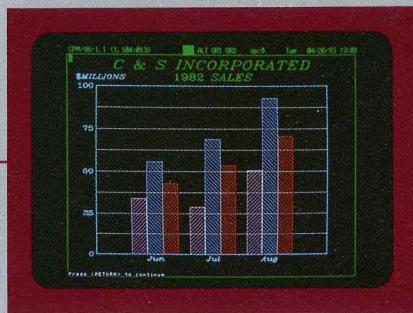# DIGITAL RESEARCH™

DR Graph™

Graphic Application
User's Guide

DIGITAL RESEARCH™

DR Graph™

Graphic Application

User's Guide

COPYRIGHT

DISCLAIMER

TRADEMARKS

Second Edition: June 1983

Foreword

ABOUT THIS
MANUAL

This User's Guide describes the features and use of DR Graph™, the interactive graphing program. Tutorial in nature, this manual includes background material and examples to help you use DR Graph in your specific environment.

Section 1 of this manual introduces you to DR Graph's features and capabilities. Section 2 explains how to install and operate DR graph. Instructions for making a working system disk are covered here.

Section 3 introduces you to the main menus and guides you through creating your first line, bar, and pie graphs. Section 4 shows you how to produce more complex graphs and how to combine several graphs on one page.

Section 5 describes the sources from which DR Graph accepts data, and tells how you can access it and use it on your graphs. Section 6 summarizes each menu and screen display, and describes options and possible entries you can make. Appendix A provides a glossary of terms you will find in DR Graph.

Table of Contents

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Table of Contents (continued)

Appendix

Tables

Figures

Table of Contents (continued)

Table of Contents (continued)

Section 1

OVERVIEW

INTRODUCTION

DR Graph is an interactive software package that lets you use your microcomputer to draw graphs and charts. DR Graph lets you create a graph, preview, change, and enhance it before you print or plot it. This section introduces you to DR Graph by explaining its features and capabilities and previewing the detailed sections that follow.

COMPUTER
GRAPHING

Historically, graphic images have relayed the information necessary for communication. Graphs take advantage of nonlinear communication channels that let you perceive a number of details at a glance rather than one sequential fact after another.

Graphs convey information about a complex set of data. Well designed graphs are more effective than other types of communication in creating interest and capturing the attention of the audience. Facts are more easily analyzed, understood, and remembered when they are presented graphically. Charts often emphasize hidden facts and relationships that change conclusions or that stimulate further analysis.

YOUR COMPUTER

Your computer and the appropriate peripherals (terminals, plotters, and printers) help you create effective graphs. Your computer manages the repetitive tasks of drawing, plotting, and labeling data. It does these tasks quickly and accurately. In a sense, the computer is an automated draftsman. The graphics terminal is an information window where you can create and preview graphs that illustrate and emphasize facts or relationships.

