HEWLETT-PACKARD

Graphics Presentations Pac

OWNER'S MANUAL

HP-86/87

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HEWLETT PACKARD

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Owner's Manual
HP-86/87

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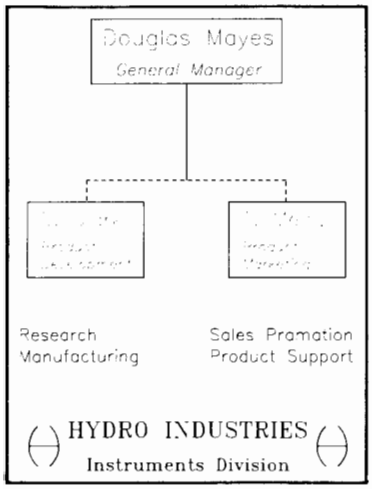
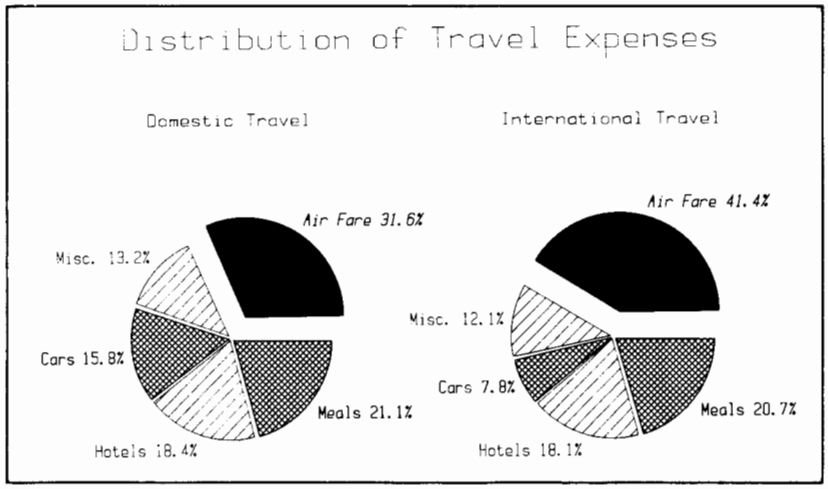
Contents

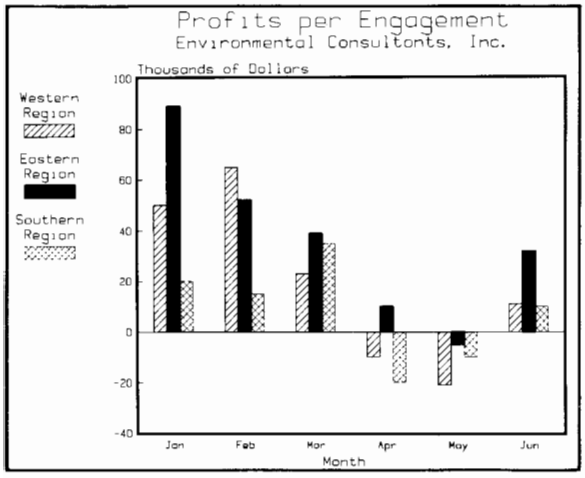
Welcome to the Graphics Presentations Pac!

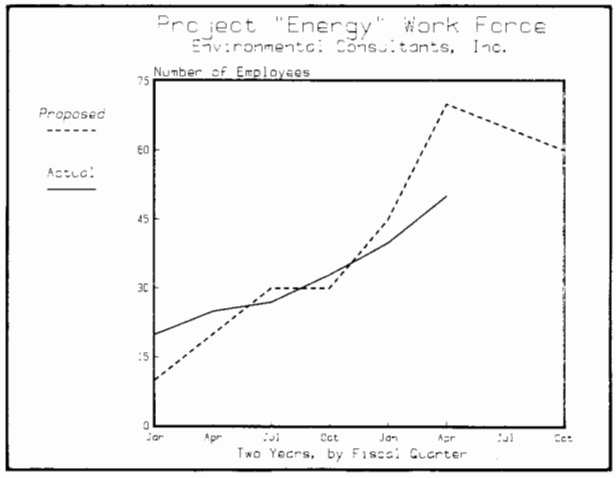
The Graphics Presentations Pac has been designed to provide you with a simple, friendly method of producing graphics that can be plotted either on overhead transparency film or on paper. With the pac, you can easily convert tables of numbers or other information into a text and draw, pie, bar, or line chart—and the computer does most of the work for you!

You can even prepare different variations of text and draw, pie, bar, and line charts. Text and draw charts can be composed of text, lines, arcs, and circles. Pie charts can consist of either one or two pies. You can produce three types of bar charts: normal (single bars), stacked (several segments stacked one on top of another), and clustered (several groups of bars). Line charts can either be single (one line) or multiple (several lines). Any of these charts can also be prepared in a variety of languages.









The pac guides you through each step of creating any of these charts, using convenient forms which have blanks to be filled in by you with the correct information. This information can be stored on a magnetic disc for easy retrieval so that originals can be plotted at any time. In addition, if you have any changes to make to a chart, editing features allow you to do so. You can edit either while you are first creating the chart, or at any time in the future, provided you have stored the chart on a disc.

This manual will help you use the pac, providing you with hints on operating the pac efficiently, on organizing your information, and on graphics in general. But before you think about all that, why don't you take a few minutes to become acquainted with the pac?

First you will need to make sure that you have a compatible plotter and disc drive connected to your computer (refer to Equipment Needed in section 2 for compatible models, and to your computer's introductory manual for connection procedures). Next follow the easy steps below!

1. Turn on your disc drive (not required for HP 9130A) and insert the disc marked GP Pac Disc 1 into DRIVE 0. If you're using more than one disc drive, insert the disc into DRIVE 0 of the device with the lowest interface select code and device address.

2. Turn on your computer. The pac will automatically load and begin running. After a while you will see a message on the CRT welcoming you to the pac and then another message that describes the use of special function keys—your primary means of communicating with the pac. Read the instructions and press either k3 if you are using an HP-86 or k5 if you are using an HP-87.

3. Read the next message describing the three types of startups available with the pac: TUTORIAL, CONFIGUR, and QUICK. If you are unfamiliar with filling out data entry forms on this pac, you should select k1, TUTORIAL for a short tutorial. If you want to skip the tutorial and continue with the pac, press k3, CONFIGUR and skip ahead to step 7. The third option k5, QUICK bypasses the system configuration forms, provided these forms have been filled out in a previous session. QUICK should not be used the first time you run the pac (refer to page 23 for a discussion of the QUICK startup option).

4. Read the next message and follow the instructions to learn what a cursor is. (Your name will not be stored permanently in the computer.) Enter 'Y' (the abbreviation for YES) in the field for the second question. You will then move on to the next message. If you want to skip ahead to step 6, enter N (the abbreviation for NO).

5. The next message explains the tabbing features in a form. Read the message and follow the instructions. (Your company's name, type of business, and department name will not be stored permanently in the computer.) When you press (END LINE) to enter the type of business, the cursor will tab to the final question. At this point, if you want to practice with this form, you can do one of three things: a) hold down (SHIFT) while pressing (END LINE) to tab to the preceding field, b) press the home cursor key, (↖), to tab to the first field, or c) type N followed by (END LINE) to tab to the first field. If you do not want to practice tabbing with this form, enter your answer to the final question by typing 'Y' followed by (END LINE). The next instructional message will then appear.

6. Press k3, RESTART to return to step 3, or press k5, PROCEED to begin filling out the system configuration forms.

7. Next, fill out the system configuration forms. (If you have any trouble, refer to Running the Pac in section 2.) First, enter N in the STORE OR RECALL CHARTS DURING THIS SESSION? field.

8. When the second form appears, enter Y in the PLOT CHARTS? field.

9. Respond to the prompt by preparing your plotter with paper, and then pressing (CONT). If the pac displays a message that it cannot find your plotter, refer to your plotter documentation for the correct plotter address to enter.

10. Enter N in the PLOT A REFERENCE GUIDE? field.

11. Enter N in the PRINT TEXT AND DATA? field.

12. Enter 1 in the SET field.

13. Now create a quick text and draw chart to see how easy it is. Just enter the information suggested in the following steps. As you become more familiar with the pac, you will better understand what some of the codes mean. In this example, we will draw a box around a text phrase.

14. On the CRT you will see a set of special function key labels listed vertically, next to a blank rectangular area. This is called the chart preparation form. Press CREATE CHART . (This is special function key k1, as you can see by the label on the CRT.)

15. A new chart preparation form appears next. The special function key labels on this form allow you to select the type of chart you want to create. Press TEXT & DRAW . You will now be able to access functions for preparing a chart consisting of any of the following: text phrases, lines, arcs, and circles.

16. When you are asked whether you want to create a horizontal, horizontal-rotated (HP-86 only), or vertical chart, press HORIZONTAL.

17. Now press TEXT to access the functions pertaining to text phrases.

18. When the next chart preparation form appears, you will also see the blinking graphics cursor (+). Press the down cursor key (↓) 12 times. The graphics cursor will move down 60 dots. Check the upper left corner of the form; you should see X=120 Y=100. If not, press any of the cursor keys (↑, ↓, ←, →) until the X,Y coordinates are 120 and 100, respectively. Now press ADD TEXT .

19. Now you will see a data entry form which allows you to enter character size, font, pen number, highlight, and a text phrase. You can see that default values are already filled into the fields. We will use the default size 6, font 1 (normal upright), and pen number 1 (black). However, we will center the text phrase. Hold down (SHIFT) and press (END LINE). The cursor will tab back and blink in the HIGHLIGHT field. Enter C to instruct the pac to center the text phrase. The cursor will then tab forward to the TEXT field.

20. Now enter Graphics Presentations Pac in the TEXT field. The phrase will then be drawn on the CRT; note that the graphics cursor is positioned at X=51 Y=90 after the phrase has been drawn.

21. To draw a box around the phrase, you must access the line and arc drawing functions. First press EXIT to return to the same chart preparation form which you saw in step 17. Next press LINES & ARCS .

22. When the line and arc drawing module has been loaded, note that the graphics cursor is still positioned at X=51 Y=90. Press the left cursor key (←) twice, so that the graphics cursor is positioned at X=41 Y=90.

23. Press START LINE . A point will appear on the CRT under the flashing graphics cursor at X=41 Y=90. Now press the up cursor key (↑) 5 times, so that the graphics cursor is positioned at X=41 Y=115. Press (END LINE). A vertical line will be drawn on the CRT.

24. Continue drawing the box: Press the right cursor key (→) 30 times, so that the graphics cursor is positioned at X=191 Y=115. (Actually, you do not have to press the right cursor key 30 separate times. You can hold down the key until you see that X = 191 and Y = 115.) Press (END LINE). Then press the down cursor key (↓) 5 times so that the graphics cursor is positioned at X=191 Y=90. Press (END LINE). Finally, press the left cursor key (←) 30 times so that the graphics cursor is positioned at X=41 Y=90. Press (END LINE), and your box is finished.

25. Press EXIT . The chart preparation form you saw in steps 17 and 21 will appear after the text module has been loaded. If you want to plot this chart, proceed with step 26. If not, skip to step 28.

26. Now plot your chart: Press PLOT CHART . When the next chart preparation form appears, press PLOTTER FINAL .

27. Press PAPER in the next form to indicate that you're plotting on paper. Prepare your plotter with paper, insert a black pen in stall 1, and press (CONT). While your chart is plotting, the only special function key label you will see is STOP PLOT. For now, do not press this key. When the plotter is finished, the chart preparation form that offers various plotting options will appear. Now press EXIT to return to the same chart preparation form you saw in step 25.

28. Now you can end your session with the pac. Simply press EXIT. When the next chart preparation form appears, press EXIT PAC , and you will have completed your first session with the pac.

Pie, bar, and line charts are just as easy to prepare as this text chart was. Now you can either explore the pac on your own, or proceed through the manual for hints and more detailed examples.

Becoming Familiar With the Graphics Presentations Pac

This section describes the basics of how the Graphics Presentations Pac works and what design choices you will have. You might be eager to try out the pac right away. If so, start running the pac by following the instructions in section 2, and then turn to sections 3 and 4 to create and edit some sample charts. When you are ready to use the pac to create your own charts, you might want to refer back to this section. It contains definitions for a few common terms used in the pac, explains how the pac is organized, and describes the design choices available with the pac.

Terms You Will Encounter

We assume that you understand the basic terms and functions associated with the keyboard of your computer (such as how to correct typing errors). If not, please refer to your computer operating and programming manual. In addition, read or skim through the following descriptions; they will help you communicate efficiently with the pac. If you have followed the steps in the introductory pages of this manual, you have already been exposed to many of these terms.

Chart Storage Disc and Directory

If you are storing your charts for future plotting or updating, they will be stored on a chart storage disc. The chart directory contains the names of the charts that are stored on the chart storage disc; the directory is also stored on the chart storage disc.

Cursor

The alphanumeric cursor will be referred to in this manual as simply "cursor." It is an inverse video space one character wide (▮) which appears on the CRT to indicate the current position at which the next character will be typed. The cursor advances one space for each character typed. When the cursor is positioned in an inverse video field in a form, the cursor blinks to indicate the current position. You can control the position of the cursor by using the space bar, the [BACK SPACE] key, the cursor keys ([←], [→]), or by tabbing (refer to Tab).

Default Values

Some forms have values preassigned to the inverse video fields. These are called default values. The forms are already filled in so that you can prepare a chart very quickly using the default values for your design choices. However, you can also easily change some or all of the default values to suit your needs by tabbing through the form and entering different values.

Edit

Edit means to make a change to any data or design choices that you have entered to prepare a chart. Editing can include correcting typographical errors, changing design choices, or simply updating a stored chart. Editing can be performed at any time before or after a chart has been stored.

Enter

Enter means the characters you have just typed will be recognized by the computer. In order to enter a number, character, word, or phrase, you must press (END LINE) after typing the characters which you want to enter. The computer recognizes (END LINE) as an instruction to save those characters.

Field (Inverse Video)

A field is a predefined area in which you can enter information in a form. In this pac a field is represented on the CRT by inverse video (a white background as opposed to a black background). The reproductions of forms in this manual show the inverse video fields with black backgrounds instead.

Form

A form is a display on the CRT which consists of one or more of the following: fields for entering chart information, prompts, special function key labels, a drawing of the chart you are preparing. Refer to How is the Pac Organized for detailed descriptions of the types of forms used by this pac.

Graphics Cursor

The graphics cursor is a blinking + symbol which appears on the chart drawing area of text and draw chart preparation forms. It indicates the current position at which the next operation will be performed. You control the position of the graphics cursor using the cursor keys (↑), (↓), (←), and (→). Pressing any cursor key will move the graphics cursor five dots in the direction of the arrow on the cursor key; pressing (SHIFT) with any cursor key will move the graphics cursor one dot. When editing, you can also use the (ROLL) key to control the graphics cursor. The message area of the chart preparation form will tell you which controls to use for a particular operation.

Initialize

When the GP Pac initializes a chart storage disc, the entire contents of the disc are erased, and a chart directory is placed on the disc.

Prompt

A prompt is a message displayed on the CRT that requests action on your part. The prompt might be a question which requires an answer, or it might be a helpful statement telling you what to do next. The prompt appears in the message areas of the forms.

Recall

Recall is the term used in the pac for retrieving a stored chart from the chart storage disc so that it can be plotted or edited. The chart remains stored on the disc while it is copied into the computer. If you edit the recalled chart, you can replace the original stored chart with the edited chart, or you can store the edited chart in addition to the original chart.

Special Function Key

The keys nearest the CRT, marked k1 through k7, are called special function keys. These keys will have different functions assigned to them depending upon the particular form which you are using. The currently assigned functions will be labeled on the CRT in inverse video. Pressing the special function key associated with a particular function will cause that function to be performed. In ths pac, pressing (SHIFT) plus a special function key (to produce k8 through k14) will have no effect.

Store

Store is the term used for saving a chart on a disc for future use.

Tab

Tabbing is an operation which permits the cursor to skip from field to field in data entry forms. Pressing (END LINE) causes the cursor to tab forward to the next field, whereas pressing (SHIFT) (END LINE) causes the cursor to tab to the preceding field. You can also press the home cursor key (↖) (produced by pressing (SHIFT) (↑)) to tab the cursor to the first field on the data entry form.

How is the Pac Organized?

With the Graphics Presentations Pac, you prepare charts by using a series of forms which are displayed on the CRT of the computer. There are three types of forms, called system configuration forms, chart preparation forms, and data entry forms. You will always begin your sessions with the pac by filling out the system configuration forms on GP Pac Disc 1. These forms allow you to specify whether you will be storing and plotting charts and printing chart information. After you have filled out the system configuration forms, you will use variations of the chart preparation forms and data entry forms to prepare your charts. If you are preparing text and draw charts, you will continue to use the forms on GP Pac Disc 1. If you are preparing pie, bar, or line charts, you will instead use the forms on GP Pac Disc 2; the pac will prompt you to exchange GP Pac Discs when necessary. The order in which the pac displays the various forms is dependent upon the type of chart which you are preparing and the operations which you want to perform on the chart. All three types of forms are described in the following paragraphs.

System Configuration Forms

The first forms you will fill out when you begin a session with the pac are the two system configuration forms. The first form requests information on storing and recalling charts, and the second form requests

information on plotting and printing charts. The second form is pictured here. Default values are preassigned to the inverse video fields; you can enter different values to suit your needs. The lower portion of both forms displays messages which will help you in filling out the form.

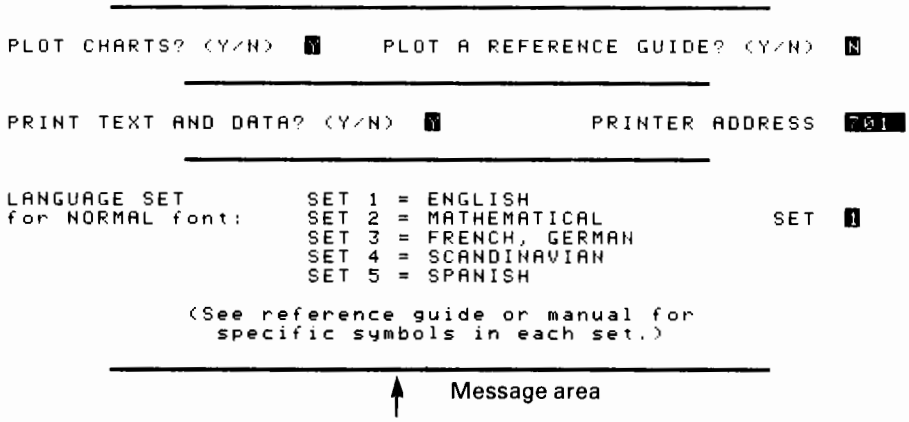
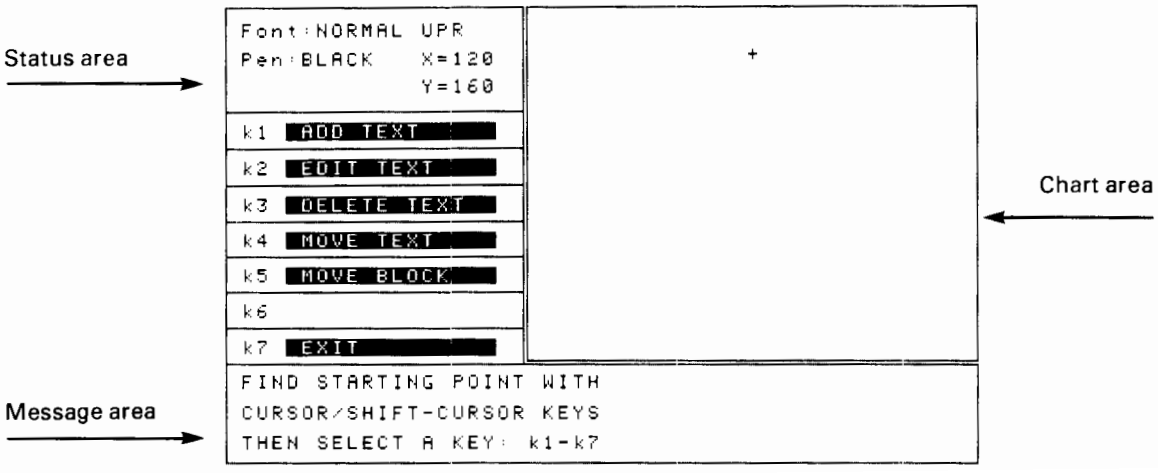


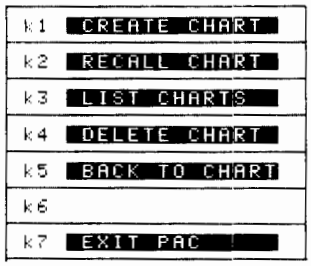
Chart Preparation Forms

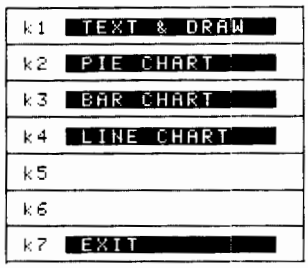
The chart preparation forms appear on the CRT with the graphic display of the chart that you are preparing. The special function key labels are shown in inverse video on the left side of the form. The numbers associated with each option (k1 through k7) refer to the particular special function keys which you must press to perform the labeled function. In the chart preparation form pictured below, you would press k1 to add a text phrase to your text chart. If a label is blank (such as the label for k6 in this example), the special function key associated with that blank is nonfunctional. If you do not want to use any of the functions in a form, press EXIT to access the next higher form in the sequence (often the previous chart preparation form); k7 is nearly always labeled with EXIT .

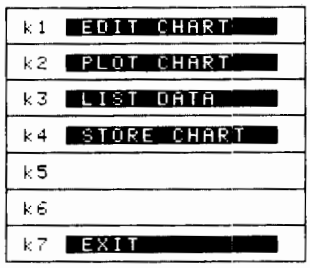
The portion of the form below the special function key labels is called the message area. In this area you will see various messages which will help you in using the particular functions available on the form for producing your chart. The portion to the right of the form is the chart area. In this area the pac will draw the chart which you are preparing so that you can have an idea of what it will look like when drawn by a plotter. In addition, if you are preparing text and draw charts, various design choices are displayed in the status area on the form above the special function key labels (refer to section 3).



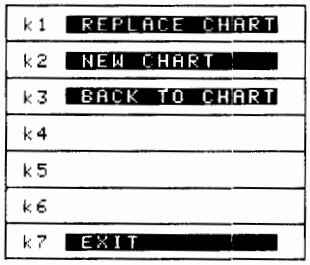
The sets of special function key labels vary depending upon what type of chart you are preparing. The sets of labels common to all types of charts are shown below. Refer to the individual descriptions of text and draw, pie, bar, and line charts in section 3 for the sets of labels unique to those charts. If you are not sure what will happen when you press a particular special function key, you can refer to appendix C, where all key labels are defined in alphabetical order.

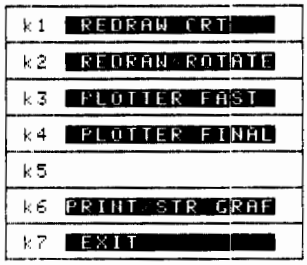




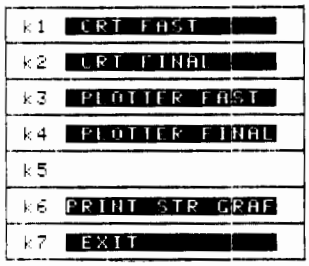


(Pie, bar, and line charts only)





(Text charts, HP-86)

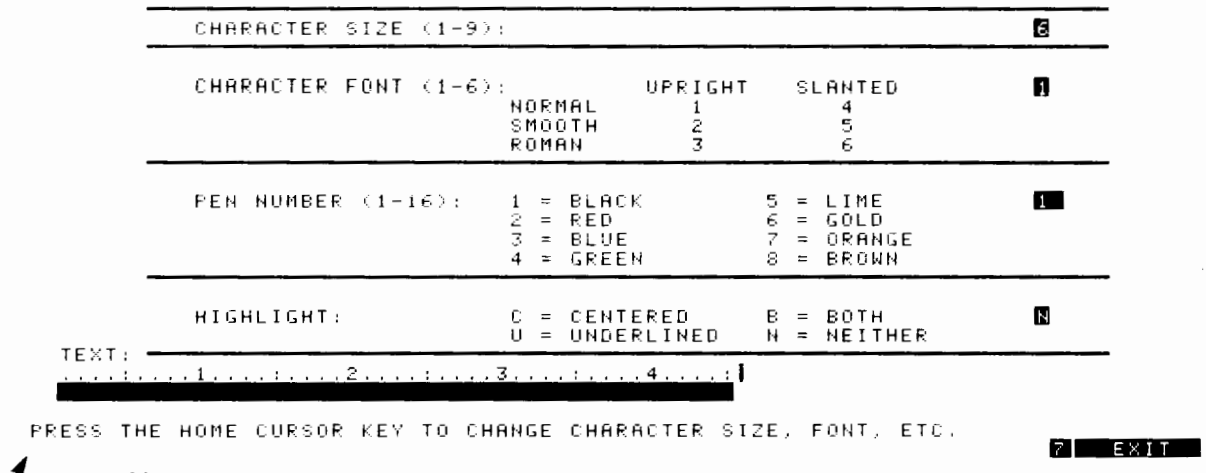


(Pie, bar, and line charts only)

Data Entry Forms

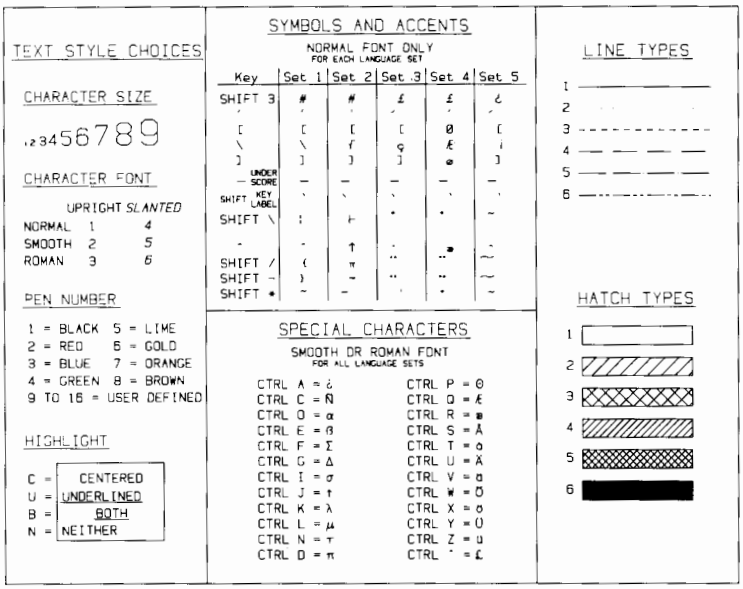
The data entry forms have inverse video fields that indicate which information you must provide to create a chart (such as pen number, labels, and numerical data). Some of the fields are filled in with preassigned default values, as you can see in the text data entry form shown on the following page. You can enter different values to suit your particular needs.

Arranged horizontally at the lower edge of each data entry form you will see inverse video special function key labels similar to those on the chart preparation forms. Each label is located directly above the special function key on the keyboard that will perform the specified function. Pressing any key that does not have a label associated with it will have no effect. In the form shown here, pressing k7 will cause the preceding chart preparation form in the sequence to be displayed, whereas pressing k6 will have no effect. The labels vary depending upon which form you are using; however, k7 is always labeled EXIT. (Use this key if you have accidentally chosen a function which displays a form which you do not want to fill out.) Immediately above the special function key labels is the message area. In this area you will see various messages which will help you in filling out the form.



What are the Pac's Design Characteristics?

The Graphics Presentations Pac provides you with a variety of design choices which allow you to tailor your charts to your particular needs. For example, you can choose between several character sizes, character fonts, and special characters. You can even produce different symbols and accents by selecting any of five language sets. Each design choice has a number or letter code which you must use when filling out data entry forms to specify your choice to the pac. The design choices and associated codes are all listed on a reference guide. The reference guide is reproduced below, but you have the option of obtaining a plot of the guide each time you begin a new session with the pac. (Refer to Running the Pac in section 2.)



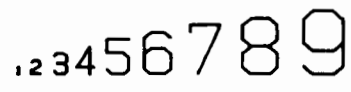
Some of the design choices are available only on particular types of charts. The design choices are described in the following paragraphs to aid you in using them.

Text Style Choices

Each text phrase on a text and draw chart can be described by codes representing character size, character font, pen number, and highlight. These design choices are available only on text and draw charts, with the exception of pen number. Pen number can be specified on all types of charts.

Character Size

The character sizes are numbered from 1 to 9, corresponding to the approximate height in millimeters of an uppercase letter or numeral. Character sizes can only be specified on text and draw charts. Character size 1 is the smallest, and is useful for annotations that you do not want to be noticeable when projected on overhead transparencies. For example, you might want to label the lower corners of your charts in numerical order, but not want these numbers to be noticeable when projected. Character size 9 is the largest, and is useful for headings or for any chart which might be projected in a large room. Character sizes 4 through 8 are also suitable for projection, but sizes 2 and 3 should be reserved for charts plotted on paper.

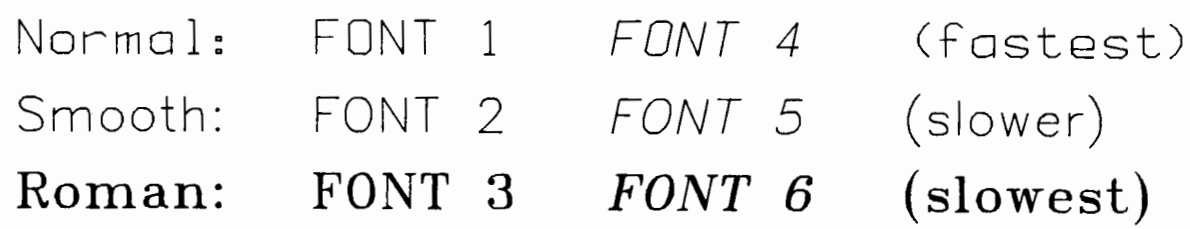


Character Font

Character fonts can only be specified on text and draw charts. You have a choice among normal, smooth, and Roman; any of these can be plotted upright or slanted. Use the number between 1 and 6 which represents the font you want to select: 1 for normal upright, 2 for smooth upright, 3 for Roman upright, 4 for normal slanted, 5 for smooth slanted, and 6 for Roman slanted.

	UPRIGHT	*SLANTED*
NORMAL	1	*4*
SMOOTH	2	*5*
ROMAN	3	*6*

The normal font is the built-in character font of your plotter. It is plotted the most quickly and uses fixed spacing for each character. The smooth font uses smaller segments to draw the curves of the characters. Therefore, the smooth font has more rounded characters than the normal font, and is plotted more slowly. On some plotters the normal font appears to be nearly as smooth as the smooth font. If you find this to be true for your plotter and do not mind fixed spacing, specify the normal font instead of the smooth font—your chart will be plotted more quickly. If you prefer proportional spacing between the characters, specify the smooth font. The Roman font also uses proportional spacing and is plotted the most slowly. You can see the differences in spacing between all six fonts in the following sample, which was plotted using character size 5. The upright and slanted versions of a given font take approximately the same amount of space.



You can also achieve different effects by using different widths of pens. Of course, character sizes 1 through 3 are more readable when you use a narrow pen. A wide pen is useful for making a character bold for emphasis. The following chart shows a few samples of different character sizes and fonts using narrow and wide pens.

Pen Number

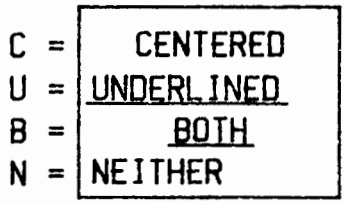
Up to 16 different pen numbers representing different pen colors or widths can be specified for text and draw, pie, bar, and line charts. The number codes for pen colors are listed below.

```
1 = BLACK   5 = LIME
2 = RED     6 = GOLD
3 = BLUE    7 = ORANGE
4 = GREEN   8 = BROWN
9 TO 16 = USER DEFINED
```

Pen numbers 1 through 8 correspond to colors which have been predefined for ease of reference. You can use pen numbers 9 through 16 to suit your particular needs. For example, you could use pen numbers 9 through 16 to represent the same colors as numbers 1 through 8, except that you might use narrow pens for 1 through 8 and wide pens for 9 through 16. If you have more than 8 colors of pens, you could also use numbers 9 through 16 for the extra colors. If your plotter holds fewer pens than the number you specify, the pac will pause the plotter after the first set of pens has been used. You will be prompted with a beep and a message to change the pens. You can then replace the current pens with the next set before instructing the pac to resume plotting.

Highlight

The highlight options can only be specified for text phrases on text and draw charts. (A text phrase consists of those characters which are entered into one text data entry form.) A letter code represents the highlight option: C causes the text phrase to be centered, U causes the text phrase to be underlined, B causes the text phrase to be both centered and underlined, and N causes the text phrase to be neither centered nor underlined. When you choose U or N, the text phrase will be plotted starting at the current graphics cursor position. When you choose C or B, the pac will automatically center the text phrase on the chart at the vertical position of the graphics cursor. When you choose U or B, the entire text phrase will be underlined.



Symbols and Accents

You can select any of five language sets, each consisting of specific symbols and accents. The sets are selected using number codes from 1 to 5: set 1 is English, set 2 is mathematical, set 3 is French and German, set 4 is Scandinavian, and set 5 is Spanish. The symbols and accents are only produced when you have specified a normal font (font 1 or 4). Since all lettering on pie, bar, and line charts is plotted in normal font, you can always produce the symbols and accents on these types of charts, as well as on text and draw charts.

SYMBOLS AND ACCENTS

NORMAL FONT ONLY
FOR EACH LANGUAGE SET

Key	Set 1	Set 2	Set 3	Set 4	Set 5
SHIFT 3	#	#	£	£	¿
'	'	'	´	´	´
[	[	[	[	Ø	[
\	\	ſ	ç	Æ	¡
]	]	]	]	ø	]
UNDER SCORE	—	—	—	—	—
SHIFT KEY LABEL	`	`	`	`	`
SHIFT \	¦	⊢	•	•	~
^	^	↑	^	^	^
SHIFT /	{	π	¨	¨	~
SHIFT -	}	→	¨	¨	~
SHIFT *	~	~	'	•	~

To produce the symbols and accents corresponding to each of the five language sets shown in the table above, press the keys listed in the first column labeled "Key." The first eight keys and key combinations are on the alphanumeric keypad of your keyboard, with the exception of (KEY LABEL), which is located with the special function keys. The last four keys and key combinations are on the numeric keypad. The shaded symbols in the table above are produced after an automatic backspace so that they will be positioned above the preceding character. Only (SHIFT) (\) on the alphanumeric keypad and (SHIFT) (/) on the numeric keypad produce backspaced accents which appear above uppercase characters (in sets 3, 4, and 5). All other backspaced symbols are for accenting lowercase letters.

Because language sets 2 through 5 are not internal to your computer, you will not always see on the CRT the exact symbol which you have specified, although it will always be plotted on your plotter. When you are entering characters into a field on a data entry form, you will see on the CRT the equivalent character for set 1. Use this as a reference so that you will know that the correct symbol will be plotted on your plotter. When your chart is drawn on a chart preparation form, you will not see any accents (backspaced symbols), although all other symbols will be drawn. However, any symbol or accent will always be plotted on the plotter. For example, if you have selected set 3 and want to enter the word "für", you would press these keys: (f), (u), (SHIFT) (-), (r). In the entry field on the data entry form you will see f u ¨ r. When the chart is drawn on the chart preparation form, you will see f ü r. However, when plotted on a plotter the word will be f ü r.

When you select a language set, every chart that you create during your session with the pac will be drawn using that language set. However, if you recall a chart that was stored with a different language set, that language set will become the new set for your session. For example, if you are using set 4 and recall a chart that was stored with set 3, the set number for creating charts will change to 3. If you then recall a chart that was stored with set 5, the set number for the session will then change to 5, and so on.

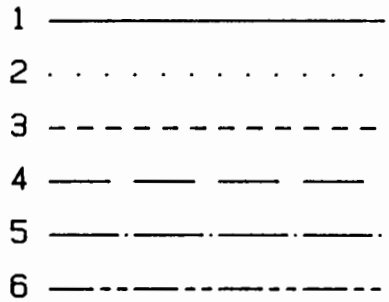
Special Characters

The special characters can be produced when you have selected either the smooth or Roman fonts (fonts 2, 3, 5, and 6), regardless of which language set you have selected. Therefore, you can use these characters only on text and draw charts. The special characters consist of some mathematical symbols and selected characters used in languages other than English. To produce these characters, refer to the following table, which is taken from the reference guide. Hold down (CTRL) while pressing the key associated with the character which you want to produce. For example, to produce the delta character (Δ), hold down (CTRL) and press (G). The character which you are producing will appear on the CRT and on the plotted version of your chart. Special characters in the smooth and Roman fonts will not be printed on a printer; each special character will be replaced by a space on the printed output. If you press (CTRL) together with any key not shown in this table, the pac will display a message that you have entered an invalid character. Simply retype the character you want using the keys in this table.

CTRL A = ¿	CTRL P = Θ
CTRL C = Ñ	CTRL Q = Æ
CTRL D = α	CTRL R = æ
CTRL E = ß	CTRL S = Å
CTRL F = Σ	CTRL T = å
CTRL G = Δ	CTRL U = Ä
CTRL I = σ	CTRL V = ä
CTRL J = ↑	CTRL W = Ö
CTRL K = λ	CTRL X = ö
CTRL L = μ	CTRL Y = Ü
CTRL N = τ	CTRL Z = ü
CTRL O = π	CTRL ^ = £

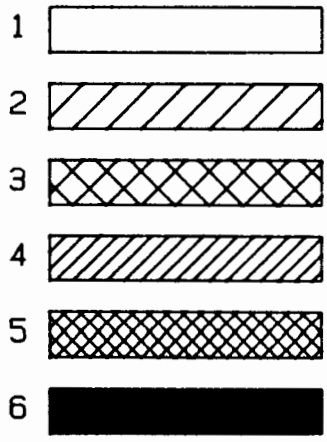
Line Types

Line types can be specified for the lines, arcs, and circles in a text and draw chart, as well as for the lines in a line chart. There are six line types, each identified by a number code from 1 to 6 as shown below. Use wide pens if you plan to project your chart as an overhead transparency in a large room.



Hatch Types

Hatch types are patterns that can be specified to fill in both the bars in a bar chart and the slices in a pie chart. There are six hatch types, each identified by a number code from 1 to 6 as shown below. Hatch type 6 is a solid area fill pattern and takes the longest to plot. Be particularly careful when using hatch type 6 to let the ink dry before stacking overhead transparencies. On transparency film, ink usually takes about 10-15 minutes to dry at room temperature.



Section 2

Beginning a Session With the Pac

Equipment Needed

The Graphics Presentations Pac consists of three 5¼-inch flexible discs (part number 00087-13510) or three 3½-inch flexible discs (part number 00087-13310) and a manual. To use the pac you need an HP-86/87 with a minimum of 96K bytes RAM and the following accessories:

Item	Model/Part Number
ROM Drawer	HP 82936A
Plotter ROM	00087-15002
Plotter	HP-IB and HP-GL compatible (for example HP 7470, HP 9872, HP 7580, HP 7585).
Disc Drive	Series 80 compatible.
Printer (optional)	Series 80 compatible.
Interface Device/Cables	Interface device/cables depend on your system configuration. Refer to the introductory manual for your computer for information about connecting peripherals.
Overhead Transparency Kit (optional)	HP 17055A or HP 17057A, depending upon your plotter.

The plotter, printer, and disc drive must be compatible with your computer. See the latest Hewlett-Packard catalog or ask your dealer for details about the available peripheral devices. Each peripheral also requires either an interconnection cable or an HP 82937A HP-IB Interface, depending on the peripheral and computer. The printer is optional. It is used to print out text and other data entered while creating a chart. In addition, printers with graphics capabilities can be used to print a CRT chart image. The chart image can also be stored as a GRAF file and reprinted with the WORD/80 text formatter (through the .DG command). The overhead transparency kit is optional if you do not intend to make overhead transparencies; it contains special pens and film designed to produce high-quality overhead transparencies.

For information on connecting the various peripherals, refer to the introductory manual for your computer or to the documentation accompanying your peripherals.

Running the Pac

The following procedures are step-by-step instructions for getting the pac started, including setting up the pac for your particular system by filling out the system configuration forms. If you have skipped to here

from the first section of this manual, note that the term "enter" means to type in any characters *and then press* (END LINE). The following are the symbol conventions used in the procedures throughout this manual:

DOT MATRIX — Characters set in dot matrix denote the specific characters which you will type, or refer to specific characters which appear on the CRT.

Inverse Video — Characters set in inverse video are the labels associated with the special function keys located at the top of the computer keyboard. The number appearing next to the label refers to a key number k1 through k7.

(END LINE) — This keycap symbol denotes a specific key on the computer keyboard.

Note: If, at any time while the pac is running, you see the warning Error 19: MEM OVF, this means you do not have enough memory available. First check to be sure your memory module is inserted properly. If so, remove all infrequently used plug-in ROMs except the Plotter ROM, as these ROMs consume some of the available memory. The pac requires a minimum of 96K bytes RAM.

Once the pac is running (steps 1 through 3), you will see prompts on the CRT that will help you to fill out the forms. Use steps 5 and 6 to help clarify what the prompts mean. The procedures assume that you have a dual disc drive. If you have a single disc drive, follow the additional prompts on your CRT for exchanging the GP Pac Discs with the chart storage disc. Avoid inserting or removing discs from the disc drive until you are prompted to do so.

1. Make sure that your computer has the necessary extended memory and plotter ROM, and that your peripherals are properly connected. (Refer to Equipment Needed and to the introductory manual for your computer.) If you are using an HP-86A with a disc drive connected through an HP 82937A HP-IB Interface, be sure the interface select code is set to a value from three through six.

2. With the computer turned off, insert GP Pac Disc 1 into the disc drive marked DRIVE 0. If the disc drive is turned off, turn it on (not required if using an HP 9130A Flexible Disc Drive). Then turn on the computer. (It is easiest to turn on the disc drive first, and then the computer. If the computer is already on, you can follow step 3.) The pac will automatically load and begin running. Skip to step 4.

