is selected). No tick marks are printed. Otherwise, the interval between labels depends on the type of label requested:

Label Type	Interval
Numeric and Annual	1, 2, 5, 10, 20, or 40
Weekly	1, 2, 4, 13, 26, or 52
Monthly	1, 2, 6, 12, 24, or 48
Quarterly	1, 2, 4, 8, 20, or 40

Chart Frame

You can have a box drawn around a bar chart to frame it. If you want a chart frame, select option 6 from the Text Settings Menu. Then, type YES and press (ENTER). If you do not specify a setting, no frame is drawn.

CHAPTER 7

Using The Pie Chart Diskette

Pie charts show proportions of parts of a whole. Each slice depicts a percentage of the total pie.

Pie charts created with the Business Graphics package can contain up to 12 slices, each representing one value. Slices can be shaded. If you have a Multi-Pen Plotter, you can specify the color to be used for each slice.

Figure 7-1 below shows some sample pie charts.

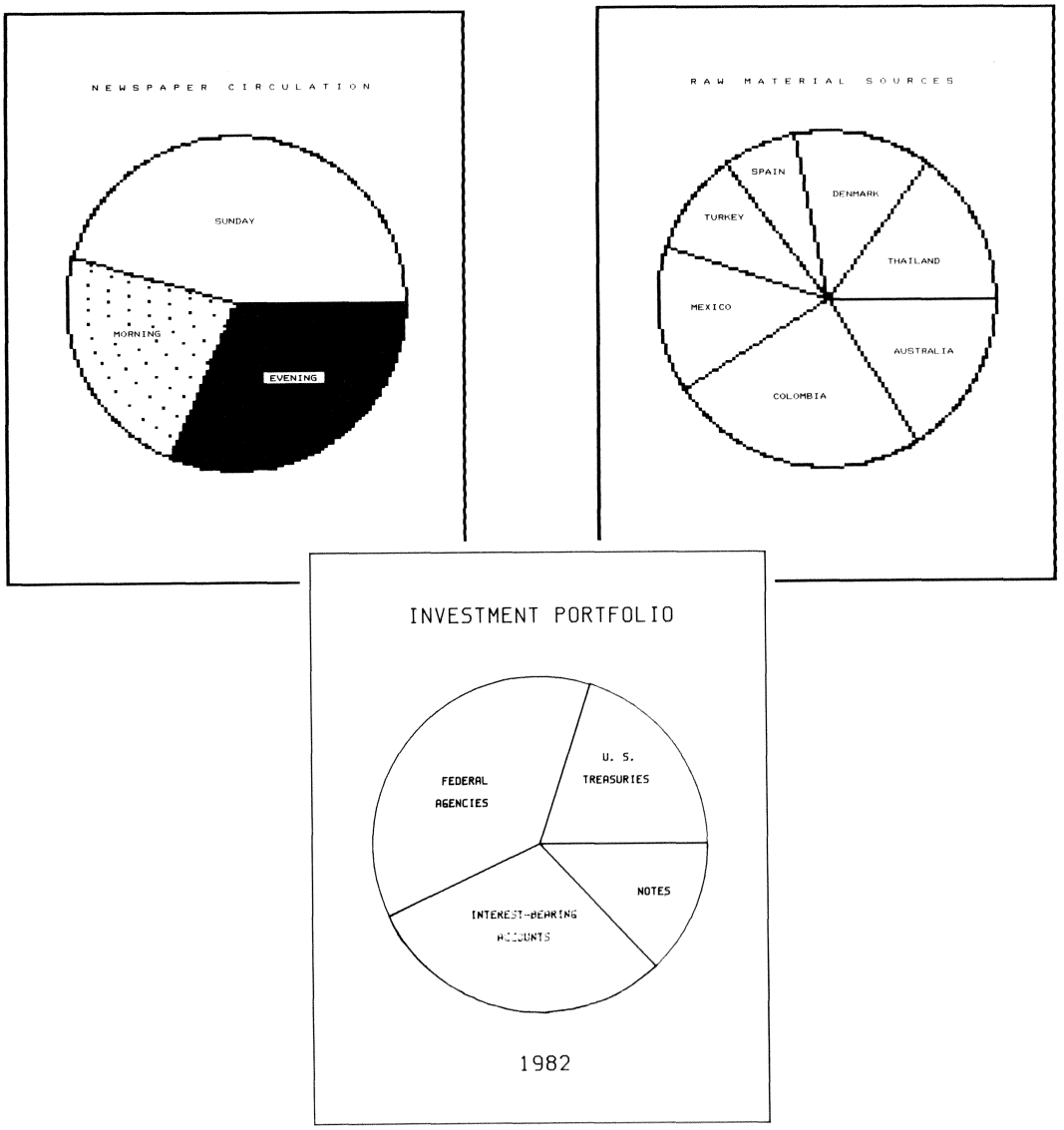
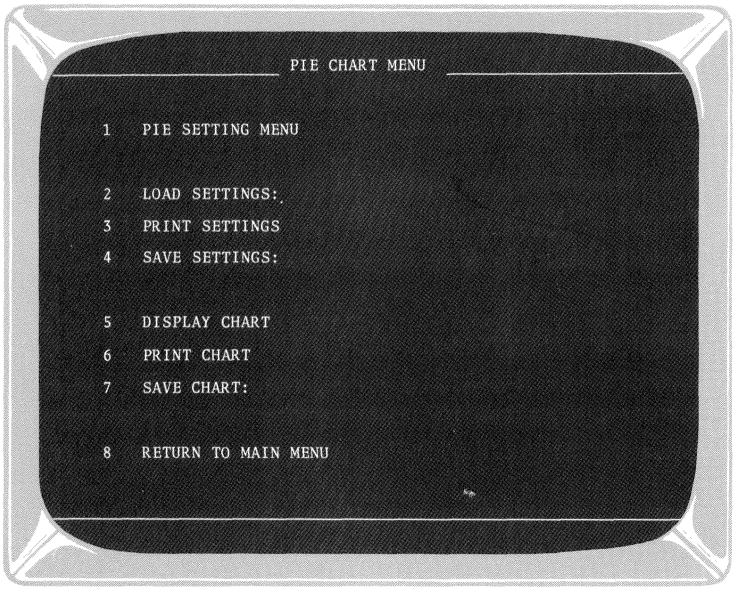


Figure 7-1. Pie Charts.

The Pie Chart Menu

Pie charts are created through the Pie Chart Menu which is accessed through the Main Menu of the Pie Chart diskette.



All Pie Chart Menu choices, except option 1, are the same as on all Chart menus and are described in Chapter 3. Option 1 lets you enter a data filename, supply titles, request a chart frame, and control the format of the slices. These choices are described in this chapter.

Data for a pie chart is taken from one disk file, which can contain up to 12 values. Each value must be greater than zero.

Very small values may result in slices that are not visible when the chart is displayed on the screen or produced on a printer. (For example, a slice that is 1% of the total pie is visible only if the pie chart is drawn on a plotter.) A message appears in such cases, warning of possible "hidden" slices.

The entire pie represents the sum of the data values, and each slice depicts one value. The chart shows the portion that each value contributes to the total data.

A pie chart is 5″ in diameter. The first slice begins at the three o'clock position and the slices move counterclockwise around the chart in the sequence in which the values occur in the file.

The elements of a pie chart are illustrated in Figure 7-2.

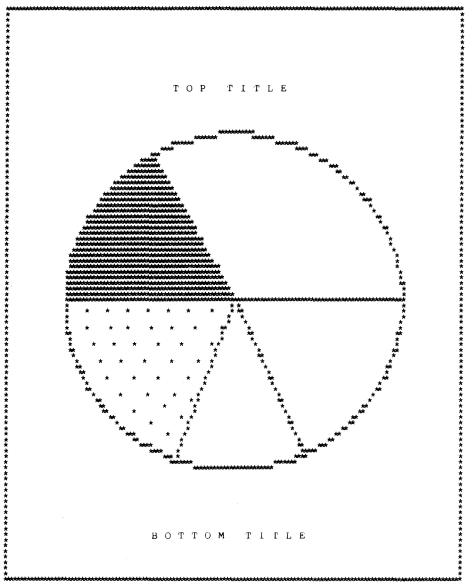
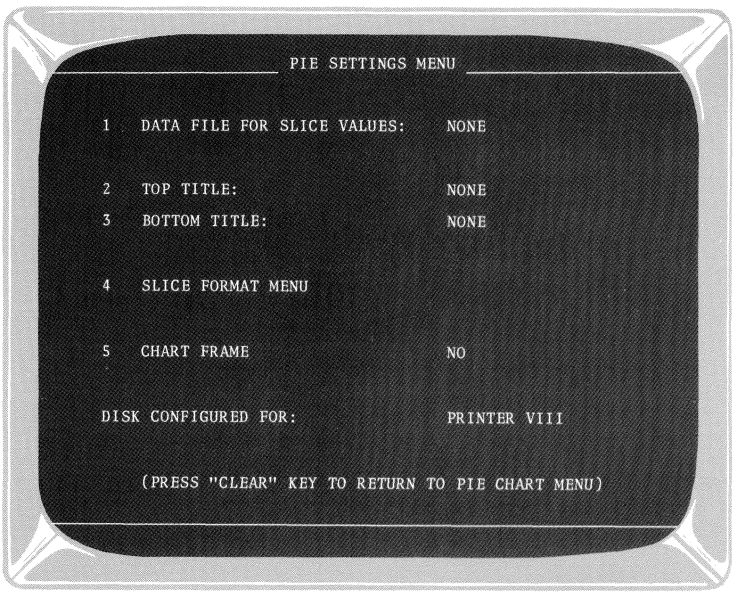


Figure 7-2. Elements of a Pie Chart.

The chart and chart settings you create or change through the Pie Chart Menu affect only the contents currently in the computer's memory. If you do not save the settings or the chart, both are erased when you return to the Main Menu.

Pie Chart Settings

When you select option 1 on the Pie Chart Menu, the Pie Chart Settings Menu and defaults are displayed, as shown below. This menu includes the data filename, chart titles, chart frame, and slice format for the pie chart, and indicates the printer or plotter for which the disk is configured. (See Chapter 4 for more details on printer/plotter settings.)



Data Filename

A pie chart is based on data in a single disk file. When you select option 1, the cursor moves to the right and waits for you to type in the name of the file. Press (ENTER) after the filename.

Titles

You can supply a centered title at the top and bottom of the pie chart. The titles can be enlarged. If you are using the Multi-Pen Plotter, you can also select the color for each title.

When you select option 2 or 3 from the Pie Settings Menu, the choices for that title line are displayed. You can change any of these settings.

Title — You can enter up to 50 characters for the top or bottom title. (Any blanks entered before or after the text are retained.) You can delete the title by typing NONE and pressing (ENTER).

Color (Multi-Pen Plotter only) — This option refers to the pen color to be used. Select one of the following:

1	BLACK	4	GREEN
2	RED	5	VIOLET
3	BLUE	6	ORANGE

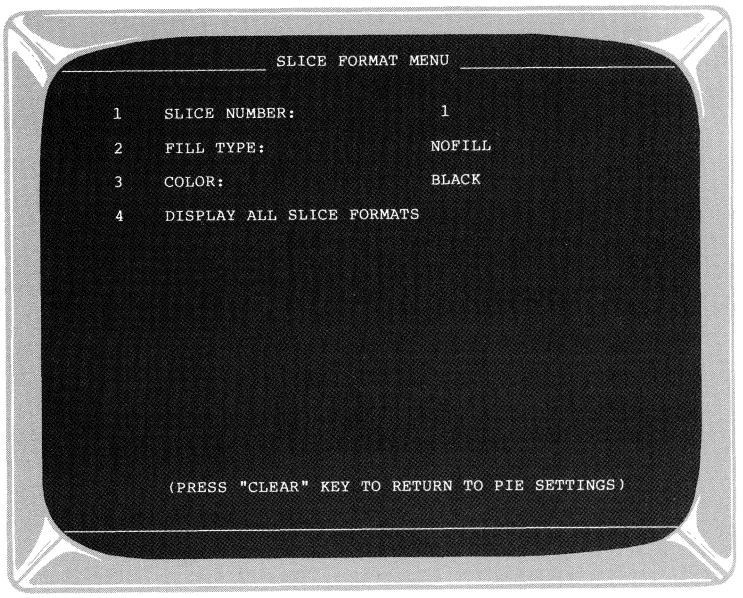
If you do not specify a color, BLACK is used. The color keyword corresponds to the indicated pen stall. For example, if you select BLUE, the pen in stall 3 is used.