DR GRAPH   The first step in creating a graph is telling the computer
                      what you want the graph to look like. DR Graph lets you
                      quickly and easily describe graphs to a computer. The com-
                      puter does most of the work while you concentrate on data
                      definition and design to make your graph communicate
                      your ideas. The capabilities of DR Graph, good graph de-
                      sign, and your aesthetic judgement let you produce high
                      quality, professional graphs like the one shown in Figure
                      1-1.
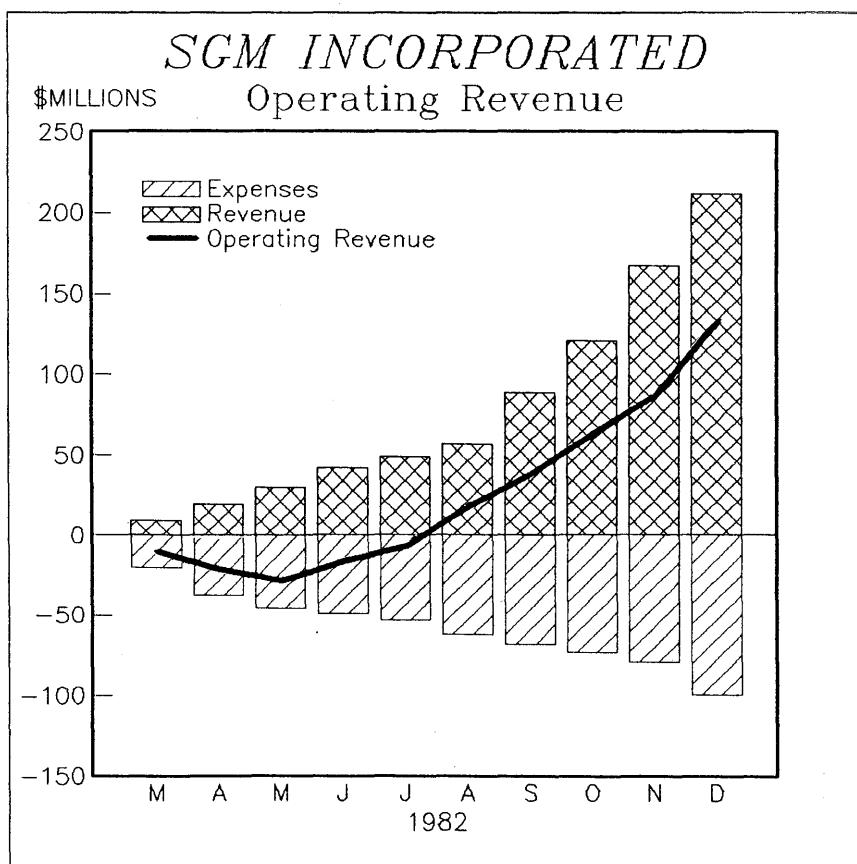
Figure 1-1.   Sample Graph

FEATURES AND BENEFITS

DR Graph is a menu-driven program. This means you communicate with DR Graph by selecting a task from a list of options. After you select a task, DR Graph either displays a form for you to fill out, or prompts you to supply information. In a short time, DR Graph helps you create a graph.

DR Graph lets you create and design graphs without guesswork by initially making some of the design decisions for you. For example, it sets the size of the letters and linestyle. As you become familiar with DR Graph and its capabilities, you can change these settings, which are called defaults.

CAPABILITIES

DR Graph helps you in these ways:

- create and edit the types of graphs below and automatically plots the data points

  line graphs
  bar graphs
  pie graphs
  step graphs
  stick graphs
  scatter graphs

- create text-only charts
- recall a graph that you have already created so you can either edit it or produce a copy of it
- display your current graph on a graphics terminal or generate a copy of it on a plotter or printer
- modify the horizontal and vertical axes and labels
- combine different types of graphs on the same page or on the same axes within one graph

Sections 3 and 4 show you how to use these DR Graph capabilities.

DESIGN CONTROLS

As you design a graph, DR Graph lets you control the following graph elements:

- generate graph titles, subtitles, and legends that vary in text size, font, and color
- designate data points with special marker symbols
- add text to graphs
- fill areas such as bars or pie slices, with a specified color and pattern
- select the linestyle, width, and color

DR GRAPH
MENUS

DR Graph menus help you select options in the appropriate order and prompt you for additional information as it is required. DR Graph computes the axis, and labels and plots values for you.

The menus provide a table of contents of DR Graph functions. The MAIN MENU selections define types of graphs and categories of functions. Submenus describe design details for a graph type.