3. If your computer is already on when you insert GP Pac Disc 1, press (SHIFT) (RESET). Then type LOAD "GP" and press (END LINE). Then press (RUN).

4. When the pac is running, you will see a welcome message on the CRT, followed by a description of the special function keys. Two keys appear at the lower edge of the CRT: 3 HP-86 and 5 HP-87. Press the key marked k3 (located in the upper row of keys on your computer's keyboard) if you're using the HP-86 or k5 if you're using an HP-87. If you press the wrong key, the pac will continue to run, but some of the graphics images may be distorted. You should reload the pac and start over (step 2).

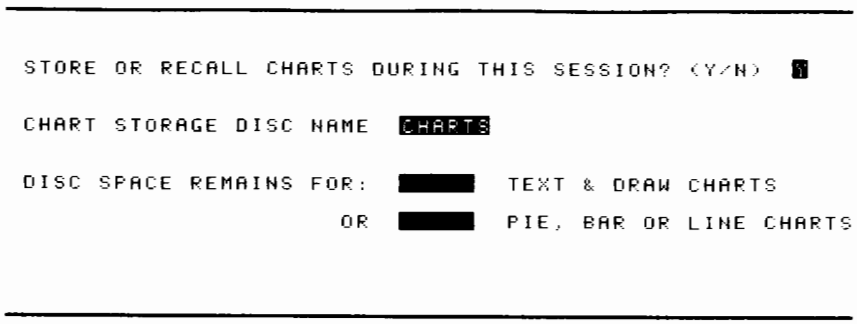
   After selecting the type of computer, the pac provides you with three startup options:

   TUTORIAL — Begins a short lesson on filling out data entry forms. Select this key if you've never used the pac and are unfamiliar with the forms. When the lesson is complete, you may select any of the three startup options.

CONFIGUR Select this key to fill out the configuration forms for your current session with the pac. These forms are used to identify the chart storage disc, and the location of the output devices—plotter and printer. Select this option if you've never used the pac before, or if your system configuration (computer plus peripherals) has changed since your last GP pac session. The two configuration forms are discussed below beginning with step 5.

QUICK The "quick" startup option bypasses the two system configuration form. Before you select **QUICK** you should have a chart storage disc named "CHARTS" inserted into a disc drive, and your plotter or printer connected and turned on. Normally, at this point, you will proceed to step 7. If the pac cannot find a chart storage disc named "CHARTS," you must fill out the first system configuration form (skip to step 5). If the current system configuration (plotter/printer address) does not match what is stored on your chart storage disc, you must fill out the second configuration form (skip to step 6).

5. Having chosen **CONFIGUR**, or if the **QUICK** option failed to locate the chart storage disc "CHARTS," the pac will display the first of two system configuration forms on the CRT. This form requests information concerning chart storage. The first two fields are filled in with default entries to save you the time of typing in entries.



a. The first field is filled in with the default value Y, since you will most likely store or recall charts during your sessions with the pac. If you do intend to store or recall charts, simply press (END LINE) to enter the default Y. If you do not, enter N and skip to step 6. (You can change to Y later during this session, as described in the next paragraph.)

If you enter N by accident, or decide later that you would like to store or recall charts, you can press either **DELETE CHART** , **LIST CHART** , **RECALL CHART** , or **STORE CHART** whenever you see any of these keys on a chart preparation form. The pac will then ask if you want to change the 'no storage' option. If you press **YES** , the chart storage configuration form (shown above) will be displayed and you can enter Y and continue with steps 5b through 5d. If you press **NO** , you will only be able to create and plot charts unless you later change the 'no storage' option as described here.

b. The second field is filled with the default chart storage disc name CHARTS. The chart storage disc that you received with the pac has already been initialized and assigned this chart storage disc name. For ease of reference, we suggest you always use the name "CHARTS" (using all uppercase letters) to

designate your chart storage discs. When you accumulate more than one chart storage disc, you can then use adhesive labels on the discs to keep them organized. Press (END LINE) to enter the default CHARTS. (If you want to use another chart storage disc name with another disc, refer to Initializing a Disc in appendix A. You can also rename the chart storage disc which you received with the pac; refer to your computer's operating and BASIC programming manual.) *Do not attempt to use a hard disc for chart storage.*

c. When prompted to do so, insert your chart storage disc in a disc drive and press (CONT).

If the pac finds the chart storage disc with the name that you have entered, the last two fields of the form will then be filled in automatically with the number of new charts that can be stored on the chart storage disc. This is based on how much available space remains on your disc. There are a few situations when you might see different messages on the CRT after you have inserted your chart storage disc. These situations include the following:

If the pac cannot find a disc with the same name that you have entered, you will be asked if this is a new disc to be initialized (erased). If it is not, enter N. The cursor will then return to the first field in the form. Check to make sure that you have inserted the correct disc and that you have entered the chart storage name with the exact upper- and lowercase letters used to initialize the disc (for example, "CHARTS", not "charts"). If it is a new disc to be initialized, enter Y and follow steps 2 through 5 under Initializing a Chart Storage Disc in appendix A.

If the disc is full, you will be asked if you want to erase it. If you enter N, you will then be asked if you want to set up a new disc. If you want to continue using this disc so that you can recall, plot, delete, or replace charts, enter N again. Then proceed with step 6. Otherwise, refer to appendix A for erasing and initializing this disc or another disc. Then start again with step 5b to set up a new disc.

You might also see a message that your disc is being "packed." This is because charts are stored sequentially on discs. If there is no room at the end of the disc for new charts, but there are empty spaces where you have deleted some charts, the pac will automatically eliminate the empty spaces to make room for new charts. This process is known as packing a disc, and may take from several seconds to a few minutes.

6. When you choose not to store or recall charts, or when you press (CONT) after reviewing the available space left on your chart storage disc, you will see the second system configuration form on the CRT. This form requests information on plotting and printing, and is also filled in with default values. The first time you run the pac, and anytime you run the pac without a chart storage disc, the default values will be those shown here. However, if you use a chart storage disc, the values which you enter for your system will be stored on the chart storage disc and assigned as the new default values for this form. Thus, if you use this same chart storage disc in subsequent sessions and do not change your system configuration, you will not need to change this form again. You will only need to press (END LINE) for each field to confirm and enter the new default values.

```
PLOT CHARTS? (Y/N) Y     PLOT A REFERENCE GUIDE? (Y/N) N

PRINT TEXT AND DATA? (Y/N) Y          PRINTER ADDRESS 701

LANGUAGE SET          SET 1 = ENGLISH
for NORMAL font:      SET 2 = MATHEMATICAL          SET 1
                      SET 3 = FRENCH, GERMAN
                      SET 4 = SCANDINAVIAN
                      SET 5 = SPANISH

              (See reference guide or manual for
                specific symbols in each set.)
```

a. Enter Y or N in response to the first question. Even if you do not plan to plot any charts, there is no harm in entering Y as long as your plotter is connected to the computer. If you enter N and later change your mind, you will have to store the chart and then end this session and rerun the pac so that you can return to this form to enter Y. If you enter N, skip to step 6d.

b. If you entered Y to plot charts, you will be prompted to set up and turn on your plotter. When you have done so, press (CONT). If the pac cannot find your plotter, you will be asked for the address of your plotter. Refer to your plotter documentation for the proper address to enter. If you entered Y by mistake and your plotter is not connected to the computer, press (CONT) and then enter 1 when prompted for the plotter address. Then skip to step 6d.

Note: If you have an HP 9872 Graphics Plotter, place the longest side of your paper or transparency film along the longest side of the platen.

c. When you have successfully set up your plotter, the cursor will skip to the second question, which asks whether you want to plot a reference guide. The reference guide shows the various design choices available with the pac, and is reproduced and discussed in section 1. If you do not want a reference guide, press (END LINE) to enter the default N. If you do, enter Y. The reference guide will not be plotted until you have finished filling out this form.

d. Next, the cursor will skip to the third question, which asks whether you want to print text phrases and other chart data. A Y response allows you to create a printed listing of the data entered while preparing a chart. In addition, if you're using an HP 82905A, HP 82905B, or HP standard graphics printer, Y allows you to print a copy of the chart CRT image. If you have a printer, it is a good idea to enter Y. If you enter N and later decide you want to print a chart or list data, you will have to end the session and rerun the pac. If you enter N, skip to step 6f.

e. If you decided to print text and data, the cursor will skip to the field which requests the printer address. Check your printer documentation for the correct address, and enter that number. The initial default value for this field is 701. If you have an HP-86 with a built-in parallel printer interface (HP-86A), use address 701 only when printing through the parallel printer interface. Address 701 is illegal for an HP-IB printer on the HP-86A.

f. Finally, select the language set that you want to use during this session by entering the appropriate number from 1 to 5. Refer to the reference guide or section 1 for the specific symbols and accents in each language set.

7. You will now see the first chart preparation form on the CRT. From here, you can either start preparing your own charts (the prompts in the message areas of the forms will help you as will the special function keys in appendix C), or you can practice with the step-by-step examples in sections 3 and 4.

Section 3

Creating and Plotting Charts

This section is divided into four parts which describe each chart type available with this pac: text and draw charts, pie charts, bar charts, and line charts. Each part describes the particular chart type, the variations which can be prepared with this pac, and hints for organizing your data so that you will be prepared to supply the information requested by the pac. In addition, each part includes step-by-step procedures for creating, storing, and plotting an example chart. The examples are an organization chart, a double pie chart, a clustered bar chart, and a multiple line chart.

The procedures represent sample methods for preparing charts. They are designed to illustrate as many features of the pac as possible. However, you will find that there is more than one way to prepare a given chart. As you become more familiar with the pac, you will discover the easiest method for your needs. Since the procedures do not utilize every function in the pac, detailed descriptions of the special function key labels are provided in appendix C.

Each example starts with the first step after filling out the configuration forms. Therefore, before you begin any of these examples, follow the instructions under Running the Pac in section 2 for loading and running the pac and for filling out the configuration forms. If you are using a chart storage disc other than the one supplied with the pac, you might also need to follow the disc initialization instructions in appendix A.

Each of the four examples has already been created and stored on the chart storage disc supplied with the pac. If you do not want to follow all of the procedures for creating the charts, options are included for recalling and plotting the prestored examples. (You can also use either the prestored examples or the example charts which you create yourself to practice editing techniques. Refer to section 4.)

Copies of the CRT screen are included wherever it will help you to see what the form on the screen should look like. These copies assume that you follow the procedures exactly. If you skip a step, the screen copy in this manual might not correspond exactly to what is on your CRT.

Text and Draw Charts

Text and draw charts can be utilized for a variety of purposes. For example, with the line and arc/circle drawing functions, you can prepare organization charts, flow charts, and even logos or other symbols. Text and draw charts are also an excellent way of illustrating key points in a presentation. You can enter text phrases, lines, arcs, and circles in any combination to prepare a text chart. However, in this pac there are restrictions on the maximum number of entries which you can include. For example, you can enter up to 50 separate text phrases, each text phrase consisting of those characters which are entered into one data entry form. You can also enter up to 100 separate endpoints for drawing lines, and up to 25 arcs or circles. Depending upon the character size, font, and highlight that you have chosen, you can enter a maximum of 76 characters for each text phrase.

The following paragraphs provide hints on organizing the information which you want to include on your text and draw chart. These hints are discussed in terms of the specific features of this pac. If you would like some hints regarding graphics design (for example, choosing colors and character sizes), refer to appendix B.

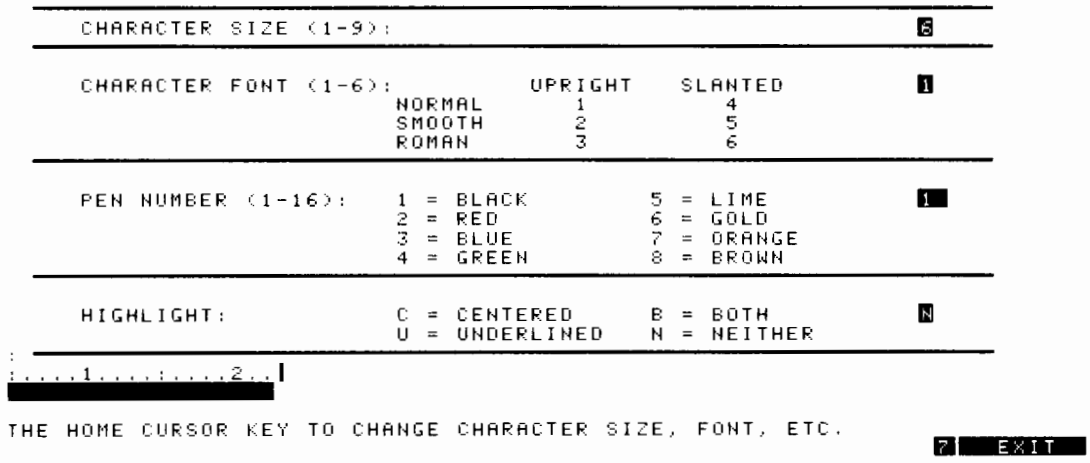
Following the section on organizing your data, there are step-by-step procedures for creating a sample text and draw chart. You might want to regard the section on organizing data as a reference for preparing your own charts, and skip it for now to practice with the example procedures.

Organizing Text and Draw Chart Data

Text and draw charts are different from the other charts in this pac because you have the freedom to select the exact position for every text phrase, line, arc, and circle which you want to include. You also have a variety of options to choose such as character font; character size; pen color; and sizes of lines, arcs, and circles. You will use two types of forms to help you design your chart, the text data entry form and the chart preparation form.

Entering Text With the Data Entry Form

The text data entry form is used for entering or editing a text phrase and its associated style choices. After you press ADD TEXT on a chart preparation form to enter the first text phrase, the data entry form is displayed. The style choice fields are filled in with the default values shown here; the TEXT field is blank.



If you simply enter your text phrase, it will be plotted according to the default style choices. However, you can change any of the style choices by tabbing through the form and entering new values before you enter the phrase. When you press ADD TEXT for any subsequent phrase, the data entry form will be displayed with the style choices from the last phrase which you entered. This makes it easy to enter rapidly a series of phrases which you want to look exactly the same. Since the style choices are already filled in, you need only enter each phrase. Of course, you can change any of the style choices before you enter a phrase, or when you edit a phrase.

Since the plotted length of a text phrase depends upon many factors, the length of the TEXT field on the data entry form varies. The length of this field is based on your choices for character size, character font, highlight (centered or not), and the position of the graphics cursor. The length is calculated so that none of the characters of a phrase drawn in normal fonts will be cut off by the borders of the chart. If you specified smooth or Roman fonts, you may be able to enter additional characters into this field due to the proportional spacing of these fonts.

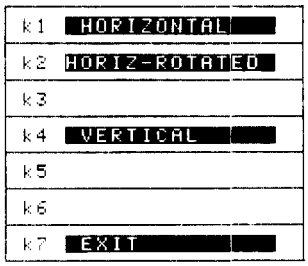
Above the text phrase field you will see . . . . : . . . . 1 . . . . : . . . . 2. These symbols count the length of the field in increments of ten characters. Depending upon the length of the field, this counter can extend up to 76 characters. You can use this as a tool to align entries for several columns of words or numbers in one text phrase. For additional phrases with the same column format (and the same character size, font and highlight), use the counter to line up the columns. This technique is best used with left justified text (highlight codes N or U) in normal font.

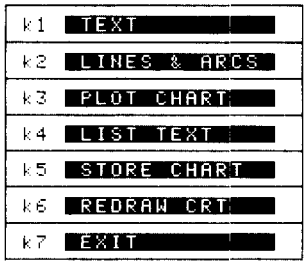
Each time you enter a text phrase, the phrase is immediately drawn in the chart area of the chart preparation form at the position which you have specified with the graphics cursor. After the phrase is drawn, the graphics cursor is automatically positioned a few dots directly below the beginning of the phrase. The number of dots is calculated to provide enough vertical space between text phrases to make them easy to read. The number of dots varies according to the character size specified for the phrase. For example, if you enter a phrase using character size 9, the graphics cursor will move down 17 dots after the phrase is drawn on the CRT; however, the graphics cursor will only move down 9 dots for character size 5. This automatic "carriage return" and spacing feature makes it easy for you to enter a series of phrases that you want to align under each other, since you do not have to reposition the graphics cursor for each new phrase. Of course, you can specify a new vertical or horizontal position for any phrase (refer to Using the Chart Preparation Forms).

Using the Chart Preparation Forms

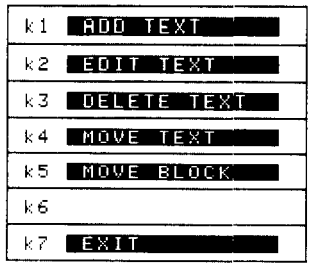
The chart preparation form is set up as a "drawing pad" to aid you in planning the layout of your text and draw chart. On the left side of the form, there are various sets of special function key labels which allow you to perform different functions in preparing your chart. The sets of text and draw labels are shown on the following page (refer to Chart Preparation Forms in section 1 for the sets of labels which are common to all types of charts). All of the text functions are grouped in the text module, and all of the line and arc functions are grouped in the line and arc module. Therefore, it is more efficient to enter all of your text at once before or after you enter all of your lines, arcs, and circles. This avoids a few extra steps in accessing the sets of text functions from the line and arc sets, and vice versa. General purpose functions such as plotting and storing charts are part of the text module, although they can be used even when you are preparing a chart which only consists of lines and arcs.

Text Module



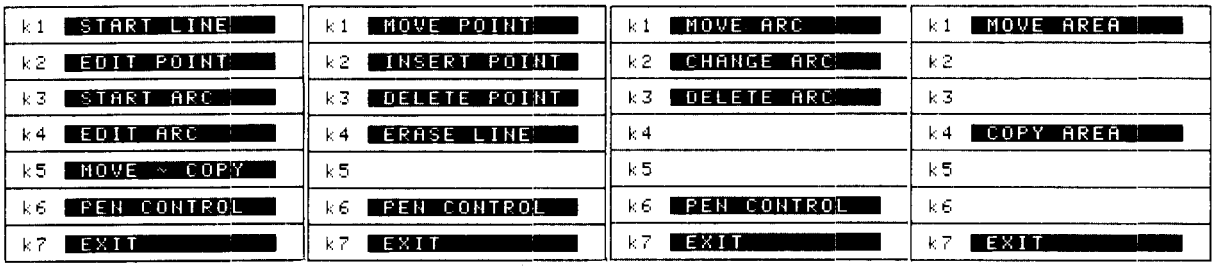


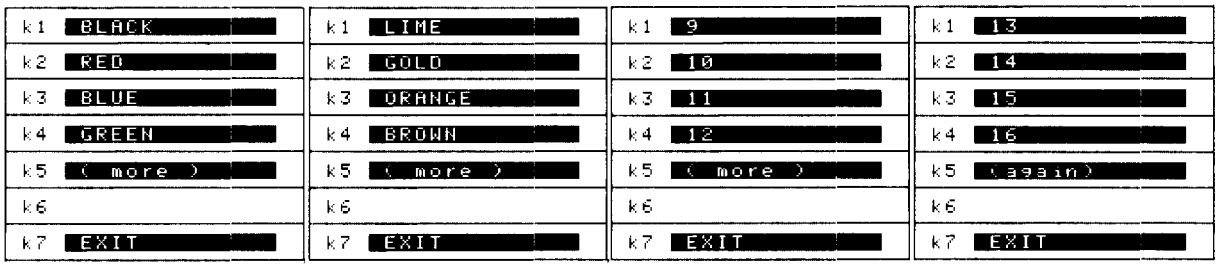
(Text and line and arc functions)



(Text functions only)

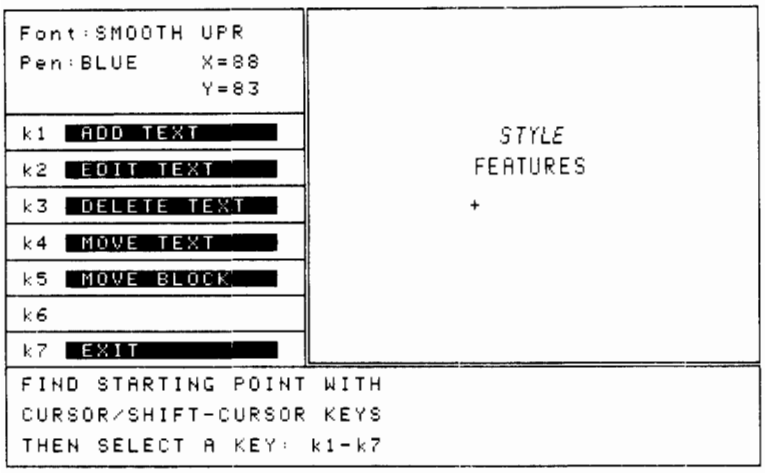
Line and Arc Module

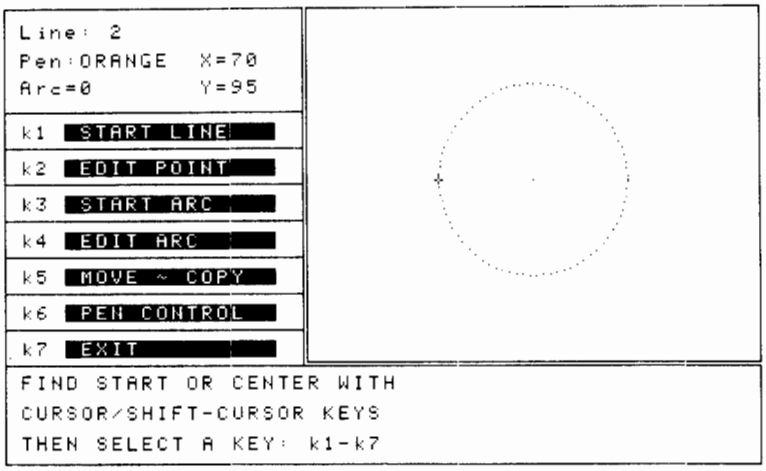




While the sets of special function key labels may vary, the chart area remains the same so that you can enter text, lines, arcs, and circles on the same chart and see the effect immediately. If you do not like the position or size of your text phrase, line, arc, or circle, you can simply use the appropriate special function keys to edit, move, copy, or delete (erase).

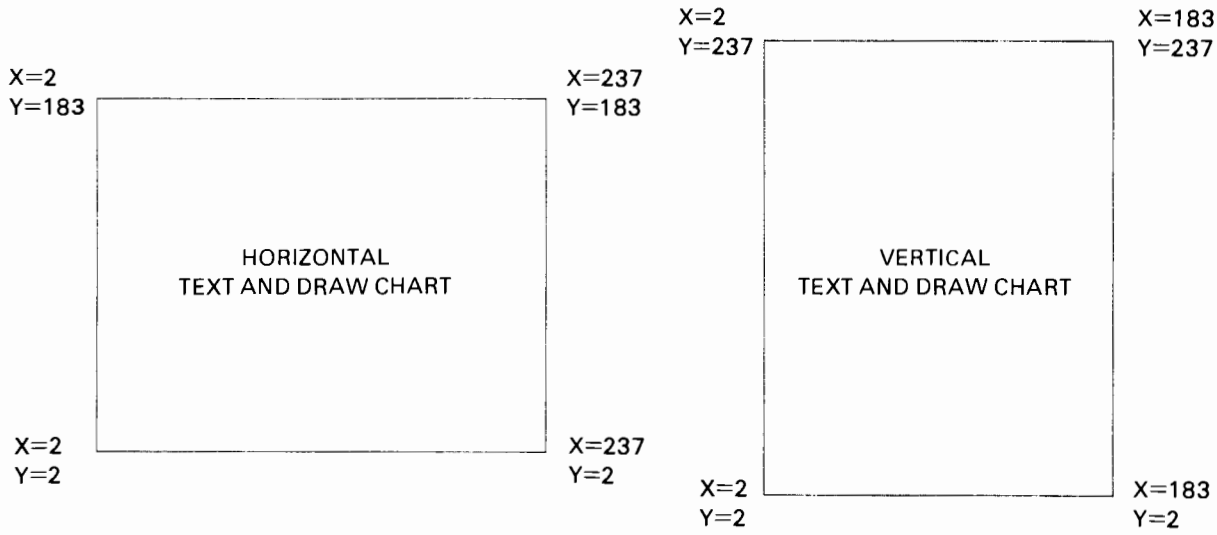
The upper left corner of each chart preparation forms serves as a status area for preparing your chart. If you are using the text functions, the character font and pen color are displayed there. When you are adding text phrases, the font and pen are those of the last phrase entered. For example, in the first form shown on the next page, the last phrase (FEATURES) was entered with design choices of pen number 3 (blue) and character font 2 (smooth upright). If you are using the line and arc functions, the line type and pen color are displayed in the same manner as for text functions. For example, in the second form the circle was drawn using line type 2 and pen number 7 (orange).



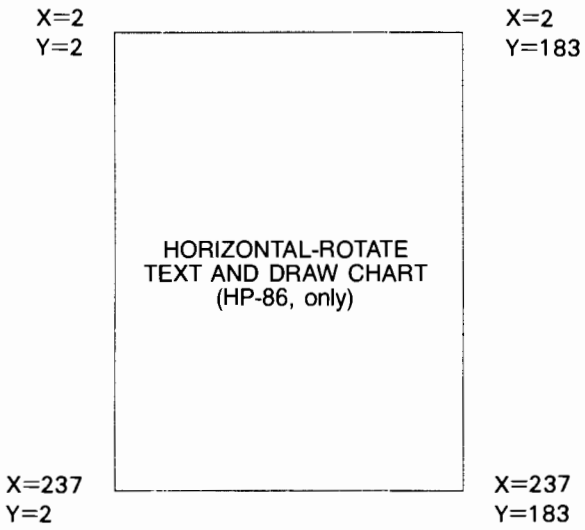


The X and Y coordinates of the graphics cursor are also displayed in the status area on both the text and the line and arc chart preparation forms. These coordinates can help you design your text and draw chart by providing a method for you to position a text phrase, line, arc, or circle exactly where you want it. The coordinates represent the position of the graphics cursor, which you control using the cursor keys (↑, ↓, ←, →). If you press any cursor key, the graphics cursor moves five dots in the direction indicated by the arrow on the cursor key, unless restricted by a border. If you hold down SHIFT and press any cursor key, the graphics cursor moves one dot in the indicated direction. The displayed X and Y coordinates change to reflect the current position of the graphics cursor. The X coordinate represents the number of dots to the right of the left border of the chart, whereas the Y coordinate represents the number of dots above the lower border of the chart. You can prepare text and draw charts with either horizontal, vertical, or horizontal-rotated (HP-86 only) orientations. The longest side on the plotted output always ranges from 2 to 237 dots, and the shortest side always ranges from 2 to

183 dots. The examples below show the X and Y coordinates at each corner of both a horizontal and a vertical text and draw chart.



The horizontal-rotate orientation for the HP-86 produces the same plotted output as the horizontal orientation. However, the CRT chart image is rotated 90 degrees clockwise (text is drawn vertically). The rotated format removes the distortion of circles and squares present in the horizontal orientation on the HP-86.



You should use the X and Y coordinates to align text phrases, lines, arcs, and circles when you prepare your chart. For example, suppose you want to draw two vertical lines in order or mark columns for a table, and you draw one from X=50 Y=200 down to X=50 Y=60. To specify the starting point for a parallel line which begins at the same vertical position but 80 dots to the right of the first line, simply move the graphics cursor to X=130 Y=200. Then move the graphics cursor to X=130 Y=60 to end this line at the same vertical position as the first line. In this way you can use the displayed X and Y coordinates so that you do not have to guess where the first line started and ended.

When you are preparing arcs and circles, the size of the arc in degrees is also displayed in the status area (see the previous form with the circle) while you are drawing the arc. This will help you to draw an arc which is exactly the right size. For a full circle, you will see ARC=360. If you want a semicircle, draw the arc until you see ARC=180 or ARC=-180. You can use the ← and → cursor keys to specify the exact degrees of an arc. If you press either of these keys, the arc will be drawn in 10-degree increments. If you hold down SHIFT and press either of these keys, the arc will be drawn in 1-degree increments. You can draw a whole circle by pressing ↑ once. You can also erase part of an arc by pressing the reverse cursor key. For example, if you draw an arc using ←, you can erase or reverse it by pressing →. When you have pressed END LINE to indicate that you have completed drawing the arc or circle, the arc degrees display will change to ARC=0.

You can also use the X and Y coordinates and arc degrees to help you make a rough layout on paper before creating your chart using the pac. Each dot on the CRT of the HP-86/87 equals 1 millimeter (1/25 inch) when plotted. If you want to draw a horizontal line 38 millimeters (1½ inches) from the bottom of your chart, draw the line 38 dots from the bottom; since the Y coordinates start at Y=2, you would draw the line along Y=40. The dimensions of a text and draw chart are 181 millimeters (7 inches) by 235 millimeters (9¼ inches).

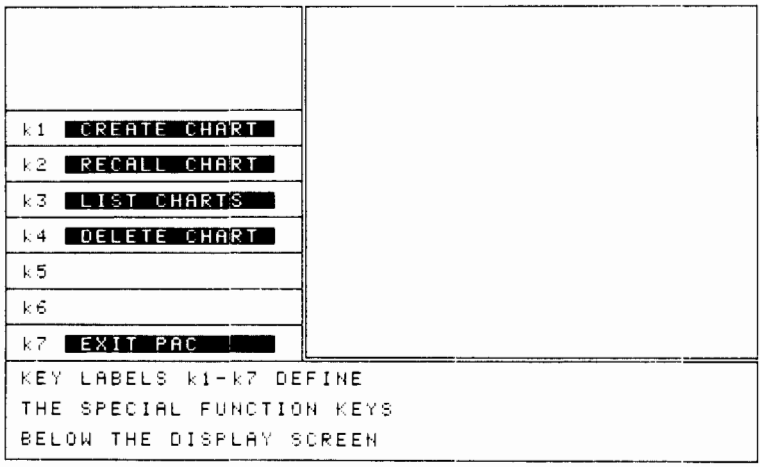
Creating a Text and Draw Chart

In the following step-by-step procedures, you will create, store, and plot an organization chart.

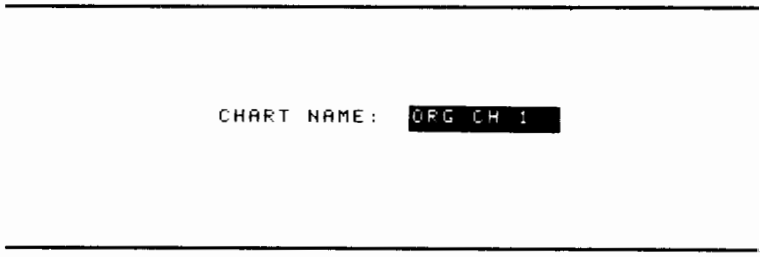
1. Follow the procedures for loading the pac and filling out the configuration forms listed under Running the Pac in section 2. Be sure to specify that you will be storing and plotting charts in this session, and use the chart storage disc supplied with the pac. If you have a printer, specify that you will be printing data in this session.

2. Press CREATE CHART.

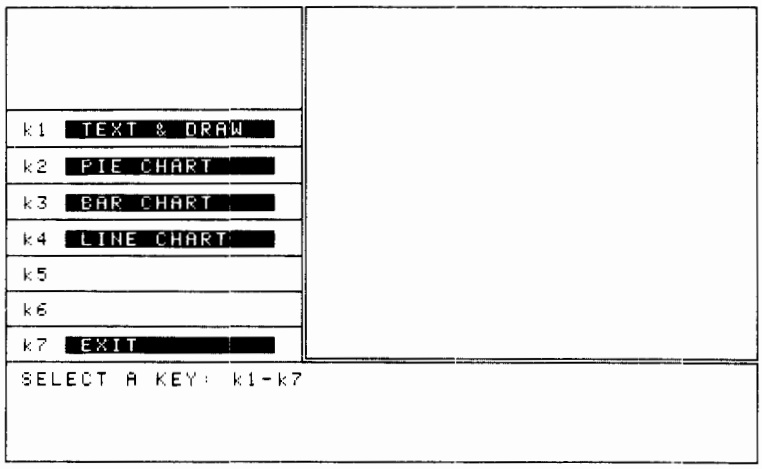
   (If you prefer to recall the prestored chart, press RECALL CHART instead. Then enter ORG CHART for the chart name and skip to step 64 to plot the chart.)



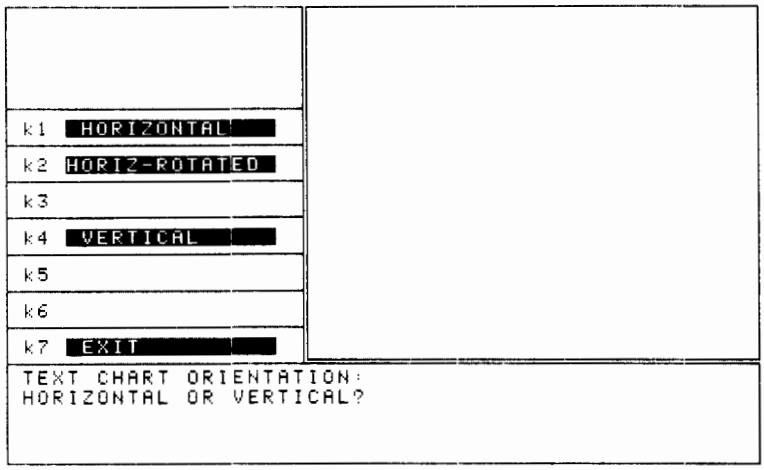
3. Enter ORG CH 1 for the chart name. (If you want to store edited versions of this chart, you might want to use the same name with consecutively higher suffix numbers, for example, ORG CH 2.)



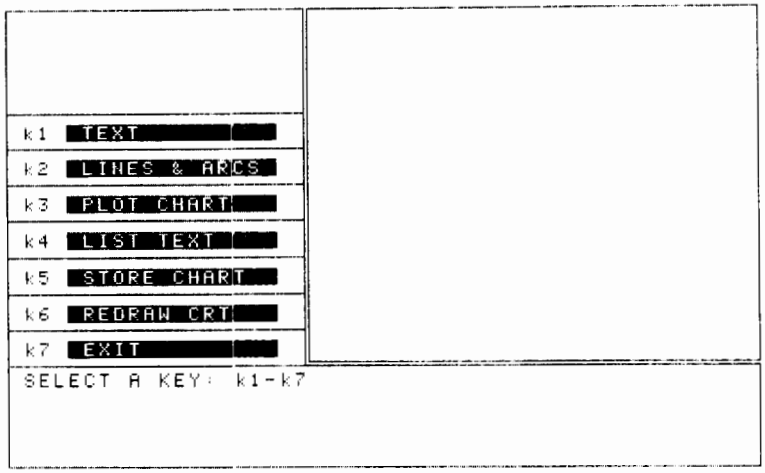
4. Press TEXT & DRAW .



5. Press VERTICAL to specify a vertical orientation for this chart.

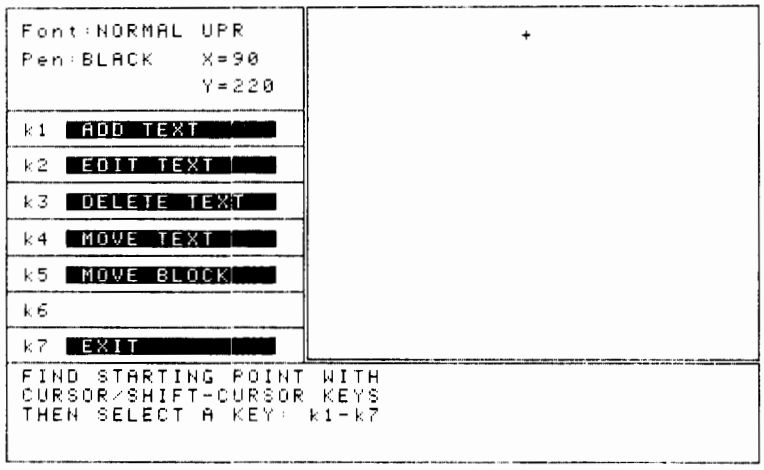


6. Press TEXT to access the text functions.



7. When asked if you want to print the text phrases as they are entered, press YES .

8. Move the graphics cursor to X=90 Y=220 by pressing the up cursor key. Then press ADD TEXT . (The X and Y coordinates are displayed in the upper left corner of the chart preparation form. Pressing a cursor key moves the graphics cursor 5 dots in the direction of the arrow. Pressing (SHIFT) plus a cursor key moves the graphics cursor 1 dot.)



9. Now fill out the data entry form with the values shown here. (Start by pressing the home cursor key, ↖, to tab to the first field so that you can enter new values instead of the default values. If you make any mistakes, you can tab forward or backward through the form to correct the errors before you press END LINE to enter the text phrase. If you notice an error after you have pressed END LINE, you can use EDIT TEXT as described in the editing procedures in section 4.)

```
CHARACTER SIZE (1-9):                                              8

CHARACTER FONT (1-6):          UPRIGHT    SLANTED                  2
                        NORMAL      1          4
                        SMOOTH      2          5
                        ROMAN       3          6

PEN NUMBER (1-16):     1 = BLACK          5 = LIME                 1
                       2 = RED            6 = GOLD
                       3 = BLUE           7 = ORANGE
                       4 = GREEN          8 = BROWN

HIGHLIGHT:             C = CENTERED       B = BOTH                 C
                       U = UNDERLINED     N = NEITHER
TEXT:
.....1.....2....:.
Douglas Mayes
```

7 EXIT

Each time you enter a text phrase, the printer will output a list similar to this:

```
CHART NAME: ORG CH 1        VERTICAL          LANGUAGE SET: ENGLISH

TEXT                SIZE    FONT              PEN  STD COLOR  HIGHLIGHT    X     Y
=============================================================================================
Douglas Mayes
                    8       SMOOTH UPRIGHT    1    BLACK      CENTERED     50    220
```

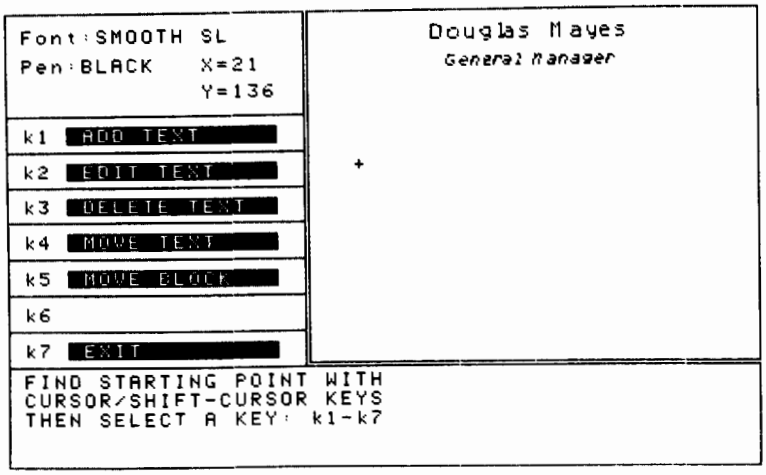
10. Leave the graphics cursor at X=50 Y=206, and press ADD TEXT.

11. Fill out the data entry form with the values shown here.

```
CHARACTER SIZE (1-9):                                              8

CHARACTER FONT (1-6):          UPRIGHT    SLANTED                  5
                        NORMAL      1          4
                        SMOOTH      2          5
                        ROMAN       3          6

PEN NUMBER (1-16):     1 = BLACK          5 = LIME                 1
                       2 = RED            6 = GOLD
                       3 = BLUE           7 = ORANGE
                       4 = GREEN          8 = BROWN

HIGHLIGHT:             C = CENTERED       B = BOTH                 B
                       U = UNDERLINED     N = NEITHER
TEXT:
.....1.....2.....3....:
Douglas Mayes
```

7 EXIT

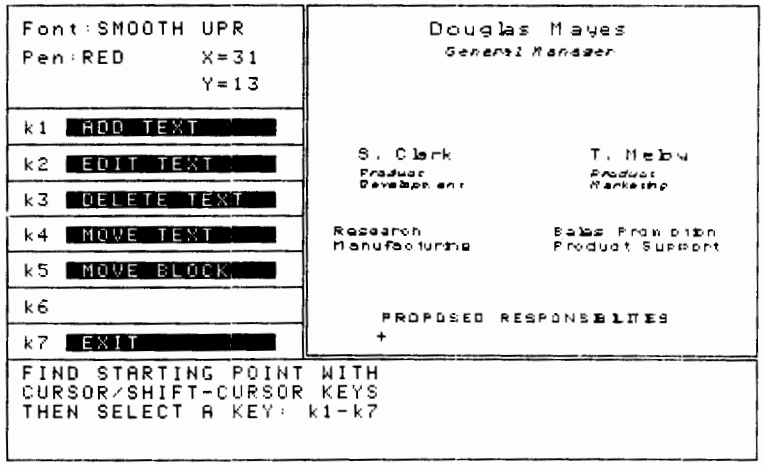
12. Now use the down and left cursor keys to position the graphics cursor at X=21 Y=136. Then press ADD TEXT. (You can hold down a cursor key so that it will move more rapidly.)