Character Size/Spacing — This option may be used to enlarge the title. On a Multi-Pen Plotter, the character size is doubled. On a printer or on the screen, a space is inserted between the characters. Select DOUBLE for an oversize title. NORMAL is the default setting.

If enlarging the title causes it to exceed the chart width, some characters at the end are lost and a warning message appears.

Slice Formats

When you select option 4 on the Pie Settings Menu, the Slice Format Menu is displayed for Slice 1:



Slice Number — This option refers to the number of the slice whose format you want to review or change. Enter the sequence number of any value in your data file. The settings now pertain to that slice.

Type of Fill — This option lets you shade the slice. Select DARK, LIGHT, or NOFILL (the default setting). Shading types are illustrated in Figure 7-3. On a plotter, shading is drawn with the pen used for the slice outline.

Using the DARK fill may slow production of the chart on the screen or printer.

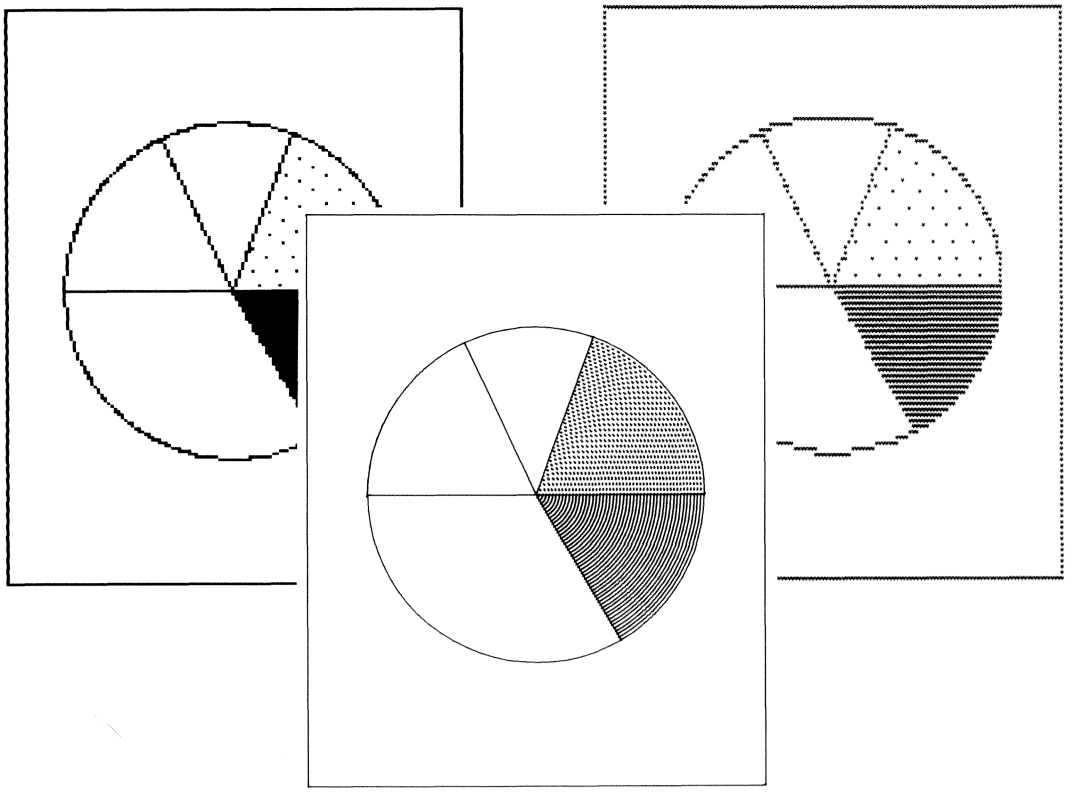


Figure 7-3. Pie Shading.

Color (Multi-Pen Plotter only) — This option refers to the pen color to be used. Select one of the following:

```
1  BLACK          4  GREEN
2  RED            5  VIOLET
3  BLUE           6  ORANGE
```

If you do not specify a color, BLACK is used. The color keyword corresponds to the indicated pen stall. For example, if you select `ORANGE`, the pen in stall 6 is used.

Display All Slice Formats — If you select this option, the current format settings for 12 slices are displayed on the screen. (If your data file contains less than 12 values, not all the slices are used.) This is useful for reviewing your settings.

Chart Frame

To have a box drawn around the chart to frame it, select option 5 from the Pie Settings Menu. Then type YES and press (**ENTER**). `NO` is the default setting.

Labels

If you wish to label individual pie slices, see Chapter 4 for details about editing chart text.

CHAPTER 8

Using The Scatter Chart Diskette

Scatter charts (sometimes called X-Y plots) show the relationship between two sets of data. Each data point in the chart represents the intersection of two values: one measured against the horizontal scale (the X-axis) and the other measured against the vertical scale (the Y-axis). Scatter charts can reveal a cause-and-effect relationship or demonstrate that no such relationship exists.

Scatter charts created by the Business Graphics package can be based on up to 100 pairs of values. You can select any character for the data points, and can connect the points if desired. If the data creates a horizontal series of points, the curve line can be shaded. If you have a Multi-Pen Plotter, you can specify the color to be used for the curve.

See Figure 8.1 for some sample scatter charts.

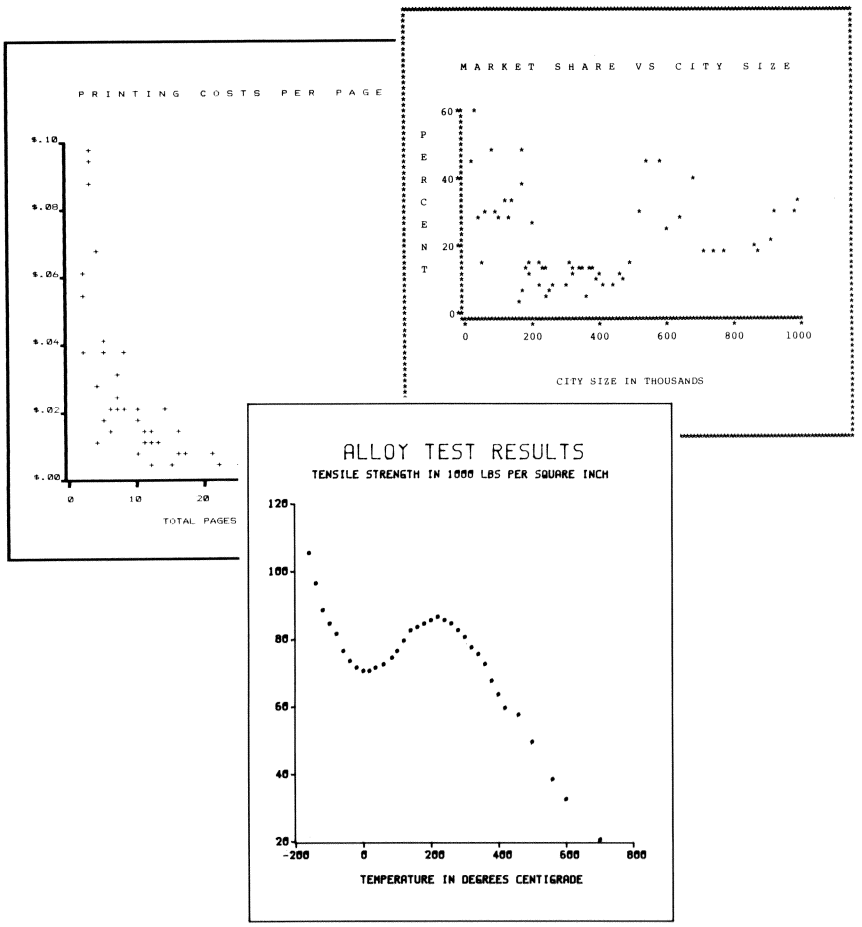
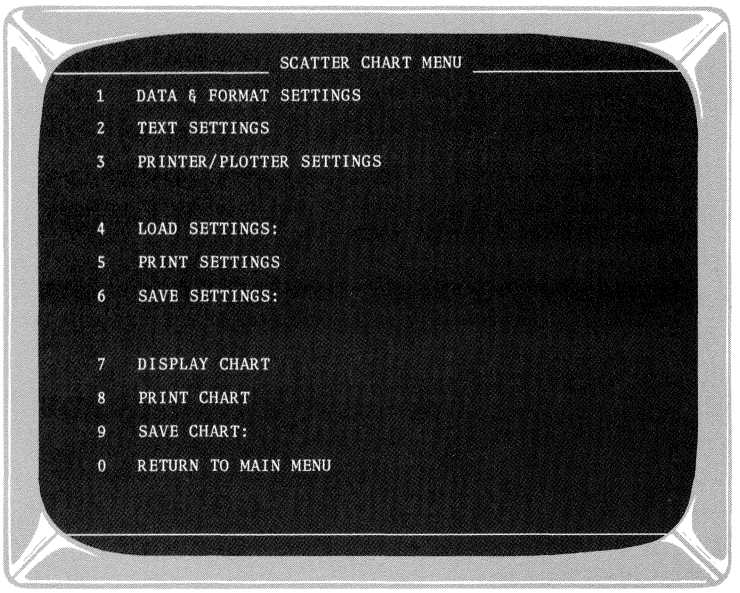


Figure 8-1. Scatter Charts.

The Scatter Chart Menu

Scatter charts are created through the Scatter Chart Menu which is accessed through the Main Menu of the Scatter Chart diskette.



All Scatter Chart Menu choices, except options 1 and 2, are the same as on all the Chart menus and are described in Chapter 3. Option 1 lets you enter data filenames, and control the curve format and parameters of the axes for the chart. Option 2 lets you enter titles, control the format of the labels, and request a chart frame. These two options are described in this chapter.

Data for a scatter chart must come from two disk files. The first file supplies the data point locations on the vertical axis, and the second file supplies the data point locations along the horizontal axis. The intersection of each pair of values becomes a data point in the chart.

The two files need not contain the same number of values. If the files are of unequal lengths, the surplus (unpaired) values are ignored and a warning message is printed.

The elements of a scatter chart are illustrated in Figure 8-2.

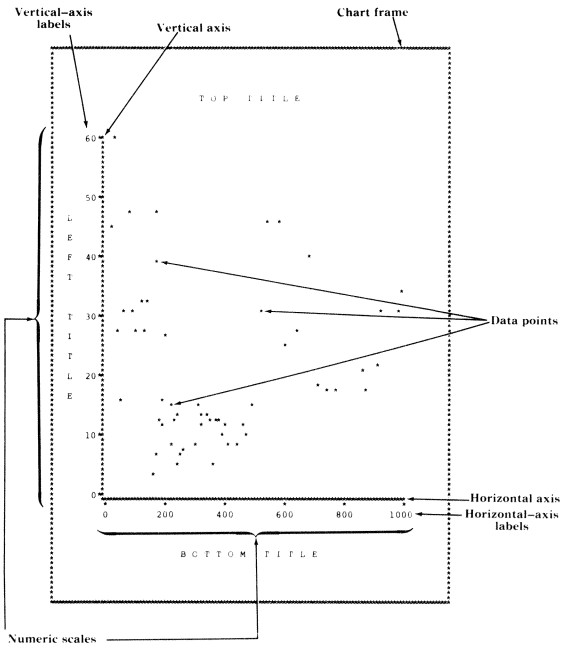


Figure 8-2. Elements of a Scatter Chart.