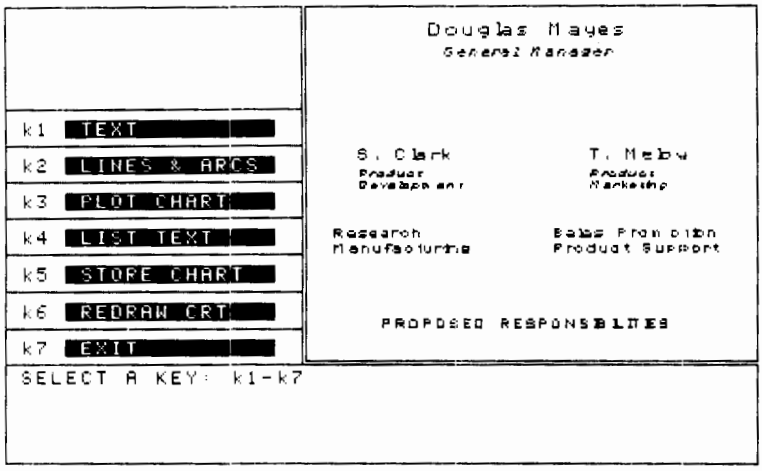
13. Fill out the data entry form by entering the following values: 7 for the character size, 2 for the character font, 3 for the pen number, N for the highlight, and S. Clark for the text phrase.
14. Use the up and right cursor keys to position the graphics cursor at X=116 Y=136. Then press ADD TEXT.
15. Fill out the data entry form by entering T. Meloy for the text phrase. Do not change any other values.
16. Leave the graphics cursor at X=116 Y=124, and press ADD TEXT.
17. Fill out the data entry form by entering the following values: 5 for the character size, 5 for the character font, and Product for the text phrase. (Do not change the pen number or the highlight; simply press END LINE to enter the preassigned values.)
18. Leave the graphics cursor at X=116 Y=116 and press ADD TEXT.
19. Fill out the data entry form by entering Marketing for the text phrase. Do not change any other values.
20. Now position the graphics cursor under S. Clark by pressing the left and up cursor keys until X=21 Y=124. Then press ADD TEXT.
21. Fill out the data entry form by entering Product for the text phrase.
22. Leave the graphics cursor at X=21 Y=116. Then press ADD TEXT.
23. Fill out the data entry form by entering Development for the text phrase.
24. Now press the left and down cursor keys to reposition the graphics cursor at X=11 Y=83. Then press ADD TEXT.
25. Fill out the data entry form by entering the following values: 6 for the character size, 2 for the character font, 2 for the pen number, N (the preassigned value) for the highlight, and Research for the text phrase.
26. Leave the graphics cursor at X=11 Y=73. Then press ADD TEXT.
27. Fill out the data entry form by entering Manufacturing for the text phrase.

28. Now press the up and right cursor keys to reposition the graphics cursor at X=101 Y=83. Then press ADD TEXT .
29. Fill out the data entry form by entering Sales Promotion for the text phrase.
30. Leave the graphics cursor at X=101 Y=73 and press ADD TEXT .
31. Fill out the data entry form by entering Product Support for the text phrase.
32. Press the down cursor key to reposition the graphics cursor at X=101 Y=23. Then press ADD TEXT .
33. Fill out the data entry form by tabbing back one field to enter C for the highlight. Then enter PROPOSED RESPONSIBILITIES for the text phrase. Do not change any other values.

34. You have finished entering text onto this chart. If you have made any errors, the sample editing procedures in section 4 will help you learn how to make corrections. Now exit the text functions by pressing EXIT .

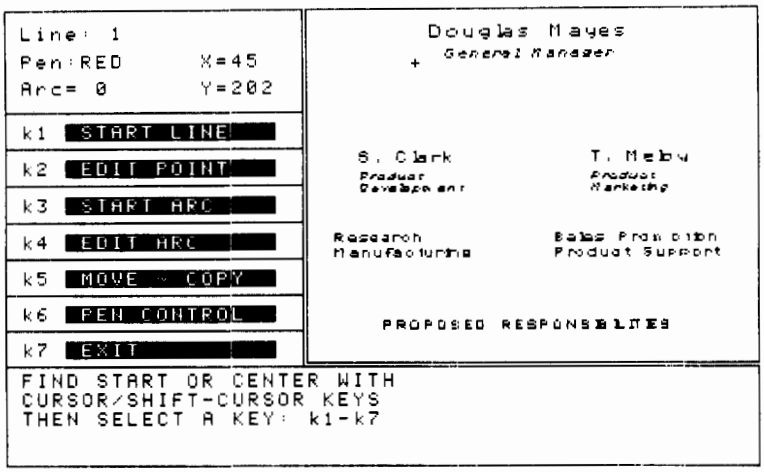


35. Access the drawing functions by pressing LINES & ARCS .

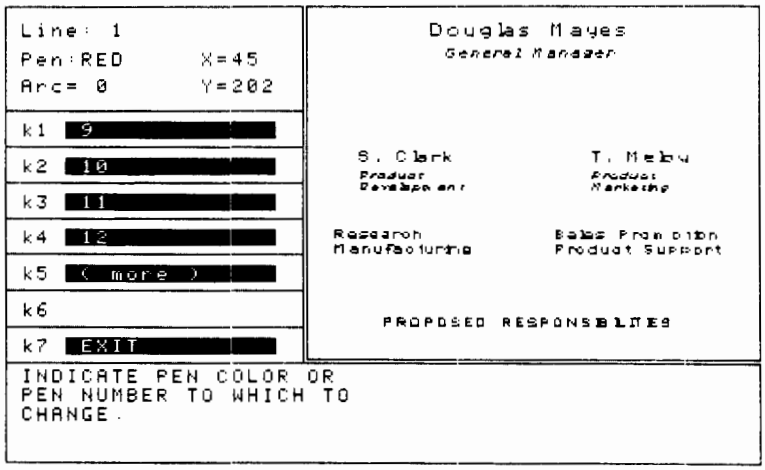


36. Reposition the graphics cursor to draw a box around Douglas Mayes by pressing the up and right cursor keys until X=45 Y=202.

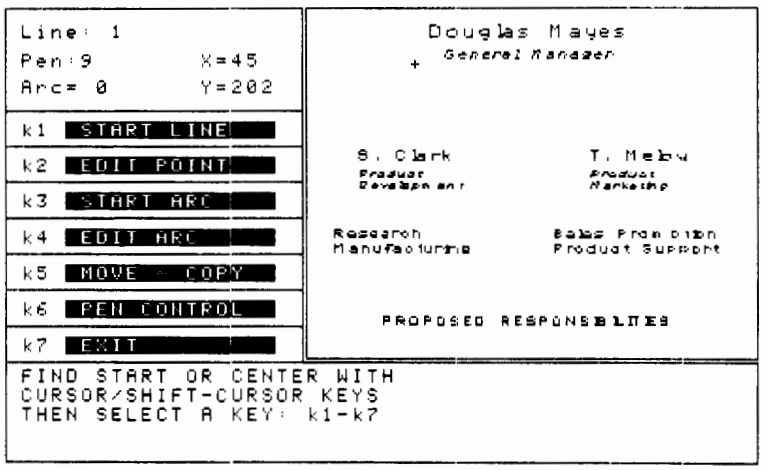
37. Since the current pen number is 2 (red) change this to a wide black pen before drawing the box. First press PEN CONTROL .



38. Define pen number 9 to be a wide black pen. Press (more) two times. Then press 9 .



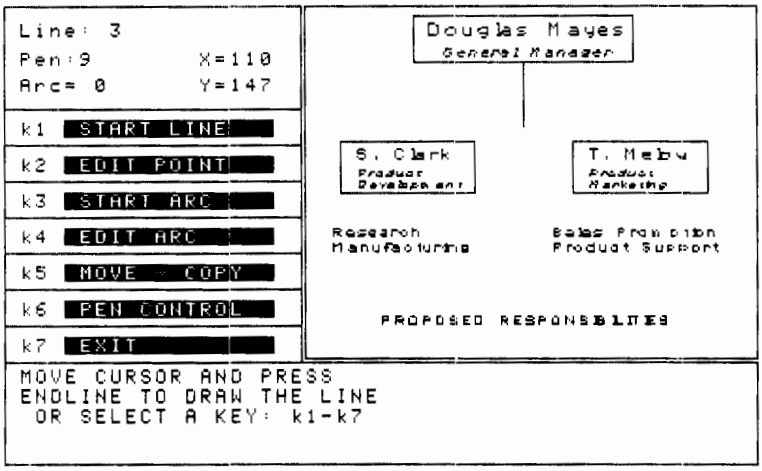
39. Now begin drawing the box by pressing START LINE .



40. Press the up cursor key until X=45 Y=232. Press (END LINE).

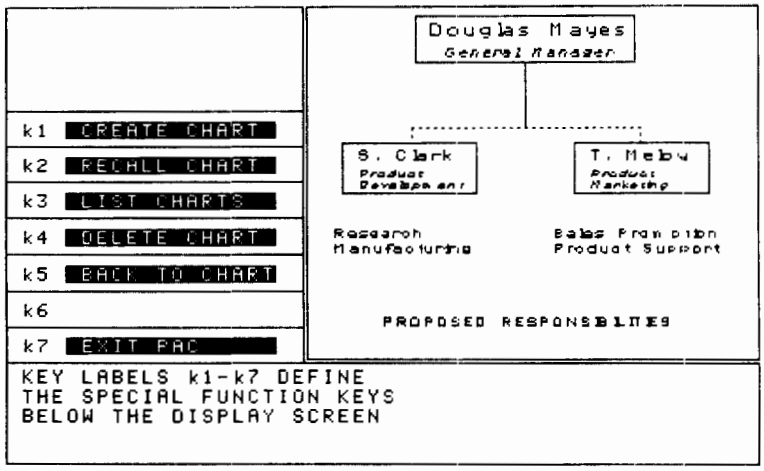
41. Press the right cursor key until X=135 Y=232. Press (END LINE).

42. Press the down cursor key until X=135 Y=202. Press (END LINE).
43. Press the left cursor key until X=45 Y=202. Press (END LINE).
44. Now reposition the graphics cursor for a new line by pressing the right cursor key until X=90 Y=202. Press START LINE.
45. Press the down cursor key until X=90 Y=157. Press (END LINE).
46. Reposition the graphics cursor for drawing a box around S. Clark by pressing the left and down cursor keys until X=70 Y=147. Press START LINE.
47. Press the down cursor key until X=70 Y=112. Press (END LINE).
48. Press the left cursor key until X=15 Y=112. Press (END LINE).
49. Press the up cursor key until X=15 Y=147. Press (END LINE).
50. Press the right cursor key until X=70 Y=147. Press (END LINE).
51. Reposition the graphics cursor for drawing a box around T. Meloy by pressing the right cursor key until X=110 Y=147. Press START LINE.
52. Press the right cursor key until X=165 Y=147. Press (END LINE).
53. Press the down cursor key until X=165 Y=112. Press (END LINE).
54. Press the left cursor key until X=110 Y=112. Press (END LINE).
55. Press the up cursor key until X=110 Y=147. Press (END LINE).
56. Now you will draw the line connecting these last two boxes. First, since the boxes represent proposed responsibilities, specify a dashed line type. Do this by pressing (3) (on either the alphanumeric or the numeric keypad).



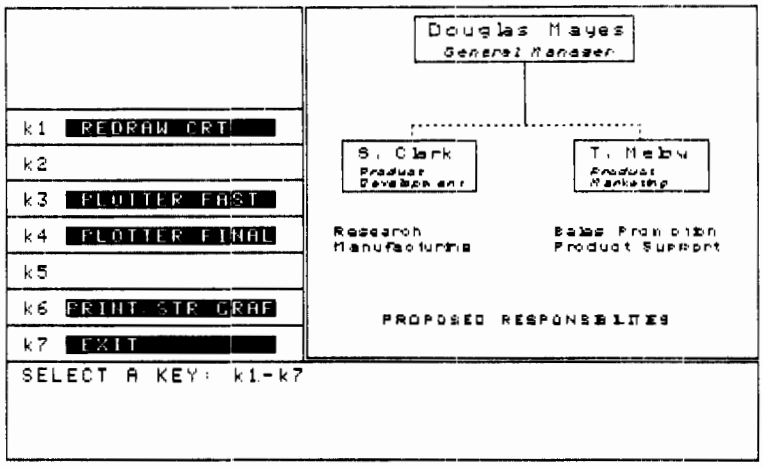
57. Press the right cursor key until X=137 Y=147. Then press START LINE.
58. Press the up cursor key until X=137 Y=157. Press (END LINE).
59. Press the left cursor key until X=43 Y=157. Press (END LINE).
60. Press the down cursor key until X=43 Y=147. Press (END LINE).
61. Now you are ready to store and plot your chart. First exit the line and arc functions by pressing EXIT.
62. Press STORE CHART, which appears on the same chart preparation form you saw in step 6.

63. After the chart has been stored, press BACK TO CHART so that you can plot the chart.



64. Now press PLOT CHART. (This label appears on the same chart preparation form you saw in steps 6 and 62.)

65. Press PLOTTER FINAL to plot your chart with all of the specified style choices. Or press PRINT/STR GRAF to print or store a graphics image of your chart. If you've chosen PRINT/STR GRAF, skip to step 70.



After selecting PLOTTER FINAL, press PAPER or TRANSPARENCY, depending upon your choice of medium. If you are plotting with an HP 9872 Plotter, you may choose between size "A" paper (210 mm by 297 mm or 8½ in. by 11 in.) or size "B" paper (297 mm by 420 mm or 11 in. by 17 in.).

66. You may be prompted with different messages directing you when to insert pens depending upon how many pen stalls your plotter has. The prompts

shown here are for the HP 7470 Graphics Plotter. In response to the first prompt, insert narrow black and red pens in stalls 1 and 2. Be sure to use the correct type of pen for your choice of medium. Then press (CONT) to start plotting.
While the chart is being plotted, the only label you will see is STOP PLOT. Do not press this key unless you do not want to plot this chart or you accidentally inserted the wrong pens and want to be able to start over (with step 65).

```
PREPARE YOUR PLOTTER WITH PAPER
INSERT PEN NUMBER 1  BLACK   IN STALL 1.
INSERT PEN NUMBER 2  RED     IN STALL 2.
PRESS [CONT] WHEN READY
```

67. Respond to the second prompt by inserting a narrow blue pen in stall 1. Then press (CONT) to continue plotting. (You do not have to insert a green pen in stall 2 since you did not use green in this chart.)

```
INSERT PEN NUMBER 3  BLUE    IN STALL 1.
INSERT PEN NUMBER 4  GREEN   IN STALL 2.
PRESS [CONT] WHEN READY
```

68. Respond to the third prompt by inserting a wide black pen in stall 1. Then press (CONT) to continue plotting.

```
INSERT PEN NUMBER 9  9       IN STALL 1.
INSERT PEN NUMBER 10 10      IN STALL 2.
PRESS [CONT] WHEN READY
```

69. When the plot has finished, the chart preparation form which offers different plotting functions will be displayed. Press PRINT/STR GRAF if you wish to print or store a graphics image of your chart and skip to step 70. Otherwise, press EXIT. The chart preparation form that offers the PLOT CHART option will be displayed. Press EXIT again and skip to step 72.

70. If you've selected PRINT/STR GRAF, the pac responds with the following form, unless this form was previously filled out:

```
GRAPHICS PRINTER TYPE

      HP 82905A
 --> HP 82905B
      HP STANDARD
           e.g. 2631G, 2671G, 2673G

PRESS KEY k1,k2 OR k3 TO SELECT WHICH PRINTER YOU WILL USE.  THEN PRESS ACCEPT.

CAUTION: THE WRONG PRINTER TYPE WILL GENERATE
THE WRONG OUTPUT AND MAY CAUSE YOU TO LOSE DATA.

1 82905A  2 82905B  3 STANDARD          5 ACCEPT          7 EXIT
```

Press 82905A, 82905B, or STANDARD to select the type of graphics printer to be used. If you choose to store a GRAF file of the chart and print it at a later time, you must select the graphics printer type at this time. The GRAF file is created according to one of these three graphics printer formats. After selecting the correct graphics printer, press k5, ACCEPT.

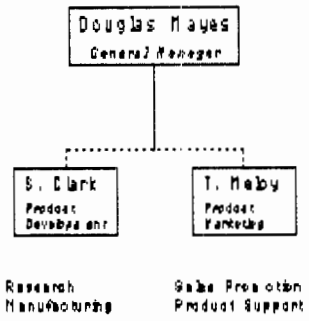
71. Next the pac will draw an image of your chart on the graphics display. The chart will be a distorted version of the original. However, the printed version will closely approximate the original, providing it is printed on the printer type selected in step 70. Then the following set of keys appears:

```
PRESS TOGGLE KEY TO SWITCH FROM THIS FORM TO THE PICTURE AND BACK.

1 TOGGLE          3 PRINT          5 STORE          7 EXIT
```

Press k1, TOGGLE once, and then again to shift between the special function key labels and the graphics display.

Press PRINT and then (CONT) to print the chart on the system printer.

Note: The PRINT function may be used only if you chose to print output in the second system configuration form (refer to section 2). The printer address must match the printer address in the system configuration form and the printer type must match the type specified in step 70.



PROPOSED RESPONSIBILITIES

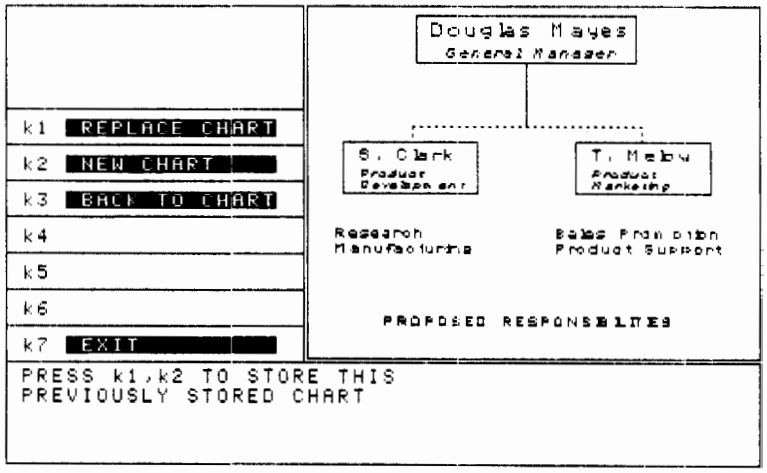
Press STORE to create a GRAF file of the chart. The GRAF file can later be recalled (using the BASIC GLOAD statement) and printed on the printer type selected in step 70. It is not necessary to have a system printer connected at this time to create the chart GRAF file. Upon selecting STORE, the pac responds with a form requesting the GRAF FILE NAME and GRAF DISC NAME. Enter ORG CH GRF or another suitable file name and press (END LINE). You should not use a file name that already exists on the storage disc. Then enter the volume label of the disc you want to use for storage followed by (END LINE). Enter Y (END LINE) when the next prompt appears if all the information is correct.

```
GRAF FILE NAME  ORG CH GRF
GRAF DISC NAME      CHARTS
```

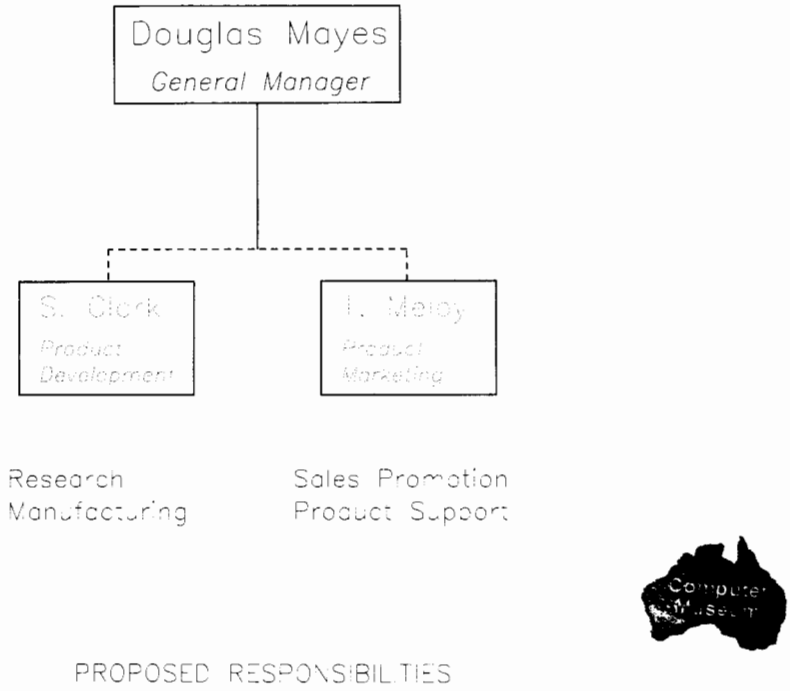
```
?  EXIT
```

Upon completing the print or store operation, the pac returns the TOGGLE, PRINT, STORE, and EXIT keys. Press EXIT; the pac displays the form that offers the different plotting options. Press EXIT again. The chart preparation form containing PLOT CHART will be displayed. Press EXIT again.

72. When you are asked whether you want to store this chart, press EXIT. (You have already stored the chart, and you made no changes to it, so you do not need to press REPLACE CHART or NEW CHART. If you press BACK TO CHART, you will return to the chart preparation form you saw in step 62.)



73. Now you are finished, and you are back in the chart preparation form which you started with in step 2. You can now press EXIT PAC to end your session with the pac, or you can go on to any of the other create chart or edit chart examples in sections 3 and 4.



PROPOSED RESPONSIBILITIES

Pie Charts

Pie charts illustrate parts or proportions of a whole, such as the distribution of sales revenue or expenses within a company. Two pie charts may be used on one page to compare related items. Since pie charts illustrate *proportions* rather than absolute amounts, they are particularly useful for audiences who might be wary of numeric scaling on graphs, or who do not need to know absolute quantities. (Bar charts are more appropriate for illustrating absolute quantities.)

Each slice of the pie represents a part or proportion of the whole, and can be distinguished by color and hatch type. The pac will convert whatever values you enter for each slice into the appropriately sized slices. Then you can label the slices to illustrate what they represent or with their exact values. In addition, you can tell the pac to convert the values that you enter into percentages and automatically label the slices with these percentages.

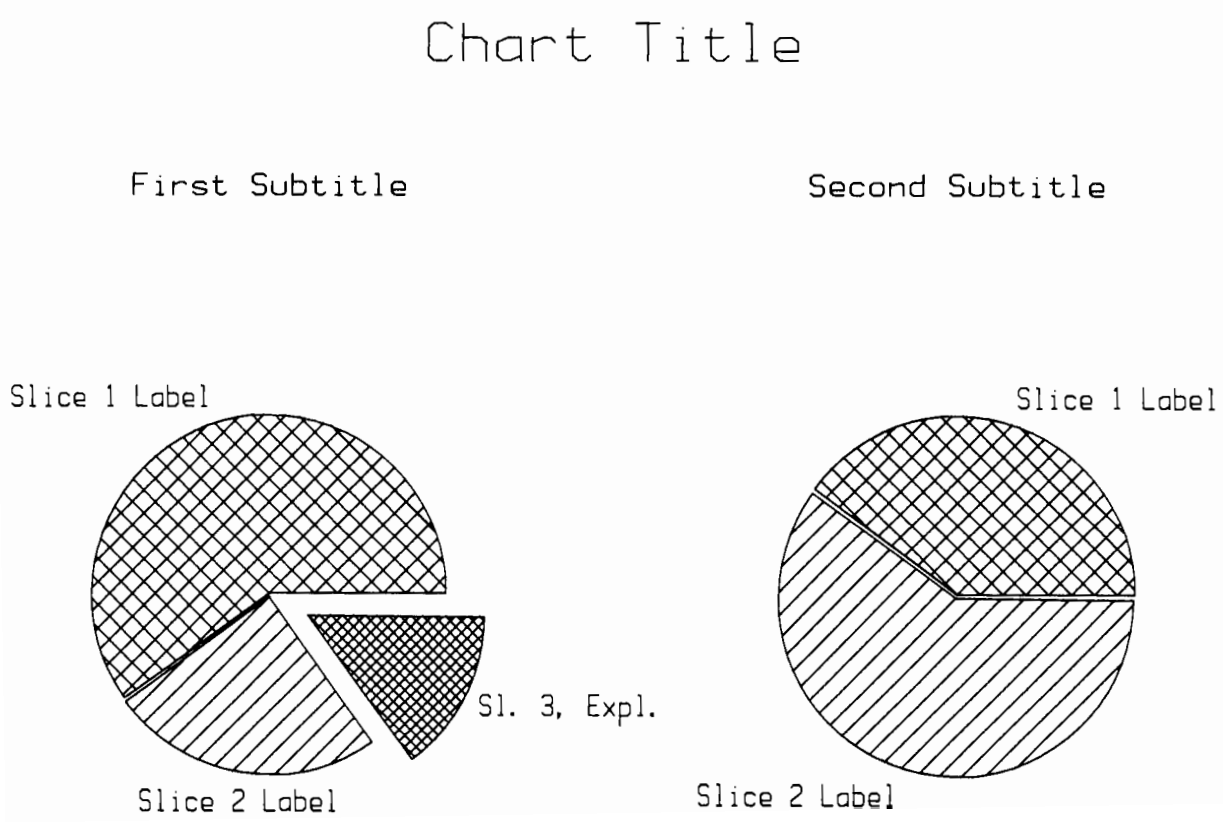
With this pac you can prepare charts consisting of one or two pies, and each pie can have up to 24 slices. You can specify that any of the slices be offset slightly from the center of the pie for emphasis. This is called exploding a slice. All pie charts are plotted with a horizontal orientation on the paper or transparency film.

The following paragraphs provide hints on organizing the information that the pac will require in order to create a pie chart. These hints are discussed in terms of the specific features of this pac. If you would like some information about graphics design (for example, choosing hatches or the number of slices), refer to appendix B.

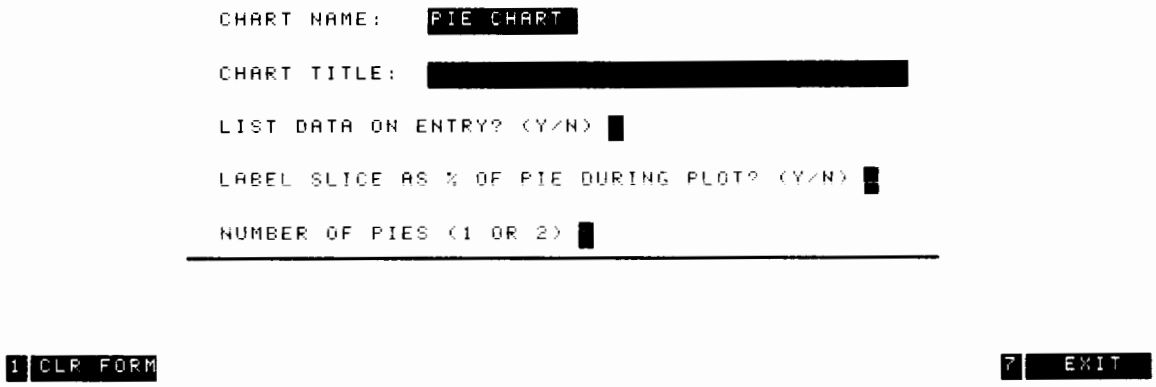
Following the section on organizing pie chart data, there are step-by-step procedures for creating a sample two-pie chart. You might want to regard the section on organizing data as a reference for preparing your own charts, and skip it for now to practice with the example procedures.

Organizing Pie Chart Data

The pac uses two data entry forms for preparing pie charts. The first form requests information which determines the type of pie chart you will have. The second form requests the labels and values for each slice. The entry fields of each form are described sequentially in the following paragraphs. In addition, the example two-pie chart below illustrates how the information you enter will be plotted. To prepare your data for entry, refer to these forms and list your data in the order shown. Your data entry through the pac will then be more efficient.



When you press PIE CHART , the form shown below is the first data entry form you will see. If you selected the chart storage option, the first field will already be filled in with the chart name; if you selected the no storage option, this field will be blank. The cursor will be flashing in the CHART TITLE field.



Pie Chart Form 1 (One and Two Pies)

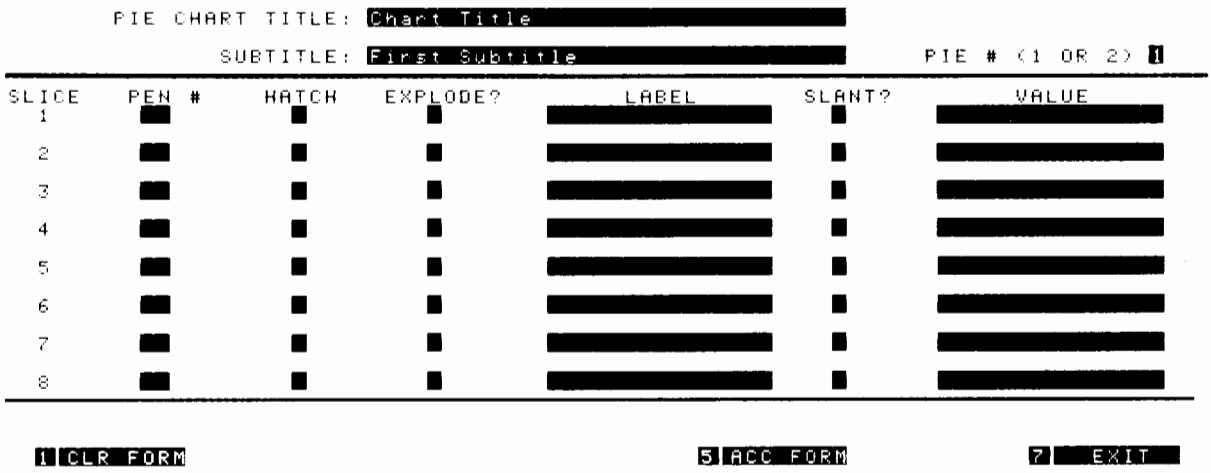
CHART TITLE. The title is always plotted using pen number 1 (black). If you do not want your title to be black, substitute another pen on the plotter for pen number 1 when you plot the chart. You can leave this field blank if you choose.

LIST DATA ON ENTRY. If you enter Y, pie chart data will be listed on the system printer each time form 2 has been filled out. If you enter N, you will only be able to list your data with the LIST DATA key.

LABEL SLICE AS %. If you want the pac to compute the percentages of each slice based upon the values which you enter, enter Y. The pac will then automatically label each slice with its percentage value.

NUMBER OF PIES. Enter either 1 or 2, for one pie or for two pies on the same chart.

After the pac has accepted the first form, the form shown on the next page will be displayed on the CRT. The PIE CHART TITLE field will already be filled in, and the cursor will be flashing in the SUBTITLE field. After you enter the subtitle, the PIE # field will automatically be filled in with 1 and the cursor will flash in the PEN # field for the first slice. If you selected two pies, you will fill this form out twice, once for each pie. When you fill out the form for the second pie, all of the fields except the SUBTITLE and VALUE fields will already be filled in with the information you entered for the first pie, since two pies are often used to compare similar items. You can change any of these fields for the second pie.



Pie Chart Form 2 (One and Two Pies)

SUBTITLE. If you are preparing a two-pie chart, you can enter a different subtitle for each pie. Like the title, the subtitles are plotted using pen number 1. You can leave this field blank.

SLICE. Slice is not an entry field, but it does indicate the number of slices for which you have entered values. This form will appear up to three times, depending upon how many slices you have: once for slices 1-8, once for slices 9-16, and once for slices 17-24. When you have filled out the form for any set of eight slices, the pac will ask if you want to enter more information. If you are preparing a two-pie chart, you can enter values for a different number of slices for each pie. If your second pie has more slices than your first pie, simply enter the additional information. If your second pie has fewer slices than your first pie, press ACC FORM right after you have entered the slice value for the last slice on your second pie; any information which was already automatically filled into any fields following the position of the cursor will not be accepted.

PEN #. Enter a number from 1 to 16 to specify a pen color for each slice. Pen number 1 is the default.

HATCH. Enter a number from 1 to 6 to specify a hatch type for each slice. Hatch type 1 is the default.

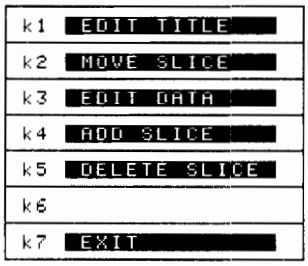
EXPLODE. Enter Y or N for each slice to specify that the slice be exploded or not exploded. The default is N.

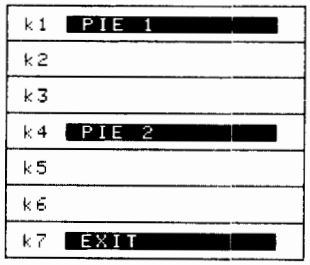
LABEL. Each slice label is plotted in the same color as the slice. Although each label can consist of up to 15 characters, all 15 characters might not get plotted when you have two pies, particularly if you have exploded slices. A good general rule for two-pie charts is to limit your labels to seven characters if you have also told the pac to label the percentages automatically. If you are not labeling percentages, limit your labels to 14 characters. If you have only one pie, all 15 characters will probably get plotted, regardless of whether you are labeling percentages. If not, simply use the editing features to enter shorter labels. You can leave any LABEL field blank.

SLANT. Enter Y or N in the SLANT field for each label to specify that the label be slanted or not slanted. The default is N.

VALUE. Enter the value for each slice. Each value can be any non-negative number. The value does not have to be a percentage, although it can be.

Once you have entered all of the data, the pie chart will be drawn on the CRT in a chart preparation form. At this point, the slices will be marked sequentially with the slice number (labels will be plotted on the plotter but not drawn on the CRT), and the hatch types will not be drawn. After the chart has been drawn, you can edit, store, or plot the chart. These operations are described in section 4 and in the individual special function key definitions in appendix C. The sets of special function key labels which are unique to pie charts are shown below.





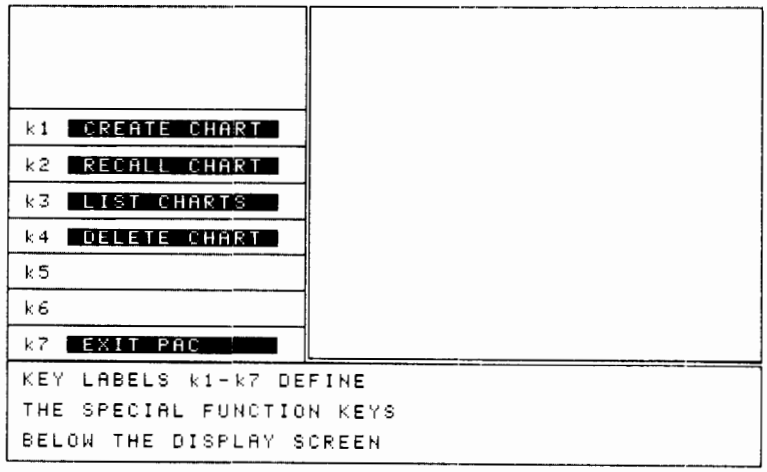
Creating a Pie Chart

In the following step-by-step procedures, you will create, store, and plot a pie chart which compares hypothetical expenditures for domestic and international business trips.

1. Follow the procedures for loading the pac and filling out the configuration forms listed under Running the Pac in section 2. Be sure to specify that you will be storing and plotting charts in this session, and use the chart storage disc supplied with the pac. If you have a printer, specify that you will be printing data in this session.

2. Press CREATE CHART .

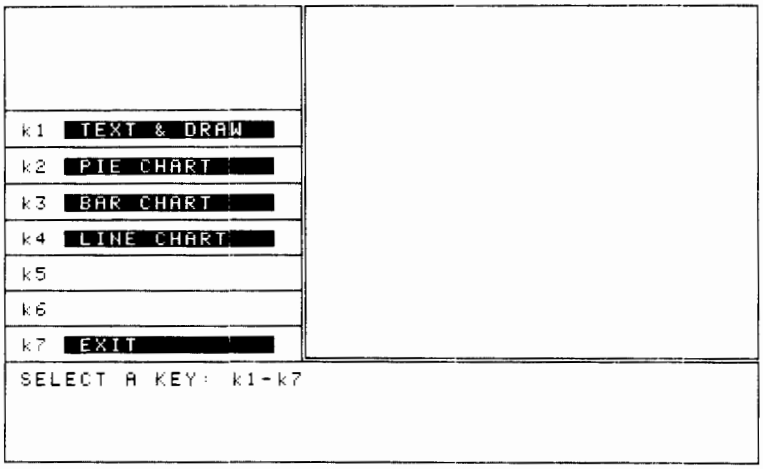
   (If you prefer to recall the prestored chart, press RECALL CHART instead. Then enter PIE CHART for the chart name, insert GP Pac Disc 2 when prompted, and skip to step 10 to plot the chart.)



3. Enter TRAVEL P 1 for the chart name. (If you want to store edited versions of this chart, you might want to use the same name with consecutively higher suffix numbers, for example, TRAVEL P 2.)

```
CHART NAME: TRAVEL P 1
```

4. Press PIE CHART. When prompted, insert GP Pac Disc 2.



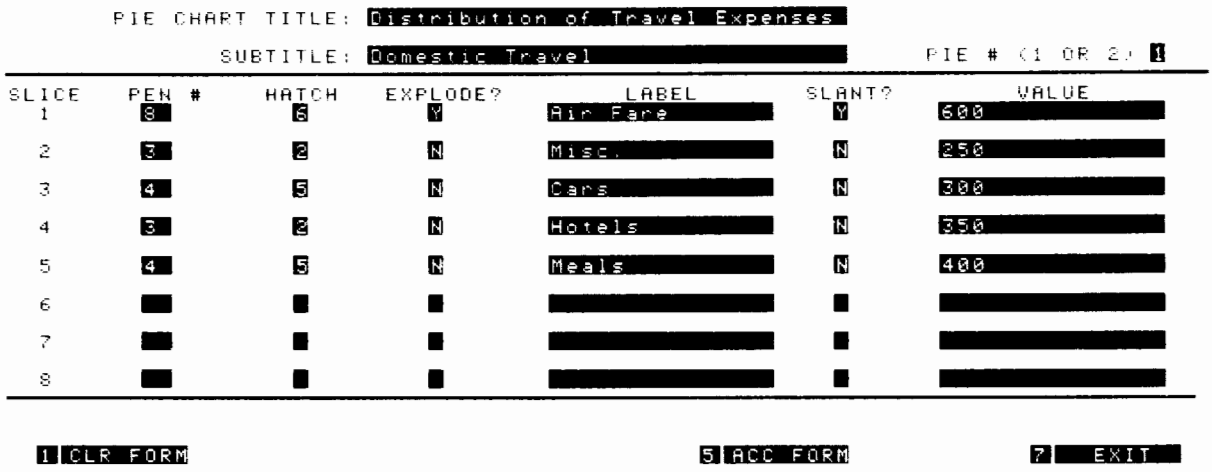
5. Now fill out the first data entry form with the values shown here:

```
CHART NAME:    TRAVEL P 1
CHART TITLE:   Distribution of Travel Expenses
LIST DATA ON ENTRY? (Y/N) Y
LABEL SLICE AS % OF PIE DURING PLOT? (Y/N) Y
NUMBER OF PIES (1 OR 2) 2
```

1 CLR FORM 7 EXIT

When you are asked if all of the information is correct, enter Y. (Of course, if you have made a mistake anywhere, you can enter N and then tab through the form to correct your errors.)

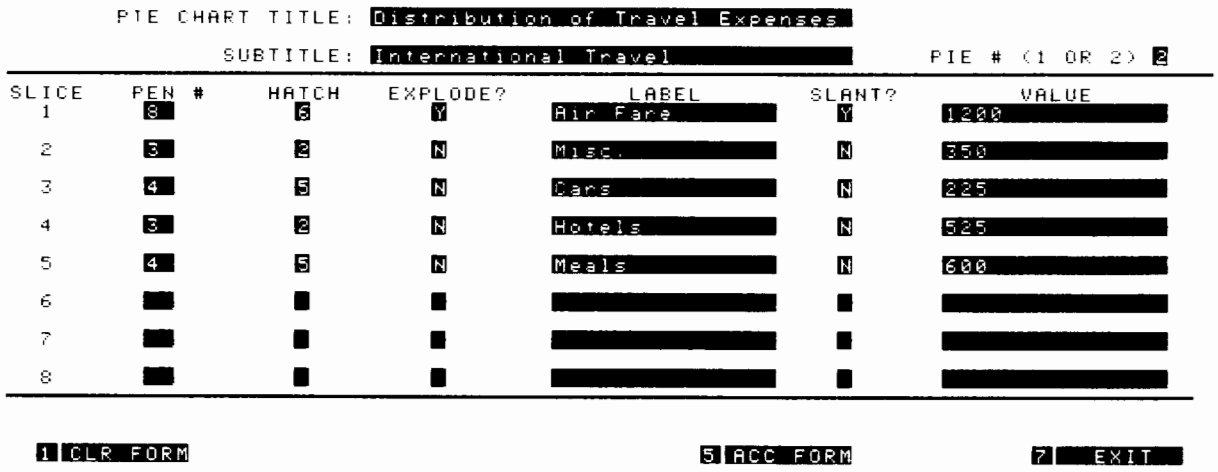
6. Next fill out the data entry form with the values shown here for the first pie:



When you have entered the value for slice 5, press ACC FORM to indicate that you have finished entering the data for the first pie. When you are asked if all of the information is correct, enter Y.

The printer will output a list of the data that you have just entered.

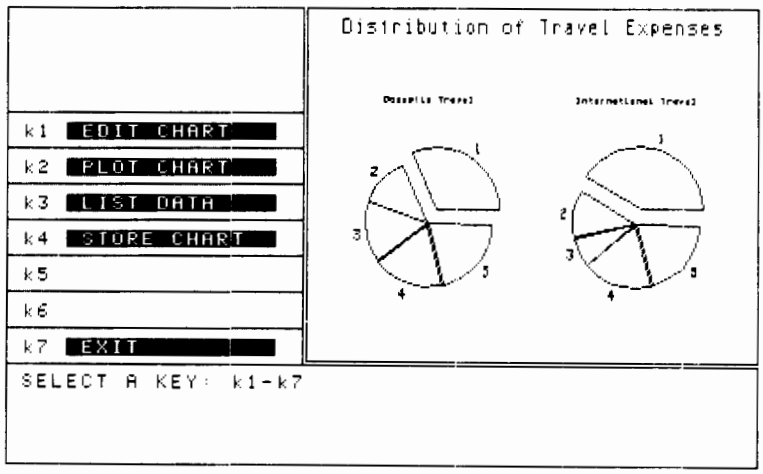
7. Now fill out the data entry form with the values shown here for the second pie. (All of the fields except SUBTITLE and VALUE are already filled in for 5 slices. Simply tab through the form to enter the new values.)



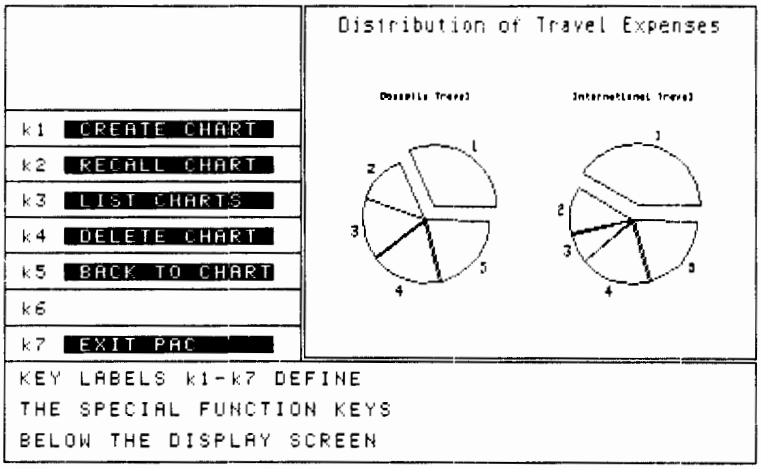
When you have entered the value for slice 5, press ACC FORM to indicate that you have finished entering the data for the first pie. When you are asked if all of the information is correct, enter Y.

The printer will output a list of the data that you have just entered.

8. Now the pie chart will be drawn on a chart preparation form. The only special function key with a label will be STOP PLOT. Do not press this key for now; if you follow the editing procedures for a bar chart in section 4 you will learn when it is useful to press this key.
When the chart has been drawn, the set of special function keys shown here will appear. Press STORE CHART.

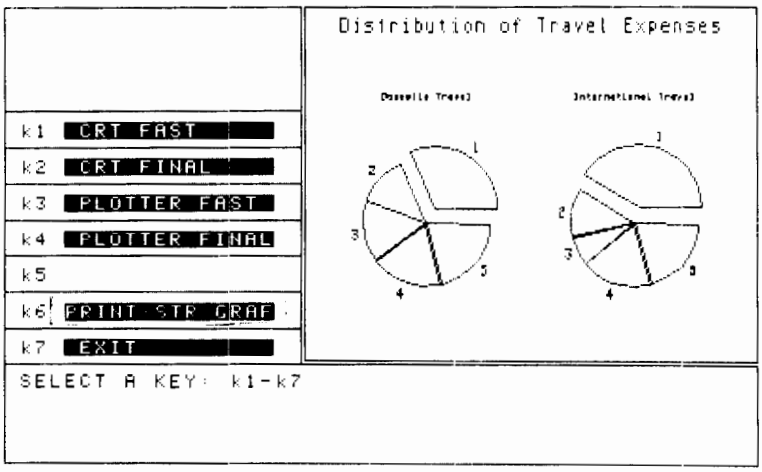


9. After the chart has been stored, press BACK TO CHART so that you can plot the chart.



10. Now press PLOT CHART. (This label appears on the same chart preparation form you saw in step 8.)

11. Press PLOTTER FINAL to plot your chart with all of the specified colors and hatches. (You can first press CRT FINAL if you want to preview the hatches that you specified. Then you can plot the chart.) Alternatively, press PRINT/STR GRAF to print or store a graphics image of your chart. If you've chosen PRINT/STR GRAF, skip to step 16.



After selecting PLOTTER FINAL, press PAPER or TRANSPARENCY, depending upon your choice of medium. If you are plotting with an HP 9872 Plotter, you may choose between size "A" paper (210 mm by 297 mm or 8½ in. by 11 in.) or size "B" paper (297 mm by 420 mm or 11 in. by 17 in.).

12. You may be prompted with different messages directing you when to insert pens depending upon how many pen stalls your plotter has. The prompts shown here are for the HP 7470 Graphics Plotter. In response to the first prompt, insert a black pen in stall 1. (You do not have to insert a red pen since you did not use red in this chart.) Be sure to use the correct type of pen for your choice of medium. Then press (CONT) to start plotting. While the chart is being plotted, the only label you will see is STOP PLOT. Do not press this key unless you do not want to plot this chart or you accidentally inserted the wrong pens and want to be able to start over (with step 11).

```
        PREPARE YOUR PLOTTER WITH PAPER
INSERT PEN NUMBER 1   BLACK    IN STALL  1.
INSERT PEN NUMBER 2   RED      IN STALL  2.
          PRESS [CONT] WHEN READY
```

13. Respond to the second prompt by inserting a blue pen in stall 1 and a green

```
INSERT PEN NUMBER 3   BLUE     IN STALL  1.
INSERT PEN NUMBER 4   GREEN    IN STALL  2.
          PRESS [CONT] WHEN READY
```

pen in stall 2. Then press (CONT) to continue plotting.

14. Respond to the third prompt by inserting a brown pen in stall 2. Then press (CONT) to continue plotting. (You do not have to insert an orange pen in stall 1 since you did not use orange in this chart.)

```
INSERT PEN NUMBER 7   ORANGE   IN STALL  1.
INSERT PEN NUMBER 8   BROWN    IN STALL  2.
        PRESS [CONT] WHEN READY
```

15. When the plot has finished, the chart preparation form which offers different plotting functions will be displayed. Press PRINT/STR GRAF if you wish to print or store a graphics image of your chart and skip to step 16. Otherwise, press EXIT. The chart preparation form that offers the PLOT CHART option will be displayed. Press EXIT again and skip to step 18.

16. If you've selected PRINT/STR GRAF, the pac responds with the following form, unless this form was previously filled out.

```
GRAPHICS PRINTER TYPE

     HP 82905A
 --> HP 82905B
     HP STANDARD
          e.g. 2631G, 2671G, 2673G
```

```
PRESS KEY k1,k2 OR k3 TO SELECT WHICH PRINTER YOU WILL USE.  THEN PRESS ACCEPT.

CAUTION: THE WRONG PRINTER TYPE WILL GENERATE
THE WRONG OUTPUT AND MAY CAUSE YOU TO LOSE DATA.
```

1 82905A | 2 82905B | 3 STANDARD | 5 ACCEPT | 7 EXIT

Press 82905A, 82905B, or STANDARD to select the type of graphics printer to be used. If you choose to store a GRAF file of the chart and print it at a later time, you must select the graphics printer type at this time. The GRAF file is created according to one of these three graphics printer formats. After selecting the correct graphics printer, press k5, ACCEPT.

17. Next the pac will draw an image of your chart on the graphics display. The chart will be a distorted version of the original. However, the printed version will closely approximate the original, providing it is printed on the printer type selected in step 16. Then the following set of keys appears:

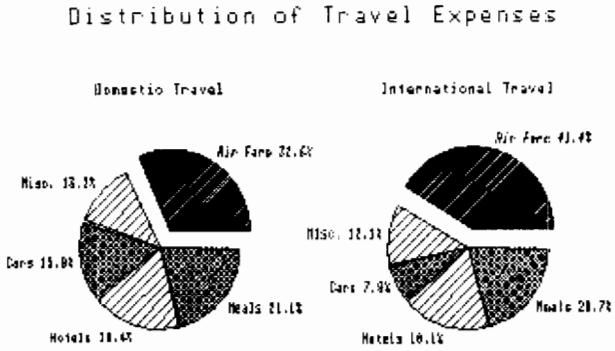
```
PRESS TOGGLE KEY TO SWITCH FROM THIS FORM TO THE PICTURE AND BACK.
```

1 TOGGLE | 3 PRINT | 5 STORE | 7 EXIT

Press k1, TOGGLE once, and then again to shift between the special function key labels and the graphics display.

Press PRINT and then (CONT) to print the chart on the system printer.

Note: The PRINT function may be used only if you chose to print output in the second system configuration form (refer to section 2). The printer address must match the printer address in the system configuration form and the printer type must match the type specified in step 16.



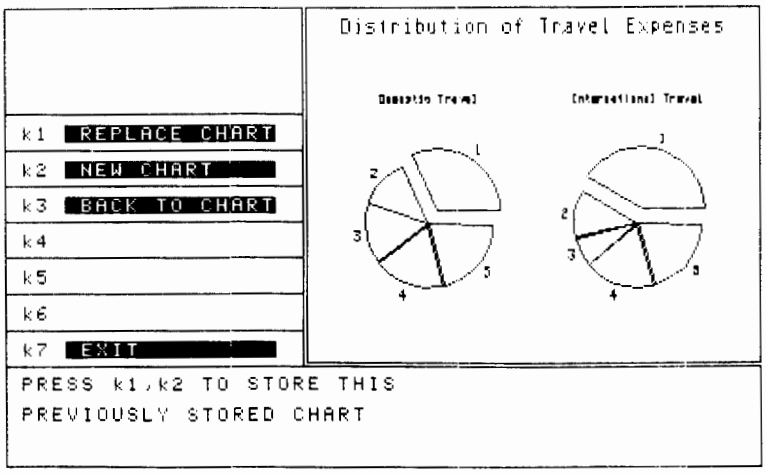
Press STORE to create a GRAF file of the chart. The GRAF file can later be recalled (using the BASIC GLOAD statement) and printed on the printer type selected in step 16. It is not necessary to have a system printer connected at this time to create the chart GRAF file. Upon selecting STORE, the pac responds with a form requesting the GRAF FILE NAME and GRAF DISC NAME. Enter TRV P1 GRF or another suitable file name and press (END LINE). You should not use a file name that already exists on the storage disc. Then enter the volume label of the disc you want to use for storage followed by (END LINE). Enter Y (END LINE) when the next prompt appears if all the information is correct.

```
GRAF FILE NAME   TRV P1 GRF
GRAF DISC NAME       CHARTS
```

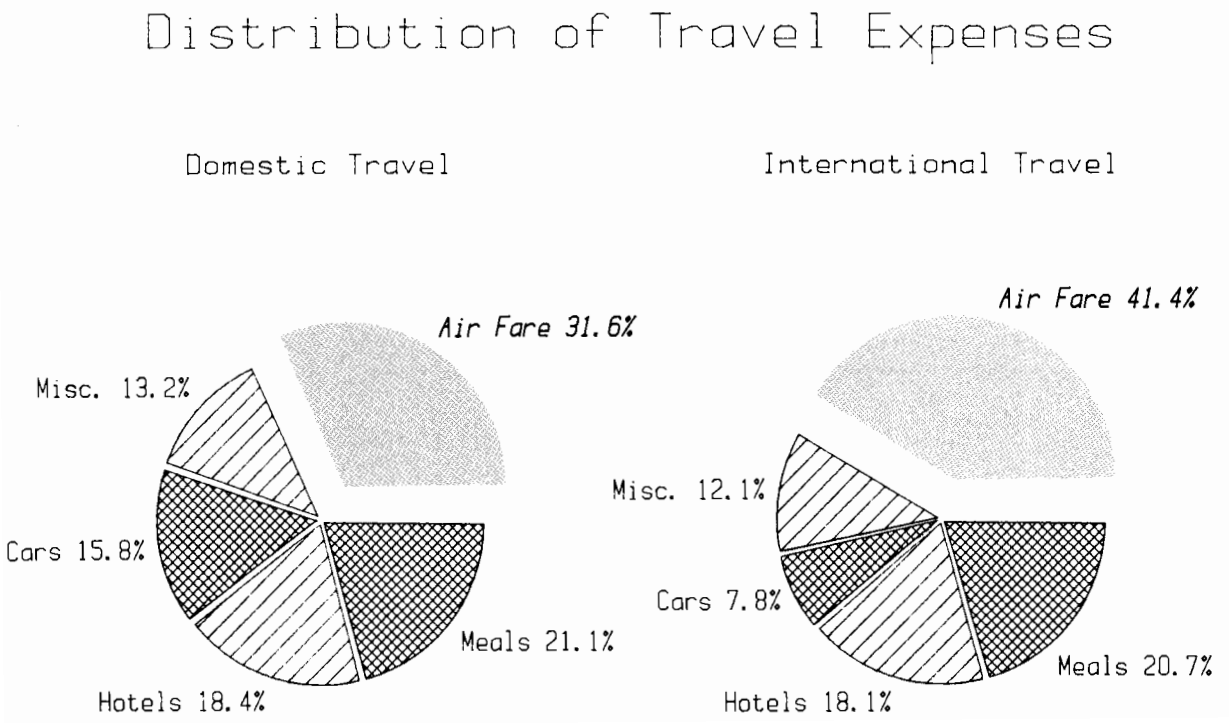
```
7 EXIT
```

Upon completing the print or store operation, the pac returns the TOGGLE, PRINT, STORE, and EXIT keys. Press EXIT; the pac displays the form that offers the different plotting options. Press EXIT again. The chart preparation form containing PLOT CHART will be displayed. Press EXIT again.

18. When you are asked whether you want to store this chart, press EXIT. (You have already stored the chart, and you made no changes to it, so you do not need to press REPLACE CHART or NEW CHART. If you press BACK TO CHART, you will return to the chart preparation form you saw in step 8.)



19. Now you are finished, and you are back in the chart preparation form which you started with in step 2. You can now press EXIT PAC to end your session with the pac, or you can go on to any of the other create chart or edit chart examples in sections 3 and 4.



Bar Charts

Bar charts are appropriate for comparing relative quantities. Usually bar charts show quantitative changes over time, or compare quantitative changes among separate but similar entities. For example, if you want to know the sales totals for each quarter, a bar chart will help you to visualize the amounts and help you to see how much the amounts fluctuated. You might also use a bar chart to show the total number of products sold for different regions or company divisions. A clustered or stacked bar chart allows you to compare more than one element (see the examples in Organizing Bar Chart Data). For example, you might want to compare the sales totals for three different products for each quarter. Each legend in this case would represent a different product.

The length of each bar represents the actual quantity (for example, sales dollars, number of products sold), which is called the y-axis value. All bar charts in this pac can be prepared with negative y-axis values. X-axis labels mark the bars along the x-axis (for example, with the month of the year or with the name of the region). Each bar is then formed from one y-axis value corresponding with an x-axis label.

With this pac, you can produce three types of bar charts. The first is the normal bar chart, where each x-axis label is associated with one bar. You can prepare a normal bar chart with up to 24 bars. Another type is the clustered bar chart. With this type, two to six bars are centered in clusters over each x-axis label. You can prepare clustered bar charts with up to 24 clusters of up to six bars per cluster. The stacked bar chart is the third type of bar chart. This type is similar to the clustered bar chart because more than one bar is associated with one x-axis label. However, the bars are stacked on top of each other. You can prepare stacked bar charts with up to 24 stacks of up to six bars per stack. Each bar in a cluster or stack is identified by a legend which consists of one or two phrases along with the color and hatch type used to differentiate the bar. The legends are plotted to the left of the bar chart; therefore the actual chart area for clustered and stacked bar charts is smaller than that for a normal bar chart.

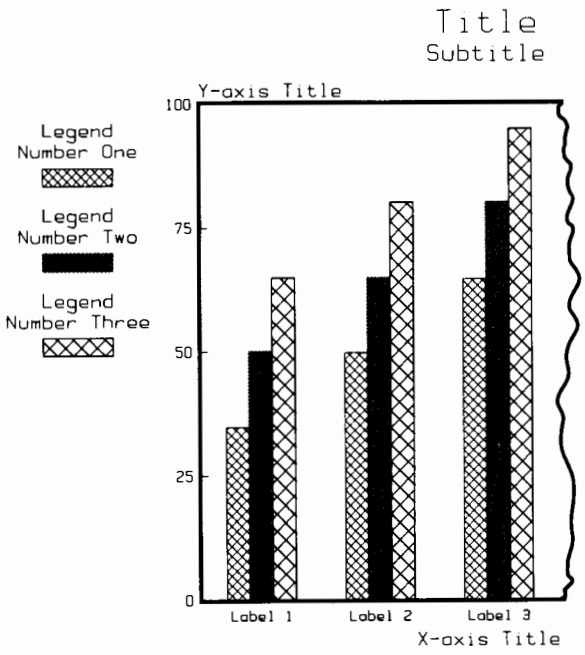
You can use the clustered or stacked bar chart forms to prepare a bar chart with just one bar per x-axis label. This is the same as a normal bar chart, except that it will be plotted in a slightly smaller area and the widths of the bars will be smaller. This is useful if you are also preparing a clustered or stacked bar chart or a multiple line chart, and want the plotting areas to be the same size to facilitate comparisons between charts. Sometimes information can be distorted when you try to compare charts that are drawn with different sizes of plotting areas. All bar charts are plotted with a horizontal orientation on the paper or transparency film.

The following paragraphs provide hints on organizing the information that the pac will require in order to create any of the bar chart types. These hints are discussed in terms of the specific features of this pac. If you would like some information about graphics design (for example, choosing hatch types or the number of bars), refer to appendix B.

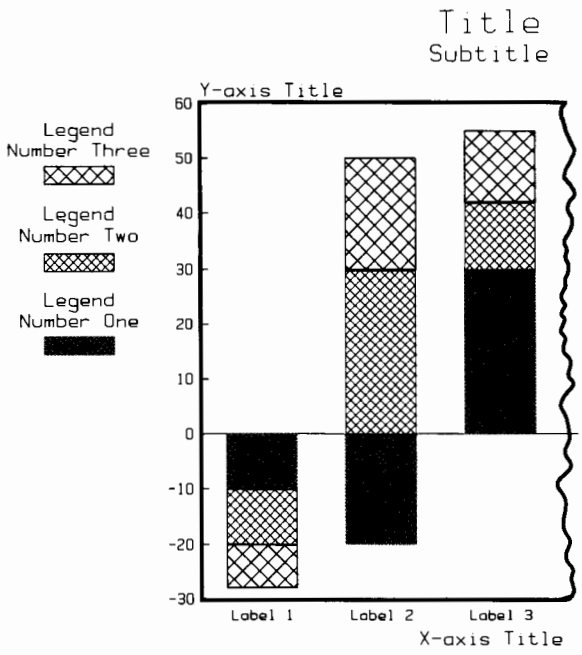
Following the section on organizing bar chart data, there are step-by-step procedures for creating a sample clustered bar chart. You might want to regard the section on organizing data as a reference for preparing your own charts, and skip it for now to practice with the example procedures.

Organizing Bar Chart Data

The pac uses four different data entry forms for preparing bar charts. The first form requests information that determines the type of bar chart you are preparing, along with determining titles and the scale on the y-axis. If you are preparing a normal bar chart, you will then fill out the second form, which requests the actual data for x-axis labels and the values of each bar. If you are preparing a clustered or stacked bar chart, you will instead fill out the third and fourth forms, which request the legends for each bar and the x-axis labels and values for each bar. The entry fields of each form are described sequentially in the following paragraphs. In addition, the example below illustrates how the information you enter will be plotted on clustered and stacked bar charts. To prepare your data for entry, refer to the forms appropriate for your bar chart type, and list your data in the order shown. Your data entry through the pac will then be more efficient.

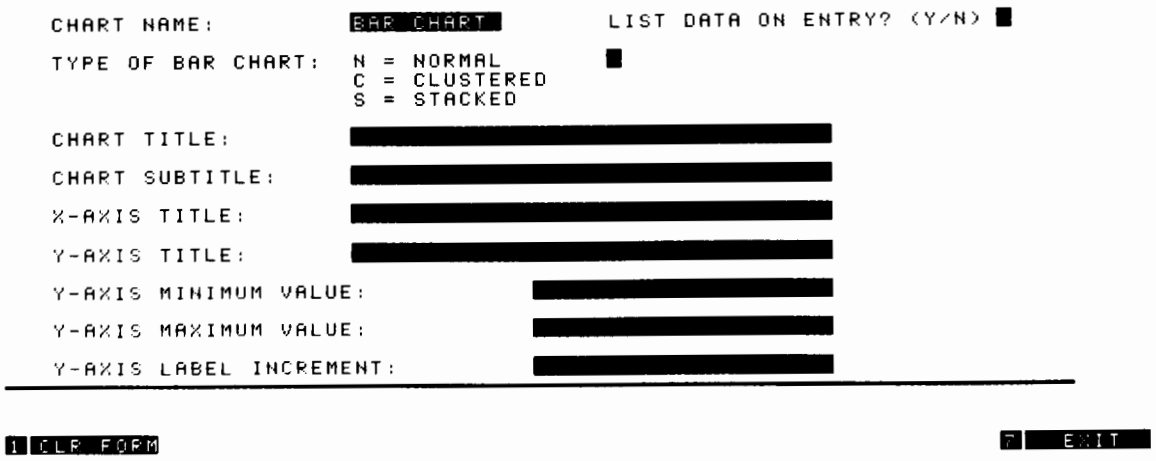


Clustered Bar Chart



Stacked Bar Chart

When you press BAR CHART, the following form is the first data entry form you will see. If you selected the chart storage option, the first field will already be filled in with the chart name; if you selected the no storage option, this field will be blank. The cursor will be flashing in the LIST DATA ON ENTRY field.



Bar Chart Form 1 (All Bar Charts)

LIST DATA ON ENTRY. If you enter Y, bar chart data will be listed on the system printer each time forms 2 and 4 have been filled out. If you enter N, you will only be able to list your data with the LIST DATA key.

TYPE OF BAR CHART. Enter N, C, or S, depending upon whether you want to prepare a normal, clustered, or stacked bar chart.

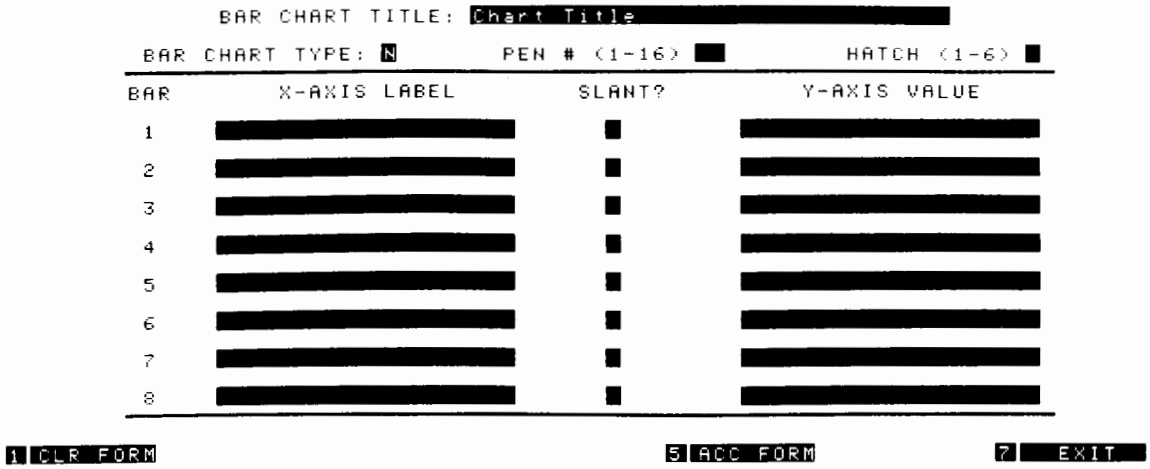
CHART TITLE and SUBTITLE. The chart title and subtitle are always plotted using pen number 1 (black). If you do not want your title and subtitle to be black, substitute another pen on the plotter for pen number 1 when you plot the chart. You can leave these fields blank.

X-AXIS TITLE and Y-AXIS TITLE. Like the chart title and subtitle, the x- and y-axis titles are always plotted using pen number 1. You can leave these fields blank.

Y-AXIS MINIMUM and MAXIMUM VALUES. The y-axis minimum value is the number which will be on the low end of the y-axis, whereas the maximum value will be on the upper end of the y-axis. Both the minimum and maximum values can be negative numbers.

Y-AXIS LABEL INCREMENT. An increment determines the number of y-axis units between the labels which are drawn along the y-axis to show the scale. If you choose an increment of 5, the pac automatically labels every fifth unit with a tick mark and the proper value for that tick mark. The increments must be positive numbers.

If you are preparing a normal bar chart, the form shown below will be displayed on the CRT after the pac has accepted the first form. The BAR CHART TITLE field will already be filled in. The BAR CHART TYPE field will be filled in with N for normal, and the cursor will be flashing in the PEN # field.



Bar Chart Form 2 (Normal Bar Charts)

PEN #. Enter a number from 1 to 16 to specify a pen number for the bars. Each bar will be plotted with the same pen. Pen number 1 is the default.

HATCH. Enter a number from 1 to 6 to specify a hatch type for the bars. Each bar will be plotted in the same hatch type. Hatch type 1 is the default.

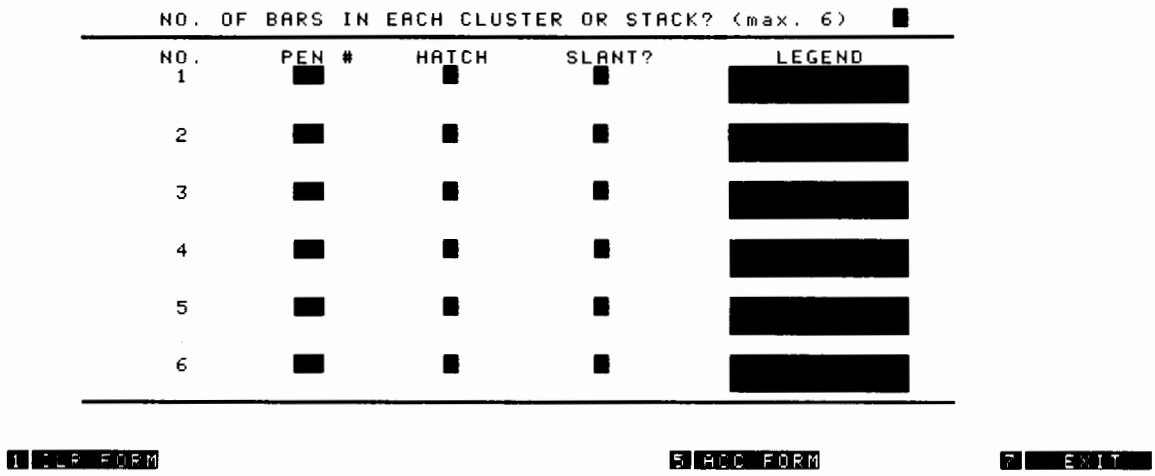
BAR. Bar is not an entry field, but it does indicate the number of bars for which you have entered values. This form will appear up to three times, depending upon how many bars you have: once for bars 1-8, once for bars 9-16, and once for bars 17-24. When you have filled out the form for any set of eight bars, the pac will ask if you want to enter more information.

X-AXIS LABEL. Each x-axis label can consist of alphanumeric characters; the labels are plotted using pen number 1. Usually the labels are plotted horizontally directly below each bar. However, if you enter several long labels which might overlap each other, the pac automatically rotates the labels. Depending upon how long the labels are, they might still overlap with the x-axis title. If this happens, simply use the editing functions to enter shorter labels or a shorter title. You can leave any of the x-axis label fields blank.

SLANT. Enter Y or N in the slant field for each label to specify that the characters in a label be slanted or not slanted. The default is N.

Y-AXIS VALUE. Enter the values for each bar. The values can be any positive or negative numbers, zero, or an asterisk (*). The * causes the bar to be omitted from the chart, leaving an empty slot. If any value exceeds the maximum or the minimum values previously specified for the y-axis, the bar will still be plotted, but only the portion within the minimum/maximum limits will show. You must enter a y-axis value for every bar you label; if you do not have any data for a bar associated with a particular x-axis label, just enter 0 (zero) for the y-axis value.

If you are preparing a clustered or stacked bar chart, the form shown below will be displayed on the CRT after the pac has accepted the first form. The cursor will be flashing in the first field.



Bar Chart Form 3 (Clustered and Stacked Bar Charts)

NO. OF BARS. Enter the number of bars which will be in each cluster or stack. You can enter from 1 to 6 bars.

NO.. This is not an entry field. Instead, it indicates the set of bars for which you are entering legend information.

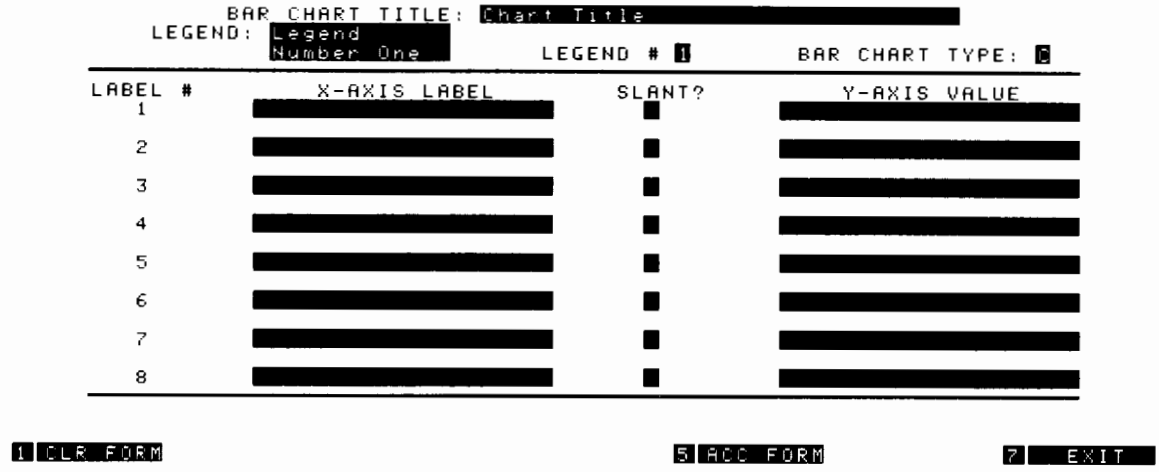
PEN #. Enter a number from 1 to 16 to specify a pen number for each set of bars. Pen number 1 is the default.

HATCH. Enter a number from 1 to 6 to specify a hatch type for each set of bars. Hatch type 1 is the default.

SLANT. Enter Y or N for each legend to specify that the legend be slanted or not slanted. The default is N.

LEGEND. The legend is the phrase which identifies the bars in each cluster or stack. When plotted, the legend is centered automatically above the hatch type associated with it. You can enter two phrases for the legend, one phrase per field; either or both fields can be left blank. If both fields are left blank, no hatch type is plotted to the left of the chart for this group of bars. If you are preparing a clustered bar chart, legend 1 refers to the first bar on the left of the cluster, legend 2 to the second bar to the right, and so on. The legends are drawn on the chart from top to bottom, 1 through 6. If you are preparing a stacked bar chart, legend 1 refers to the bar closest to the x-axis, legend 2 to the next bar stacked on the first bar, and so on. The legends are drawn to correspond to this order, so they are drawn from bottom to top, legends 1 through 6.

If you are preparing a clustered or stacked bar chart, the form shown here will be displayed on the CRT after you have filled out the third form. The BAR CHART TITLE, LEGEND, LEGEND #, and BAR CHART TYPE fields will already be filled in with the information you entered previously. The cursor will be flashing in the first X-AXIS LABEL field. You will fill out this form separately for each legend previously specified.



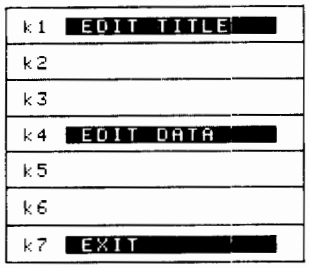
Bar Chart Form 4 (Clustered and Stacked Bar Charts)

LABEL #. This is not an entry field, but it does indicate the number of bars (x-axis labels) for which you have entered values. This form will appear up to three times, depending upon how many labels you have: once for labels 1-8, once for labels 9-16, and once for labels 17-24. When you have filled out the form for each set of eight labels, the pac will ask if you want to enter more information.

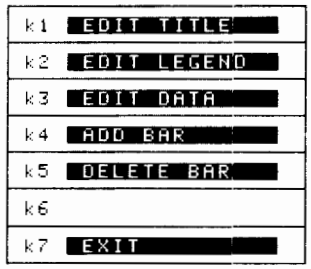
X-AXIS LABEL and SLANT. Refer to the descriptions of these fields under form 2. The only difference is that once you have entered labels and slant values for the first legend, these fields will be filled in automatically when you enter data for the other legends. Anytime you change any of the labels or slant values, the changes become the new values for the chart.

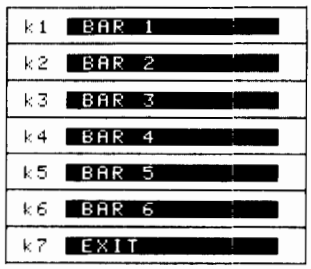
Y-AXIS VALUE. Refer to the description of this field under form 2. The only difference is that you enter y-axis values for the bars of each legend separately.

Once you have entered all of the data, the bar chart will be drawn on the CRT in a chart preparation form. At this point, the hatch types will not be drawn in. After the chart has been drawn, you can edit, store, or plot the chart. These operations are described in section 4 and in the individual special function key definitions in appendix C. The sets of special function key labels unique to bar charts are shown below.



Normal Bar Charts





Clustered and Stacked Bar Charts

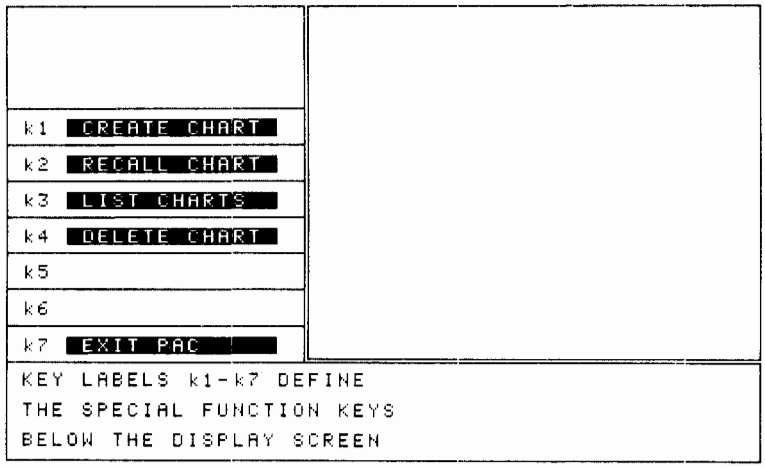
Creating a Bar Chart

In the following step-by-step procedures, you will create, store, and plot a clustered bar chart which shows the hypothetical profits of a consulting firm by region.

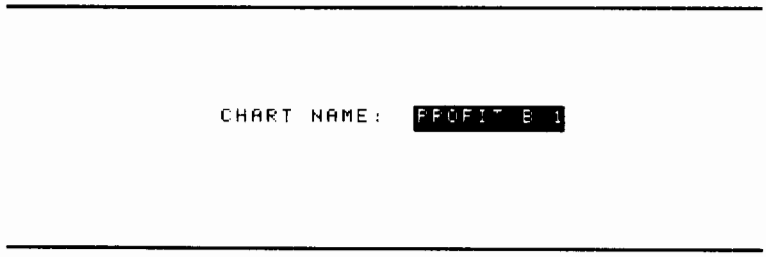
1. Follow the procedures for loading the pac and filling out the configuration forms listed under Running the Pac in section 2. Be sure to specify that you will be storing and plotting charts in this session, and use the chart storage disc supplied with the pac. If you have a printer, specify that you will be printing data in this session.

2. Press CREATE CHART.

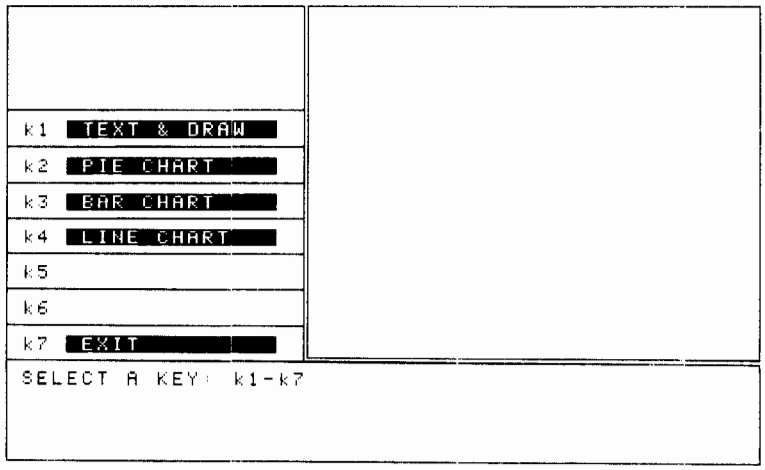
   (If you prefer to recall the prestored chart, press RECALL CHART instead. Then enter BAR CHART for the chart name, insert GP Pac Disc 2 when prompted, and skip to step 12 to plot the chart.)



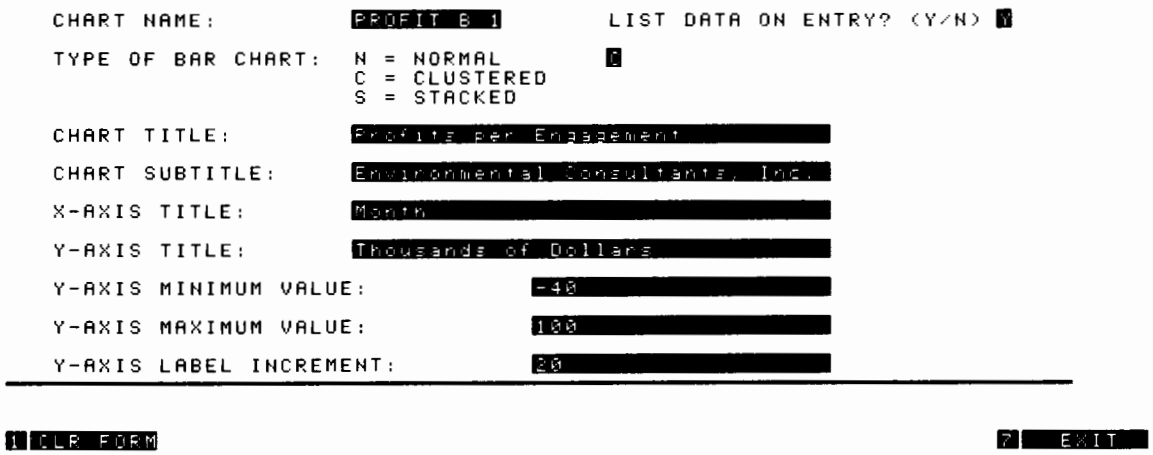
3. Enter PROFIT B 1 for the chart name. (If you want to store edited versions of this chart, you might want to use the same name with consecutively higher suffix numbers, for example, PROFIT B 2.)



4. Press BAR CHART. When prompted, insert GP Pac Disc 2.

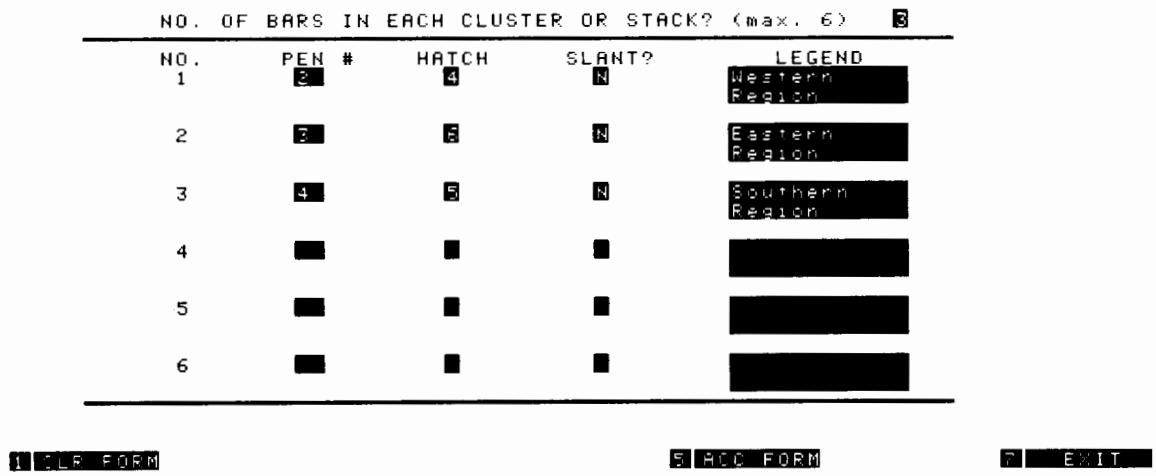


5. Now fill out the first data entry form with the values shown here:



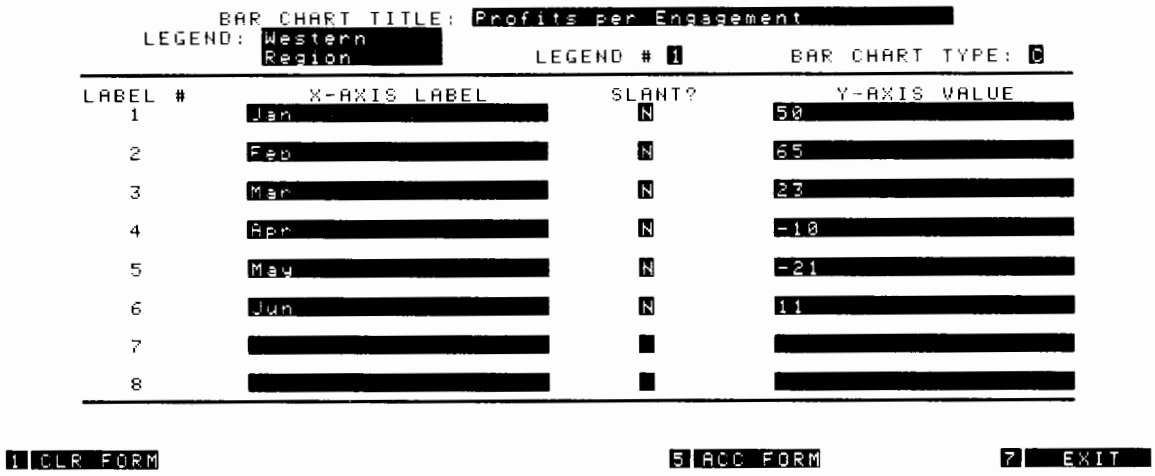
When you are asked if all of the information is correct, enter Y. (Of course, if you have made a mistake anywhere, you can enter N and then tab through the form to correct your errors.)

6. Next fill out the data entry form with the values shown here for the number of legends (the number of bars in each cluster):



When you are asked if all of the information is correct, enter Y.