Data and Format Settings

When you select option 1 on the Scatter Chart Menu, the Data & Format Settings Menu and default settings are displayed, as shown below. The options let you specify the data files, curve formats, and parameters of the axes.

```
                DATA & FORMAT SETTINGS

1    DATA FILE FOR VERT AXIS:       NONE
2    DATA FILE FOR HORZ AXIS:       NONE
3    CURVE FORMAT:                  AUTO NOLINE NOFILL BLACK

4    VERT AXIS LENGTH (LINES):      3Ø
5    HORZ AXIS LENGTH (CHARS):      5Ø

6    VERTICAL SCALE RANGE:          AUTO
7    HORIZONTAL SCALE RANGE:        AUTO

8    SUPPRESS AXES AND LABELS:      NO
     (PRESS "CLEAR" KEY TO RETURN TO SCATTER CHART MENU)
```

Data Filenames

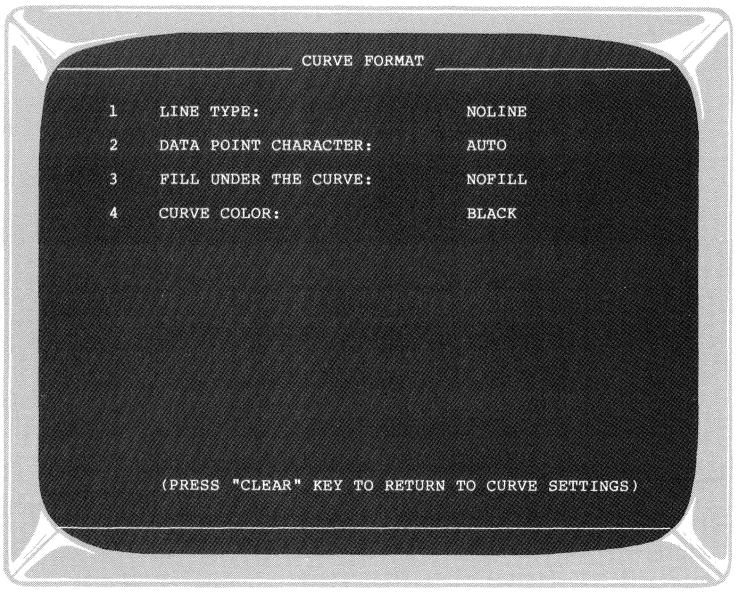
A scatter chart must be based on two files, one to supply the locations along the vertical axis and a second to supply the locations along the horizontal axis.

When you select option 1 or 2, the cursor moves to the right and waits for you to type the name of the file. Press (ENTER) after the filename.

You can delete a filename by typing NONE (the default setting) and pressing (ENTER). Two filenames must be supplied to produce a chart. Chart settings can be saved, if desired, without specifying the filenames.

Curve Format

Option 3 controls the curve format, that is, how you want the curve to look. When you select this option, the Curve Format Settings Menu and default setttings are displayed, as shown below.



You may select and change any of the settings.

Line Type — This option specifies the type of line (if any) that is to connect the coordinate points. Select SOLID, DASHED, DOTTED, or NOLINE (default setting).

Data Point Character — This option lets you select the symbol to be printed at each data point. Enter any character, such as *. When AUTO (the default setting) is selected, the points are marked by a graphics character on the dot-matrix printers, by an asterisk on the Daisy Wheel II printer, or by a dot on the Multi-Pen Plotter.

Fill Under the Curve — This option lets you shade below the curve to the bottom border (the horizontal axis). Select DARK, LIGHT, or NOFILL (the default setting). Two conditions must be met to fill under the curve:

- Values used for the horizontal data point locations must be in low-to-high sequence
- Line type must be SOLID

If these conditions are not met, any requested fill is ignored and a warning message is displayed.

On a Multi-Pen Plotter, shading is drawn with the pen used for the curve.

Exercise 2 — Creating A Bar Chart

Follow the steps in this exercise to produce a bar chart with four bars. The chart includes titles, numeric labels, and a frame.

1. Insert a TRSDOS system diskette in Drive 0.
2. Insert the Business Graphics Bar Chart diskette in Drive 1.
3. Press the reset button. When `TRSDOS Ready` appears, type TRSCHART (ENTER). The Main Menu appears and option 1 is flashing.
4. Press (ENTER) to display the Data Handling Menu.
5. Option 1 is flashing. Press (ENTER) to enter data from the keyboard. You are prompted to enter data values, one at time:

   - For Value #1, type 35 (ENTER)
   - For Value #2, type 22 (ENTER)
   - For Value #3, type 41 (ENTER)
   - For Value #4, type 53 (ENTER)

   When prompted for Value #5, press (CLEAR) to return to the Data Handling Menu.
6. Option 6 is flashing. Press (ENTER) to review your data and then press (CLEAR) to return to the Data Handling Menu.
7. Select option 8 by typing 8 (ENTER). The cursor appears at the right of the screen. Type BAR1/DAT (ENTER) to assign a filename to the data. When option 6 begins to flash, the values have been saved on your TRSDOS diskette as BAR1/DAT.
8. Type 9 (ENTER) to return to the Main Menu.
9. Now, type 2 (ENTER) to select option 2. The Bar Chart Menu is displayed.
10. Option 1 is flashing. Press (ENTER) to select it. The Data & Format Settings Menu appears.
11. Option 1 is flashing. Press (ENTER) to select it. The cursor appears at the right of the screen. Type BAR1/DAT (ENTER). This file will supply the data for the bars.
12. Press (CLEAR) to return to the Bar Chart Menu.
13. To select option 7, type 7 (ENTER). Your bar chart appears on the screen in a few seconds. Use the arrow keys to view the entire chart. (The dashed lines on the screen mark the page boundaries.)
14. Press (CLEAR) or (ENTER) to return to the Bar Chart Menu.
15. Now, type 2 (ENTER) to see the Text Settings Menu.
16. Option 1 is flashing. Press (ENTER) to select it. The choices for the top title are displayed.
17. Press (ENTER) and type SAMPLE CHART #2 (ENTER) to assign that title to your chart. Press (CLEAR) to return to the Text Settings Menu.
18. Type 5 (ENTER) to select option 5. The choices for the bar labels are displayed. Press (ENTER) to select option 1 so that the bars will be numbered from 1. The Text Settings Menu automatically reappears.

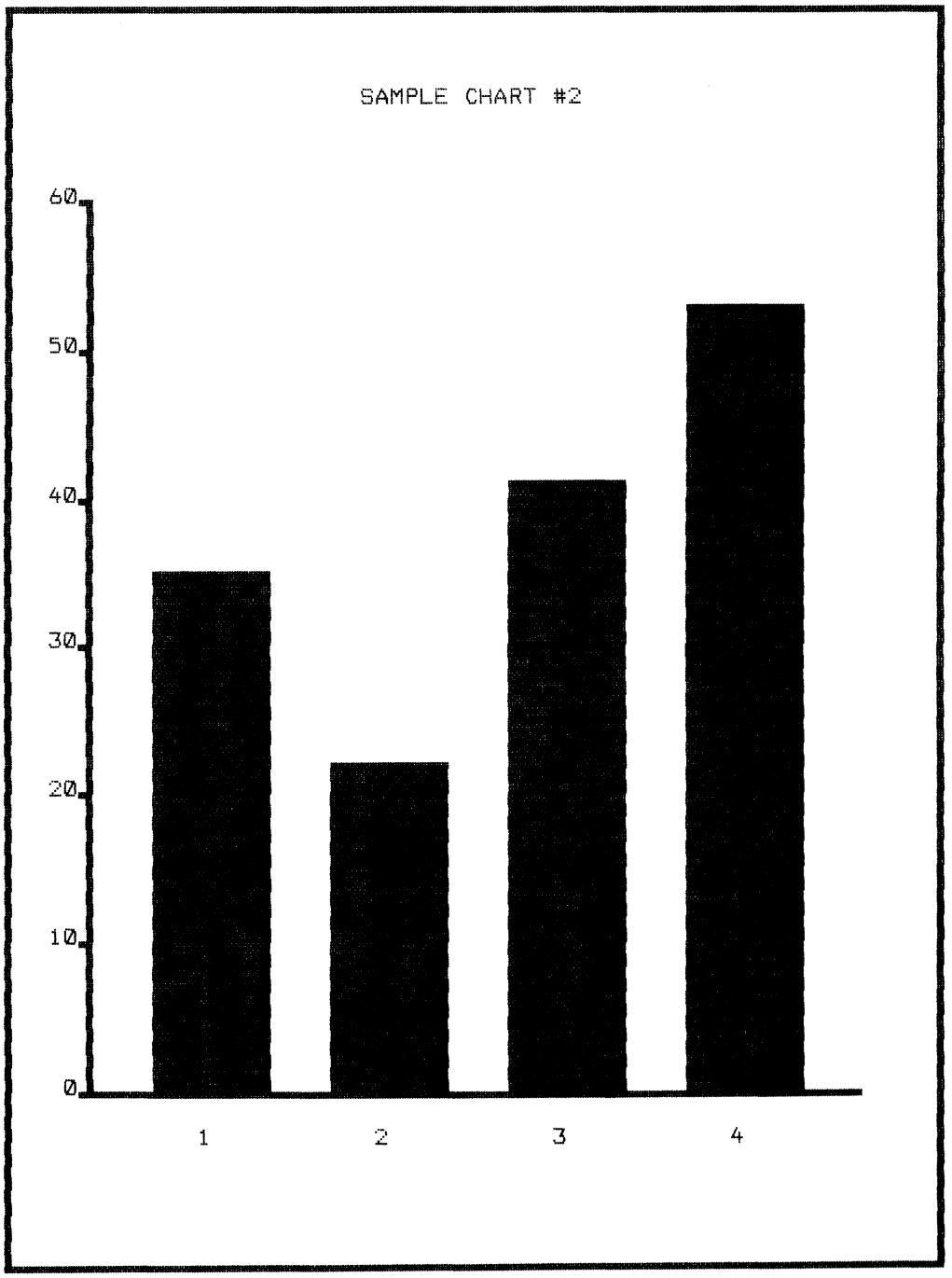
19. To frame your chart, type 6 (ENTER). When the cursor appears on the right of the screen, type YES (ENTER).

20. Press (CLEAR) to return to the Bar Chart Menu.

21. Type 8 (ENTER) to print the chart. In a few seconds, a message is displayed telling you to ready the printer or plotter. When you press (ENTER), printing begins.

After the chart has been printed, the Bar Chart Menu reappears. If you want to continue with the sample sessions, return to `TRSDOS Ready`, remove the Bar Chart diskette from Drive 1, and place it in its envelope. Begin with Step 2 of the next exercise.

If you want to end the session, remove both diskettes and place them in their envelopes. Turn off the computer and the printer or plotter.


SAMPLE CHART #2
60
50
40
30
20
10
0
1
2
3
4

Exercise 3 — Creating A Pie Chart

Follow the steps in this exercise to produce a pie chart with five slices, two of which will be shaded. The chart includes a title and a frame.

1. Insert a TRSDOS system diskette into Drive 0.
2. Insert the Business Graphics Pie Chart diskette in Drive 1.
3. Press the reset button. When `TRSDOS Ready` appears, type TRSCHART (ENTER). The Main Menu appears and option 1 is flashing.
4. If you created the file, LINE1/DAT in the Line Chart exercise, you can use that data file for your pie chart. In that case, skip to Step 10.
5. If you do not have LINE1/DAT saved on diskette, press (ENTER) to display the Data Handling Menu.
6. Option 1 is flashing. Press (ENTER) to enter data from the keyboard. You are prompted to enter data values, one at time:
   - For Value #1, type 1 (ENTER)
   - For Value #2, type 4 (ENTER)
   - For Value #3, type 2 (ENTER)
   - For Value #4, type 5 (ENTER)
   - For Value #5, type 3 (ENTER)

   When prompted for Value #6, press (CLEAR) to return to the Data Handling Menu.
7. Option 6 is flashing. Press (ENTER) to review your data, and then press (CLEAR) to return to the Data Handling Menu.
8. Select option 8 by typing 8 (ENTER). The cursor appears at the right of the screen. Type PIE1/DAT (ENTER) to assign a filename to the data. When option 6 begins to flash, the values have been saved on your TRSDOS diskette as PIE1/DAT.
9. Type 9 (ENTER) to return to the Main Menu.
10. Now, type 2 (ENTER) for option 2. The Pie Chart Menu is displayed.
11. Press (ENTER) to select option 1. The Pie Chart Settings Menu appears.
12. Press (ENTER) to select option 1. The cursor appears at the right of the screen. Enter the name of the file you want to use (either LINE1/DAT or PIE1/DAT) and press (ENTER).
13. Press (CLEAR) to return to the Pie Chart Menu.
14. Type 5 (ENTER) to select option 5. Your pie chart appears on the screen in a few seconds. Use the arrow keys to view the entire chart. (The dashed lines on the screen mark the page boundaries.)
15. Press (CLEAR) or (ENTER) to return to the Pie Chart Menu.
16. Type 1 (ENTER) to select option 1. When the Pie Settings Menu appears, type 2 (ENTER). The choices for the top title are displayed.
17. Press (ENTER) and type SAMPLE CHART #3 (ENTER) to assign that title to your chart. Press (CLEAR) to return to the Pie Settings Menu.