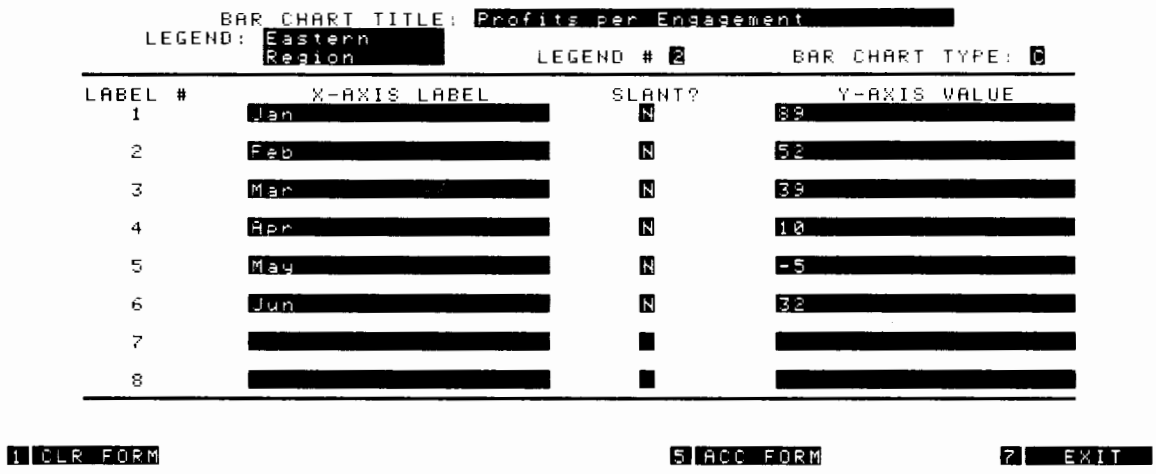
7. Fill out the next data entry form with the values shown here for the first legend:



When you have entered the y-axis value for label 6, press ACC FORM to indicate that you have finished entering the data for the first legend. When you are asked if all of the information is correct, enter 'Y'.

The printer will output a list of the data that you have just entered.

8. Fill out the next data entry form with the values shown here for the second legend. (All of the x-axis label and slant data which were entered for the first legend appear in the appropriate fields. Simply tab through the form to enter the new values.)



When you have entered the y-axis value for label 6, press ACC FORM to indicate that you have finished entering the data for the second legend. When you are asked if all of the information is correct, enter 'Y'.

The printer will output a list of the data that you have just entered.

9. Fill out the final data entry form with the values shown here for the third legend. (Again, tab through the form to enter the new values.)

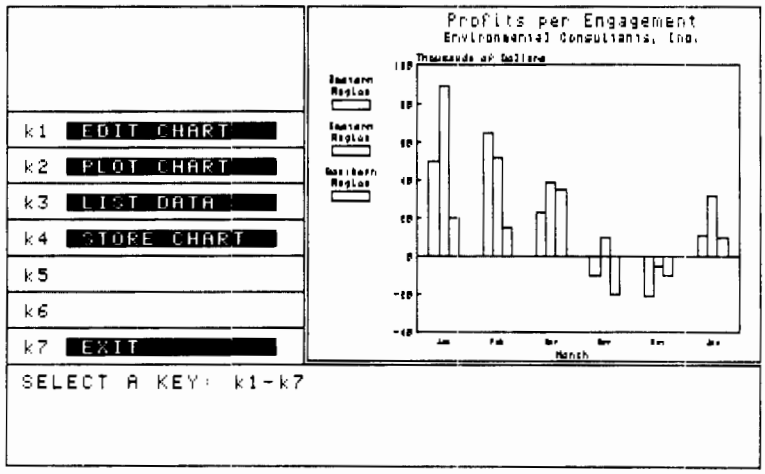
```
                BAR CHART TITLE: Profits per Engagement
LEGEND: Southern Region          LEGEND # 3          BAR CHART TYPE: C

LABEL #    X-AXIS LABEL          SLANT?    Y-AXIS VALUE
   1       Jan                     N        20
   2       Feb                     N        15
   3       Mar                     N        35
   4       Apr                     N        -20
   5       May                     N        -10
   6       Jun                     N        10
   7                               N
   8                               N

1 CLR FORM                    5 ACC FORM                    7 EXIT
```

When you have entered the y-axis value for label 6, press ACC FORM to indicate that you have finished entering the data for the third legend. When you are asked if all of the information is correct, enter Y.

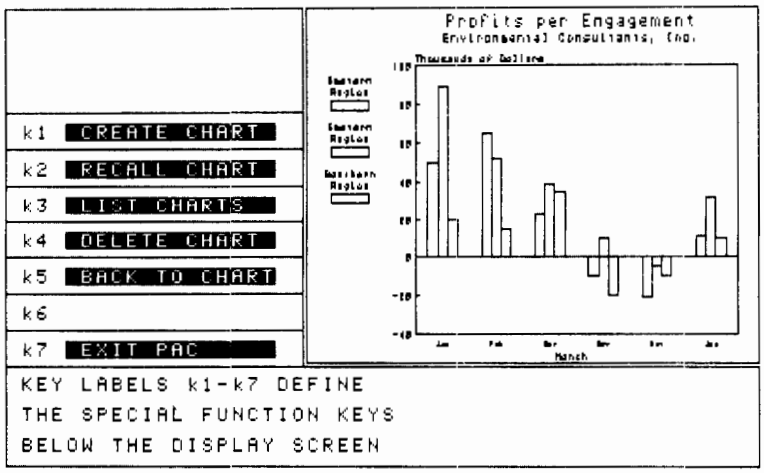
The printer will output a list of the data that you have just entered.

10. Now the bar chart will be drawn on a chart preparation form. The only special function key with a label will be STOP PLOT. Do not press this key for now; in the bar chart editing procedures in section 4 you will learn when it is useful to press this key.

    When the chart has been drawn, the set of special function keys shown here will appear. Press STORE CHART.



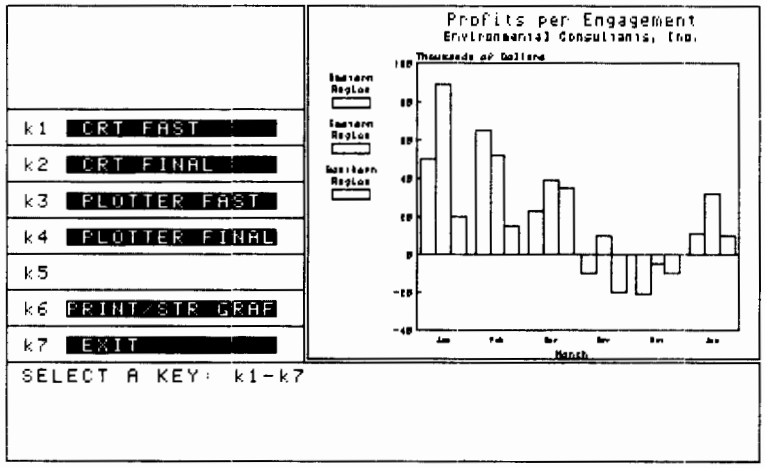
11. After the chart has been stored, press BACK TO CHART so that you can plot the chart.



12. Now press PLOT CHART. (This label appears on the same chart preparation form you saw in step 10.)

13. Press PLOTTER FINAL to plot your chart with all of the specified colors and hatches. You can first press CRT FINAL if you want to preview the hatches that you specified. Then you can plot the chart.) Alternatively, press PRINT/STR GRAF to print or store a graphics image of your chart. If you've chosen PRINT/STR GRAF, skip to step 17.

    After selecting PLOTTER FINAL, press PAPER or TRANSPARENCY, depending upon your choice of medium. If you are plotting with an HP 9872 Plotter, you may choose between size "A" paper (210 mm by 297 mm or 8½ in. by 11 in.) or size "B" paper (297 mm by 420 mm or 11 in. by 17 in.).



14. You will be prompted with different messages directing you when to insert pens depending upon how many pen stalls your plotter has. The prompts shown here are for the HP 7470 Graphics Plotter. In response to the first prompt, insert black and red pens in stalls 1 and 2. Be sure to use the correct type of pen for your choice of medium. Then press (CONT) to start plotting. While the chart is being plotted, the only label you will see is STOP PLOT. Do not press this key unless you do not want to plot this chart or you accidentally inserted the wrong pens and want to be able to start over (with step 13).

```
        PREPARE YOUR PLOTTER WITH PAPER
INSERT PEN NUMBER 1   BLACK    IN STALL  1.
INSERT PEN NUMBER 2   RED      IN STALL  2.
          PRESS [CONT] WHEN READY
```

15. Respond to the second prompt by inserting a blue pen in stall 3 and a green pen in stall 4. Then press (CONT) to continue plotting.

```
INSERT PEN NUMBER 3   BLUE     IN STALL  1.
INSERT PEN NUMBER 4   GREEN    IN STALL  2.
          PRESS [CONT] WHEN READY
```

16. When the plot has finished, the chart preparation form which offers different plotting functions will be displayed. Press PRINT/STR GRAF if you wish to print or store a graphics image of your chart and skip to step 17. Otherwise, press EXIT. The chart preparation form that offers the PLOT CHART option will be displayed. Press EXIT again and skip to step 19.

17. If you've selected PRINT/STR GRAF, the pac responds with the following form, unless this form was previously filled out.

```
GRAPHICS PRINTER TYPE

     HP 82905A
--> HP 82905B
     HP STANDARD
          e.g. 2631G, 2671G, 2673G

PRESS KEY k1,k2 OR k3 TO SELECT WHICH PRINTER YOU WILL USE.  THEN PRESS ACCEPT.

CAUTION: THE WRONG PRINTER TYPE WILL GENERATE
THE WRONG OUTPUT AND MAY CAUSE YOU TO LOSE DATA.

1 82905A  2 82905B  3 STANDARD        5 ACCEPT        7 EXIT
```

Press 82905A, 82905B, or STANDARD to select the type of graphics printer to be used. If you choose to store a GRAF file of the chart and print it at a later time, you must select the graphics printer type at this time. The GRAF file is created according to one of these three graphics printer formats. After selecting the correct graphics printer, press k5, ACCEPT.

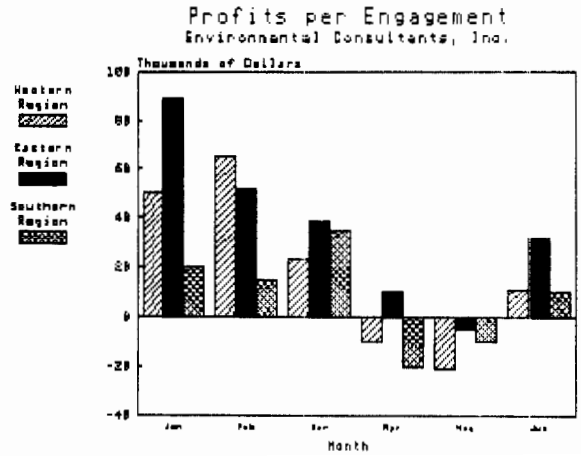
18. Next the pac will draw an image of your chart on the graphics display. The chart will be a distorted version of the original. However, the printed version will closely approximate the original, providing it is printed on the printer type selected in step 17. Then the following set of keys appears:

```
PRESS TOGGLE KEY TO SWITCH FROM THIS FORM TO THE PICTURE AND BACK.

1 TOGGLE        3 PRINT        5 STORE        7 EXIT
```

Press k1, TOGGLE once, and then again to shift between the special function key labels and the graphics display.

Press PRINT and then (CONT) to print the chart on the system printer.

Note: The PRINT function may be used only if you chose to print output in the second system configuration form (refer to section 2). The printer address must match the printer address in the system configuration form and the printer type must match the type specified in step 17.



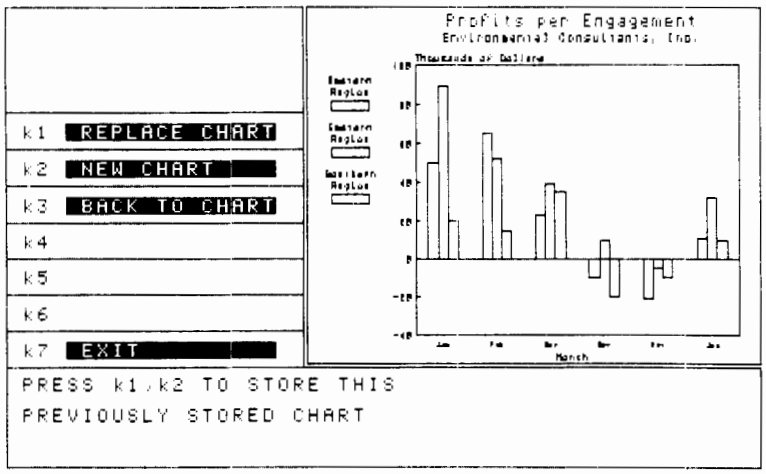
Press STORE to create a GRAF file of the chart. The GRAF file can later be recalled (using the BASIC GLOAD statement) and printed on the printer type selected in step 17. It is not necessary to have a system printer connected at this time to create the chart GRAF file. Upon selecting STORE, the pac responds with a form requesting the GRAF FILE NAME and GRAF DISC NAME. Enter PRO B1 GRF or another suitable file name and press (END LINE). You should not use a file name that already exists on the storage disc. Then enter the volume label of the disc you want to use for storage followed by (END LINE). Enter Y (END LINE) when the next prompt appears if all the information is correct.

```
GRAF FILE NAME   PRO B1 GRF
GRAF DISC NAME       CHARTS
```

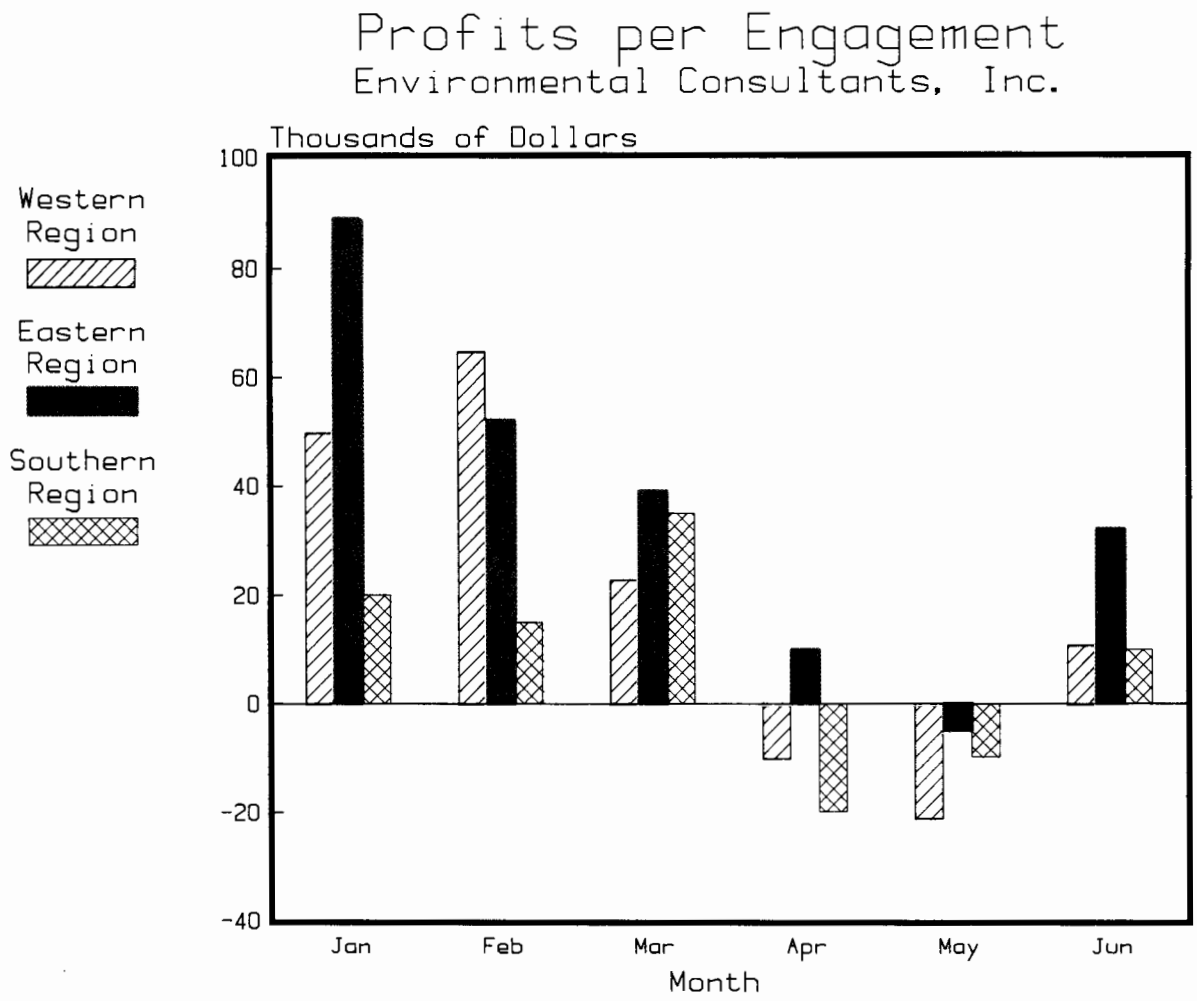
```
                                        7 EXIT
```

Upon completing the print or store operation, the pac returns the TOGGLE, PRINT, STORE, and EXIT keys. Press EXIT; the pac displays the form that offers the different plotting options. Press EXIT again. The chart preparation form containing PLOT CHART will be displayed. Press EXIT again.

19. When you are asked whether you want to store this chart, press EXIT. (You have already stored the chart, and you made no changes to it, so you do not need to press REPLACE CHART or NEW CHART. If you press BACK TO CHART, you will return to the chart preparation form you saw in step 10.)



20. Now you are finished, and you are back in the chart preparation form which you started with in step 2. You can now press EXIT PAC to end your session with the pac, or you can go on to any of the other create chart or edit chart examples in sections 3 and 4.



Line Charts

Line charts are useful for analyzing trends. Because of this, line charts usually show how an item (for example, sales dollars, number of products) has changed over time. However, line charts can also show distribution, such as the number of employees who earn certain salaries. In addition, line charts are useful for comparing trends. For example, you might want to compare the number of employees who earned certain salaries for three one-year time periods; each line would represent a different year. Another typical comparison might be projected expenses versus actual expenses.

Each line is prepared by connecting several individual data points. Usually time is plotted along the x-axis, and the other variable (for example, sales dollars, number of products) is plotted along the y-axis. The data points are determined when you enter x- and y-axis values for each tick mark (point or label) along the x-axis. Data points can include negative x- and y-axis values. Tick marks can be labeled with an x-axis label, or they can be left unlabeled.

With this pac, you can prepare two types of line charts. The first is the single line chart. This is a chart which consists of one line with up to 24 points. The second chart is a multiple line chart. This chart can consist of up to six lines with up to 24 points per line. Each line is identified by a legend which consists of one or two phrases along with the color and line type used to differentiate the line. The legends are plotted to the left of the line chart. Therefore the actual chart area of a multiple line chart is smaller than that of a single line chart.

With multiple line charts, the different lines can end at different tick marks. This is useful if you are showing a projected trend and the actual trend to date; the projected trend might extend beyond the actual trend, requiring more data points. You can also use the multiple line chart forms to prepare a chart with one line. This is the same as a single line chart, except that it will be plotted in a slightly smaller area. This is useful if you are also preparing a multiple line chart, or a clustered or stacked bar chart, and want the plotting areas to be the same size to facilitate comparisons between charts. Sometimes information can be distorted when you try to compare charts that are drawn with different sizes of plotting areas. All line charts are plotted with a horizontal orientation on the paper or transparency film.

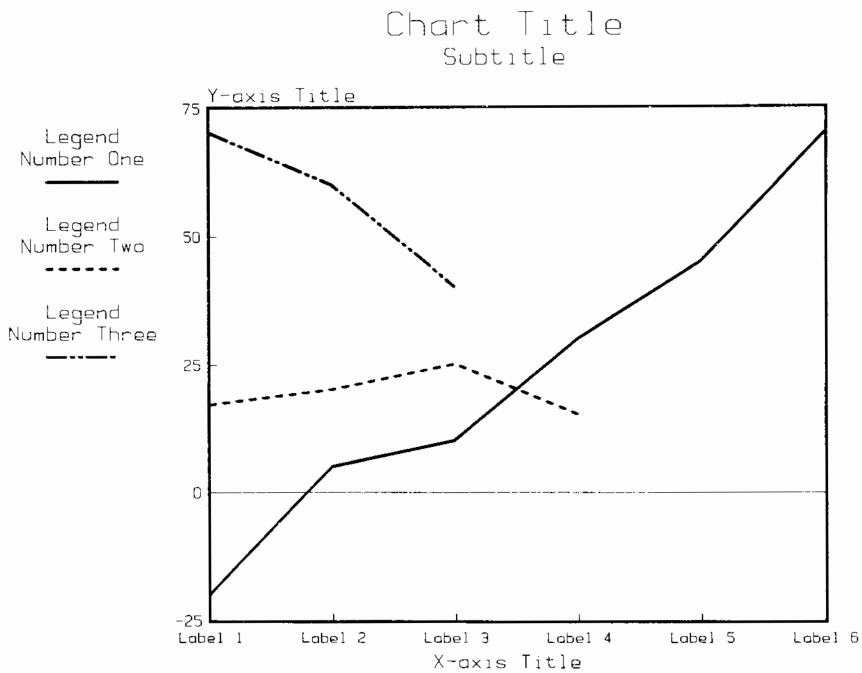
The following paragraphs provide hints on organizing the information that the pac will require in order to create single or multiple line charts. These hints are discussed in terms of the specific features of this pac. If you would like some information about graphics design (for example, choosing line types or pen colors), refer to appendix B.

Following the section on organizing line chart data, there are step-by-step procedures for creating a sample multiple line chart. You might want to regard the section on organizing data as a reference for preparing your own charts, and skip it for now to practice with the example procedures.

Organizing Line Chart Data

The pac uses six different data entry forms for preparing line charts. The first form requests information which determines the type of line chart you are preparing, along with chart and axis titles and whether you will scale or label the x-axis. If you decide to scale the x-axis, you will then fill out the second form with the y-axis and x-axis scale and increment values. If you decide to label the x-axis, you will instead fill out the third form with the y-axis scale and increment values. Then, if you are preparing a single line chart, you will fill out the fourth form, which requests the data for the x-axis values/labels and the y-axis values of the points along each line. The entry fields of each form are described sequentially in the following paragraphs. In addition, the example below illustrated how the information you enter will be plotted on multiple line charts. To prepare your data for entry, refer to the forms appropriate for your line chart type, and list your data in the order shown. Your data entry through the pac will then be more efficient.

addition, the example below illustrates how the information you enter will be plotted on multiple line charts. To prepare your data for entry, refer to the forms appropriate for your line chart type, and list your data in the order shown. Your data entry through the pac will then be more efficient.



When you press LINE CHART , the form shown below is the first data entry form you will see. If you selected the chart storage option, the first field will already be filled in with the chart name; if you selected the no storage option, this field will be blank. The cursor will be flashing in the LIST DATA ON ENTRY field.

```
CHART NAME:            LINE CHART        LIST DATA ON ENTRY? (Y/N)

TYPE OF LINE CHART:  S = SINGLE LINE
                     M = MULTIPLE LINES (max. 6)

CHART TITLE:

CHART SUBTITLE:

X-AXIS TITLE:

Y-AXIS TITLE:

SCALE OR LABEL X-AXIS? (S/L)

1 CLR FORM                                                7 EXIT
```

Line Chart Form 1 (All Line Charts)

LIST DATA ON ENTRY. If you enter Y, line chart data will be listed on the system printer each time forms 4 and 6 have been filled out. If you enter N, you will only be able to list your data with the LIST DATA key.

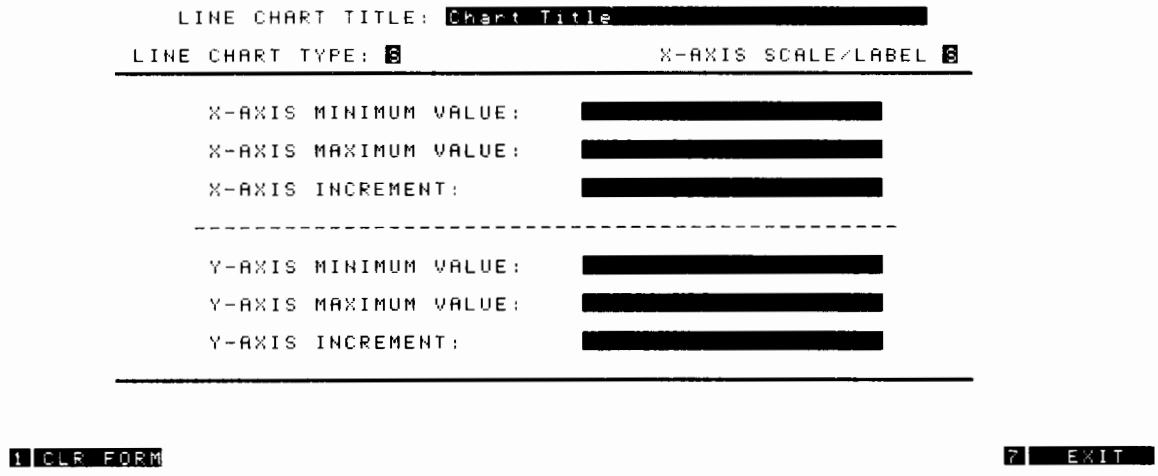
TYPE OF LINE CHART. Enter S or M, depending upon whether you want to prepare a single or multiple line chart.

CHART TITLE and CHART SUBTITLE. The chart title and subtitle are always plotted using pen number 1 (black). If you do not want your title and subtitle to be black, substitute another pen on the plotter for pen number 1 when you plot the chart. You can leave the title and subtitle fields blank.

X-AXIS TITLE and Y-AXIS TITLE. Like the title and subtitle, the x- and y-axis titles are always plotted using pen number 1. You can leave these fields blank.

SCALE OR LABEL X-AXIS. Enter S to scale the x-axis, or L to label the x-axis. If you choose to scale the x-axis, the pac will automatically provide default values for the X-AXIS VALUE/LABEL fields in form 4 or 6, using the minimum/maximum and increment values which you specify in form 2. If you choose to label the x-axis, you will enter the labels for each tick mark when you fill out form 4 or 6. The advantages of labeling the x-axis are that you can enter alphanumeric labels and you do not have to label every tick mark. The advantage of scaling the x-axis is that your x-axis values need not correspond to x-axis tick marks.

If you have told the pac to *scale* the x-axis, the form shown below will be displayed on the CRT after the pac has accepted the first form. The LINE CHART TITLE, LINE CHART TYPE, and X-AXIS SCALE/LABEL fields will already be filled in. The cursor will be flashing in the X-AXIS MINIMUM VALUE field.



Line Chart Form 2 (Any Line Chart With Scaled X-axis)

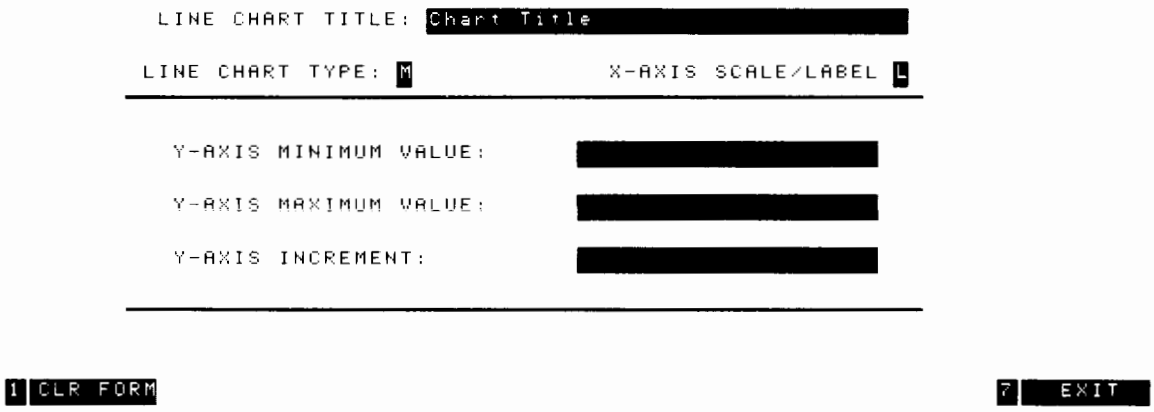
X-AXIS MINIMUM and MAXIMUM VALUES. The x-axis minimum value is the number which will be on the left side of the x-axis, whereas the maximum value will be on the right side of the x-axis. Both the minimum and the maximum values can be negative numbers.

X-AXIS INCREMENT. An increment determines the number of units between the labels which are drawn along the x-axis to show the scale. If you choose an increment of 1, the pac automatically labels every unit between the minimum and maximum with a tick mark and the proper value for that tick mark. The increments must be positive numbers.

Y-AXIS MINIMUM and Y-AXIS MAXIMUM VALUES. The y-axis minimum value is the number which will be on the low end of the y-axis, whereas the maximum value will be on the upper end of the y-axis. Both the minimum and maximum values can be negative numbers.

Y-AXIS INCREMENT. Refer to the description of the x-axis increment.

If you have chosen to *label* the x-axis, the form shown below will be displayed on the CRT after the pac has accepted the first form. The LINE CHART TITLE, LINE CHART TYPE, and X-AXIS SCALE/LABEL fields will already be filled in. The cursor will be flashing in the Y-AXIS MINIMUM VALUE field.

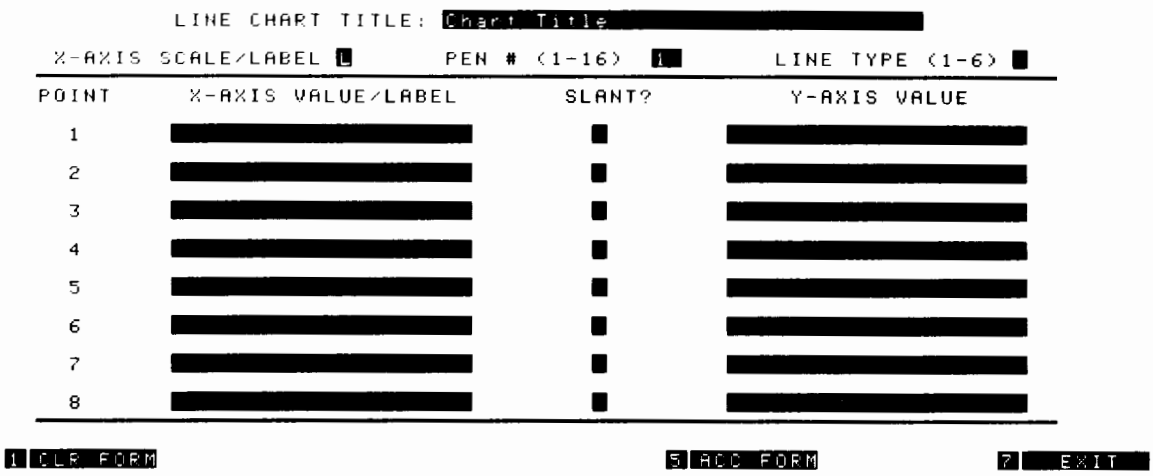


Line Chart Form 3 (Any Line Chart With Labeled X-axis)

Y-AXIS MINIMUM and Y-AXIS MAXIMUM VALUES. Refer to the description of these fields under form 2.

Y-AXIS INCREMENT. Refer to the description of this field under form 2.

If you are preparing a single line chart, the form below will be displayed on the CRT after the pac has accepted form 1 and either form 2 (scaled x-axis) or form 3 (labeled x-axis). The LINE CHART TITLE and the X-AXIS SCALE/LABEL fields will already be filled in. The cursor will be flashing in the PEN # field.



Line Chart Form 4 (All Single Line Charts)

PEN #. Enter a number from 1 to 16 to specify a pen number for the line. Pen number 1 is the default.

LINE TYPE. Enter a number from 1 to 6 to specify a line type. Line type 1 is the default.

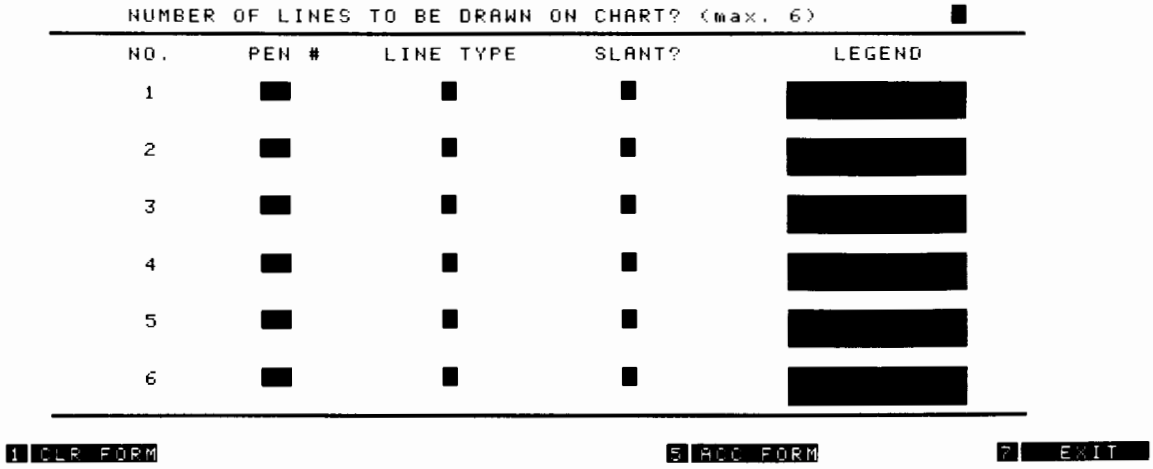
POINT. Point is not an entry field, but it does indicate the number of points for which you have entered values. This form will appear up to three times, depending upon how many points you have: once for points 1-8, once for points 9-16, and once for points 17-24. When you have filled out the form for points 1-8 and 9-16, the pac will ask if you want to enter more information.

X-AXIS VALUE/LABEL. If you told the pac to scale the x-axis, the pac will automatically calculate and fill in the default values as you tab through the form. (Of course, you may enter any x-axis values to meet your needs.) If you chose to label the x-axis, you can enter alphanumeric labels; you can also leave any of the x-axis label fields blank. All x-axis labels are plotted using pen number 1. Usually the labels are plotted horizontally directly below each tick mark. However, if there are several long labels which might overlap each other on a labeled line chart, the pac automatically rotates the labels. Depending upon how long the labels are, they might still overlap with the x-axis title. If this happens, use the editing functions either to change the x-axis values and increments if you specified a scaled x-axis, or to enter shorter labels if you specified a labeled x-axis.

SLANT. The default for this field is N. If your x-axis is labeled, enter Y or N for each label to specify that the label will be slanted or not slanted on the plot. If your x-axis is scaled, the labels will always be plotted upright.

Y-AXIS VALUE. Enter the y-axis values for each point. The values can be any positive or negative numbers or * to represent a null data point. The * generates an empty spot or broken line at the corresponding X-AXIS VALUE. If any value exceeds the maximum or the minimum values previously specified for the y-axis, the line will still be plotted, but only the portion within the minimum/maximum limits will show. You can enter data for fewer points than are labeled. However, you must enter the data for the first consecutive points; only trailing points can be left blank.

If you are preparing a multiple line chart, the form shown below will be displayed on the CRT after the pac has accepted form 1 and either form 2 (scaled x-axis) or form 3 (labeled x-axis). The cursor will be flashing in the first field.



Line Chart Form 5 (All Multiple Line Charts)

NUMBER OF LINES. Enter the number of lines for which you will be entering data. You can enter from 1 to 6 lines.

NO.. This is not an entry field. Instead, it indicates the line for which you are entering legend information.

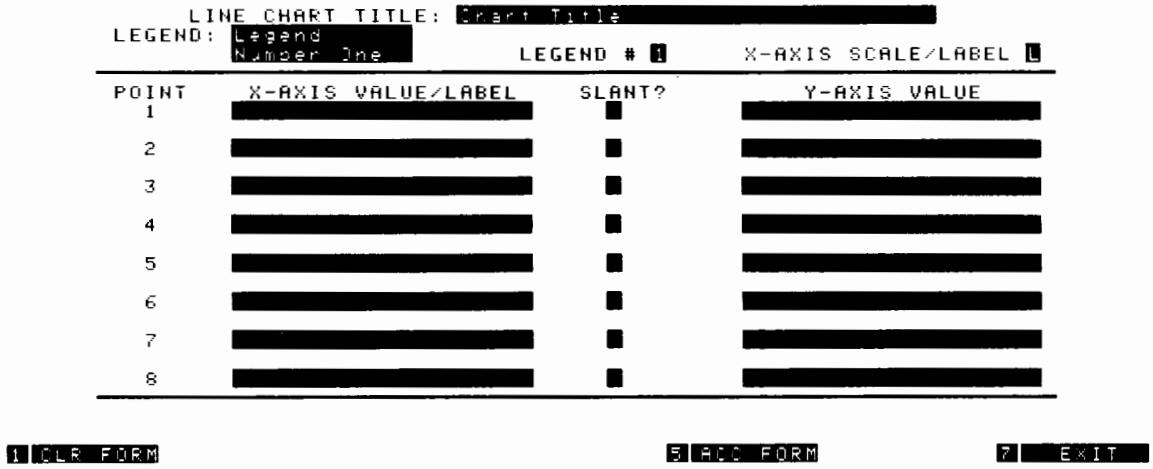
PEN #. Enter a number from 1 to 16 to specify a pen number for each line. Pen number 1 is the default.

LINE TYPE. Enter a number from 1 to 6 to specify a line type for each line. Line type 1 is the default.

SLANT. Enter Y or N for each legend to specify that the legend be slanted or not slanted. The default is N.

LEGEND. The legends are the phrases which identify each line. When plotted, the legend is centered automatically above the line type associated with it. You can enter two phrases for the legend, one phrase per field; either or both fields can be left blank. If both fields are left blank, no legend or line type is plotted to the left of the chart for that line.

If you are preparing a multiple line chart, the form shown below will be displayed on the CRT after you have filled out form 5. The LINE CHART TITLE, LEGEND, LEGEND #, and X-AXIS SCALE/LABEL fields will already be filled in. The cursor will be flashing in the first X-AXIS VALUE/LABEL field. You will fill out this form separately for each legend previously specified.



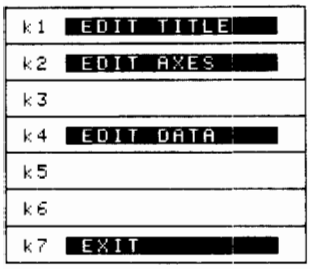
Line Chart Form 6 (All Multiple Line Charts)

POINT. Refer to the description of this field under form 4. Each line can have a different number of points, but values must be entered for the first points; only the last points of each line can be left blank. If you have more points on any subsequent lines than you have on the first line, simply enter the additional information in form 6. If you have fewer points on any subsequent lines than you have on the previous line, press ACC FORM right after you have entered the y-axis value for the last point on your line; any information which was already automatically filled into any fields following the position of the cursor will not be accepted.

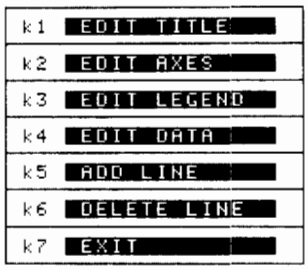
X-AXIS VALUE/LABEL and SLANT. Refer to the descriptions of these fields under form 4. The only difference is that for the second through sixth legends, these fields will be filled in automatically. You can change any of the values or labels; the changes then become the new values or labels for plotting the chart. You can add values or labels for any subsequent lines. If an x-axis value extends beyond the x-axis minimum or maximum value, only the portion of the line within the x scale will be plotted.

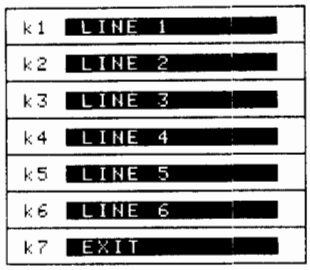
Y-AXIS VALUE. Refer to the description for this field under form 4. The only difference is that you enter y-axis values for the points of each line separately.

Once you have entered all of the data, the line chart will be drawn on the CRT in a chart preparation form. After the chart has been drawn, you can edit, store, or plot the chart. These operations are described in section 4 and in the individual special function key definitions in appendix C. The sets of special function key labels unique to line charts are shown below.



Single Line Charts





Multiple Line Charts

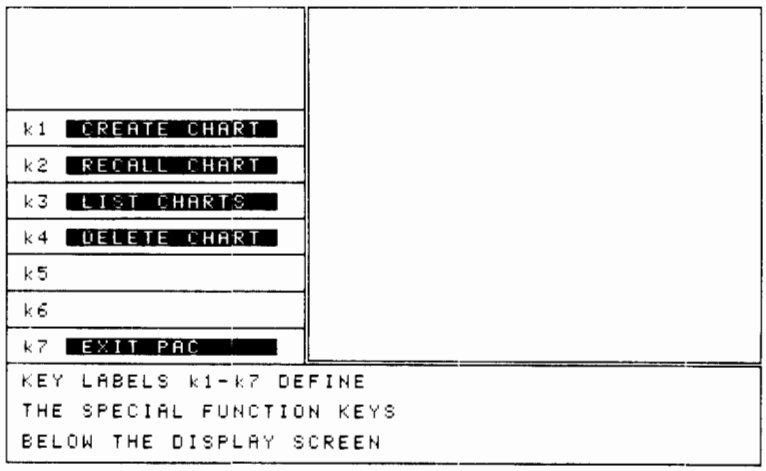
Creating a Line Chart

In the following step-by-step procedures, you will create, store, and plot a multiple line chart which shows the hypothetical work force of a consulting firm project.

1. Follow the procedures for loading the pac and filling out the configuration forms listed under Running the Pac in section 2. Be sure to specify that you will be storing and plotting charts in this session, and use the chart storage disc supplied with the pac. If you have a printer, specify that you will be printing data in this session.

2. Press CREATE CHART .

   (If you prefer to recall the prestored chart, press RECALL CHART instead. Then enter LINE CHART for the chart name, insert GP Pac Disc 2 when prompted, and skip to step 12 to plot the chart.)