18. Type 4 (ENTER) to set the slice formats. The format displayed is for Slice 1. Option 1 (the slice number, itself) is flashing. Type 2 (ENTER) for option 2. The available shading types are displayed. Type 3 (ENTER) to select DARK fill for this slice.

19. Now, type 1 (ENTER) and when the cursor appears at the right, type 3 (ENTER) to enter another slice number. The format information displayed now pertains to this slice. Type 2 (ENTER) to select option 2 and then type 2 (ENTER) to select LIGHT fill.

20. To review all slice formats, type 4 (ENTER). Note that the screen displays the format for 12 slices (the maximum) although only 5 slices are used.

21. Press (CLEAR) to return to the Slice Format Menu, and press (CLEAR) again to return to the Pie Settings Menu.

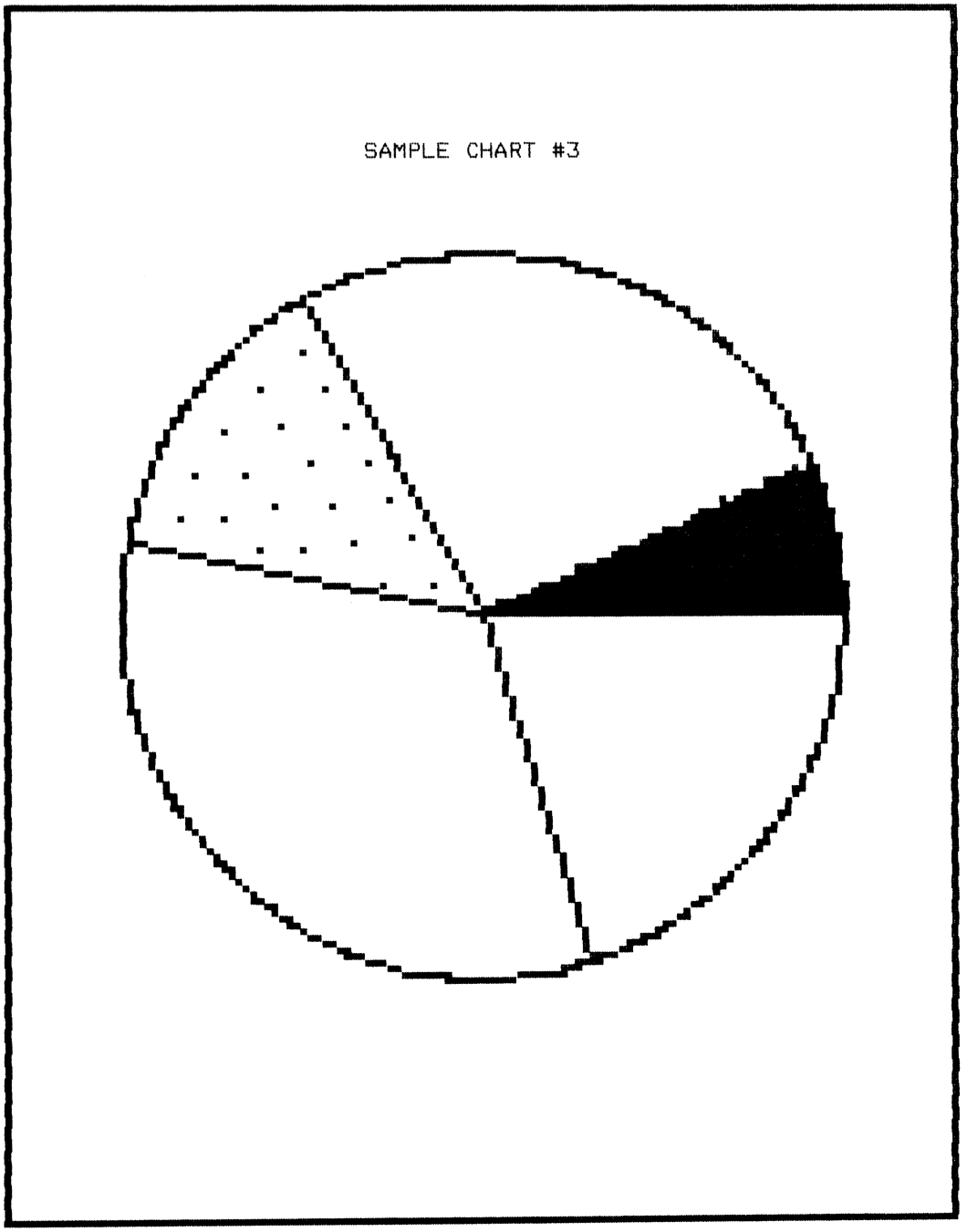
22. To have a frame drawn around the pie chart, type 5 (ENTER). When the cursor appears on the right of the screen, type YES (ENTER).

23. Press (CLEAR) to return to the Pie Chart Menu.

24. Press 6 (ENTER) to print the chart. (Use of dark fill slows production of the chart. A message warns you of the delay.) When requested, ready the printer or plotter and press (ENTER). Printing then begins.

After the chart is printed, the Pie Chart Menu reappears. You may continue with the next exercise or end the session. To continue, return to TRSDOS Ready, remove the Pie Chart diskette from Drive 1, and place it in its envelope. Begin with Step 2 of the next exercise.

If you want to end the session, remove both diskettes and place them in their envelopes. Turn off the computer and the printer or plotter.


SAMPLE CHART #3

Exercise 4 — Creating A Scatter Chart

Follow the steps in this exercise to produce a scatter chart with six data points. The chart includes a title and a frame.

1. Insert a TRSDOS system diskette into Drive 0.
2. Insert the Business Graphics Scatter Chart diskette in Drive 1.
3. Press the reset button. When `TRSDOS Ready` appears, type TRSCHART (ENTER). The Main Menu appears and option 1 is flashing.
4. Press (ENTER) to display the Data Handling Menu.
5. Option 1 is flashing. Press (ENTER) to enter data from the keyboard. You are prompted to enter data values, one at time:

   - For Value #1, type 1 (ENTER)
   - For Value #2, type 2 (ENTER)
   - For Value #3, type 5 (ENTER)
   - For Value #4, type 9 (ENTER)
   - For Value #5, type 12 (ENTER)
   - For Value #6, type 17 (ENTER)

   When prompted for Value #7, press (CLEAR) to return to the Data Handling Menu.
6. Option 6 is flashing. Press (ENTER) to review your data and then press (CLEAR) to return to the Data Handling Menu.
7. Type 8 (ENTER) to select option 8. The cursor appears at the right of the screen. Type SCAT1/DAT (ENTER) to assign a filename to your data. When option 6 begins to flash, the values have been saved on your TRSDOS diskette under the filename SCAT1/DAT.
8. Select option 1 again by typing 1 (ENTER). The program again prompts you to enter data values:

   - For Value #1, type 39 (ENTER)
   - For Value #2, type 15 (ENTER)
   - For Value #3, type 27 (ENTER)
   - For Value #4, type 41 (ENTER)
   - For Value #5, type 70 (ENTER)
   - For Value #6, type 65 (ENTER)

   When prompted for Value #7, press (CLEAR) to return to the Data Handling Menu.
9. Option 6 is flashing. Press (ENTER) to review your data and then press (CLEAR) to return to the Data Handling Menu.
10. Type 8 (ENTER) to select option 8. When the cursor appears at the right of the screen, type SCAT2/DAT (ENTER). When option 6 begins to flash, the values have been saved.
11. Type 9 (ENTER) to return to the Main Menu.
12. Now, type 2 (ENTER) to select option 2. The Scatter Chart Menu is displayed.

13. Option 1 is flashing. Press (ENTER) to select it. The Data & Format Settings Menu appears.

14. Option 1 is flashing. Press (ENTER) to select it. The cursor appears at the right of the screen. Type SCAT1/DAT (ENTER). This file will supply the values along the vertical axis.

15. To select option 2, type 2 (ENTER). The cursor appears at the right of the screen. Type SCAT2/DAT (ENTER). This file will supply the values along the horizontal axis.

16. Select option 3 by typing 3 (ENTER). The Curve Format Menu appears. Now select option 2 by typing 2 (ENTER). The cursor appears at the right of the screen. Type * (ENTER) to set the Data Point Character.

17. Press (CLEAR) twice to return to the Scatter Chart Menu.

18. Select option 7 by typing 7 (ENTER). In a few seconds, your scatter chart appears on the screen. Use the arrow keys to view the entire chart. (The dashed lines on the screen mark the page boundaries.)

19. Press (CLEAR) or (ENTER) to return to the Scatter Chart Menu.

20. Now, type 2 (ENTER) for option 2. The Text Settings Menu is displayed.

21. Press (ENTER) to select option 1. The choices for the top title are displayed.

22. Press (ENTER) and type SAMPLE CHART #4 (ENTER) to assign that title to your chart. Press (CLEAR) to return to the Text Settings Menu.

23. To frame your chart, type 6 (ENTER). When the cursor appears on the right of the screen, type YES (ENTER).

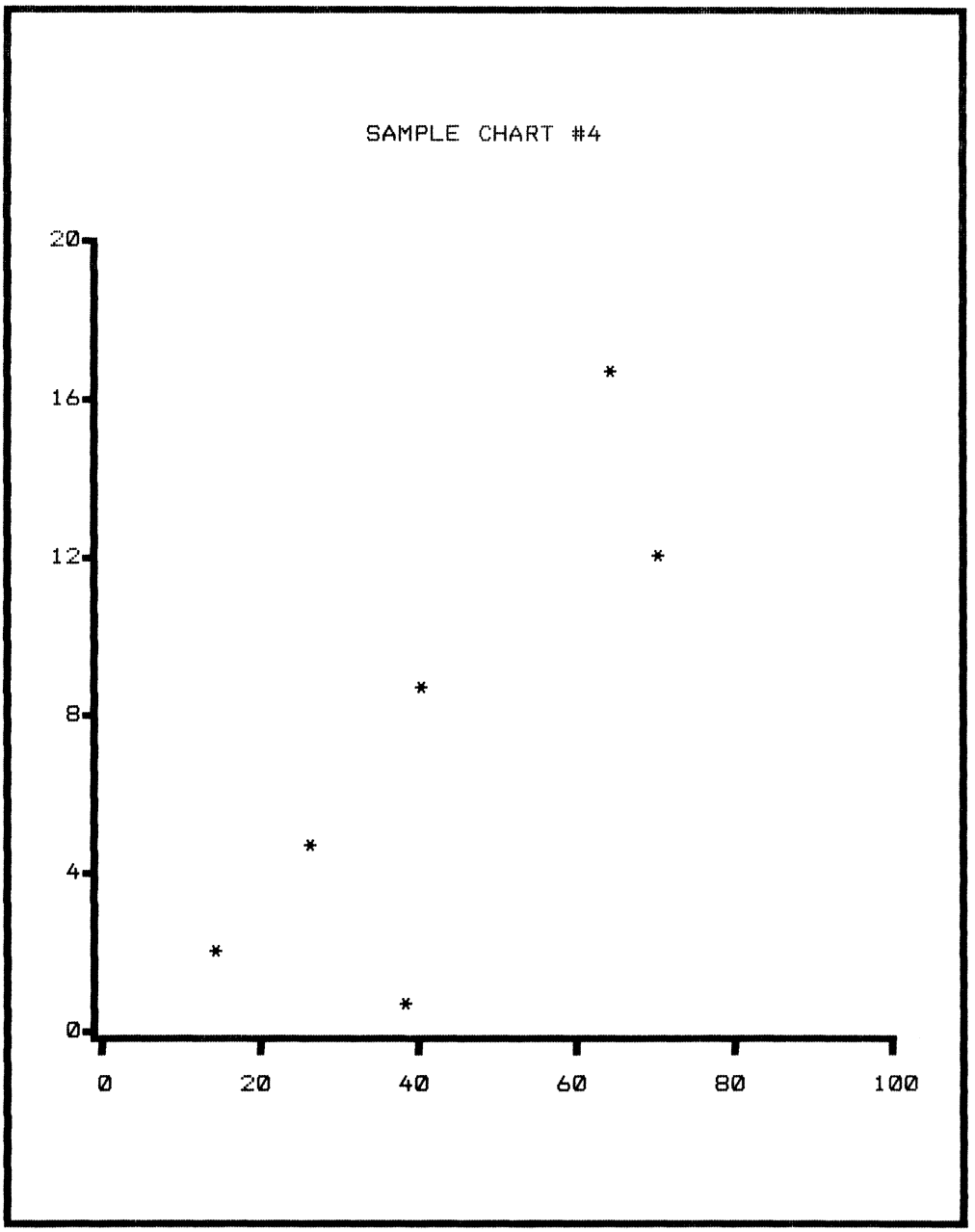
24. Press (CLEAR) to return to the Scatter Chart Menu.