3. Enter WORK L 1 for the chart name. (If you want to store edited versions of this chart, you might want to use the same name with consecutively higher suffix numbers, for example, WORK L 2.)

```
CHART NAME:  WORK L 1
```

4. Press LINE CHART . When prompted, insert GP Pac Disc 2.

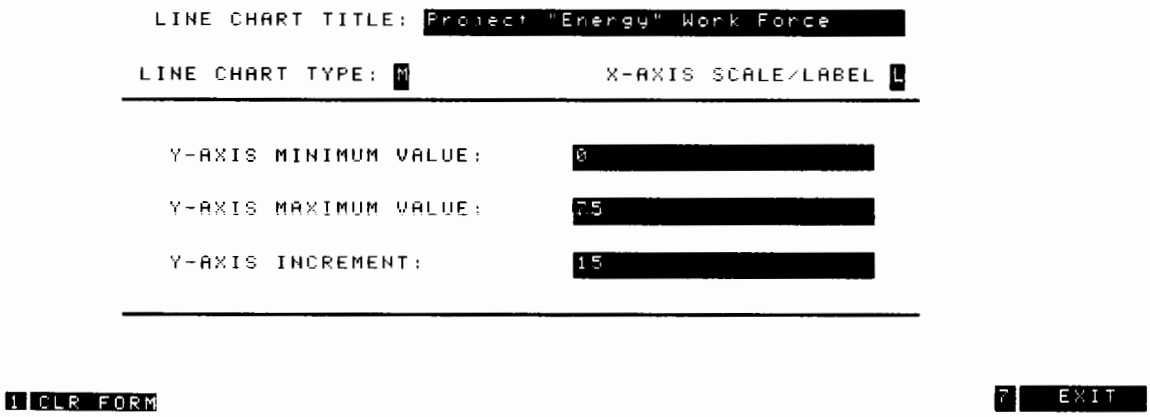
```
k1 TEXT & DRAW
k2 PIE CHART
k3 BAR CHART
k4 LINE CHART
k5
k6
k7 EXIT
SELECT A KEY: k1-k7
```

5. Now fill out the first data entry form with the values shown here:

```
CHART NAME:          WORK L 1          LIST DATA ON ENTRY? (Y/N) N

TYPE OF LINE CHART:  S = SINGLE LINE                            M
                     M = MULTIPLE LINES (max. 6)

CHART TITLE:         Project "Energy" Work Force
CHART SUBTITLE:      Environmental Consultants, Inc.
X-AXIS TITLE:        Two Years, by Fiscal Quarter
Y-AXIS TITLE:        Number of Employees
SCALE OR LABEL X-AXIS? (S/L)                                    L

1 CLR FORM                                                  7 EXIT
```

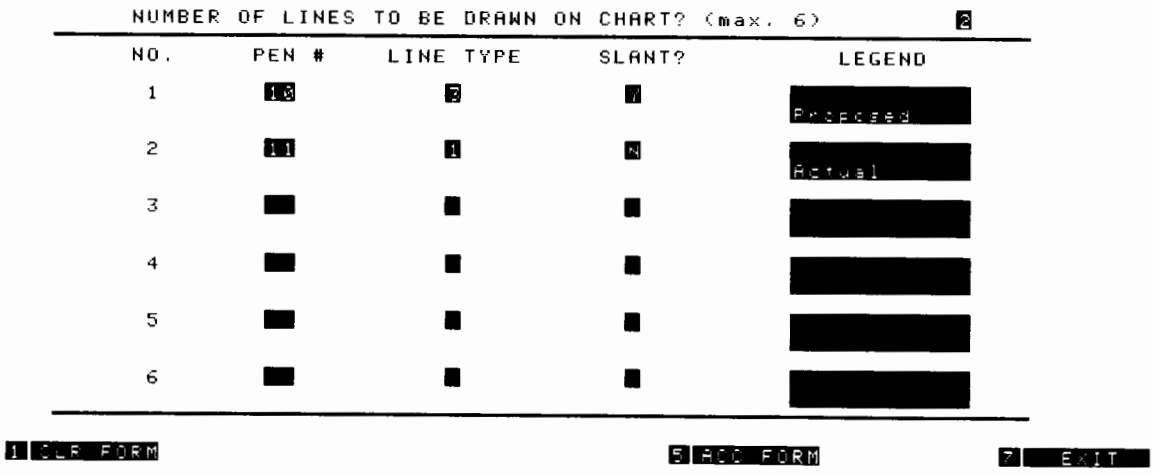
When you are asked if all of the information is correct, enter Y. (Of course, if you have made a mistake anywhere, you can enter N and then tab through the form to correct your errors.)

6. Next fill out the data entry form with the values shown here for scaling the y-axis:



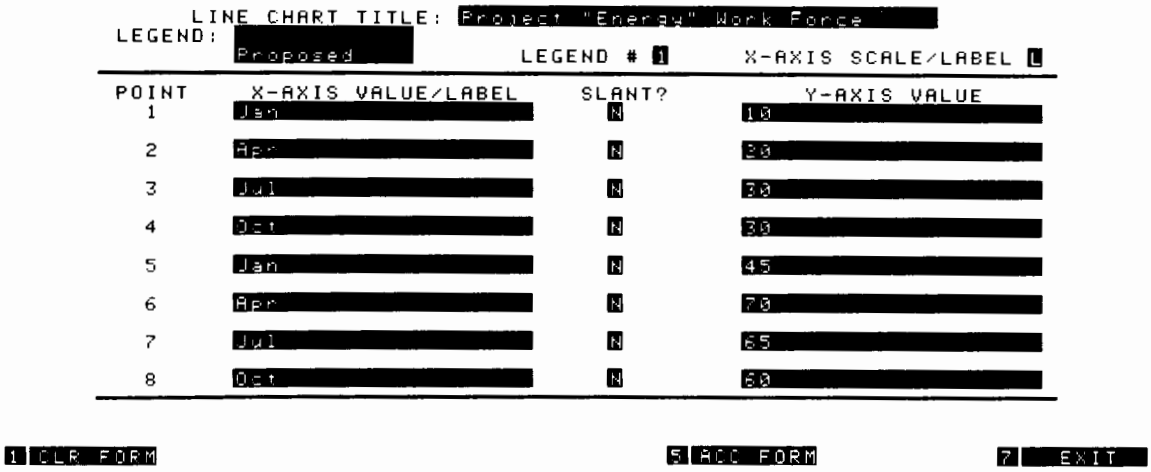
When you are asked if all of the information is correct, enter 'Y'.

7. Fill out the next data entry form with the values shown here for the number of lines to be drawn on the chart:



When you are asked if all of the information is correct, enter 'Y'.

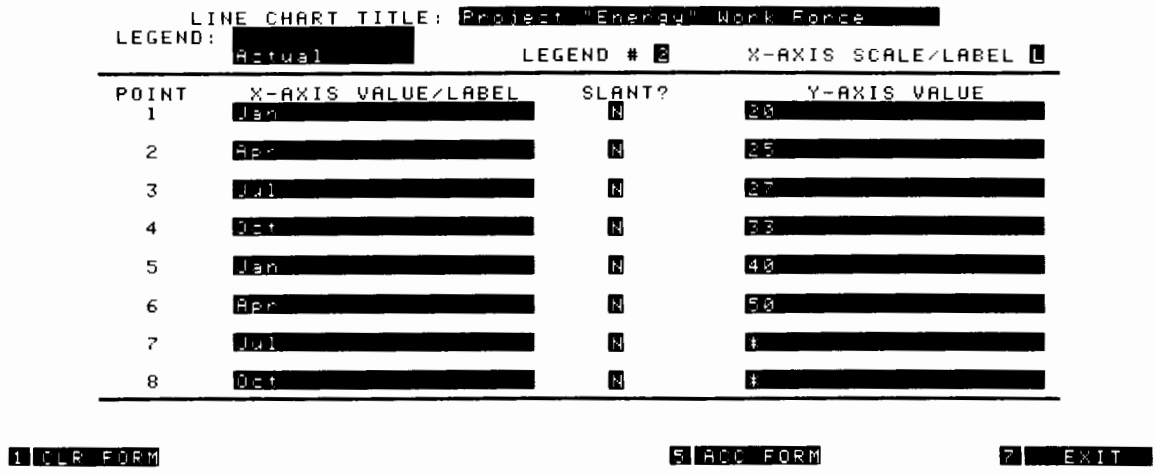
8. Fill out the next data entry form with the values shown here for the first legend:



When you are asked if all of the information is correct, enter Y.

The printer will output a list of the data that you have just entered. When you are asked if you want to enter more information, enter N.

9. Now fill out the data entry form with the values shown here for the second legend. (All of the x-axis label and slant data which were entered for the first legend appear in the appropriate fields. Simply tab through the form to enter the new values.) When you have entered the y-axis value for point 6, press ACC FORM to indicate that you have finished entering the data for the second legend.



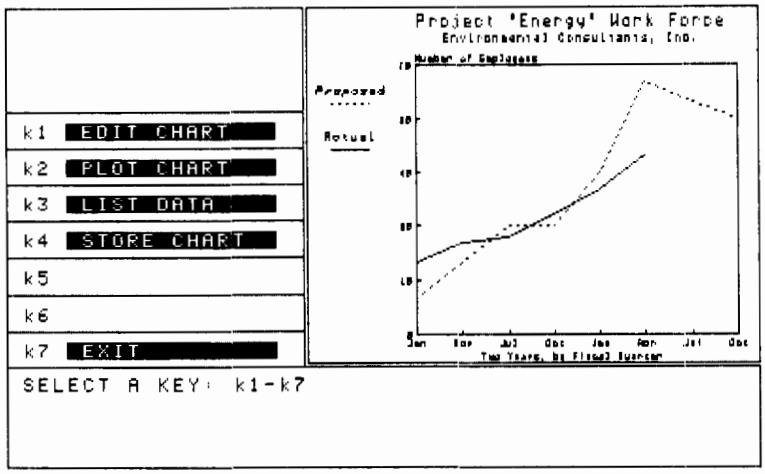
The asterisk (*) indicates no data is available for points 7 and 8.

When you are asked if all of the information is correct, enter Y.

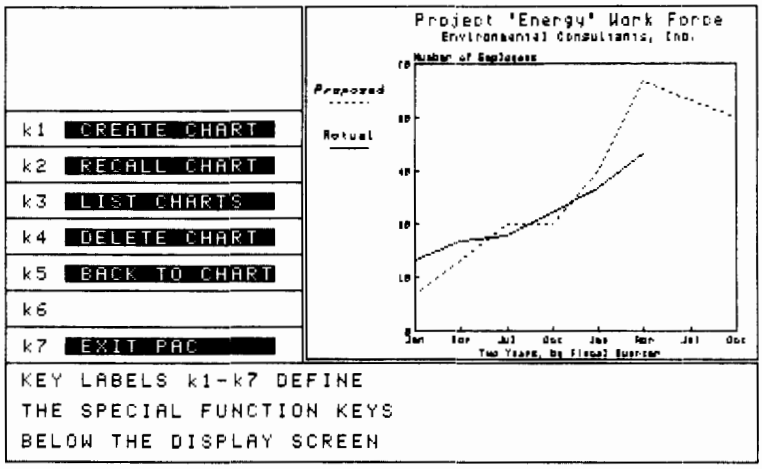
The printer will output a list of the data that you have just entered.

10. Now the line chart will be drawn on a chart preparation form. The only special function key with a label will be STOP PLOT. Do not press this key for now; in the editing procedures for a bar chart in section 4 you will learn when it is useful to press this key.

    When the chart has been drawn, the set of special function keys shown here will appear. Press STORE CHART.



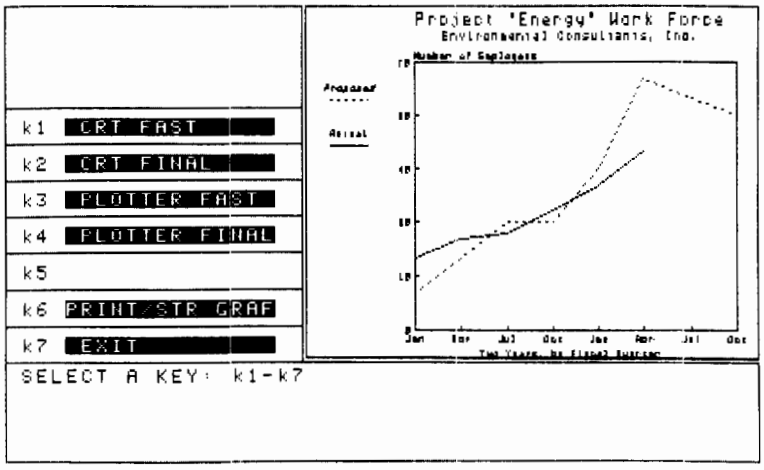
11. After the chart has been stored, press BACK TO CHART so that you can plot the chart.



12. Now press PLOT CHART. (This label appears on the same chart preparation form you saw in step 10.)

13. Press PLOTTER FINAL to plot your chart with all of the specified style choices. Or press PRINT/STR GRAF to print or store a graphics image of your chart. If you've chosen PRINT/STR GRAF, skip to step 18.

    After selecting PLOTTER FINAL, press PAPER or



TRANSPARENCY, depending upon your choice of medium. If you are plotting with an HP 9872 Plotter, you may choose between size "A" paper (210 mm by 297 mm or 8½ in. by 11 in.) or size "B" paper (297 mm by 420 mm or 11 in. by 17 in.).

14. You may be prompted with different messages directing you when to insert pens depending upon how many stalls your plotter has. The prompts shown here are for the HP 7470 Graphics Plotter. In response to the first prompt, insert black and red pens in stalls 1 and 2. Be sure to use the correct type of pen for your choice of medium. Then press (CONT) to start plotting. While the chart is being plotted, the only label you will see is STOP PLOT. Do not press this key unless you do not want to plot this chart or you accidentally inserted the wrong pens and want to be able to start over (with step 13).

```
        PREPARE YOUR PLOTTER WITH PAPER
INSERT PEN NUMBER 1   BLACK    IN STALL  1.
INSERT PEN NUMBER 2   RED      IN STALL  2.
          PRESS [CONT] WHEN READY
```

15. Respond to the second prompt by inserting a wide red pen in stall 2. (You do not need to insert pen number 9 since you did not use it in this chart.) Then press (CONT) to continue plotting.

```
INSERT PEN NUMBER 9   9        IN STALL  1.
INSERT PEN NUMBER 10  10       IN STALL  2.
          PRESS [CONT] WHEN READY
```

16. Respond to the third prompt by inserting a wide blue pen in stall 1. (You do not need to insert pen number 12 since you did not use it in this chart.) Then press CONT to continue plotting.

```
INSERT PEN NUMBER 11   11          IN STALL  1.
INSERT PEN NUMBER 12   12          IN STALL  2.
          PRESS [CONT] WHEN READY
```

17. When the plot has finished, the chart preparation form which offers different plotting functions will be displayed. Press PRINT/STR GRAF if you wish to print or store a graphics image of your chart and skip to step 18. Otherwise, press EXIT. The chart preparation form that offers the PLOT CHART option will be displayed. Press EXIT again and skip to step 20.

18. If you've selected PRINT/STR GRAF, the pac responds with the following form, unless this form was previously filled out.

```
                GRAPHICS PRINTER TYPE

                    HP 82905A
                --> HP 82905B
                    HP STANDARD
                         e.g. 2631G, 2671G, 2673G

PRESS KEY k1,k2 OR k3 TO SELECT WHICH PRINTER YOU WILL USE.  THEN PRESS ACCEPT.

CAUTION: THE WRONG PRINTER TYPE WILL GENERATE
THE WRONG OUTPUT AND MAY CAUSE YOU TO LOSE DATA.

1 82905A  2 82905B  3 STANDARD          5 ACCEPT          7 EXIT
```

Press 82905A, 82905B, or STANDARD to select the type of graphics printer to be used. If you choose to store a GRAF file of the chart and print it at a later time, you must select the graphics printer type at this time. The GRAF file is created according to one of these three graphics printer formats. After selecting the correct graphics printer, press k5, ACCEPT.

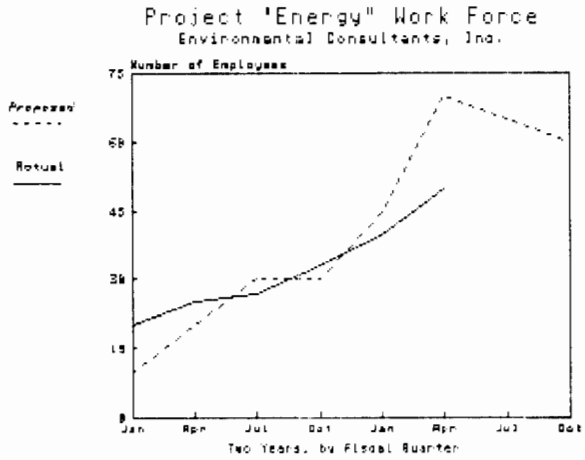
19. Next the pac will draw an image of your chart on the graphics display. The chart will be a distorted version of the original. However, the printed version will closely approximate the original, providing it is printed on the printer type selected in step 18. Then the following set of keys appears:

```
PRESS TOGGLE KEY TO SWITCH FROM THIS FORM TO THE PICTURE AND BACK.

1 TOGGLE          3 PRINT          5 STORE          7 EXIT
```

Press k1, TOGGLE once, and then again to shift between the special function key labels and the graphics display.

Press PRINT and then (CONT) to print the chart on the system printer.

Note: The PRINT function may be used only if you chose to print output in the second system configuration form (refer to section 2). The printer address must match the printer address in the system configuration form and the printer type must match the type specified in step 18.



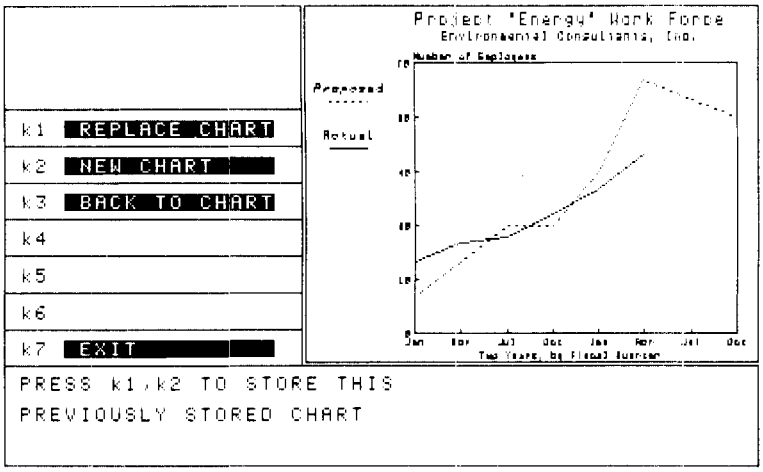
Press STORE to create a GRAF file of the chart. The GRAF file can later be recalled (using the BASIC GLOAD statement) and printed on the printer type selected in step 18. It is not necessary to have a system printer connected at this time to create the chart GRAF file. Upon selecting STORE, the pac responds with a form requesting the GRAF FILE NAME and GRAF DISC NAME. Enter WRK L1 GRF or another suitable file name and press (END LINE). You should not use a file name that already exists on the storage disc. Then enter the volume label of the disc you want to use for storage followed by (END LINE). Enter Y (END LINE) when the next prompt appears if all the information is correct.

```
GRAF FILE NAME   WRK L1 GRF
GRAF DISC NAME       CHARTS
```

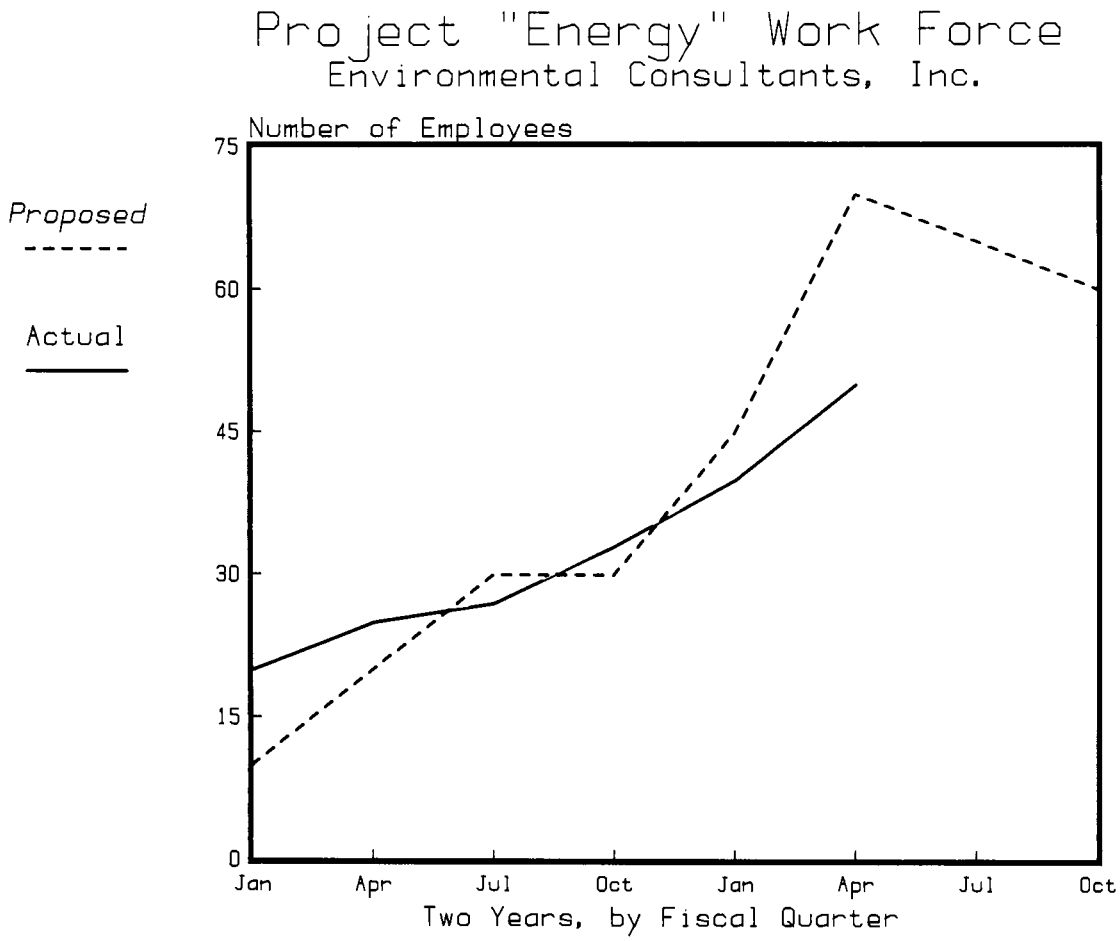
```
?  EXIT
```

Upon completing the print or store operation, the pac returns the TOGGLE, PRINT, STORE, and EXIT keys. Press EXIT; the pac displays the form that offers the different plotting options. Press EXIT again. The chart preparation form containing PLOT CHART will be displayed. Press EXIT again.

20. When you are asked whether you want to store this chart, press EXIT. (You have already stored the chart, and you made no changes to it, so you do not need to press REPLACE CHART or NEW CHART. If you press BACK TO CHART, you will return to the chart preparation form you saw in step 10.)



21. Now you are finished, and you are back in the chart preparation form which you started with in step 2. You can now press EXIT PAC to end your session with the pac, or you can go on to any of the other create chart or edit chart examples in sections 3 and 4.



Section 4

Editing Charts

In this section you will find example procedures for editing two of the charts shown in section 3, the text and draw chart and the clustered bar chart. These same charts are also already stored on the chart storage disc supplied with the pac. In order to follow the editing procedures in this section, you can either recall the prestored charts supplied with the pac or recall the chart you created in section 3.

Text and draw charts have several unique editing features which are presented in the first example procedures. Once you learn how to use the edit keys for bar charts using the second procedures in this section, you will be able to apply the techniques to pie and line charts. Therefore, only brief comments on editing pie and line charts are included.

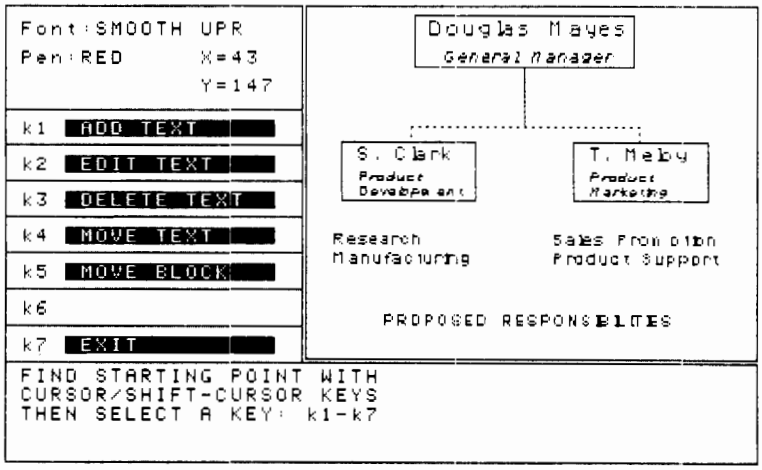
In general, the methods for editing are the same for all chart types. There is a special function key label associated with each data entry form which causes that form to be displayed so that you can tab through the form and correct errors, change data, or change design choices. For example, in pie, bar, and line charts EDIT TITLE accesses the first data entry form where the title was input. Any field within the form can be changed.

Editing a Text and Draw Chart

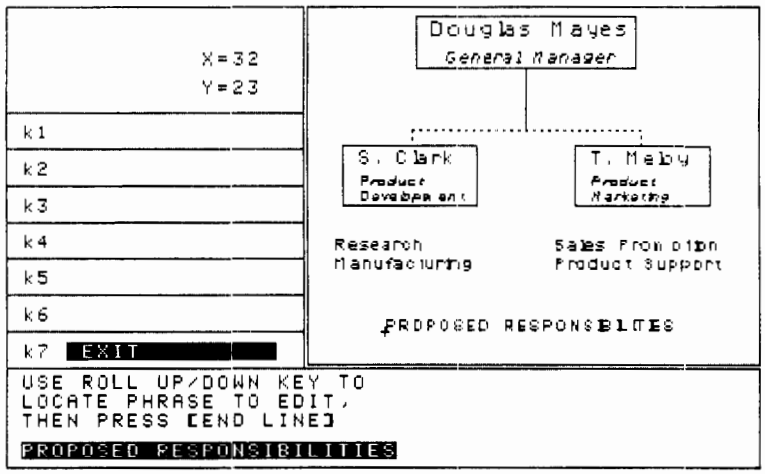
In the following step-by-step procedures, you will use many of the editing features of the pac to edit the organization chart created in section 3 (or the organization chart stored on the chart storage disc supplied with the pac). We will add the company name and logo to the bottom of the chart. To learn how editing functions not covered in these procedures operate, refer to the special function key definitions in appendix C.

1. If you are continuing this session after finishing any of the procedures in section 3, skip to step 2. If you are starting a new session with the pac, follow the procedures listed under Running the Pac in section 2 before proceeding to step 2. Be sure to specify that you will be storing and plotting charts in this session and use the chart storage disc supplied with the pac. If you have a printer, specify that you will be printing data in this session.
2. Press RECALL CHART .
3. If you have created this chart using the steps in section 3, enter ORG CH 1 for the chart name. If you simply want to recall the version of this chart which was already stored on the chart storage disc supplied with the pac, enter ORG CHART for the chart name.
4. After the chart has been drawn on the chart preparation form, press TEXT to access the text functions.
5. When asked if you want to print the text phrases as they are entered, press YES .

6. Press EDIT TEXT .

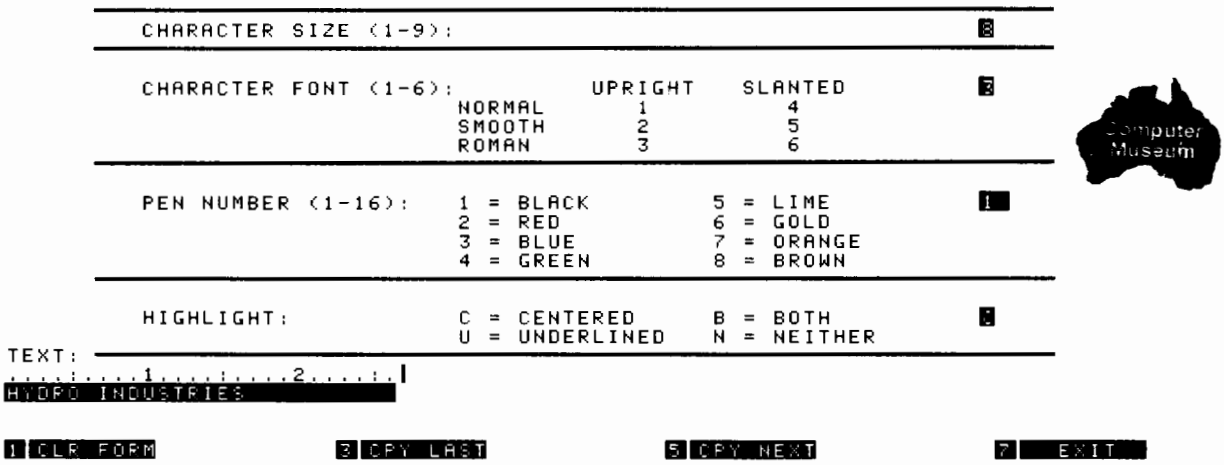


7. The graphics cursor will flash in the text phrase at the bottom of the chart. Press (END LINE) to select this phrase as the one to be edited.



8. The text data entry form with the design choices for the phrase PROPOSED RESPONSIBILITIES will be displayed. Press COPY NEXT to cause the data entry form with the design choices for the phrase Douglas Mayes to be displayed. We want all design choices except font to be the same as they were for Douglas Mayes. However, rather than trying to remember the size and pen number, we have simply accessed the form which was filled out for that phrase.

9. Now use this form to modify a design choice and enter a new phrase to replace PROPOSED RESPONSIBILITIES. First tab back to the CHARACTER FONT field and enter 3. Then tab to the TEXT field and enter HYDRO INDUSTRIES for the new text phrase. The new text phrase will be drawn on the chart preparation form to replace the old phrase.



10. Reposition the graphics cursor by pressing the down cursor key until you see X=34 Y=8 displayed in the upper left portion of the chart preparation form. Then press ADD TEXT .

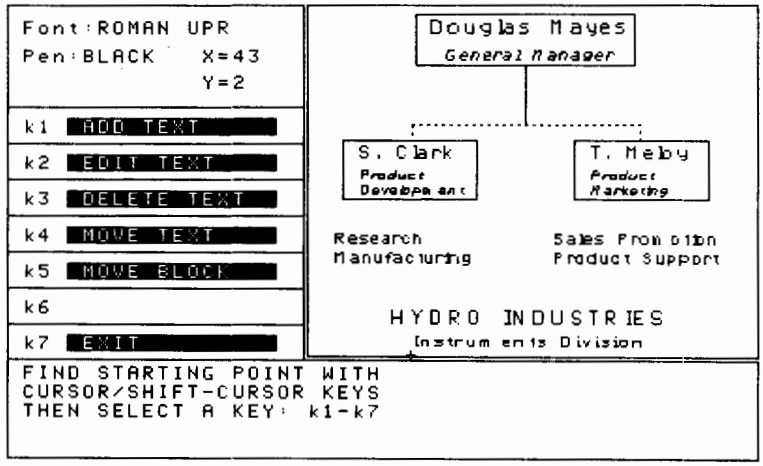
11. Fill out the data entry form as follows: First tab to the CHARACTER SIZE field and enter 6. Then tab to the TEXT field and enter Instruments Division. The phrase will then be drawn on the chart preparation form.

12. Now press MOVE BLOCK to move the company name away from the bottom of the chart.

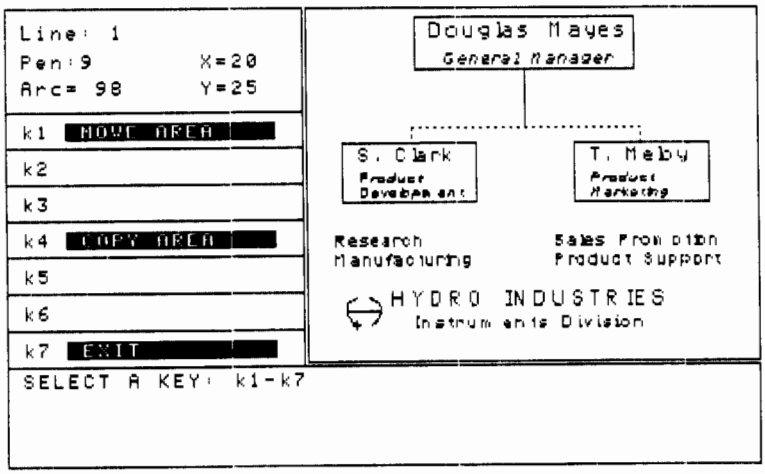
13. Determine the lower left corner of the block to be moved by pressing the left cursor key until X=28 Y=2. Press (END LINE).

14. Determine the upper right corner of the block to be moved by pressing the up and right cursor keys until X=48 Y=32. Press (END LINE).

15. Now the graphics cursor will flash again at the first lower left corner (X = 28 Y = 2). Determine the new lower left corner of the block to be moved by pressing the up cursor until X=28 Y=17. Press (END LINE). The two text phrases identified by the block will be erased and redrawn 15 dots above their old position.



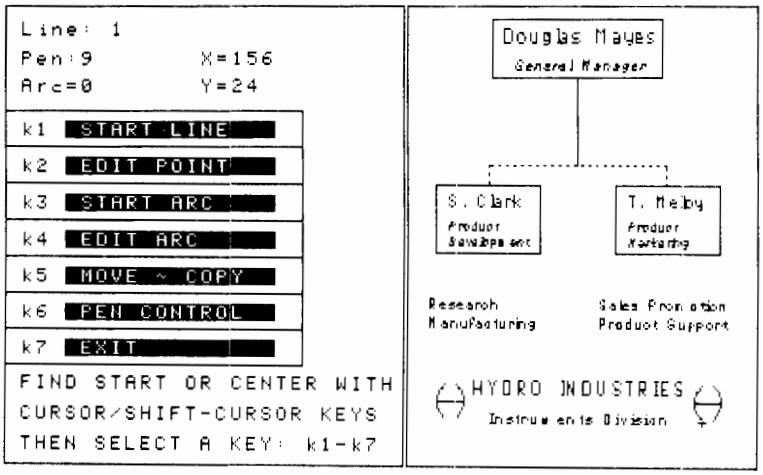
16. Now press EXIT, and then LINES & ARCS, to access the drawing functions to draw the company logo. (See the CRT screen in step 27.)
17. Change the pen to a wide black pen (pen number 9) by pressing PEN CONTROL, then (more), (more), and 9.
18. Reposition the graphics cursor by pressing the up and right cursor keys until X=30 Y=34 (remember that the graphics cursor will move one dot at a time if you press (SHIFT) together with a cursor key). Then press START LINE.
19. Press the left cursor key until X=16 Y=34. Press (END LINE).
20. Press the right cursor key until X=18 Y=34. This will be the center of the first arc. Press START ARC.
21. Determine the radius starting point of the arc by pressing the right and up cursor keys until X=26 Y=43. Press (END LINE).
22. Press (→) 10 times and (SHIFT) (←) 2 times, so that Arc=-98. Press (END LINE).
23. The graphics cursor will now be flashing at X=26 Y=25. Reposition the graphics cursor by pressing the up and right cursor keys until X=28 Y=34. This will be the center of the second arc. Press START ARC.
24. Determine the radius starting point of the arc by pressing the left and up cursor keys until X=20 Y=43. Press (END LINE).
25. Press (←) 10 times and (SHIFT) (→) 2 times, so that Arc=98. Press (END LINE).
26. Now press MOVE ~ COPY to copy the logo on the other side of the company name.
27. Press COPY AREA.



28. Determine the lower left corner of the area to be copied by pressing the left cursor key until X=10 Y=25. Press (END LINE).
29. Determine the upper right corner of the area to be copied by pressing the up and right cursor keys until X=35 Y=45. Press (END LINE).

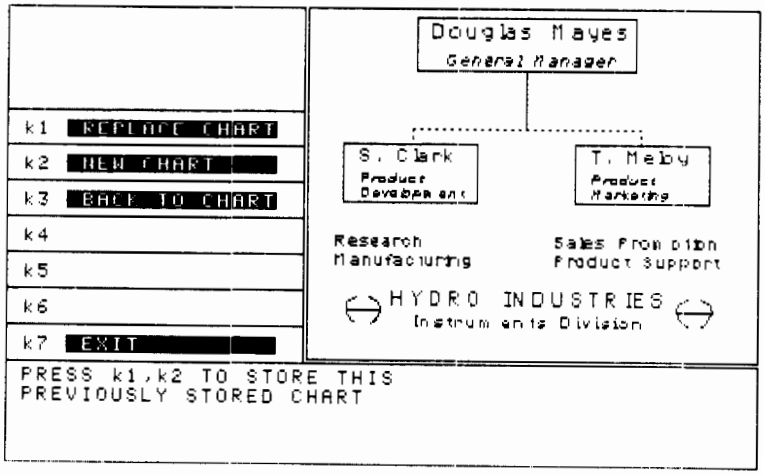
30. Now the graphics cursor will flash again at the first lower left corner (X=10 Y=25). Determine the new lower left corner of the area to be copied by pressing the right cursor key until X=146 Y=25. Press END LINE. The logo will now be drawn to the right of the company name.

31. Now press EXIT.



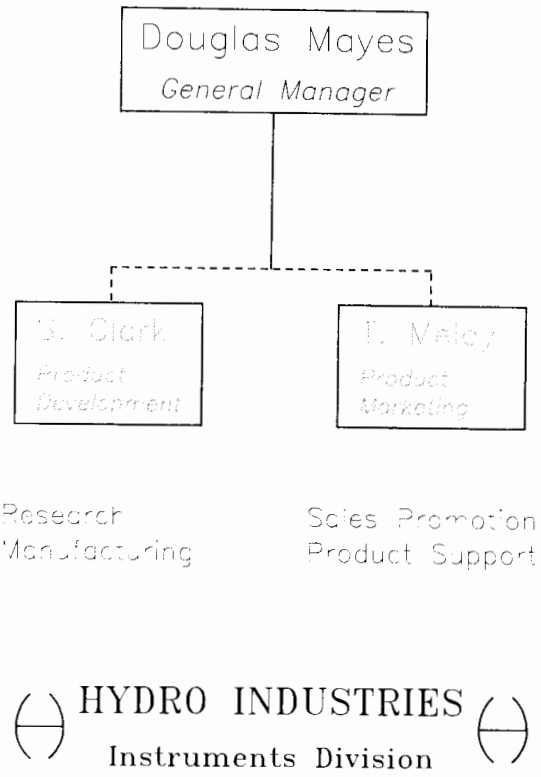
32. Press STORE CHART.

33. Press NEW CHART to store this edited chart under a different chart name.



34. Enter ORG CH 2 for the new chart name.

35. If you want to plot or print this chart, follow steps 3 through 73 of the procedures in section 3 for creating a text and draw chart. If you do not want to plot this chart, go on to any other create or edit chart example in sections 3 and 4, or press EXIT PAC to end this session with the pac.



Editing a Pie Chart

You can modify your pie charts in a number of ways. For example, with MOVE SLICE you can rearrange the order of the slices in any pie. With ADD SLICE and DELETE SLICE, you can enter or delete data pertaining to a slice which you want to insert or remove.

In addition, you can use EDIT TITLE to access pie chart form 1, and EDIT DATA to access form 2 (refer to Organizing Pie Chart Data in section 3). You can then change any of the entries you have made in these forms. In fact, if you have a two-pie chart and change the PIE # field to 1, the pac will convert the first pie into a full-size one-pie chart. Conversely, if you have a one-pie chart and change the PIE # field to 2, the pac will convert the pie into the first pie of a two-pie chart. You can then use either ADD SLICE or EDIT DATA for pie number two in order to enter the values for the second pie, or you can leave this area blank. If you leave the area blank, you can add annotations by creating a separate horizontal text and draw chart, placing the annotations in the area corresponding to the blank area on the pie chart. After plotting the pie chart, plot the text and draw chart on the same paper or transparency film.

Editing a Bar Chart

In the following step-by-step procedures, you will use many of the editing features of the pac to edit the clustered bar chart created in section 3 (or the bar chart stored on the chart storage disc supplied with the pac). These procedures will also show you how to convert a clustered bar chart into a stacked bar chart. To learn how editing functions not covered in these procedures operate, refer to the special function key definitions in appendix C. Editing pie charts and line charts is very similar to editing bar charts. If you follow these procedures, you will be able to apply the techniques to pie charts and line charts.

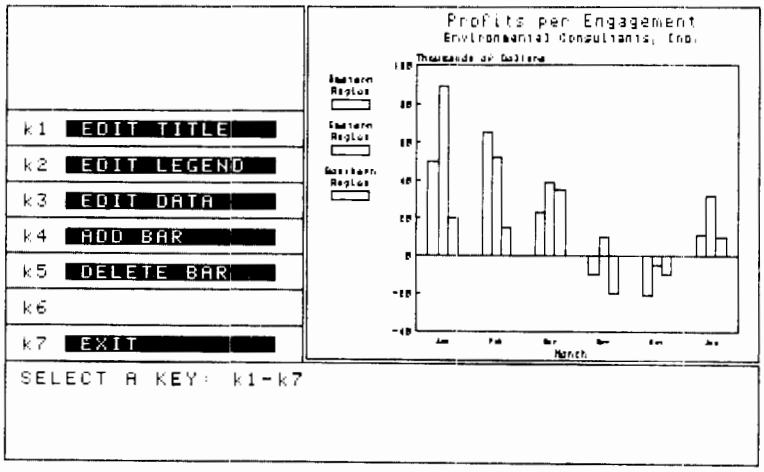
1. If you are continuing this session after finishing any of the procedures in section 3, skip to step 2. If you are starting a new session with the pac, follow the procedures listed under Running the Pac in section 2 before proceeding to step 2. Be sure to specify that you will be storing and plotting charts in this session and use the chart storage disc supplied with the pac. If you have a printer, specify that you will be printing data in this session.

2. Press RECALL CHART .

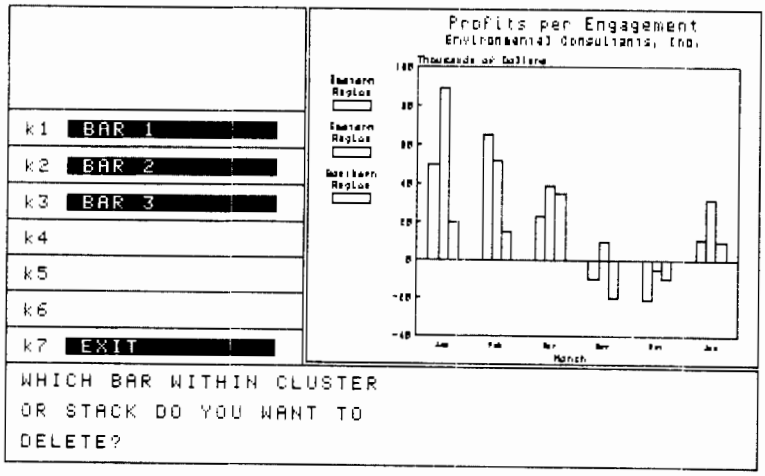
3. If you have created this chart using the steps in section 3, enter PROFIT B 1 for the chart name. If you simply want to recall the version of this chart which was already stored on the chart storage disc supplied with the pac, enter BAR CHART for the chart name. When prompted, insert GP Pac Disc 2.

4. After the chart has been drawn on the chart preparation form, press EDIT CHART

5. Press DELETE BAR .



6. Press BAR 3 to delete the bars identified by the third legend from the top.



7. After the chart has been redrawn on the CRT, press EDIT CHART again.

8. Press EDIT DATA .

9. Press BAR 1 to edit the data for the bars identified by the first legend on the chart. You will be adding a seventh x-axis label and y-axis value to the data entry form for legend 1.

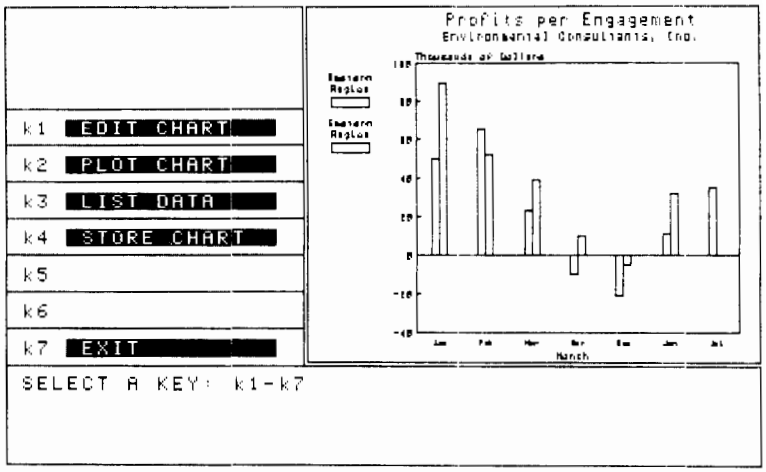
10. Tab through the form, until the cursor is flashing in the field for label number 7. Enter Jul for the x-axis label, enter N for the slant, and enter 35 for the y-axis value. Then press ACC FORM. When you are asked if all information is correct, enter Y.

BAR CHART TITLE: Profits per Engagement
LEGEND: Western Region LEGEND # 1 BAR CHART TYPE: C

LABEL #	X-AXIS LABEL	SLANT?	Y-AXIS VALUE
1	Jan	N	50
2	Feb	N	65
3	Mar	N	23
4	Apr	N	-10
5	May	N	-21
6	Jun	N	11
7	Jul	N	35
8			

1 CLR FORM 3 NXT FORM 5 ACC FORM 7 EXIT

11. After the chart has been redrawn on the CRT, press EDIT CHART.



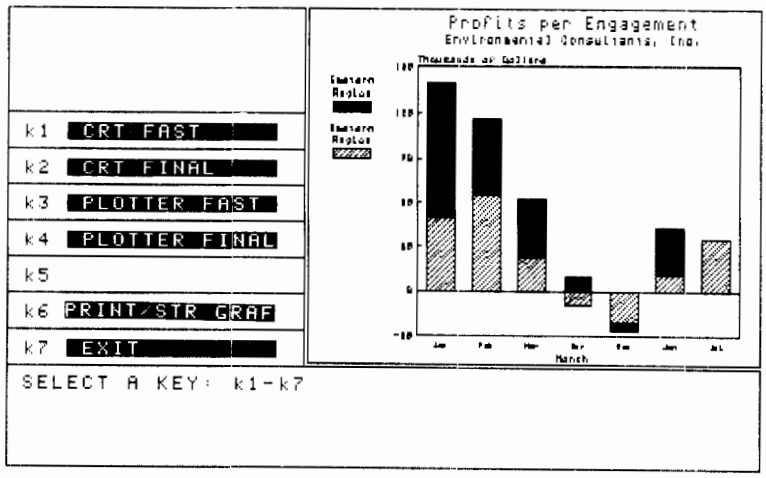
12. Since it is possible that the Eastern Region has not yet reported its profits, we will only have one bar at the seventh label. Now we will convert this chart from a clustered to a stacked bar chart. Press EDIT TITLE.

13. When the data entry form is displayed, tab to the TYPE OF BAR CHART field. Enter S. Since this is now a stacked bar chart, you need to change the y-axis scale. First tab to the Y-AXIS MINIMUM VALUE field, and enter -30. Then enter 150 for the maximum value, and enter 30 for the increment. When you are asked if all information is correct, enter Y.

```
CHART NAME:              PROFIT B 1        LIST DATA ON ENTRY? (Y/N) Y
TYPE OF BAR CHART:       N = NORMAL        S
                         C = CLUSTERED
                         S = STACKED
CHART TITLE:             Profits per Engagement
CHART SUBTITLE:          Environmental Consultants, Inc.
X-AXIS TITLE:            Month
Y-AXIS TITLE:            Thousands of Dollars
Y-AXIS MINIMUM VALUE:                -30
Y-AXIS MAXIMUM VALUE:                150
Y-AXIS LABEL INCREMENT:              30

1 CLR FORM                    5 ACC FORM                    7 EXIT
```

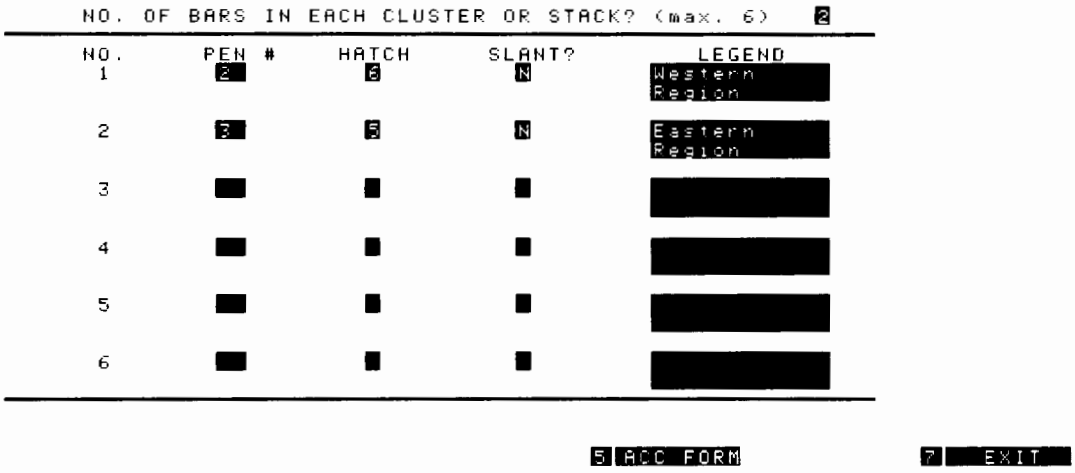
14. Press STOP PLOT when this key label appears on the CRT (it may take a moment for the chart to stop plotting). Since bar charts are normally drawn on the CRT without any hatches, we will draw the chart with hatches so that we can make sure they are what we want to use. Now press PLOT CHART and then CRT FINAL.

The bars in a stacked bar chart are stacked from the x-axis to the top, so the two legends are now reversed. It is better to have a solid hatch on the bottom, so we will edit the legends to change the hatch types. We will also change the hatch type on the top bar to a cross-hatch instead of a slanted hatch, in order to prevent the optical illusion that the top bar is leaning off of the stack.



15. First press **EXIT**. Then press **EDIT CHART**. Next, press **EDIT LEGEND**.

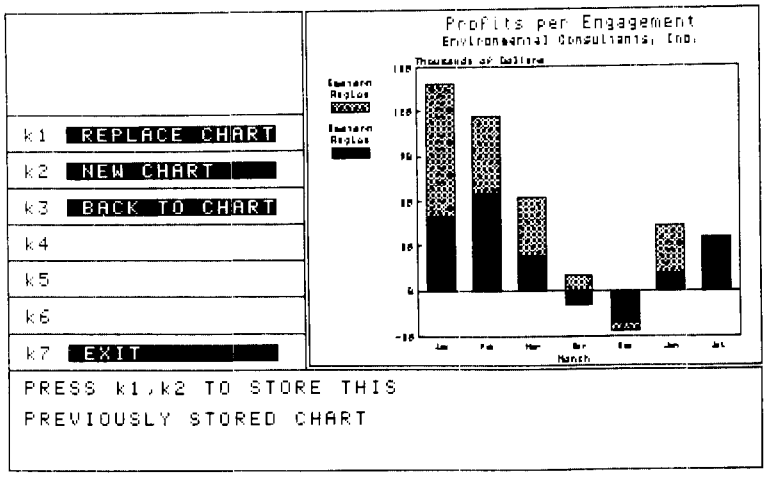
16. Tab through the form and enter 6 for the hatch type for bar 1, and 5 for the hatch type for bar 2. Then press **ACC FORM**. When you are asked if all information is correct, enter Y.



17. Repeat step 14 to be sure that the correct hatch patterns are drawn. Then press **EXIT** so that you can store the chart.

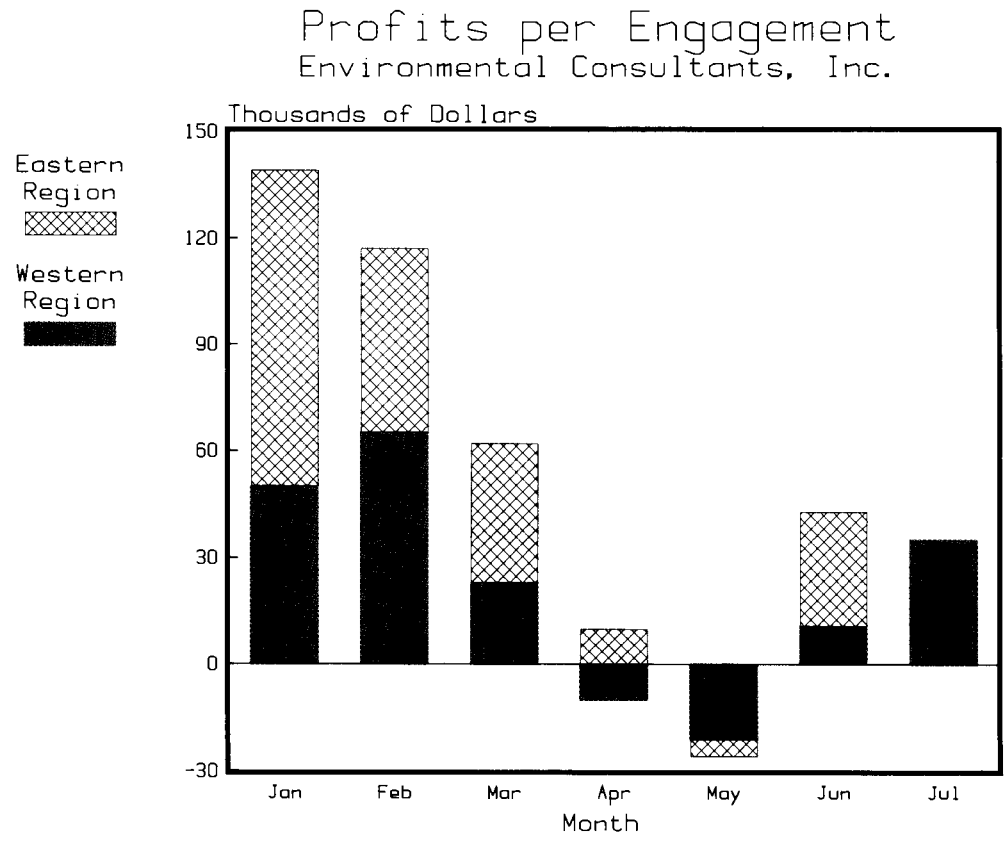
18. Press STORE CHART .

19. Press NEW CHART to store this edited chart under a different chart name.



20. Enter PROFIT B 2 for the new chart name.

21. If you want to plot this chart, follow steps 11 through 18 of the procedures in section 3 for creating a bar chart. If you do not want to plot this chart, go on to any other create or edit chart example in sections 3 and 4, or press EXIT PAC to end this session with the pac.



Editing a Line Chart

Line charts are edited in a similar manner to bar charts, using many of the same sets of special function keys. Refer to the procedures for editing bar charts or to appendix C to learn how these sets of keys operate. There is also another key label, EDIT AXES , which accesses either line chart form 2 or 3, depending upon whether your x-axis is scaled or labeled.

In addition, line charts can be modified in a way similar to pie or bar charts. That is, if you have a single line chart you can change it to a multiple line chart. Simply use EDIT TITLE to access line chart form 1 to change the TYPE OF LINE CHART field from S to M. You can then use ADD LINE to enter additional lines. Conversely, if you have a multiple line chart, you can change the TYPE OF LINE CHART field from M to S. Then the first line will be drawn as a single line chart in a full-size plotting area with no legend.

Appendix A

Dealing With Discs

This appendix covers different aspects of dealing with discs: caring for discs, copying discs and charts for protective backup copies, initializing discs, and what to do when your chart storage disc is full.

Caring for Discs

If you follow these few words of caution, you will extend the life of your flexible discs. When you are not using a disc, store it in its envelope in an upright position; this protects the surface from dust particles and other substances. Do not touch the surface of the disc. Do not bend the disc, as it may warp or break. Do not carry or store a disc near a magnetic source; this may destroy the data on the disc and may also permanently damage its recording properties. In addition, always keep write-protect tabs on the GP Pac Discs as a precaution against accidentally destroying the data stored on these discs. (Do not place write-protect tabs on your chart storage discs.)

Refer to the documentation for your hard discs for cautions on caring for them.

Copying GP Pac Discs

Copying to Flexible Disc

If you're using the pac with 3½ or 5¼-inch flexible discs, then you should follow the instructions below for copying the GP Pac Discs. We suggest that you make a backup copy of the three discs, including the "CHARTS" storage disc, right away. The disc that you use for the backup copy can be blank or used. If it has information stored on it, be sure you do not want to keep the information, as this will be erased when it is initialized. Then follow these procedures:

1. Be sure that both drives are empty, and turn on the disc drives. Then turn on the computer.
2. Insert the backup disc into either drive.

CAUTION

Do not insert either GP Pac Disc at this point. Make sure that the only disc in the drive is the backup copy. The initialize procedure in step 3 will erase the disc that is in the drive.

3. Next you will enter the initialize command having the following form:

```
INITIALIZE "new volume label", ":msus"
```

First determine the correct new volume label and msus to use, as described in the following paragraphs. Then enter the above command with the correct new volume label and msus. For example, if you are initializing a disc for copying GP Pac Disc 1, and the disc in drive 0, you might enter the command as follows: `INITIALIZE "GP PAC",":D700"`. This assumes that the select code is set to 7 and the device address is 0.

The new volume label should be the same as the volume label of the original disc that you will be copying. If you plan to copy GP Pac Disc 1, the new volume label *must* be `GP PAC`. If you plan to copy GP Pac Disc 2, the new volume label *must* be `gp pac`. If you plan to copy a chart storage disc, the new volume label should be the same as the chart storage disc name, for example, `CHARTS`.

The msus is the mass storage unit specifier; it tells the computer which drive the disc is in. Refer to your disc drive and computer documentation for the correct msus to use.

4. Insert the original disc that you want to copy from into the other drive.

5. To copy the original disc to the backup disc, first determine the msus for each drive. Then enter the following copy command; the first msus is that of the original disc, and the second msus is that of the backup disc: `COPY ":`*source msus*`" TO ":`*destination msus*`"`.

   For example, if your original disc is in drive 1 and your backup disc is in drive 0, you might enter the command as follows: `COPY ":D701" TO ":D700"`.

   While the disc is being copied, the lights on the two drives will flash on and off. The copy process might take several minutes; the copy is finished when both lights go off. Do not attempt to use the computer or the disc drives during the copy process, as this may destroy data.

Copying to Hard Disc

It is possible to transfer the contents of the GP Pac Discs 1 and 2 to a single volume of a Winchester hard disc. The procedure is outlined below. In addition to copying the flexible discs supplied with the pac to the hard disc, the procedure involves making some simple changes to the software. *You should not copy GP Pac Disc 3, the chart storage disc to the hard disc or use the hard disc for chart storage.* Use a flexible disc for chart storage and follow the instructions for copying Disc 3 outlined above in Copying to Flexible Disc.

1. Turn on your computer and disc drives. You will require at least one single flexible disc drive as well as your hard disc.

2. Choose a volume on your hard disc to copy the GP Pac files. The volume must have a volume label assigned. (Refer to your computer's operating and programming manual for information about volume labels.) For the purpose of these instructions, we will use the volume label "MISC" to indicate the hard disc volume.

3. Now you want to check that there are no files on your hard disc volume that use file names common to the GP Pac. If you attempt to copy a file with a duplicate name, the computer responds with `Error 63 : DUP NAME`. One way to check this is by using the CAT statement on the three vol-

umes—"MISC" (hard disc), "GP PAC" (GP Pac Disc 1), and "gp pac" (GP Pac Disc 2) to compare the contents of the GP Pac Discs with the hard disc. You may want to print out the volume directories by first assigning the CRT output to your system printer. Type in

```
CRT IS 701 (END LINE)
```

(replace 701 with your printer address).

Then obtain the volume directory listings by typing in

```
CAT ":MISC" (END LINE)
CAT ":GP PAC" (END LINE)
CAT ":gp pac" (END LINE)
```

and compare the "MISC" volume files with the GP Pac Disc files.

Type in

```
CRT IS 1 (END LINE)
```

when finished.

If you discover any duplicate file names, use the RENAME statement to rename the hard disc files. Do not alter any GP Pac file names. Alternatively, you can purge the duplicate hard disc files.

Note: It is not necessary to copy the GP Pac file named "Autost". "Autost" is the same program as "GP" with a different name. If there is already a program named "Autost" on your hard disc volume, you can leave it. The copy operation will copy all files except "Autost". If you wish to use the GP Pac "Autost" program, you must use your hard disc default drive for storage of GP Pac Disc 1 and 2. The "Autost" program will load and run automatically only if located on drive 0 of the disc drive with the lowest address and interface select code. (Refer to your computer's operating and programming manual for more information about the autostart feature.)

4. Insert the GP Pac Disc 1 into a flexible disc drive and copy its entire contents onto the hard disc using the COPY statement by typing in:

   ```
   COPY ":GP PAC" TO ":MISC" (END LINE)
   ```

   (Replace MISC with the volume label of your hard disc.)

   When the copy operation is complete, check that all the GP Pac Disc 1 files have been copied by executing CAT ":MISC" and CAT ":GP PAC" to compare files.

   If any files are missing, use the COPY statement to copy the individual files. For example, if you are missing the GP Pac file TEXT1, type in:

   ```
   COPY "TEXT1:GP PAC" TO "TEXT1:MISC" (END LINE)
   ```

5. Repeat step 4 with the GP Disc 2 by typing in:

   ```
   COPY ":gp pac" TO ":MISC" (END LINE)
   ```

   (Replace MISC with the volume label of your hard disc.)

The computer will display `Error 63 : DUP NAME`. This is because the last four files on GP Pac Disc 2 are also on GP Pac Disc 1 and have already been copied in step 4. Once again check that all of the GP Pac Disc 2 files have been copied, and use the `COPY` statement to copy any missing files.

When all of the GP Pac files have been copied to your hard disc (volume "MISC" in this example), you must make some modifications to the software so that the pac will run with the hard disc. Follow these steps:

1. Remove the GP Pac flexible disc(s) from the disc drive.

2. Unsecure the "GP" program on the hard disc by typing in:

   ```
   UNSECURE "GP.MISC","HP",2 (END LINE)
   ```

3. Now load the program by typing:

   ```
   LOAD "GP.MISC" (END LINE)
   ```

4. List lines 837 and 838 by typing:

   ```
   LIST 837,838 (END LINE)
   ```

   The following lines are displayed:

   ```
   837 Progvol$=",GP PAC"
   838 Progvol2$,Progvol3$,Progvol4$=",gp pac"
   ```

5. Move your cursor up to the `G` in `GP PAC` on line 837. Replace the volume label `GP PAC` with the volume label for your hard disc and press (END LINE). For example:

   ```
   837 Progvol$=",MISC" (END LINE)
   ```

   Now move your cursor to the `g` in `gp pac` (line 838). Replace the volume label `gp pac` with the volume label for your hard disc and press (END LINE).

   ```
   838 Progvol2$,Progvol3$,Progvol4$=",MISC" (END LINE)
   ```

   To verify that these changes have been accepted, type in

   ```
   LIST 837,838 (END LINE)
   ```

   and check that the hard disc volume label appears in both statements.

6. Now you need to store the edited version of the "GP" program on your hard disc. Type in

   ```
   STORE "GP.MISC" (END LINE)
   ```

   and then

   ```
   SECURE "GP.MISC","HP",2 (END LINE)
   ```

If you are using the "Autost" program from GP Pac Disc 1 on your hard disc, then follow the procedure below. If you're not using "Autost", then you're finished with the hard disc copy operation. To begin using the pac, simply press the (RUN) key (the "GP" program should still be loaded in memory). To use the pac from hard disc in future sessions (without the autostart), type in `LOAD "GP.MISC"` (END LINE) and press (RUN).

To revise the "Autost" program on the hard disc, do the following.

1. Unsecure the "Autost" program by typing in

   UNSECURE "Autost.MISC","HP",2 (END LINE)

2. Since "Autost" and "GP" are the same programs with different names, you need only store your edited version of "GP" under the file name "Autost":

   STORE "Autost.MISC" (END LINE)

3. Then resecure the program as follows:

   SECURE "Autost.MISC","HP",2 (END LINE)

The "Autost" program will load and run automatically when your computer is turned on, provided that:

1. Your hard disc is turned on.
2. The hard disc has the lowest address and interface select code of all mass storage devices connected to your system. For an HP-86A, the select code must be set to a value in the range three through six. No two peripherals can share the same select code and device address.
3. The GP Pac "Autost" program is stored on volume number 0 of the hard disc.

Storing Backup Copies of Individual Charts

Whether you have a single or dual disc drive, you can store backup copies of each chart that you create or edit. Make sure that you are using two chart storage discs which have the same chart storage disc name (such as CHARTS) and which both contain a directory file (as set up by the GP Pac in the system configuration forms). (Refer to Initializing a Chart Storage Disc.) Then follow these simple steps:

1. Follow the procedures listed under Running the Pac in section 2. Then recall a previously created chart or create a new chart that you want to store on the backup chart storage disc.
2. If you've created a new chart or edited a recalled chart, store the chart on one of the discs. For a newly created chart, press STORE CHART. For a recalled and edited chart, press STORE CHART and then either REPLACE CHART or NEW CHART. (Refer to appendix C to decide which function to use.)
3. Next, remove the first chart storage disc from the disc drive, and insert the backup chart storage disc. Now press STORE CHART again and then either REPLACE CHART or NEW CHART. If you press REPLACE CHART, the backup chart copy will be stored with the same name as the chart on the original disc. If you press NEW CHART, you will have to assign a chart name to the backup copy.

When Your Chart Storage Disc is Full

Each time you store a chart, the pac automatically checks your chart storage disc and displays the number of charts that can still be stored on the disc. A newly-initialized chart storage disc (3½-inch or 5¼-inch flexible mini disc) has a capacity of 19 text and draw charts or 64 pie, bar, or line charts. The capacity of an 8-inch

flexible disc is approximately five times that of a flexible mini disc. When a disc becomes full, the pac displays the message "YOUR DISC IS FULL AND CANNOT BE SET UP AS A CHART STORAGE DISC. DO YOU WANT TO ERASE ALL STORED INFORMATION AND REUSE THIS DISC (Y/N)?". You have three options at this point: you can delete some charts to make space for additional charts, you can erase the entire disc by initializing it as a new chart storage disc, or you can initialize a different disc for use as an additional chart storage disc. These three options are discussed in the paragraphs below. Normally there is no problem in using a full chart storage disc; you can continue using it to recall, plot, and replace charts (you cannot store newly created or additional edited versions of charts).

Note: It is not possible to recall or plot charts from a full Rev. A CHARTS disc with the Rev. B GP Pac software. This is because the updated Rev. B software requires 47 records on the chart storage disc for a file named "$screen". If there is enough room on the Rev. A CHARTS disc, the Rev. B software will create the file. If there is not enough room, you will have to first delete some charts from the full Rev. A disc, using the Rev. A GP Pac software (through the DELETE CHART function). Either one text and draw chart (50 records) or four pie, bar, or line charts (15 records each) must be deleted to provide the 47 records. The Rev. A charts disc can then be used with the Rev. B software.

Beginning a Session With a Full Chart Storage Disc

If your chart storage disc is full when you first fill out the chart storage configuration form, the pac will ask if you want to erase (and initialize) this chart storage disc. If you want to erase all of the contents of this disc, enter Y and refer to steps 4 and 5 of Initializing a Chart Storage Disc later in this appendix. If you want to continue using this disc or want to use a different disc, enter N. At this point, you have three choices:

1. Continue using this disc; you will fill out the plotter/printer configuration form next.
2. Use a different disc which is blank or which you want to erase; follow steps 1 through 5 under Initializing a Chart Storage Disc.
3. Use a different disc that has already been initialized as a chart storage disc; simply start over with filling out the chart storage configuration form.

Handling a Full Disc in the Middle of a Session

When you attempt to store a chart on a full chart storage disc, you will see a chart preparation form with a message that asks if you want to set up a new chart storage disc since your current chart storage disc is full. If you press YES to set up a new chart storage disc, the chart storage configuration form will be displayed. You can then proceed as though you were beginning the session (refer to Beginning the Session with a Full Chart Storage Disc). If you press NO or EXIT, the chart preparation form which offers the functions CREATE CHART , RECALL CHART , DELETE CHART , LIST CHARTS , and BACK TO CHART will be displayed. You can then proceed with your session by using any of these functions. For example, you could delete some charts to create space to store additional charts.

Initializing a Chart Storage Disc

You can initialize a chart storage disc in two situations: either when you are beginning a new session with the pac, or when you have been informed by the pac that your chart storage disc is full and you want to initialize (erase) the full disc or another disc. In both situations, you simply respond to prompts in the chart storage configuration form. Use the following steps to help clarify what the prompts mean. Remember that if you use a disc which has some information stored on it, everything will be erased when the disc is initialized.

1. When you fill out the chart storage configuration form, enter the chart storage disc name that you want to assign to the new disc. If you are initializing a partially full chart storage disc, you must enter a different chart storage disc name than that currently assigned to it. (If you want to use the same chart storage disc name, you can initialize the disc without running the pac by following steps 1-3 under Copying GP Pac Discs.) Insert the new disc into a drive and press (CONT).
2. The pac will ask if this is a new disc to be initialized. Enter Y. (If you enter N, start over with step 1.)
3. You will next be asked to remove the GP Pac Disc; this is a safeguard against erasing and initializing the GP Pac Disc by accident. Then you will be asked to insert the disc to be initialized and to enter the msus for the drive that this disc is in. The msus is the mass storage unit specifier; it tells the pac which drive the disc is in. Refer to your disc drive and computer documentation for correct msus to use. A typical msus for drive 0 might be D700 or D720. A typical msus for drive 1 might be D701 or D721.
4. Finally, the pac will check the disc to determine whether it has already been initialized. If the disc has been initialized, you will again be asked if you really want to initialize it; this is another safeguard to make sure that you do not erase data that you want to keep. Enter Y or N. If you enter Y, skip to step 5. If you enter N, the cursor will appear in the first field of the form.
5. If the pac determines that this disc has not already been initialized or if you entered Y in step 4 to erase and initialize a previously initialized disc, the pac will proceed to initialize the disc. When it has finished, you can continue your session with the pac by filling out the plotter/printer configuration form.

Appendix B

Graphics Concepts

The Graphics Presentations Pac offers many choices for designing and tailoring your charts so that they communicate your data as effectively as possible. However, how do you combine these design choices to produce clear charts? In the following discussion you will find information which will help you to design effective charts using established graphics concepts.

Choose the Right Chart

The first thing that you should consider in preparing a chart is the purpose, or message, of your data. Based upon the message, choose the proper chart format. Are you illustrating the steps a product goes through from research to marketing? A text and draw chart will do this clearly. Do you want to show the allocations of your monthly budget? A pie chart is perfect. Are you showing the total number of products sold each month? A bar chart will accurately illustrate the numbers. Are you analyzing a trend? Use a single line chart. The descriptions of text and draw, pie, bar, and line charts in section 3 explain more uses of these charts and the variations which you can produce.

Guidelines for Effective Charts

Now that you have selected the type of chart that you are going to use, you need to consider some of the design principles which will enhance the communication of your data. If you view these principles as common sense guidelines, rather than as hard-and-fast rules, you will find that it is easy to prepare charts which will aid in the comprehension of data.

The most important guideline is to keep your charts *as simple as possible.* People can assimilate and comprehend relationships much more quickly and easily using charts instead of tables or lists of numbers. So why clutter a chart in an effort to show too many relationships or too much data? Since your data will be comprehended more readily, it is actually more efficient to prepare several charts which are simple and well-defined, than to prepare one "comprehensive" chart. If you are projecting your charts on overhead transparencies, remember that your audience will only have a limited time to absorb the information on the chart. This is another reason for keeping your chart simple.

How Much Data?

In designing a clear, simple chart, an important consideration is how much data to show. Here are some guidelines for each chart type.

Text and Draw Chart. When preparing a transparency, six lines of text totaling 20 words is the ideal. As a maximum, place no more than 10 lines of text with 24 characters per line on a single transparency. For clarity, avoid using too many different character fonts in one chart. Also, use wide pens for large

characters, lines, arcs, and circles. When preparing text and draw charts which will not be projected, use your own judgment so that the text can be read easily.

Line Chart. Compare no more than five lines on one line chart: the fewer, the better.

Bar Chart. For any bar chart, include no more than five clusters, stacks, or single bars. In order to facilitate comparison, limit the number of bars in a cluster or a stack to three. When preparing a clustered bar chart that compares items over a period of time, two to three bars in each cluster are the most that can be compared easily. If you want to compare three or more items, reconsider whether you are really trying to show trends; if so, use a multiple line chart. Otherwise, you might wish to choose one item as the standard for comparison; then prepare several charts that each compare a new item with that one standard item.

Pie Chart. Divide a pie chart into no more than five or six slices. For easy comprehension, do not include a slice if it is less than 5 percent. If you have several slices that are each less than 5 percent, combine them as one slice labeled "Other" or "Miscellaneous." In addition, arrange the slices so that they are in order according to the size of the slice, either from small to large or from large to small. Exploding a slice is useful for adding emphasis; however, avoid exploding more than one slice in a pie chart.

Design Enhancements

In this pac, you can choose 16 pens, six line types, and six hatch types to enhance your charts. Combining too many different colors with too many line or hatch types often results in a distracting chart. Choosing color and line types or hatch types can appear to be complicated; however, in the end you are the best judge. Simply remember that you are illustrating a particular point in your chart, and that any design options which you choose should make that point more clear, not disguise it.

Lettering. For maximum readability, particularly with long words or phrases, use upper- and lowercase letters rather than all uppercase letters. Use different fonts and colors to make important points stand out; however, avoid using too many fonts or colors, as this will diminish clarity and comprehension. You can also use wide pens on larger character sizes to add emphasis. Use a narrow pen width for smaller character sizes so that the letters are sharp and easy to read. When preparing a text and draw chart for projection, give particular attention to the size of your lettering. The minimum size of character to use will depend upon the viewing distance; be sure that even people in the back row can read all characters easily. In this pac, a minimum size of 5 is suggested for projected charts. Of course, if you are preparing a chart that will not be projected, use your own judgment for the minimum character size.

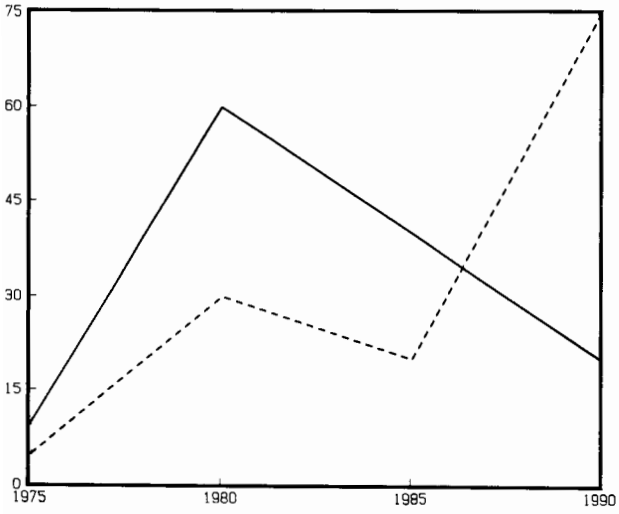
Line Types. In general, use wide pens for all lines. If you are making a single line chart, also use a dark color and a solid or nearly solid line type. In multiple line charts, single out the most important line with a darker color and more solid line type. If you are preparing a chart which shows planned versus actual sales or growth, the convention is to make the planned line a dashed line type (such as line type 3), and the actual line a solid line type (line type 1).

Hatch Types. Again, simplicity is the rule when choosing hatch types. Avoid mixing too many complicated hatch types. Instead, use them to help make your point more clear. Sometimes, particularly in bar charts, the combination of some hatch types can create an optical illusion as to the sizes of the bars. To prevent this on stacked bar charts, position the stacks so that the largest ones are on the bottom and the smallest on the top; at the same time, order the hatch types and colors so that the darkest or most dense type is on the bottom and the lightest on the top. On clustered bar charts, use dark or dense hatch types on the shortest or the most important bar. Similarly, use the most dense hatch types on the smallest or most important slices of a pie chart. For either bar or pie charts, avoid leaving a bar or slice blank (hatch type 1) if all others have a dense hatch type. Often it is very effective to use a solid hatch type (hatch type 6) for every bar or slice, but to vary the colors. If you do this and you are projecting the chart on an overhead transparency, be careful not to use similar colors next to each other (such as orange and red), as they are sometimes hard to distinguish.

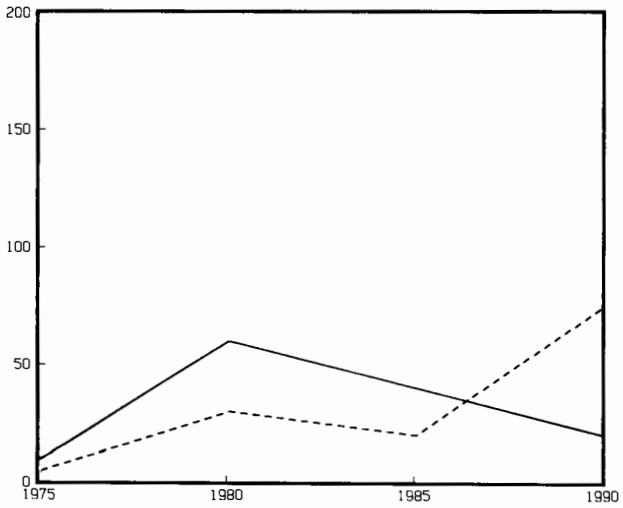
Scaling Axes on Bar and Line Charts

On bar and line charts, the minimum value for the y-axis scale should always be either zero or a negative number. This is a convention which provides a standard reference point and helps eliminate misinterpretation of the data. Generally the y-axis maximum value should be zero if the bar or line data values are all negative. Choose minimum and maximum values that include, but do not greatly exceed the smallest and largest data values of the bars or lines. If you are preparing a stacked bar chart, remember to add the data values of all bars in a stack to arrive at the smallest and largest values.

A common error in preparing bar and line charts is to use a range of values along the y-axis that greatly exceeds the data values of the bars or lines. For example, consider the multiple line charts shown here. The differences between the data values of the two lines appear negligible when the range of the y-axis scale is too large.



Good Y-axis Scale

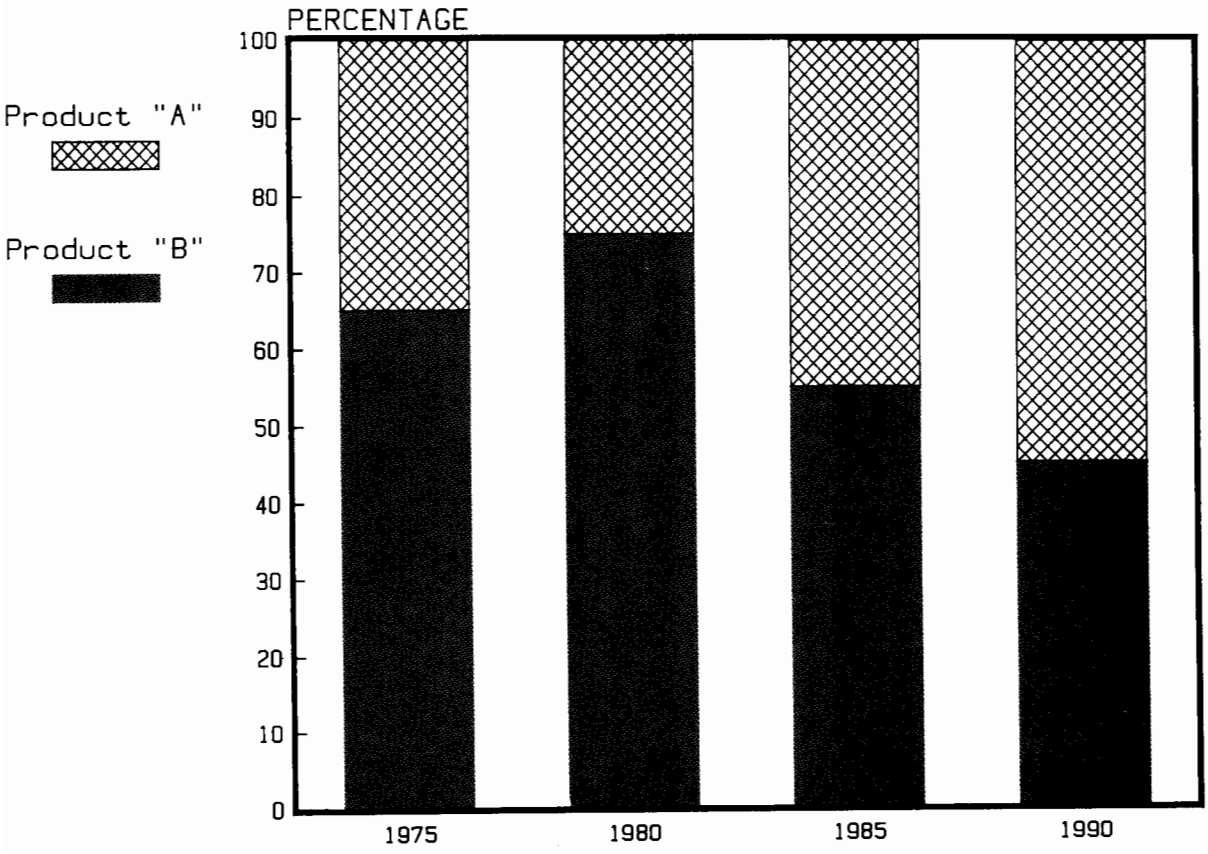


Poor Y-axis Scale

When presenting several related charts in a series (for example, five bar and/or line charts illustrating the same type of data for different regions or for different time periods), use the same y-axis scale to facilitate accurate comparison.

Time or entities (such as particular products or regions) are usually plotted along the x-axis, whereas quantities (such as total sales amount or number of products sold) are usually plotted along the y-axis. Avoid crowding the labels along the y- and x-axes; keep the labels short and do not include more labels than are necessary for accurate communication of your data. A good trick when dealing with large numbers is to include the multiplier as part of the axis label. For example, if your range of values is $10,000 to $199,000, you might choose a y-axis scale of 0 to 200 and label the axis "Thousands of Dollars." An increment of 25 would be good for the labels; you would then have nine labels along the y-axis.

If your data values are expressed as percentages, you can use the y-axis scale to produce a variation of the stacked bar chart called the "100 percent bar chart." This type of chart is useful for comparing proportions of a whole; it differs from the pie chart in that the viewer can make more accurate comparisons of the proportions. Simply prepare a stacked bar chart with a minimum y-axis value of 0 and a maximum value of 100. Then enter your data values as percentages. The chart below is an example of a 100 percent bar chart.



100 Percent Bar Chart

Appendix C

Special Function Keys

In this appendix you will find detailed descriptions of each special function key label that appears either on chart preparation forms or data entry forms. The descriptions supplement the prompts on the CRT, explaining what you must do and what the pac will do each time you press the key.

82905A

This key selects the HP 82905A Printer as the PRINT/STR GRAF printer in the current pac session. A chart must be formatted according to the destination printer type, prior to printing or storing.

82905B

This key selects the HP 82905B Printer as the PRINT/STR GRAF printer in the current pac session. A chart must be formatted according to the destination printer type, prior to printing or storing.

ACC FORM

Press this key when you have only partially filled out a form but have completed entering data. There are a couple of tricks to knowing how to make the best use of the features of the ACC FORM key. For example, suppose you are *creating* a multiple line chart and your first line has 8 data points. When the data entry form for the second line appears, the X-AXIS VALUE/LABEL and SLANT fields for all 8 points will be automatically filled with the values you entered for the first line. Now suppose you only have 6 data points for the second line. Simply tab through the form and enter the y-axis values for those 6 points, *but stop* after you have entered the sixth value. If you press ACC FORM now, all information for points 7 and 8 will be erased. This is true also for filling out the data entry forms for the second pie of a two-pie chart and for the second through sixth legends of clustered and stacked bar charts. If you are *editing* any pie, bar, or line chart, all information in the form will be saved when you press ACC FORM with one exception. This exception helps you to erase unwanted information quickly when you are editing data in pie chart form 2, bar chart forms 2 or 4, or line chart forms 4 or 6 (refer to the organizing data parts of section 3). In these forms, if you blank out a horizontal row of fields, you will be informing the pac to erase all information following that row when you press ACC FORM. For example, if you have data filled in for 8 labels in bar chart form 4, but now want to save only the information for the first 4 labels, simply blank out the fields associated with label 5. When you press ACC FORM, all fields for labels 5 through 8 will be erased.