25. Type 8 (ENTER) to print the chart. In a few seconds, a message is displayed telling you to ready the printer or plotter. When you press (ENTER), printing begins.

After the chart has been printed, the Scatter Menu reappears. You may continue with the next exercise or end the session.

You do not have to change diskettes to continue with the data-handling exercises that follow. Type 0 (ENTER) to return to the Main Menu, and then start with Step 4 of the next exercise.

If you want to end the session, return to `TRSDOS Ready`, remove both diskettes, and store them in their envelopes. Turn off the computer and the printer or plotter.


SAMPLE CHART #4
20
16
12
8
4
0
0
20
40
60
80
100

Exercise 5 — Editing Data

In this exercise, you will recall data from a file, edit the data, and then save it in another file.

1. Insert a TRSDOS system diskette in Drive Ø.
2. Insert any one of the four Business Graphics chart diskettes in Drive 1.
3. Press the reset button and when `TRSDOS Ready` appears, type TRSCHART (ENTER). The Main Menu appears and option 1 is flashing.
4. Press (ENTER) to display the Data Handling Menu.
5. Type 2 (ENTER) to enter data from a file. When the cursor appears at the right of the screen, type LINE1/DAT (ENTER) to retrieve the data file created in Exercise 1. (If you do not have this file, you can use PIE1/DAT created in Exercise 3 or you can create a new file by following Steps 5 and 7 of Exercise 1.)
6. When the file is loaded, option 6 begins to flash. Press (ENTER) to review the data and then press (CLEAR) to return to the Data Handling Menu.
7. To select option 4, type 4 (ENTER). The Data Editing Menu appears, and option 1 is flashing.
8. Press (ENTER) to change data. You are then asked to enter the number of the first value to be changed. Type 3 (ENTER) and respond to prompting:

   - For Value #3, type 3 (ENTER)
   - For Value #4, type 8 (ENTER)

   When prompted for Value #5, press (CLEAR). The edited data is displayed.
9. Press (CLEAR) again. You are then asked whether you want to keep the edited results. Type YES (ENTER).
10. When the Data Editing Menu reappears, type 2 (ENTER) to insert data. When asked for the number of the first value to be inserted, type 5 (ENTER), and respond to prompting:

    - For Value #5, type 3 (ENTER)
    - For Value #6, type 4 (ENTER)

    When prompted for Value #7, press (CLEAR). The edited data is displayed.
11. Press (CLEAR) again. Type YES (ENTER) when asked whether you want to keep the edited data.
12. When the Data Editing Menu reappears, type 3 (ENTER) to delete data. You are asked for the number of the first value to be deleted. Type 2 (ENTER). You are then asked for the number of the last value to be deleted. (All values within the range are erased.) Type 2 (ENTER) to delete only that single value.
13. The edited values are displayed immediately. Press (CLEAR) and when asked whether to keep the edited values, type YES (ENTER).
14. When the Data Editing Menu reappears, press (CLEAR) to return to the Data Handling Menu.

15. Select option 8 by typing 8 (ENTER). The cursor appears at the right of the screen. Type LINE2/DAT (ENTER) to assign a filename to the data. When option 6 begins to flash, the values have been saved on your TRSDOS diskette as LINE2/DAT. You will use this file in Exercise 9 to update the line chart created in Exercise 1.

Continue with the next exercise. You can use the data in current memory instead of entering data at the keyboard. Begin with Step 6.

Exercise 6 — Transforming Data

In this exercise you will enter data at the keyboard, transform it with multiplication and division functions, and then fit and project a linear trend curve.

1. Insert a TRSDOS system diskette in Drive 0.
2. Insert any one of the Business Graphics Chart diskettes in Drive 1.
3. Press the reset button. When `TRSDOS Ready` appears, type TRSCHART (ENTER). The Main Menu appears and option 1 is flashing.
4. Press (ENTER) to display the Data Handling Menu.
5. Option 1 is flashing. Press (ENTER) to enter data from the keyboard. You are prompted to enter data values, one at time:

   - For Value #1, type 1 (ENTER)
   - For Value #2, type 2 (ENTER)
   - For Value #3, type 3 (ENTER)
   - For Value #4, type 5 (ENTER)
   - For Value #5, type 4 (ENTER)

   When prompted for Value #6, press (CLEAR) to return to the Data Handling Menu.
6. Type 5 (ENTER) to select option 5. The Data Transformation Menu is displayed.
7. Type 3 (ENTER) to select option 3. You are prompted to enter a constant by which the data values are to be multiplied. Type 10 (ENTER). The transformed data is displayed immediately.
8. Press (CLEAR). You are then asked whether you want to keep the transformed data. Type YES (ENTER).
9. When the Data Transformation Menu reappears, type 4 (ENTER) to select option 4. You are prompted to enter a constant by which the data values are to be divided. Type 10 (ENTER). The transformed data is immediately displayed.
10. Press (CLEAR). Next, type YES (ENTER) to keep the transformed data.
11. When the Data Transformation Menu reappears, type 5 (ENTER) for option 5. The three trend types are displayed. Press (ENTER) to select option 1. Type 5 (ENTER) for the number of periods you wish to project the curve. The transformed data is displayed immediately.
12. Press (CLEAR). You are asked whether you want to keep the transformed data. Type NO (ENTER).

13. When the Data Transformation Menu reappears, press (CLEAR) to return to the Data Handling Menu.

Continue to the next exercise, beginning with Step 5.

Exercise 7 — Generating A Sequence Of Data

In this exercise you will have the Business Graphics package generate an arithmetic sequence and a geometric sequence of data values.

1. Insert a TRSDOS system diskette in Drive 0.
2. Insert any one of the Business Graphics Chart diskettes in Drive 1.
3. Press the reset button. When TRSDOS Ready appears, type TRSCHART (ENTER). The Main Menu appears and option 1 is flashing.
4. Press (ENTER) to display the Data Handling Menu.
5. Type 3 (ENTER) for option 3. The sequence types are displayed and option 1 is flashing. Press (ENTER) to select it.
6. When prompted, type 10 (ENTER) as the starting value, 10 (ENTER) as the increment, and 10 (ENTER) as the number of values to be generated.
7. The Data Handling Menu reappears and option 6 is flashing. Press (ENTER) to view the data and then press (CLEAR) to return to the Data Handling Menu.
8. Select option 3 again by typing 3 (ENTER). When the sequence types are displayed, type 2 (ENTER).
9. In response to prompting, type 1 (ENTER) as the initial value, 2 (ENTER) as the factor, and 30 (ENTER) as the number of values to be generated.
10. The Data Handling Menu reappears and option 6 is flashing. Press (ENTER) to display your data. Only the first 10 values fit on the screen. Use (↓) to view the rest of the data. The final value is 536,870,912.
11. Press (CLEAR) to return to the Data Handling Menu.

If you want to continue with the next exercise, type 9 (ENTER) to return to the Main Menu, and begin with Step 4.

If you want to end the session, return to TRSDOS Ready, remove both diskettes, and store them in their envelopes. Turn off the computer and the printer or plotter.

Exercise 8 — Editing Chart Text

In this exercise, you will edit the text on the line chart created in Exercise 1.

1. Insert a TRSDOS system diskette in Drive 0.
2. Insert any one of the Business Graphics Chart diskettes in Drive 1.
3. Press the reset button. When TRSDOS Ready appears, type TRSCHART (ENTER). The Main Menu appears.
4. Type 3 (ENTER) to select option 3. The Chart Text Editor Menu is displayed.

5. To select option 1, press (ENTER). When the cursor appears on the right of the screen, type LINE1/CHT (ENTER) to load the chart created in Exercise 1. It takes a few seconds to load the chart.

6. When the chart is loaded, the Chart Text Editor Menu reappears and option 2 is flashing. Press (ENTER) to view the chart.

7. Use the arrow keys to move the cursor to a line below the chart but inside the frame. Then press (ENTER) or (CLEAR) to return to the Chart Text Editor Menu.

8. Type 3 (ENTER) for option 3. The chart is displayed again. (If you are using the Multi-Pen Plotter, you are asked to select a pen color for the label.) Enter a new horizontal label by typing EDITED BY, your name, and pressing (ENTER).

9. The Chart Text Editor Menu reappears and option 2 is flashing. Press (ENTER) to view the chart. When the chart appears, move the cursor to any point within the chart and then press (ENTER).

10. When the menu reappears, select option 3 by typing 3 (ENTER). When the chart is displayed, type NOTE—>. Before pressing (ENTER), press (←) once to move the cursor back onto the label and then press (ENTER). The menu reappears. (If you have already pressed (ENTER), press it again. The chart reappears and you can move the cursor.)

11. Type 7 (ENTER) to move the label. When the chart appears, use the arrow keys to move the cursor and the label around the chart. Note that as the label moves over elements of the chart, a portion of the chart is blanked out, only to reappear when the label is moved away. (If you typed the label over part of the chart initially, that blank background remains on the screen but in the printed chart it appears only where a label exists. On a plotter, no blank background is provided.) You can place the label anywhere, inside or outside the chart. Move it alongside the November data point and press (ENTER). You are then returned to the Chart Text Editor Menu.

12. Option 2 is flashing. Press (ENTER) to redisplay the chart. Now move the cursor to the top character of the left label (UNITS) and press (ENTER).

13. When the menu reappears, type 6 (ENTER) for option 6. When the chart is displayed, delete the label by pressing (CLEAR) one time for each character. (When all characters have been deleted, pressing (CLEAR) has no effect.) Then press (ENTER) to return to the menu.

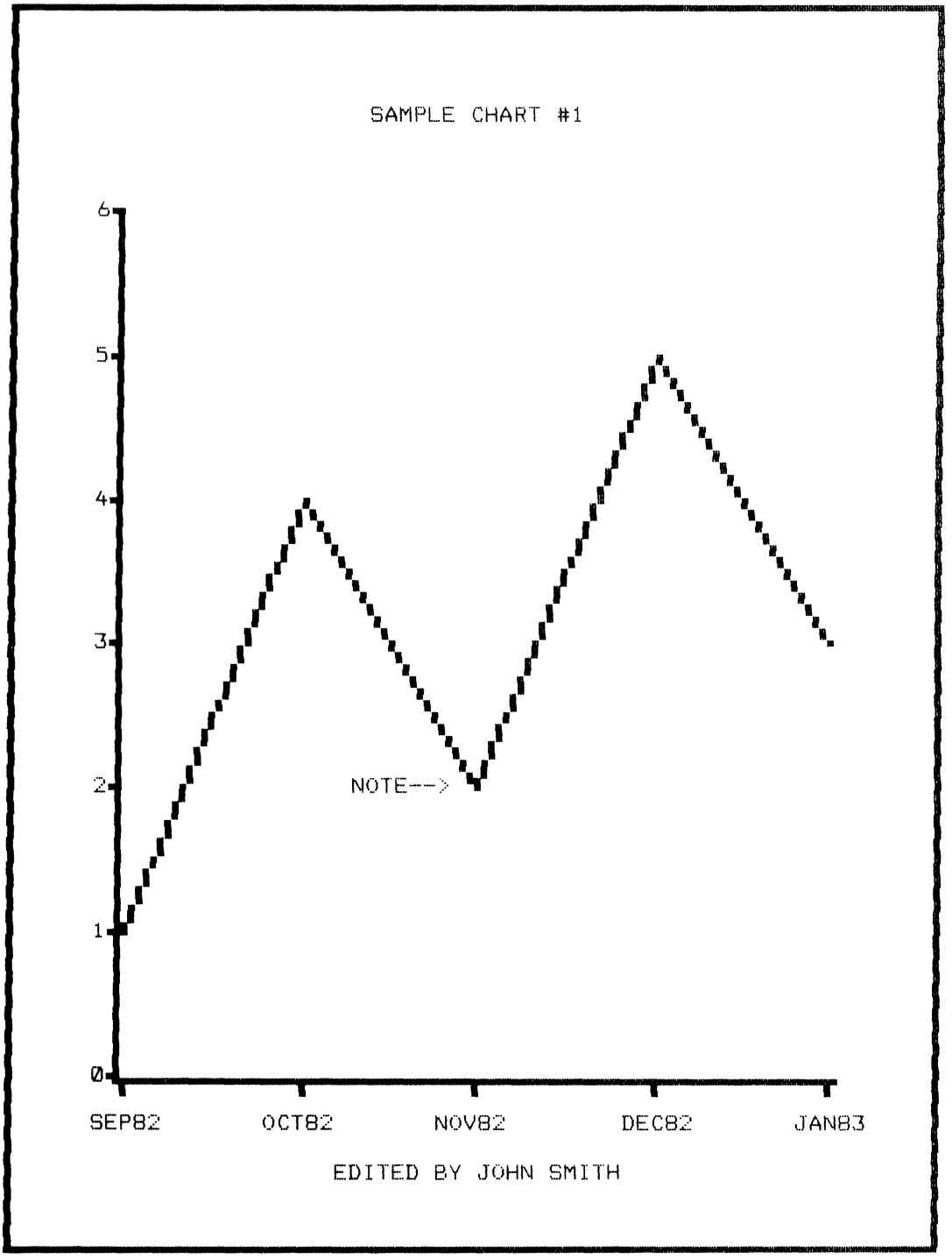
14. Type 8 (ENTER) to print the chart. In a few seconds, a message is displayed telling you to ready the printer or plotter. When you press (ENTER), printing begins.

After the chart has been printed, the Chart Text Editor Menu reappears.

The final exercise uses the Line Chart diskette. If you have that diskette in Drive 1, type 0 (ENTER) to return to the Main Menu. Begin with Step 4 of the next exercise.

If you are using one of the other Chart diskettes, return to TRSDOS Ready, remove the diskette, and place it in its envelope. Then insert the Line Chart diskette in Drive 1. Begin with Step 3 of the next exercise.

If you want to end the session, remove both diskettes and place them in their envelopes. Turn off the computer and the printer or plotter.



Exercise 9 — Updating A Line Chart

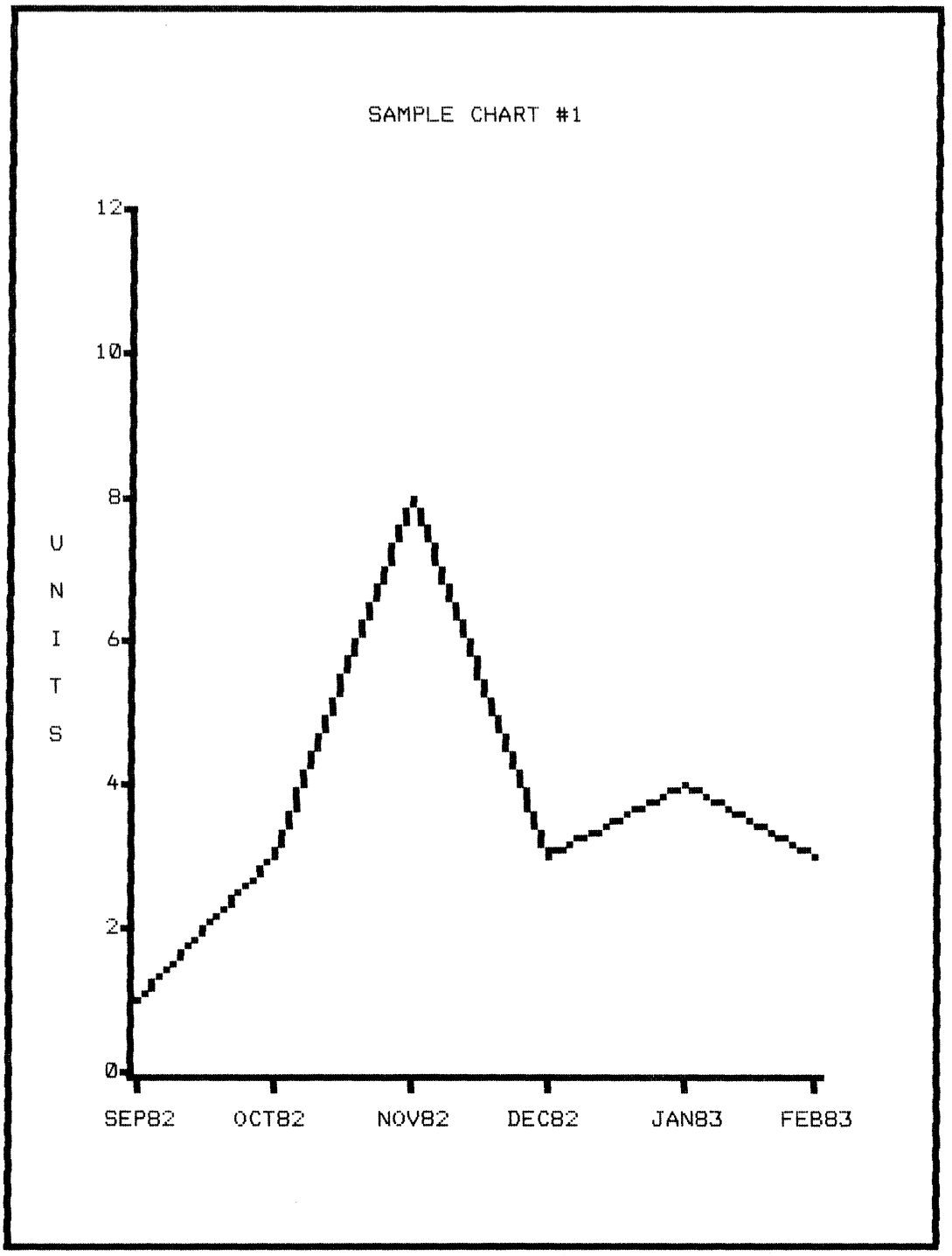
In this last exercise, you will use the line chart settings created in Exercise 1 along with the edited data created in Exercise 5 to produce an updated chart.

1. Insert a TRSDOS system diskette in Drive 0.
2. Insert the Line Chart diskette in Drive 1.
3. Press the reset button. When `TRSDOS Ready` appears, type TRSCHART (ENTER). The Main Menu appears.
4. Type 2 (ENTER) to select option 2. The Line Chart Menu is displayed.
5. Type 4 (ENTER) to select option 4. When the cursor appears on the right of the screen, type LINE1/SET (ENTER) to load the line chart settings created in Exercise 1.
6. Now type 1 (ENTER) for option 1. When the Data & Format Settings Menu is displayed, note that LINE1/SET is shown as the data file for Curve 1.
7. Option 1 is flashing. Press (ENTER) to select it. When the cursor appears on the right of the screen, type LINE2/DAT (ENTER). Then press (CLEAR) to return to the Line Chart Menu.
8. Type 8 (ENTER) to print the chart. In a few seconds, a message is displayed telling you to ready the printer or plotter. When you press (ENTER), printing begins.

When the chart has been finished, the Line Chart Menu reappears.

Compare this chart to the first version created in Exercise 1. Note that the vertical scale has been increased and another month's data has been added to the chart and to the horizontal-axis labels. You could easily have supplied a new title as well.

To end the session, return to `TRSDOS Ready`, remove both diskettes, and store them in their protective sleeves. Then turn off the computer and the printer or plotter.


SAMPLE CHART #1
12
10
8
6
4
2
0
U
N
I
T
S
SEP82
OCT82
NOV82
DEC82
JAN83
FEB83

CHAPTER 11

System Messages

A flashing message that appears at the bottom of the screen is either a warning or an indication of an error. All such messages require a response from the user.

Warning messages (all of which begin with WARNING:) notify you of some action the program has taken or some condition of which you should be aware. If you wish, you can simply acknowledge the message (by pressing (CLEAR)) and continue. However, you may want to change some of your settings or revise your data before proceeding.

Error messages appear when the program cannot follow your instructions — for example, if a file cannot be located, if settings are inconsistent, or if an entry is outside the acceptable range. When an error message appears, you must change your instructions before the program can continue.

The system messages are listed in this chapter in alphabetical order. For each message, the possible causes and a suggested course of action are indicated.

AT LEAST n VALUES NEEDED FOR TREND! PRESS "CLEAR".

You tried to compute a trend with too few values. At least two values are needed to compute a linear or exponential trend; at least three values are needed to compute a quadratic trend. Press (CLEAR), return to the Data Handling Menu, and enter more values.

CANNOT ACCESS DATA FILE x! PRESS "CLEAR".

You tried to generate a chart, and the computer is unable to load the specified data file. "x" is the number of the bar set or curve to which the data file pertains. This message may result from one of the following conditions:

- No filename is specified in the chart settings
- The filename is invalid
- The computer cannot find the file
- The computer cannot read the file

Press (CLEAR), select the Data & Format Settings Menu, and make sure you entered the name of a file that is saved on your system diskette.

CANNOT ACCESS YOUR FILE! SELECT 2 TO TRY AGAIN.
CANNOT ACCESS YOUR SETTINGS FILE! PRESS CLEAR.
CANNOT LOAD YOUR FILE! SELECT 1 TO TRY AGAIN.

The computer is unable to load your data file, chart settings file, or chart file for one of the following reasons:

- The filename is invalid
- The computer cannot find the file
- The computer cannot read the file

Press (CLEAR) and make sure you entered the name of a file that is saved on your system diskette.

```
CANNOT SAVE YOUR CHART! PRESS "CLEAR".
CANNOT SAVE YOUR CHART! SELECT 9 TO TRY AGAIN.
CANNOT SAVE YOUR DATA! SELECT 8 TO TRY AGAIN.
CANNOT SAVE YOUR SETTINGS! PRESS "CLEAR".
```

Your current chart, data, or settings cannot be saved on diskette for one of the following reasons:

Cause	Remedy
No room on diskette	Place a new system diskette in Drive 0.
Protected file	Specify an unprotected file.
Diskette error	Try again or use a new diskette.
Invalid filename	Try again.
No data diskette	Place a system diskette in Drive 0.

```
CANNOT STACK NEGATIVE VALUES. PRESS "CLEAR".
```

You tried to generate a stacked bar chart using data sets that contain one or more negative values. Press (CLEAR), return to the Data & Format Settings Menu, and specify grouped format for the bars; or return to the Data Handling Menu and remove the negative values from your data files.

```
CONSTANT CANNOT BE ZERO! PRESS "CLEAR".
```

You tried to divide by zero. Press (CLEAR) and try a different constant.

```
DATA CANNOT BE NEGATIVE OR NEAR ZERO! PRESS "CLEAR".
```

You tried to apply the logarithmic function or the exponential trend to data that has one or more values less than or equal to zero or very near zero. Press (CLEAR) and either change the value(s) or try a different function.

```
DATA UNSUITABLE FOR AUTO-SCALING! PRESS "CLEAR".
```

You tried to generate a chart using data values that are inappropriate for automatic scaling. The screen shows the current data range and the number of data points. This message may result from one of the following conditions:

- Only one data point exists
- All data points have the same value
- The data is made up of large values that have only small differences between them (for example, 900,000 to 900,100)

Press (CLEAR) and either specify your own numeric scale range in the Data & Format Settings Menu or revise the data through the Data Handling Menu.