ADD BAR

This key allows you to add another bar to each cluster or stack of bars on an existing clustered or stacked bar chart. When you press ADD BAR, the appropriate forms are displayed for you to enter legend information and y-axis values.

ADD LINE

This key allows you to add another line to an existing multiple line chart. When you press ADD LINE, the appropriate forms are displayed for you to enter legend information and y-axis values.

ADD SLICE

This key allows you to insert a new slice into an existing one- or two-pie chart. After you press ADD SLICE, labels 1 and 2 on the appropriate pie will start blinking. (If you have a two-pie chart, you must press PIE 1 or PIE 2 to select the appropriate pie.) Use (ROLL) and (SHIFT) (ROLL) to cause succeeding or preceding pairs of labels to blink. When you have located the pair between which you want to insert the slice, press (END LINE). Next, the data entry form is displayed for you to enter the design choices and value for the slice.

ADD TEXT

Use this key to add a text phrase to a text and draw chart. First use the cursor keys to position the graphics cursor at the point where you wish to add the text phrase. (Pressing any cursor key itself move the graphics cursor five dots. Pressing (SHIFT) along with any cursor key moves the graphics cursor one dot.) Then press ADD TEXT. When the data entry form is displayed, enter the design choices and text phrase. The text phrase will then be drawn on the chart on the CRT.

(again)

This key is on the last pen control chart preparation form. It allows you to return to the first pen control form. Refer to PEN CONTROL.

BACK TO CHART

This key returns you to the forms associated with the chart you are currently preparing. For example, if you store your chart and then want to plot or edit that chart before creating or recalling a different chart, you can press BACK TO CHART to return to the plotting and editing functions associated with your chart.

BAR CHART

This key accesses the appropriate forms for preparing normal, clustered, or stacked bar charts.

BAR 1 through BAR 6

When you are editing a clustered or stacked bar chart and press EDIT DATA or DELETE BAR, the BAR 1 through BAR 6 keys are displayed (depending upon how many bars are in the bar chart). BAR 1 refers to the bars identified by the first legend at the top of the chart, BAR 2 to the next legend down, and so on. Press the appropriate key to select the set of bars for which you want to edit data or the set of bars to delete.

CHANGE ARC

With this key you can change the size of an arc or circle on a text and draw chart with or without moving the arc or circle. (If you want to move an arc or circle without changing its size, refer to MOVE ARC.) First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the reference points on the circumferences of the arcs and circles on your chart. Stop when the graphics cursor is located on the arc or circle which you want to change. Then press CHANGE ARC. Next, use the cursor keys to move the graphics cursor to the new arc or circle center. (If you only want to change the radius or starting point, move the graphics cursor to

the current center.) Press (END LINE). Then move the graphics cursor to the new starting point, and again press (END LINE). Now redraw the arc or circle: use (←) to draw counterclockwise, (→) to draw clockwise, or (↑) to have the pac automatically draw a complete circle. As the arc or circle is drawn, the size of the arc or circle in degrees is displayed in the upper left portion of the chart preparation form.

CLR FORM

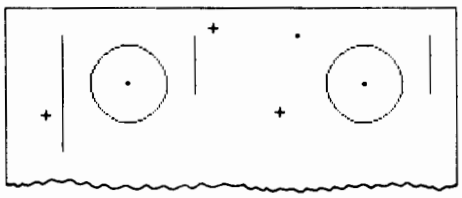
When you press CLR FORM, most entries in the displayed data entry form are erased, and the cursor is positioned in the first erased field so that you can start over with filling out the form.

CONFIGUR

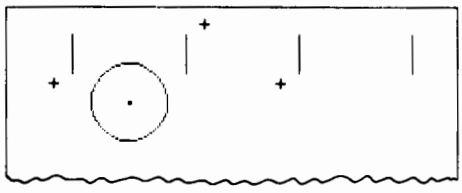
This key selects the configuration startup option, allowing you to specify the configuration of your peripherals for the session. In the forms that follow, you will specify your chart storage disc (volume label of the chart storage disc), and select whether or not you wish to plot charts, plot a reference guide, and print charts and data.

COPY AREA

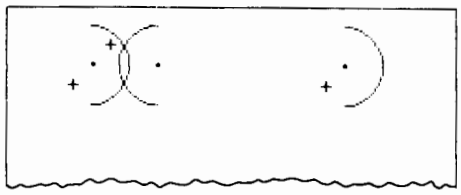
This key allows you to copy selected lines, arcs, and circles to another location on a text and draw chart. The copied area also remains in its original location. First press COPY AREA. Then imagine a rectangular outline superimposed on the area which you want to copy. If you want to copy lines, both endpoints of each line must be included in the area; if you want to copy arcs or circles, only the center reference dots of each arc or circle must be included in the area. (See the diagrams below). Now use the cursor keys to move the graphics cursor to the lower left corner of the imaginary rectangular area, and press (END LINE). Next use the cursor keys to move the graphics cursor to the current upper right corner of the imaginary rectangular area, and press (END LINE). You have now informed the pac of the size of your area. Now determine where you want to copy this rectangular area. Be sure that the whole area fits within the chart boundaries (use the displayed X and Y coordinates to help you). Use the cursor keys to position the graphics cursor at the new lower left corner, and press (END LINE). Your area will then be copied in the new location. If the area does not fit within the borders of the chart, the copy will not occur and you will be asked to try again. If the original area includes only one endpoint of any line, the endpoint will be copied for reference and plotted on the final chart. Also, if the original area includes any part of an arc or circle, but not the center of the arc or circle, the arc or circle will not be copied. No text phrases will be copied.



Reference dot, circle, and one line copied.



Two lines copied.



One arc copied.

CPY LAST

This key appears on the text data entry form when you are editing a text phrase. When you press CPY LAST, the data entry form for the text phrase which was entered previous to the phrase being edited will be displayed. In this way you can reuse the design choices for the previous phrase without having to remember and enter them manually. Pressing CPY LAST repeatedly allows you to cycle through the preceding text phrases.

CPY NEXT

This key operates the same as CPY LAST, except that the data entry form for the text phrase which was entered subsequent to the phrase being edited is displayed. Pressing CPY NEXT repeatedly allows you to cycle through the data entry forms for each succeeding text phrase.

CREATE CHART

This key allows you to select which type of chart to create: text and draw, pie, bar, or line chart.

CRT FAST

This key causes the current pie or bar chart, that you are preparing, to be drawn on the CRT without hatch types. With line charts, this key operates the same as CRT FINAL.

CRT FINAL

This key causes the current pie, bar, or line chart, that you are preparing, to be drawn on the CRT in final form. Hatch types are drawn in for pie and bar charts.

DELETE ARC

This key allows you to delete an arc or a circle on a text and draw chart. First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the reference points on the circumferences of the arcs and circles on your chart. Stop when the graphics cursor is located on the arc or circle that you want to delete. Then press DELETE ARC. If this is the arc or circle you want to delete, press (END LINE) to delete it. If you do not want to delete this arc or circle, do not press (END LINE). You can instead start over by using (ROLL) or (SHIFT) (ROLL) as described above to locate a different arc or circle, or you can press another special function key. In either case, the arc or circle will not be deleted.

DELETE BAR

This key allows you to delete a bar from each cluster or stack of bars on an existing clustered or stacked bar chart. After you press DELETE BAR, press the appropriate key between BAR 1 and BAR 6 to select the bar that you want to delete. The bar chart will then be redrawn on the CRT.

DELETE CHART

This key allows you to delete a chart from your chart storage disc. When you press DELETE CHART, you will be asked for the name of the chart that you want to delete. (If you are not using a chart storage disc, you will first be given the option of specifying a disc in the chart storage configuration form.) If the pac cannot find the chart with the chart name that you entered, a message will be displayed. Check to see that you spelled the chart name correctly, or that you are using the correct chart storage disc for the chart that you want to delete. (You can use LIST CHARTS to obtain a copy of the chart directory for the chart storage disc that you are currently using.)

DELETE LINE

This key allows you to delete a line from an existing multiple line chart. After you press DELETE LINE, press the appropriate key between LINE 1 and LINE 6 to select the line that you want to delete. The line chart will then be redrawn on the CRT.

DELETE POINT

This key allows you to delete a point from a series of points that define the starting and ending points of line segments on a text and draw chart. First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the points on your chart. Stop when the graphics cursor is flashing over the point that you want to delete. Then press DELETE POINT. If this is the point you want to delete, press (END LINE) to delete it. The line(s) that were created with this point as a starting or ending point will then be erased or redrawn if the point was an intersection of two lines. Lines that end or begin at the same X and Y coordinate position as this point, but were not created with this specific point, will not be affected. (Refer to MOVE POINT, where this concept is illustrated in a diagram.) If you do not want to delete this point, do not press (END LINE). You can instead start over by using (ROLL) or (SHIFT) (ROLL) as described above to locate a different point, or you can press another special function key. In either case, this point will not be deleted.

DELETE SLICE

This key allows you to delete a slice from an existing one- or two-pie chart. After you press DELETE SLICE, label 1 on the appropriate pie will start blinking. (If you have a two-pie chart, you must press PIE 1 or PIE 2 to select the appropriate pie.) Use (ROLL) and (SHIFT) (ROLL) to cause succeeding or preceding numbers to blink. When the number for the slice that you want to delete is blinking, press (END LINE). The pie chart will then be redrawn on the CRT.

DELETE TEXT

Use this key to delete a text phrase from a text and draw chart. First press DELETE TEXT. Then use (ROLL) or (SHIFT) (ROLL) to move the graphics cursor through each phrase on your text and draw chart. When the graphics cursor is located in the beginning of the phrase that you want to delete, press (END LINE). If you want to delete this text phrase, press YES. If not, press NO or EXIT.

EDIT ARC

This key accesses the chart preparation form that provides you with those functions associated with editing arcs and circles on text and draw charts. Refer to MOVE ARC, CHANGE ARC, DELETE ARC, PEN CONTROL, and Line Type (in this appendix).

EDIT AXES

This key causes line chart form 2 or 3 (refer to Organizing Line Chart Data in section 3) to be displayed so that you can change any of the minimum, maximum, and increment values for the x- and y-axes.

EDIT CHART

Press this key when you want to perform any editing function on the pie, bar, or line chart that you are currently preparing. When you press EDIT CHART, another chart preparation form that provides the appropriate editing functions for your type of chart will be displayed.

EDIT DATA

This key causes the appropriate data entry form containing the numerical data values for the current pie, bar, or line chart to be displayed. This form will be either pie chart form 2, bar chart form 2 or 4, or line chart form 4 or 6 (refer to the organizing data parts of section 3). If you are preparing a two-pie chart, a clustered or stacked bar chart, or a multiple line chart, you must select the pie, bar, or line for which you want to edit data before the form will be displayed (refer to PIE 1, BAR 1, and LINE 1).

EDIT LEGEND

This key causes the data entry form that contains legend information for the current clustered or stacked bar chart or for the current multiple line chart to be displayed. This will be either bar chart form 3 or line chart form 5 (refer to the organizing data parts of section 3). You can then edit legend information.

EDIT POINT

This key accesses the chart preparation form that provides you with those functions associated with editing points and lines on text and draw charts. Refer to MOVE POINT, INSERT POINT, DELETE POINT, ERASE LINE, PEN CONTROL, and Line Type (in this appendix).

EDIT TEXT

Use this key to edit a text phrase on a text and draw chart. First press EDIT TEXT. Then use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the text phrases on your chart. Stop when the graphics cursor is located in the beginning of the phrase that you want to edit. Then press (END LINE). The data entry form with the current design choice values for the text phrase will be displayed. You can now enter new values for any of the fields on this form. You can also cause data entry forms for any other text phrase on the chart to be displayed so that you can use their design choices for the phrase you are editing (refer to CPY LAST and CPY NEXT). When you press (END LINE) for the text phrase field, the text phrase will be redrawn on the chart on the CRT.

EDIT TITLE

This key causes the data entry form that contains title information for the current pie, bar, or line chart to be displayed. This will be either pie chart form 1, bar chart form 1, or line chart form 1 (refer to the organizing data parts of section 3). You can then edit the information in this form.

ERASE LINE

This key allows you to erase any line segment on the text and draw chart that you are currently preparing. First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the points on your chart. As the graphics cursor rolls through the points, the appearance of each succeeding line will change. When the appearance of the line that you want to erase has changed, press **ERASE LINE**. (Sometimes no line will change appearance, depending upon the order in which you entered the points to draw the lines. If no lines have changed appearance, nothing will happen when you press **ERASE LINE**. Press (ROLL) or (SHIFT) (ROLL) again to select a line.) If this is really the line you want to erase, press (END LINE) to erase it. You can also use (ROLL) or (SHIFT) (ROLL) again or select any other special function key instead of pressing (END LINE) if you do not want to erase the line.

EXIT

This key appears on nearly every form so that you can access the next higher chart preparation form in the sequence of forms. This is useful if, for example, you accidentally pressed the wrong key and do not wish to do anything with the current form. You would also press **EXIT** when you have finished using the functions available on the current chart preparation form. If you press **EXIT** while you are in the middle of performing an operation, that operation will not be completed. For example, if you are in the process of deleting an arc or a point, but have not pressed (END LINE) to complete the deletion, the arc or point will not be deleted from the chart when you press **EXIT**. Similarly, if you are filling out a data entry form, none of the data will be saved if you press **EXIT** instead of **ACC FORM**.

EXIT PAC

When you press **EXIT PAC**, you end your current session with the pac. If you want to start a new session, you must follow the procedures listed under Running the Pac in section 2 or immediately press (CONT).

HORIZONTAL

This key specifies that the next text and draw chart to be created will have a horizontal orientation on the CRT and on the paper or transparency film. This key label only appears when you are creating a text and draw chart.

HORIZ-ROTATED (HP-86 only)

This key selects the horizontal-rotated chart orientation for text and draw charts. This orientation causes charts to be drawn rotated 90 degrees clockwise and allows text and draw charts to be produced without distortion. Circles and squares are distorted in horizontal (unrotated) HP-86 text and draw charts.

HP-86

Use this key to indicate that you are using an HP-86 in the current pac session.

HP-87

Use this key to indicate that you are using an HP-87 in the current pac session.

INSERT POINT

This key allows you to convert one line segment into two connected line segments. First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the points on your chart. As the graphics cursor rolls through the points, the appearance of each succeeding line will change. Your new point will be inserted between the starting and ending points of the line whose appearance has changed. (Sometimes no line will change appearance, depending upon the order in which you entered the points to draw the lines. If no lines have changed appearance, nothing will happen when you press **INSERT POINT**. Press (ROLL) or (SHIFT) (ROLL) again to select a line.) When you have selected the right line, press **INSERT POINT**. Now use the cursor keys to move the graphics cursor to the position where you want your new point to be inserted. Press (END LINE). The line will be erased, and two new lines will be drawn connecting the starting and ending points with the new inserted point.

LINE CHART

This key accesses the appropriate forms for preparing single or multiple line charts.

LINE 1 through **LINE 6**

When you are editing a multiple line chart and press **EDIT DATA** or **DELETE LINE**, the **LINE 1** through **LINE 6** keys are displayed (depending upon how many lines are in the line chart). **LINE 1** refers to the line identified by the first legend at the top of the chart, **LINE 2** to the next legend down, and so on. Press the appropriate key to select the line for which you want to edit data or the line to delete.

LINES & ARCS

This key accesses the chart preparation forms that allow you to perform all operations associated with lines, arcs, and circles on a text and draw chart.

Line Type

"Line Type" is not a special function key, but it is a function that changes the line type on any line, arc, or circle on a text and draw chart. Before drawing a line, arc, or circle, press any keyboard key between (1) and (6) to specify line types 1 through 6; the computer will beep and the Line number displayed in the upper left corner of the chart preparation form will change to the number you have specified. Next press **START LINE** or **START ARC**. The line, arc, or circle that you are creating will be drawn in the specified line type. To change the line type of any line, arc, or circle that you have already drawn, first press **EDIT POINT** or **EDIT ARC**. Then use (ROLL) or (SHIFT) (ROLL) to select the line or arc whose line type you want to change (refer to **ERASE LINE** or **DELETE ARC** for a description of how to select the line, arc, or circle). Finally, press any keyboard key between (1) and (6). The line, arc, or circle will then be redrawn using the specified line type.

LIST CHARTS

When you press this key, a list of the charts contained on the chart storage disc that you are currently using will be printed on the system printer. (If you are not using a chart storage disc, you will be given the option of specifying a disc in the chart storage configuration form.) If you are not using a printer, the charts will be listed on the CRT. The list includes the chart name and the type (text and draw, pie, bar, or line) of each chart. For text and draw charts, the first text phrase and the orientation of the chart (horizontal or vertical) are printed. For pie, bar, and line charts, the title of the chart is printed.

LIST DATA

When you press this key, a list of the titles, labels, and data values for the pie, bar, or line chart that you are currently preparing will be printed on the system printer. If you did not specify a printer in the plotter/printer configuration form, the computer will beep to indicate that you cannot use this key.

LIST TEXT

When you press this key, a list of the text phrases on the text and draw chart that you are currently preparing will be printed on the system printer. The design choices for each phrase and the X and Y coordinates of the first character of the phrase are included in the list. Any special characters in the smooth and Roman fonts will be replaced with a blank space on the printed output. If you did not choose to print text and data in the plotter/printer configuration form, the computer will beep to indicate that you cannot use this key.

(more)

This key is on the first three pen control chart preparation forms. It allows you to access the next pen control form for more color options. Refer to PEN CONTROL.

MOVE ARC

This key allows you to move an arc or circle on a text and draw chart without changing the size of the arc or circle. First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the reference points of the arcs and circles on your chart. Then press MOVE ARC. Next, use the cursor keys to move the graphics cursor to the new center for your arc or circle. Now press (END LINE). The arc or circle will be erased and redrawn at the new location.

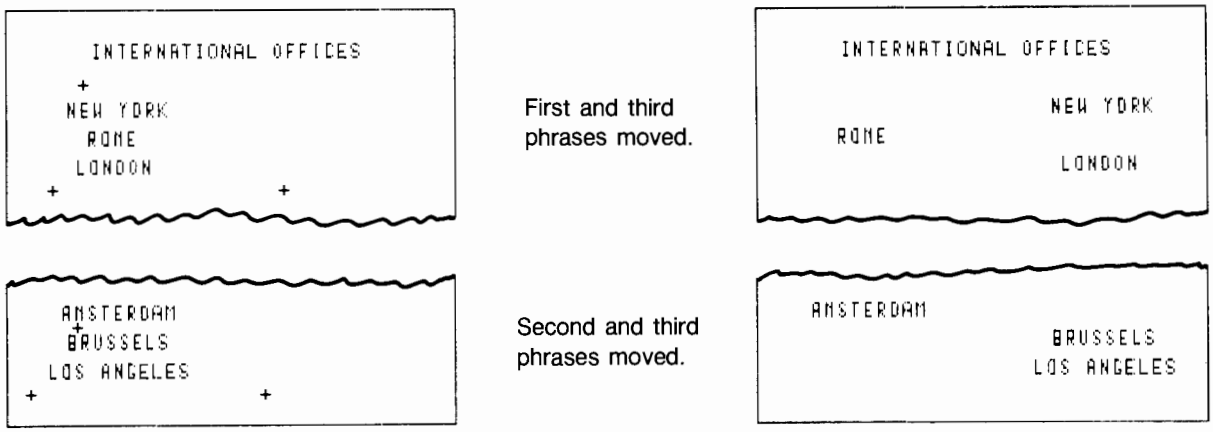
MOVE AREA

This key allows lines, arcs, and circles to be moved to another location on a text and draw chart. Use this key instead of MOVE ARC when you want to move more than one arc or circle. Use it also when you want to move an area that includes lines with or without arcs and circles. Refer to COPY AREA for a description of how this key operates. The only difference is that you will press MOVE AREA instead of COPY AREA, and the original area will be erased when it is redrawn in the new area.

MOVE BLOCK

This key allows you to move a block of text from one location on a text and draw chart to another location. This key differs from MOVE TEXT in that you can move a block of multiple text phrases rather than having to move them one phrase at a time. First press MOVE BLOCK. Then imagine a rectangular outline superimposed on the block that you want to move. Only the first characters of the phrases that you want to move must be

contained within the rectangle (see the following diagrams). Now use the cursor keys to move the graphics cursor to the lower left corner of the imaginary rectangle, and press (END LINE). Then use the cursor keys to move the graphics cursor to the upper right corner of the imaginary rectangle, and press (END LINE) again. You have now told the pac which text phrases you want to move. Now imagine where you want to place this rectangular block. Determine the position of the new lower left corner and move the graphics cursor to that position. Press (END LINE) and the phrases in the original block will be erased and redrawn at the new location. No lines, arcs, or circles contained in the original rectangular block will be moved. If the phrases do not fit within the borders of the chart, the move will not occur and you will be asked to try again.



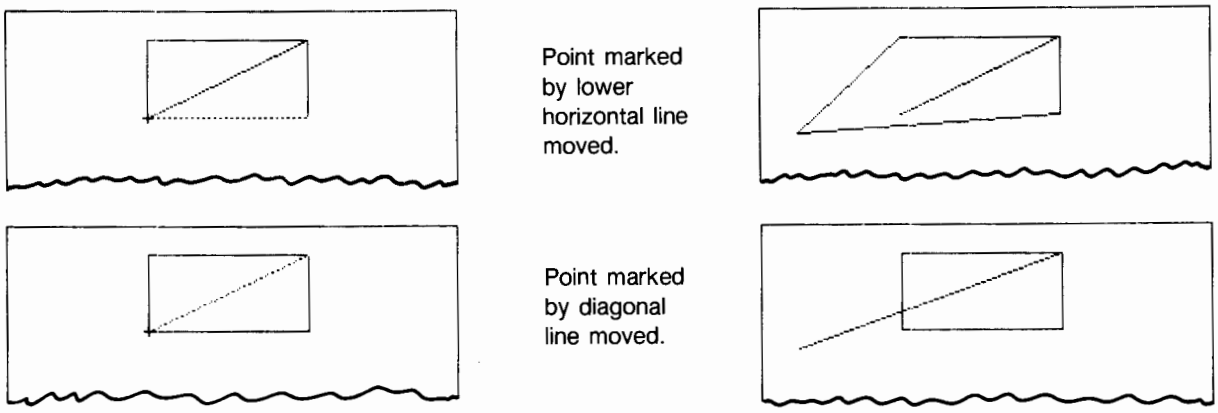
MOVE ~ COPY

This key accesses the chart preparation form that gives you the options of moving or copying an area of lines, arcs, and circles on a text and draw chart. Refer to **MOVE AREA** and **COPY AREA**.

MOVE POINT

With this key you can move one point in a series of two or more points that define the starting and ending points of line segments on a text and draw chart. First use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the points on your chart. Stop when the graphics cursor is flashing over the point that you want to move. Then press **MOVE POINT**. Next use the cursor keys to move the graphics cursor to the new location for the point and press (END LINE). The line(s) will be erased and redrawn to connect the moved point to the point(s) preceding and/or following it. When you are selecting the point, you might notice that the graphics cursor can roll to the same point more than once. This depends upon how you constructed the line segments. That is, if that point is a common endpoint of more than one line segment drawn with separate **START LINE** operations, the graphics cursor will roll to that point once for each **START LINE** operation.

The appearance of the line will change to indicate which line was created with that point as an endpoint. When you press MOVE POINT, only the particular line(s) currently associated with the point will be moved. (See the diagram below.)



MOVE SLICE

This key allows you to relocate a slice within an existing pie chart. After you press MOVE SLICE, label 1 on the appropriate pie will start blinking. (If you have a two-pie chart, you must press PIE 1 or PIE 2 to select the appropriate pie.) Use (ROLL) or (SHIFT) (ROLL) to step through the numbers in this pie in a counterclockwise or clockwise direction, respectively. When the number for the slice that you want to move is blinking, press (END LINE). Then labels 1 and 2 will start blinking. Use (ROLL) or (SHIFT) (ROLL) again to cause different pairs of numbers to blink. When you have located the pair between which you want to move the slice, press (END LINE). The pie chart will then be redrawn.

MOVE TEXT

This key allows you to move a single text phrase on a text and draw chart from one location to another. First press MOVE TEXT. Then use (ROLL) or (SHIFT) (ROLL) to advance or reverse the graphics cursor through the text phrases on your chart. Stop when the graphics cursor is located at the beginning of the phase that you want to move. Then press (END LINE). Now use the cursor keys to move the graphics cursor to the new position where you want the text phrase to begin. Press (END LINE) to enter this new position. The text phrase will then be erased and redrawn in the new position on the chart. If the phrase does not fit within the borders of the chart, the move will not occur and you will be asked to try again.

NEW CHART

This key appears when you exit from working on a chart that you have previously stored on the chart storage disc. It is a possible response to a prompt asking how you want to store the chart; this is a safeguard so that you will not accidentally lose the chart if you go on to create or recall a different chart. This key also appears when you press STORE CHART after working on a previously stored chart. If you press NEW CHART, you will enter a new chart name for the chart. Then the original chart will remain stored on the chart storage disc, and the edited chart will be stored under the new name that you have specified.

NXT FORM

This key allows you to move sequentially between successive data entry forms when editing data for pie, bar, or line charts (pie chart form 2, bar chart form 2 or 4, or line chart form 4 or 6; refer to the organizing data parts of section 3). For example, suppose you have one line that has 14 points. When you press EDIT DATA, the data entry form for points 1 through 8 is displayed. If you want to edit the data for the eleventh point, press NXT FORM to display the form that contains the eleventh point. When the last form is reached, pressing NXT FORM cycles back to the first of these data entry forms.

PAPER

This key appears after you press PLOTTER FINAL. If you press PAPER, the plotter will move at a high speed; paper is the recommended plotting medium for this speed. Be sure to use the pens designed for plotting on paper.

PAPER SIZE A (HP 9872 Plotter only)

This key specifies that you are plotting on size "A" paper. This paper measures 8½ in. by 11 in. (297 mm by 420 mm).

PAPER SIZE B (HP 9872 Plotter only)

This key specifies that you are plotting on size "B" paper. This paper measures 11 in. by 17 in. (210 mm by 297 mm).

PEN CONTROL

This key allows you to select a new pen number for a line, arc, or circle on a text and draw chart. To change the pen number when starting a line, arc, or circle, press PEN CONTROL before pressing START LINE or START ARC. To change the pen number for any line, arc, or circle that you have already drawn, first press EDIT POINT or EDIT ARC. Then use (ROLL) or (SHIFT) (ROLL) to select the line, arc, or circle whose pen number you want to change (refer to ERASE LINE or DELETE ARC for a description of how to select the line, arc, or circle). Finally, press PEN CONTROL. When you press PEN CONTROL, the pac will display the first of four chart preparation forms that give you 16 color choices. Use the (more) and (again) keys to move between the forms. Then press the key that represents the color you want. The keys are: BLACK, RED, BLUE, GREEN, LIME, GOLD, ORANGE, BROWN, 9, 10, 11, 12, 13, 14, 15, and 16. The color key labels represent the standard colors for pen numbers 1 through 8. The numeral key labels (9 through 16) are for you to define. For example, you might want to use more than eight colors or use pen numbers 9 through 16 to represent wide pens with the same colors as the standard pen colors (1 through 8).

PIE CHART

This key accesses the appropriate forms for preparing pie charts with either one or two pies.

PIE 1 and PIE 2

When you are editing a two-pie chart and press MOVE SLICE, EDIT DATA, ADD SLICE, or DELETE SLICE, the PIE 1 and PIE 2 keys are displayed. PIE 1 refers to the pie on the left side of the chart, and PIE 2 to the pie on the right side of the chart. Press the appropriate key to select the pie that you want to edit.

PLOT CHART

This key accesses the chart preparation form that offers various plotting options such as drawing a chart on the CRT and plotting either a quick or a final version on a plotter. Refer to **CRT FAST**, **CRT FINAL**, **PLOTTER FAST**, **PLOTTER FINAL**, **REDRAW CRT**, **PRINT/STR GRAF**, and **REDRAW-ROTATE** (HP-86 only).

PLOTTER FAST

When you press this key, a quick version of the chart that you are currently preparing is plotted on the plotter. The chart will be plotted using only pen number 1 and the normal upright or normal slanted character fonts. Line types will be plotted, but hatch types will not. If you did not choose to plot charts in the plotter/printer configuration form, the computer will beep to indicate that you cannot use this key.

PLOTTER FINAL

When you press this key, you will be given the choice of plotting on paper or transparency film (refer to **PAPER** and **TRANSPARENCY**). Then the final version of the chart that you are preparing will be plotted on the plotter. All pen colors, hatch types, line types, and character fonts (for text and draw charts) will be used. If you did not choose to plot charts in the plotter/printer configuration form, the computer will beep to indicate that you cannot use this key.

PRINT

This key initiates the print operation in **PRINT/STR GRAF**. The current chart will be printed on the system printer in the format previously selected for use in the current session: **82905A**, **82905B**, or **STANDARD** (HP standard graphics printer).

PRINT/STR GRAF

This key selects the print/store graph operation. This allows you to print a graphics image of your chart on the system printer. A compatible Series 80 graphics printer must be connected to your system and entered in the system configuration form. This key also allows you to store your chart in a GRAF file, formatted for the selected printer type **82905A**, **82905B**, or **STANDARD** (HP standard graphics printer). A printer does not have to be connected to your system to store the GRAF file.

QUICK

This key selects the "quick" start option. This startup bypasses the two system configuration forms, using the configuration information stored on the "CHARTS" disc.

RECALL CHART

This key allows you to retrieve any chart that was previously stored on your chart storage disc. When you press **RECALL CHART**, you will be asked for the name of the chart that you want to recall. (If you are not using a chart storage disc, you will first be given the option of specifying a disc in the chart storage configuration form.) If the pac cannot find the chart with the chart name that you entered, a message will be displayed. Check to see that you spelled the chart name correctly, or that you are using the correct chart storage disc for the chart that you want to recall. (You can use **LIST CHARTS** to obtain a copy of the chart directory on the chart storage disc that you are currently using.) When the pac has retrieved the chart, the chart will be drawn on the first chart preparation form for that chart type so that you can refer to it for editing or plotting the chart.

REDRAW CRT

This key erases the text and draw chart that you are preparing from the CRT and redraws it on the CRT. This is particularly useful if editing has caused portions of the chart to be erased or overdrawn on the CRT (but not necessarily on the final chart). By redrawing the chart on the CRT, you can see what the chart really looks like and determine whether you have inadvertently overdrawn or erased something.

REDRAW-ROTATE (HP-86 only)

This key redraws a horizontally formatted text and draw chart in the horizontal-rotate format. This operation rotates the chart 90 degrees clockwise and removes the distortion present in the horizontal (unrotated) format. It also rotates a horizontal (unrotated) chart to horizontal-rotate format, and can be used to toggle between the two formats.

REPLACE CHART

This key appears when you exit from working on a chart that you have previously stored on the chart storage disc. It is a possible response to a prompt asking how you want to store the chart; this is a safeguard so that you will not accidentally lose a chart. This key also appears when you press STORE CHART after working on a previously stored chart. If you press REPLACE CHART, the data for the original chart will be replaced by the data for the current chart on the chart storage disc; the chart will be stored with the same name as the original chart.

STANDARD

This key selects an HP standard graphics printer as the PRINT/STR GRAF printer in the current pac session. The following graphics printers are some of the HP standard types: HP 2631G, HP 2671G, and HP 2673A. A chart must be formatted according to the destination printer type, prior to printing or storing.

START ARC

This key allows you to add an arc or a circle to a text and draw chart. First use the cursor keys to move the graphics cursor to the center of your new arc or circle. Then press START ARC; a dot will appear on the CRT to mark the center point. This dot will not be plotted on your final chart, but will be useful as a reference point on the CRT when you want to move or copy an area of the chart. Next use the cursor keys to move the graphics cursor to the starting point of your arc or circle and press (END LINE). (The distance between the center and the starting point is the radius.) Now use (←) to draw a counterclockwise arc, or (→) to draw a clockwise arc. Continue to press the cursor until the desired size of arc has been drawn. If you are drawing an arc using (→), you can back up to erase segments of the arc by using (←), and vice versa. The starting point of the arc or circle is the 0 degree point. While the arc is being drawn, the size of the arc in degrees is displayed in the upper left corner of the chart preparation form. Each time you press (←) or (→), the arc progresses 10 degrees. You can move in 1-degree increments by pressing (SHIFT) with (←) or (→). If you want to draw a circle, simply press (↑); the whole circle will be drawn automatically by the pac. When the circle has been drawn, ARC=360 will be displayed. Press (END LINE) when you have finished drawing the arc or circle.

START LINE

This key allows you to add a new line to a text and draw chart. First use the cursor to move the graphics cursor to the starting point of your new line. Then press **START LINE**. A dot will appear on the CRT under the graphics cursor. Now use the cursor keys to move the graphics cursor to the endpoint of the line. Press (END LINE) to cause a line to be drawn between the dot (starting point) and the graphics cursor (endpoint). You can continue drawing successive connected lines or proceed to another function. To continue drawing, simply move the graphics cursor to a new endpoint and press (END LINE). This feature allows you to quickly draw a rectangle, triangle, or other shape. If you want to draw another line that is not connected to the previous line, simply move the graphics cursor to the new starting point and press **START LINE** again. Then follow the procedure described above.

STOP PLOT

This key is always an option while a chart is being drawn on the CRT or plotted on a plotter. When you press this key, the chart being plotted will stop at the completion of the current operation. (For example, if you press **STOP PLOT** while the first word of a text phrase in normal font is being plotted, the plot will not stop until the entire phrase has been plotted.) If you press any of the plotting function keys after stopping a plot partway through, the new plot will start over at the beginning; it is not possible to restart a plot at the point at which it was stopped.

STORE

Initiates the store operation in **PRINT/STR GRAF**. A GRAF file is stored under the selected file name on the selected storage disc. The chosen file name cannot duplicate a chart name on the disc. The GRAF file is formatted for the graphics printer type previously selected for use in the current session: **82905A**, **82905B**, or **STANDARD** (HP standard graphics printer). The GRAF file can be recalled later, and printed. The printer does not have to be connected to your system to store the GRAF file.

STORE CHART

When you press this key after creating a new chart, the pac will automatically store your chart using the chart name you specified before you created the chart. If you have been working on a previously stored chart and you press **STORE CHART**, you will be asked whether you want to replace the original chart on the disc or store it under a new name. If you did not choose to store and recall charts when you filled out the chart storage configuration form, you will first be asked whether you want to change the no storage option in order to store this chart.

TEXT

This key accesses the chart preparation forms that allow you to perform all operations associated with text phrases on a text and draw chart.

TEXT & DRAW

This key allows you to access the appropriate forms for preparing text and draw charts.

TOGGLE

This key toggles between the alpha and graphics display during the **PRINT/STR GRAF** operation. Press the key once to view the chart; press it again to return to the special function keys.

TRANSPARENCY

This key appears after you press **PLOTTER FINAL**. If you intend to plot on overhead transparency film, press **TRANSPARENCY**. The plotter will then move at the recommended speed for transparency film. Be sure to use the pens designed for plotting on transparency film.

TUTORIAL

This key selects the tutorial startup option. When selected, the pac gives a brief introduction to filling out data entry forms. If you've never used the pac, it is a good idea to start a session with this option. When the tutorial is finished, the pac returns to the point where you select from the three startup options: **TUTORIAL**, **CONFIGUR**, and **QUICK**.

VERTICAL

This key specifies that the next text and draw chart to be created will have a vertical orientation on the CRT and on the paper or transparency film. This key label only appears when you are creating a text and draw chart.

Appendix D

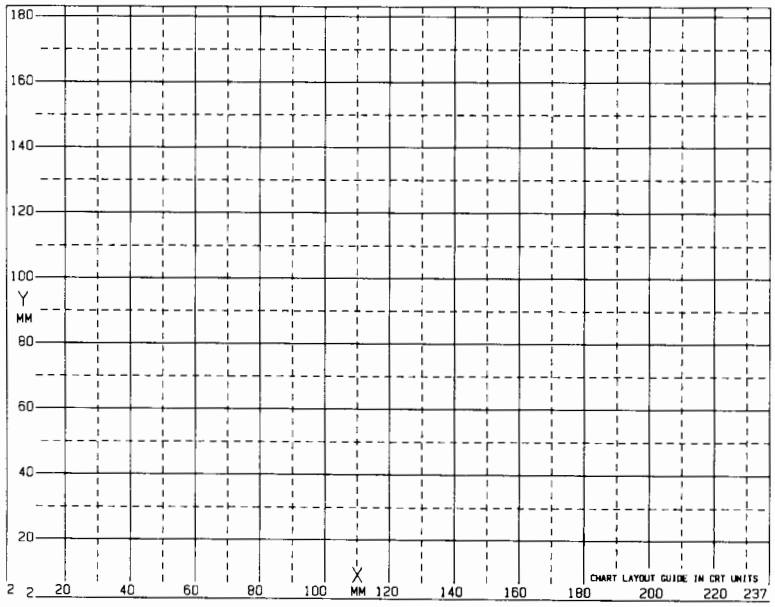
Overlaying Charts

The GP Pac is designed to create four types of charts: text and draw charts, pie charts, bar charts, and line charts. In some cases you might want to use the text and draw features with another type of chart, for example, if you wanted to add detailed text to a pie chart. It is possible to "overlay" or superimpose two different charts by simply plotting one chart over the other on one piece of paper or transparency. The results might be unexpected however, unless there was a way of telling, prior to plotting, how the charts would line up.

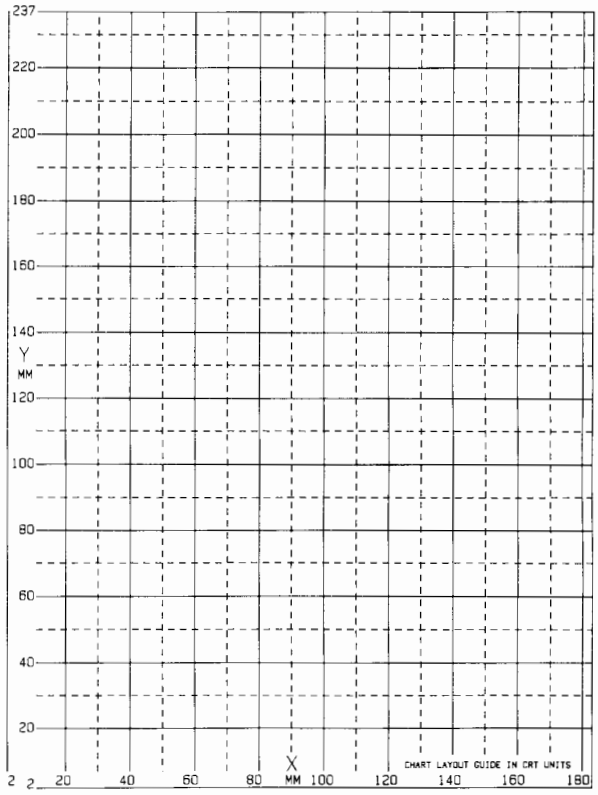
The pac provides an aid for aligning text and draw charts with any of the other three chart types. Since the text and draw charts are created on a scaled grid, you need only know the corresponding coordinate positions on the pie, bar, and line charts. A separate text and draw chart containing the overlay labels, lines, and arcs, at the desired coordinates, can be created and then plotted over the existing pie, bar, or line chart.

The "CHARTS" disc provided with the pac contains two text and draw charts named HORIZ-GRID and VERTI-GRID. The HORIZ-GRID chart can be plotted as a transparency and used as a guide for overlaying text and draw charts with other charts. The VERTI-GRID chart can be used in the same way for overlaying vertically formatted text and draw charts with other charts.

To obtain a transparency copy of the two charts, use the RECALL CHART special function key followed by PLOT CHART for the HORIZ-GRID chart and then the VERTI-GRID chart. Plotting transparencies requires either the HP 17055A or the HP 17057A Overhead Transparency Kit. Use the PLOTTER FINAL and TRANSPARENCY plotting options.



HORIZ-GRID CHART



VERTI-GRID CHART

The horizontal grid should be used for overlaying text and draw charts in the horizontal or horizontal-rotate (HP-86 only) format with pie, bar, and line charts. Pie, bar, and line charts are all produced in the horizontal format.

The vertical grid is supplied so that vertical format text and draw charts can be overlayed with pie, bar, and line charts. The vertical format chart is rotated 90 degrees counterclockwise when plotted.

To use the text and draw chart overlay grid with a pie, bar, or line chart follow these steps:

1. Plot the VERTI-GRID or HORIZ-GRID text and draw chart on transparency. If you intend to use text and draw to overlay horizontal text, use the HORIZ-GRID. To overlay vertical text, use VERTI-GRID. These grids need to be plotted only once, and can be reused.
2. Create the pie, bar, or line chart, store it, and plot it. (Refer to section 3.)
3. Place the transparency grid on top of the pie, bar, or line chart. For horizontal format, the grid corner marked X=2,Y=2 should be placed near the lower-left corner of the pie, bar, or line chart. Align the edges of the transparency with the chart plot. For a vertical grid, place the corner marked X=2,Y=2 near the lower-right corner of the pie, bar, or line chart.
4. Create the overlay text and draw chart (refer to section 3). Position the labels, lines, and arcs according to the grid points now visible on your pie, bar, or line chart through the overlay grid (from step 3).

5. Store the text and draw overlay chart. Load your plotter with the chart plot from step 2 and plot the text and draw chart over the pie, bar, or line chart.

The above procedure could also be used to overlay a group of text and draw charts with each other. Use the horizontal or vertical grid with an existing text and draw chart plot.

Note: If you use this overlay feature and have more than one type of plotter available, you should plot the grids on each plotter and only use the grids for the appropriate plotter.

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