DISK NOT AVAILABLE! CORRECT PROBLEM AND RERUN.

You tried to switch between the Data Handling Menu and the Data Transformation Menu when the diskette in Drive 0 is full or is write-protected. The program stops and returns you to TRSDOS. Press (CLEAR) and either use a new system diskette in Drive 0 or remove the write-protect tab from the system diskette.

ENTER "ROW" OR "COL" ONLY! PRESS "CLEAR".

The only valid response to the current prompt is "ROW" or "COL". (The program actually reads only the first character of the response.) Only one row or column of a VisiCalc DIF file can be recalled at one time. Press (CLEAR) and enter a valid response.

ENTER "YES" OR "NO" ONLY! PRESS "CLEAR".

The only valid response to the current prompt is "YES" or "NO". (The program actually reads only the first character of the response.) Press (CLEAR) and enter a valid response.

ENTRY INVALID OR OUT OF RANGE! PRESS "CLEAR".

This message is caused by one of the following problems:

- You specified a horizontal axis length that is outside the permissible range (20 to 100) or invalid (not a whole number or — with a scatter chart — not an even multiple of 10).
- You specified a vertical axis length that is invalid. The valid lengths are 18, 24, 30, 36, 42, and 48.
- You entered a value other than 0, 1, or 2 for the number of digits to be printed to the right of the decimal point in numeric scale labels.
- You specified a page width or page height that is invalid (not a whole number) or outside the permissible range. Page width can range from 35 to 67 on the plotter, from 35 to 80 on the Line Printer VIII, and from 35 to 110 on other printers. Page height can range from 30 to 52 on the plotter and from 30 to 66 on the printers.
- You specified a page margin that is invalid (not a whole number) or outside the permissible range. Top and bottom margins can range from 0 to 20 on the plotter and from 0 to 36 on the printers. Left and right margins can range from 0 to 35 on the plotter, from 0 to 40 on the Line Printer VIII, and from 0 to 70 on other printers.
- You entered a slice number that is not a whole number between 1 and 12.

Press (CLEAR) and enter a valid number.

FACTOR IS TOO LARGE/SMALL FOR xxx VALUES! PRESS "CLEAR".

You entered a geometric factor that will produce numbers either too large or too small (outside the range of 10^{-15} to 10^{15} absolute value) to be handled

by the program. "xxx" is the number of values requested. Press (CLEAR) and try again, changing the factor and/or the number of values to be generated.

HORIZONTAL-AXIS LABEL EXCEEDS 15 CHARS! PRESS "CLEAR".

You tried to generate a scatter chart for which the horizontal-axis label has more than 15 characters (the maximum allowed). Press (CLEAR) and remedy the problem. If you requested a leading character, commas, or one or two decimal places in the scale labels, return to the Data & Format Settings Menu. Then, change the format so the label fits within the limit. If your data values themselves exceed 15 digits (that is, your data includes a value outside the range of -1Ø13 through 1Ø14), return to the Data Handling Menu. Then, scale the data with the division transformation before trying to use it for the scatter chart.

INVALID DATE ENTRY! PRESS "CLEAR".

You entered a starting date for the horizontal-axis labels in an invalid format or range. The starting date must be in the form nnWyy for weekly labels, mmmyy for monthly labels, nQyy for quarterly labels, or yy for yearly labels. For weekly labels, the range must be from 1 to 52; for quarterly labels, it must be from 1 to 4. Press (CLEAR) and enter a valid date.

INVALID OR INSUFFICIENT DATA ON YOUR FILE! PRESS "CLEAR".

You tried to recall data from a VisiCalc DIF file that contains invalid data or less data than indicated by the number of rows and columns. Press (CLEAR) and try another file.

INVALID SCALE RANGE ENTRY! PRESS "CLEAR".

You specified a numeric scale range that does not conform to the required format: two numbers, each containing up to 12 digits (including up to two decimal places), separated by a comma or a blank. Press (CLEAR) and enter a valid range.

LABEL EXISTS AT CURSOR! SELECT 2 TO MOVE CURSOR.

You tried to create a new label, but the cursor is positioned on an existing label. Display the chart (with option 2) and reposition the cursor before trying again to create the label.

LABEL TOO LONG (MAX 64)! SELECT 2 TO MOVE CURSOR.

You tried to create a label that is more than 64 characters in length. Only the first 64 characters have been retained. Display the chart (with option 2) and reposition the cursor if you want to delete or type over some characters in the label.

LABELS OVERLAP! LATEST LABEL MUST BE MOVED. SELECT 7.

You created, changed, or moved a label so it overlaps an existing label. (If no overlap is visible, the label may be overlapping a blank.) The label must be

moved to a non-overlapping position before you can do anything else. Press any key on the keyboard to display the chart. Then, move the label by using the arrow keys. (See Chapter 4/ Editing Chart Text.) When the label no longer overlaps any other label, press (ENTER).

MAX 100 DATA VALUES ALREADY PRESENT! PRESS "CLEAR".

You tried to insert data when 100 data values (the maximum) already are present. Press (CLEAR) and remove some data before trying again.

MORE THAN 12 VALUES IN FILE! PRESS "CLEAR".

You tried to generate a pie chart using a data file that has more than 12 data values. Press (CLEAR) and specify a different file or return to the Data Handling Menu and save a data file that has no more than 12 values.

MUST HAVE MORE THAN 1 DATA VALUE! PRESS "CLEAR".

You tried to generate a moving average or consolidate your data, but there is only one data value. Press (CLEAR) and return to the Data Handling Menu to enter more values.

NEGATIVE OR ZERO VALUE(S) IN DATA FILE! PRESS "CLEAR".

You tried to generate a pie chart, using a data file that contains an invalid data value. Press (CLEAR) and specify a different file or return to the Data Handling Menu and remove all negative and zero data values from the file.

NO CHART HAS BEEN LOADED! SELECT 1 TO LOAD A CHART.

You tried to edit, save, display, or print a chart, but no chart has been loaded. Select option 1 (LOAD CHART) before trying any other functions.

NO DATA PRESENT! SELECT 1, 2 OR 3 TO ENTER DATA.

You tried to edit, transform, print, or save data when no data is present. Select option 1, 2, or 3 on the Data Handling Menu to enter, retrieve, or generate some data.

NO FILE NAME FOR BAR SET 1 AND/OR 2! PRESS "CLEAR".

You tried to generate a bar chart after supplying a filename for Bar Set 2 but not for Bar Set 1, or for Bar Set 3 but not for both Bar Sets 1 and 2. Press (CLEAR) and select the Data & Format Settings Menu. Either specify files for the missing bar sets or assign the existing file(s) to the first or the first and second bar sets.

NO FILE NAME FOR CURVE 1 AND/OR 2! PRESS "CLEAR".

You tried to generate a line chart after supplying a filename for Curve 2 but not for Curve 1, or for Curve 3 but not for both Curves 1 and 2. Press (CLEAR) and select the Data & Format Settings Menu. Either specify files for the

missing curves or assign the existing file(s) to the first or the first and second curves.

NO LABEL AT CURSOR! SELECT 2 TO MOVE CURSOR!

You tried to change or move a label, but the cursor is not positioned on an existing label. Select option 2 (DISPLAY CHART) and use the arrow keys to position the cursor on the desired label before trying this function again.

NOT A BAR CHART SETTINGS FILE! PRESS "CLEAR".
NOT A LINE CHART SETTINGS FILE! PRESS "CLEAR".
NOT A PIE CHART SETTINGS FILE! PRESS "CLEAR".
NOT A SCATTER CHART SETTINGS FILE! PRESS "CLEAR".

You tried to load settings, naming a file that either does not contain chart settings or contains settings for a different chart type. Press (CLEAR) and enter the name of a file that has been saved using the SAVE SETTINGS option of the current chart menu.

ONLY NUMBERS MAY BE ENTERED! PRESS "CLEAR".

You entered a non-numeric character such as a letter or symbol when a numeric value was expected. Only digits, decimal points, and leading plus or minus signs are acceptable. Press (CLEAR) and enter a valid number.

ONLY 1 TO 100 VALUES MAY BE GENERATED! PRESS "CLEAR".

You tried to generate a sequence that would result in more than 100 data values, the maximum allowed. Press (CLEAR) and try a sequence with fewer values.

ONLY 2 TO xxx VALUES MAY BE AVERAGED! PRESS "CLEAR".

You tried to average either too few values (0 or 1) or too many values (more than the number in the current file). "xxx" is the number of values in the current data. Press (CLEAR) and try again.

ONLY 2 TO xxx VALUES MAY BE TOTALED! PRESS "CLEAR".

You tried to consolidate either too few values (0 or 1) or too many values (more than the number in the current file). "xxx" is the number of values in the current data. Press (CLEAR) and try again.

ONLY UP TO 10 CHARACTERS MAY BE ENTERED! PRESS "CLEAR".

You tried to enter a data value with more than 10 characters (the maximum allowed), including any decimal point or leading sign. Press (CLEAR) and try again.

ONLY UP TO xx VALUES MAY BE PROJECTED! PRESS "CLEAR".

You tried to project values in a trend or growth transformation beyond the

maximum of 100 values. "xx" is the highest acceptable number, based on the current data. Press (CLEAR) and try again.

ONLY WHOLE NUMBERS MAY BE ENTERED! PRESS "CLEAR".

You tried to enter a non-integer value when an integer (whole number) is required (for example, a sequence number, or a row or column number). Press (CLEAR) and enter a whole number.

PRINTER IS NOT READY! PRESS "ENTER" WHEN READY.
PRINTER NOT READY! PRESS "CLEAR".

You tried to print a chart, data, or chart settings when the printer is not ready. If you are using a Daisy Wheel II printer, the printer either is not turned on, is not on-line, or is not functioning properly. If you are using a dot-matrix printer, the printer is not on-line. If you are printing a chart, remedy the problem and press (ENTER) to start printing. Otherwise, press (CLEAR) to return to the menu. Then, remedy the problem and select the print function again.

SCALE RANGE NOT LOW-TO-HIGH! PRESS "CLEAR".

For the numeric scale, you specified a range in which the second value is smaller than the first. Press (CLEAR) and re-enter the lower and upper limits in that order.

SOME/ALL HORZ DATA OFF SCALE! PRESS "CLEAR".

You tried to generate a scatter chart and specified for the horizontal scale a range that does not include all your data values. Press (CLEAR), return to the Data & Format Settings Menu, and increase the range (or enter AUTO to let the program determine the range).

SOME/ALL VERT DATA OFF SCALE! PRESS "CLEAR".

You tried to generate a line chart, bar chart, or scatter chart and specified for the vertical scale a range that does not include all your data values. Press (CLEAR), return to the Data & Format Settings Menu, and increase the range (or enter AUTO to let the program compute the range).

SOME DATA VALUES ARE TOO LARGE! PRESS "CLEAR".

You tried to perform a transformation on data values that are too large for the computations to be performed (the results would exceed $\pm 10^{15}$). Press (CLEAR) and scale your data using the division transformation.

THE CHART HAS TOO MANY REQUESTED PARTS! PRESS "CLEAR".

You tried to generate a chart that requires more internal storage space than the computer has available. Press (CLEAR) and simplify your chart. (For example, you can delete or shorten labels or decrease the number of data points in the chart).

```
THIS CHART IS FOR DAISY II ONLY! PRESS "CLEAR".
THIS CHART IS FOR PEN PLOTTER ONLY! PRESS "CLEAR".
THIS CHART IS FOR PRINTER V, VI OR VIII ONLY! PRESS "CLEAR".
```

You tried to load a chart that was created for an output device different than the one for which the current Chart diskette is configured. Press (CLEAR) and specify a chart that was created for the current device type.

```
THIS FILE IS NOT A CHART FILE! PRESS "CLEAR".
```

You tried to load a chart, naming a file that is not a chart file. Press (CLEAR) to delete the filename. Then, press (ENTER) and supply the name of a chart file.

```
TITLE TOO LONG! PRESS "CLEAR".
```

You entered a title that exceeds the maximum number of characters (50 for top and bottom titles, 25 for left titles). Press (CLEAR) and enter a shorter title.

```
TOO MUCH TEXT IN CHART! SELECT 6 TO DELETE.
```

Because of text added through the Chart Text Editor Menu, the chart used up the available internal storage space in the computer. Use option 6 to delete some of the text.

The first time this message appears, you still have some leeway — about 30 characters — and can delete text, adjust one or more existing labels, and so on. If the message appears a second time, you are locked out of the editing functions. You can save or print the chart as is or you can reload the chart, discarding all editing changes made since you last saved the chart, and start over.

```
TOTAL HEIGHT EXCEEDS PAGE HEIGHT!
```

You tried to generate a chart that is taller than the page height on which it is to be printed. The screen shows a summary of the settings that contribute to chart height. For example:

```
CHANGE ONE OR MORE CURRENT SETTINGS TO DECREASE THE CHART
HEIGHT (OR INCREASE THE PAGE HEIGHT IF BELOW MAXIMUM).

--------CHART ELEMENT--------          -SETTING-   --RANGE--
    (1)  TOP MARGIN                        0         0 -  36
    (2)  FRAME (TOP & BOTTOM)              8         0 OR  8
    (3)  TOP TITLE AREA                    5         0 OR  5
    (4)  VERT AXIS LENGTH                 48        18 -  48
    (5)  BOTTOM LABEL & AXIS               3         1 OR  3
    (6)  BOTTOM TITLE AREA                 4         0 OR  4
    (7)  BOTTOM MARGIN                     0         0 -  36
         TOTAL HEIGHT (1) THRU (7)        68        30 -  66
         PAGE HEIGHT                      52        30 -  66
```

On the Multi-Pen Plotter, total height and page height are limited to 52 lines. Top and bottom margins are limited to 20 lines.

The frame and space inside it require eight lines; five lines are used for the top title and space following it; four lines for the bottom title and space preceding it. If you omit the horizontal-axis labels, one line is used for the axis border. Otherwise, three lines are used for the border, labels, and a line following them.

Press (CLEAR), return to the appropriate menu, and change the settings to reduce the height of the chart, and/or increase the page height setting if it is not already at its maximum value.

```
TOTAL WIDTH EXCEEDS PAGE WIDTH! PRESS "CLEAR".
```

You tried to generate a chart that is wider than the page width on which it is to be printed. The screen shows a summary of the settings that contribute to chart width. For example:

```
--------CHART ELEMENT--------          -SETTING-   --RANGE--
    (1)  LEFT MARGIN                        0        0 -  70
    (2)  LEFT FRAME                         3        0 OR  3
    (3)  LEFT TITLE AREA                    0        0 OR  3
    (4)  VERT AXIS & LABELS                 2        2 -  16
    (5)  HORZ AXIS LENGTH (ADJUSTED)      100       20 - 100
    (6)  RIGHT FRAME                        4        0 -  21
    (7)  RIGHT MARGIN                       0        0 -  70
         TOTAL WIDTH (1) THRU (7)         109       35 - 110
         PAGE WIDTH                        67       35 - 110
```

On the Multi-Pen Plotter, total width and page width are limited to 67 character positions. Left and right margins each are limited to 35 character positions.

On the Line Printer VIII, total width and page width are limited to 80 character positions. Left and right margins each are limited to 40 character positions.

The frame and space inside it require seven character positions, and three character positions are used for a left title and space following it. At least two character positions are used for the vertical axis and labels.

Press (CLEAR), return to the appropriate menu, and change the settings to reduce the width of the chart, and/or increase the page width setting if it is not already at its maximum value.

```
TWO DATA FILE NAMES ARE REQUIRED! PRESS "CLEAR".
```

You tried to generate a scatter chart when either one or no data filename was supplied. Press (CLEAR), select the Data & Format Settings Menu, and supply the missing filename(s).

```
VERTICAL-AXIS LABEL EXCEEDS 15 CHARACTERS! PRESS "CLEAR".
```

You tried to generate a line chart, bar chart, or scatter chart for which the vertical-axis label has more than 15 characters, the maximum allowed. Press (CLEAR) and remedy the problem. If you requested a leading character, commas, or one or two decimal places in the scale labels, return to the Data &

Format Settings Menu and change the format so the label fits within the limit. If your data values themselves exceed 15 digits (that is, your data includes a value outside the range of -10^{13} through 10^{14}), return to the Data Handling Menu and scale the data with the division transformation before trying to use it for a chart.

```
WARNING: BOTTOM TITLE SHORTENED TO FIT! PRESS "CLEAR".
```

You tried to generate a chart, and the bottom title you supplied either did not fit within a requested frame or did not fit within the page width. The rightmost letters of the title are deleted. This is only a warning. Press **CLEAR** to continue. If you save the chart, you can then change the title through the Chart Text Editor Menu.

```
WARNING: FILL IGNORED FOR NON-SOLID CURVE! PRESS "CLEAR".
```

You tried to generate a line chart or scatter chart and requested fill for a curve that is represented by a dashed or dotted line or by data points only. Fill is available under solid-line curves only. This is only a warning. Press **CLEAR** to continue.

```
WARNING: FILL IGNORED--HORZ DATA UNSUITABLE! PRESS "CLEAR".
```

You tried to generate a scatter chart and requested fill, but the values for the horizontal data point locations are not in low-to-high sequence. This is only a warning. Press **CLEAR** to continue.

```
WARNING: FILL OVERRIDES DATA POINT CHARACTER! PRESS "CLEAR".
```

You tried to generate a line chart or scatter chart and requested both fill and a special data point character for a curve. The data point character is set back to AUTO (the character used for the connecting line) in order to fill under the curve. This is only a warning. Press **CLEAR** to continue.

```
WARNING: LEFT TITLE SHORTENED TO FIT! PRESS "CLEAR".
```

You tried to generate a line, chart, bar chart, or scatter chart, and the left title you supplied exceeds the length of the vertical axis. The lowermost letters of the title are deleted. This is only a warning. Press **CLEAR** to continue. If you save the chart, you can then change the title through the Chart Text Editor Menu.

```
WARNING: ONLY 1ST 100 ITEMS TAKEN FROM COLUMN! PRESS "CLEAR".
WARNING: ONLY 1ST 100 ITEMS TAKEN FROM DATA FILE! PRESS
    "CLEAR".
WARNING: ONLY 1ST 100 ITEMS TAKEN FROM ROW! PRESS "CLEAR".
```

You tried to retrieve a data file, or a column or row of a VisiCalc DIF file, that contains more than 100 data values. Only the first 100 values are retrieved. This is only a warning. Press **CLEAR** to continue.

```
WARNING: ONLY 1ST 100 ITEMS TAKEN FROM DATA FILE x! PRESS
    "CLEAR".
```

You tried to generate a chart, using a data file that contains more than 100 data values. "x" is the number of the bar set or curve to which the data pertains. Only the first 100 values are used. This is only a warning. Press (CLEAR) to continue.

```
WARNING: PAGE HEIGHT TOO LARGE, DEFAULT USED. PRESS "CLEAR".
WARNING: PAGE WIDTH TOO LARGE, DEFAULT USED. PRESS "CLEAR".
```

You loaded a chart settings file that contains a page height or page width setting that exceeds your current device maximum. The default value of the current device is used instead. This is only a warning. Press (CLEAR) to continue.

```
WARNING: POSSIBLE HIDDEN SEGMENT(S). PRESS "CLEAR".
WARNING: POSSIBLE HIDDEN SLICE(S). PRESS "CLEAR".
```

You tried to generate a bar chart or pie chart, and at least one bar, bar segment, or pie slice is too small to show up on the screen. The bar or slice may be visible if the chart is produced on a printer or pen plotter. This is only a warning. Press (CLEAR) to continue.

```
WARNING: TOO MANY BAR DATA VALUES. PRESS "CLEAR".
```

You tried to generate a bar chart that has more bars than will fit within the current format settings. Some bars must be omitted. The message on the screen tells you how many bars can fit and suggests ways to remedy the problem. When you press (CLEAR), you are asked whether or not you want the program to generate the chart the way it is. If you answer YES, the chart is displayed, printed, or saved. If you answer NO or press (CLEAR), you are returned to the Bar Chart Menu.

If the horizontal axis length is not already at the maximum, select the Data & Format Settings Menu and increase the axis length to make room for more bars. (You may also need to increase the page width, using the Printer/Plotter Settings Menu.) If the bars are grouped, you may be able to fit all the data onto the chart by switching to stacked format if your data contains no negative values. Otherwise, return to the Data Handling Menu and delete some of your data.

```
WARNING: TOP TITLE SHORTENED TO FIT! PRESS "CLEAR".
```

You tried to generate a chart, and the top title you supplied either did not fit within the requested frame or did not fit within the page width. The rightmost letters of the title are deleted. This is only a warning. Press (CLEAR) to continue. If you save the chart, you can then change the title through the Chart Text Editor Menu.

```
WARNING: UNEQUAL ITEM COUNTS IN DATA FILES. PRESS "CLEAR".
```

You tried to generate a grouped or stacked bar chart, and the data files do not

contain the same number of values. This is only a warning. Press (CLEAR) to continue.

```
WARNING: UNEQUAL NO. OF VALUES! PAIRS USED. PRESS "CLEAR".
```

You tried to generate a scatter chart, and the data files for the horizontal and vertical axes do not contain the same number of values. Only the paired values (the number of values in the shorter file) are used. This is only a warning. Press (CLEAR) to continue.

```
# MUST BE FROM 1 TO xxx! PRESS "CLEAR".
```

If you were editing data, you tried to change, insert, or delete data starting at a sequence number that is either too large or less than 1. For CHANGE or DELETE, "xxx" is the sequence number of the last current data value. For INSERT, "xxx" is one beyond the sequence number of the last current data value.

If you were recalling data from a VisiCalc DIF file, you tried to specify a row or column number that is either less than 1 or greater than the number of rows or columns (indicated by "xxx") in the file.

Press (CLEAR) and enter a valid number.

```
# MUST BE FROM xxx TO yyy! PRESS "CLEAR".
```

You tried to delete a range of data values, and you either specified an upper limit that is less than the lower limit (xxx) or entered a sequence number larger than that of the last current data value (yyy). Press (CLEAR) and enter a valid number.

APPENDIX A

Making Backups Of Your Program Diskettes

Be sure to make "precaution" copies of the Chart diskettes included in this package before you begin using the program.

In the following procedure, the original Business Graphics Chart diskettes are referred to as the "source" diskettes. The precaution copies you will be creating are referred to as "destination" diskettes. Follow these steps:

1. Turn your computer on. If you are not familiar with the equipment, please refer to your Disk System Owner's Manual for system start-up.
2. Insert a TRSDOS system diskette in Drive Ø and close the drive door.
3. Insert a Chart diskette in Drive 1 and close the drive door.
4. Press the orange reset button.

The screen displays:	You type:
`Enter Date (MM/DD/YY)?`	Ø1/Ø1/83 and press (ENTER). (Example for January 1, 1983).
`Enter Time (HH:MM:SS)?`	Press (ENTER).
`TRSDOS Ready`	BACKUP and press (ENTER).
`SOURCE Drive Number?`	1 (ENTER)
`DESTINATION Drive Number?`	Ø (ENTER)
`SOURCE Disk Master Password?`	

(Remove the TRSDOS system diskette from Drive Ø and insert a new, blank diskette into Drive Ø.) Then type:

PASSWORD (ENTER)

If you are using a new diskette, the system formats the diskette for you.

If you are reusing an old diskette, one or two additional questions may appear, depending on the previous content of the diskette. You may see:

```
Diskette contains DATA. Use Disk or not?
```

and/or:

```
Do you wish to RE-FORMAT the diskette?
```

If the questions appear and you are sure you are using the correct diskette, type Y and press (ENTER) for each question. When the process is completed, the screen shows:

```
** Backup Complete **

Insert SYSTEM Diskette (ENTER)
```

Remove the Chart diskette from Drive 0, place it in its protective envelope, and label it appropriately. Insert the TRSDOS system diskette in Drive 0 and press (ENTER) to return to TRSDOS READY.

INDEX

RADIO SHACK, A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

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