Figure 1-2 on the following page maps the DR Graph menu system. Looking at the menu map, you can see how DR Graph routes you through its menu system. When you select an option from the MAIN MENU, DR Graph takes you to a submenu with more selections or prompts you for additional information. Each menu selection or response takes you to a level of increasing detail. However, you decide the level of detail. You can make simple graphs with the main menus in just a few steps, or you can use the submenus to create graphs with greater detail and more complex design.
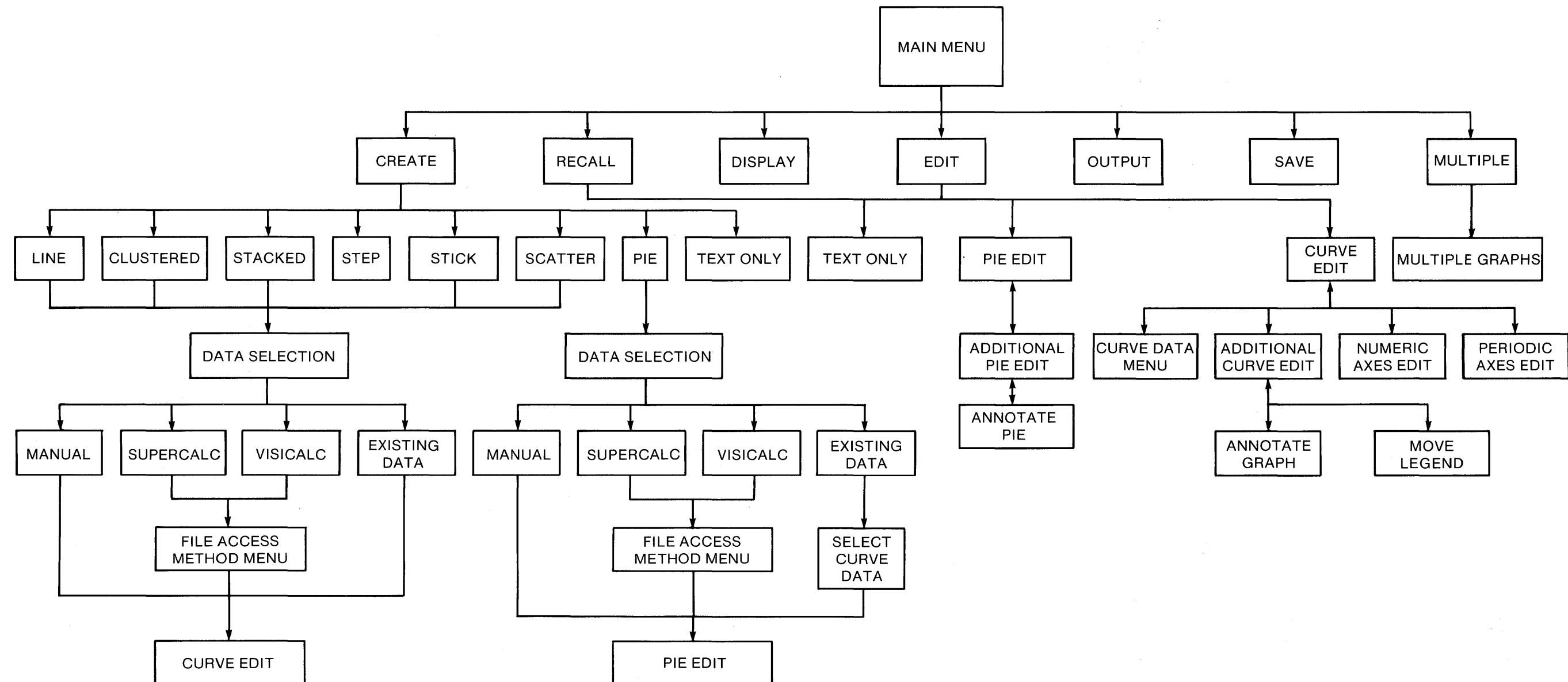
Figure 1-2.   DR Graph Menu Map

All Menus except Annotate and Move legends have the option to
return to the Main Menu.

End of Section 1

Section 2

INSTALLATION

INTRODUCTION

DR Graph is easy to install and operate on your micro-computer system. This section explains the steps you need to follow to install DR Graph on your system.

SYSTEM REQUIREMENTS

You can run DR Graph on microcomputers that use the Graphics System Extension (GSX™) on one of the supported operating systems. GSX gives your operating system graphics capability, which means that you can run DR Graph and many other graphics application programs on many different graphics devices. Your GSX documentation lists specific devices.

For CP/M-80 Systems

DR Graph has specific memory requirements. If your system is running CP/M-80™, your system needs a minimum of 64K bytes of memory and two disk drives with 190K bytes per disk or the equivalent to run DR Graph.

For CP/M-86 Systems
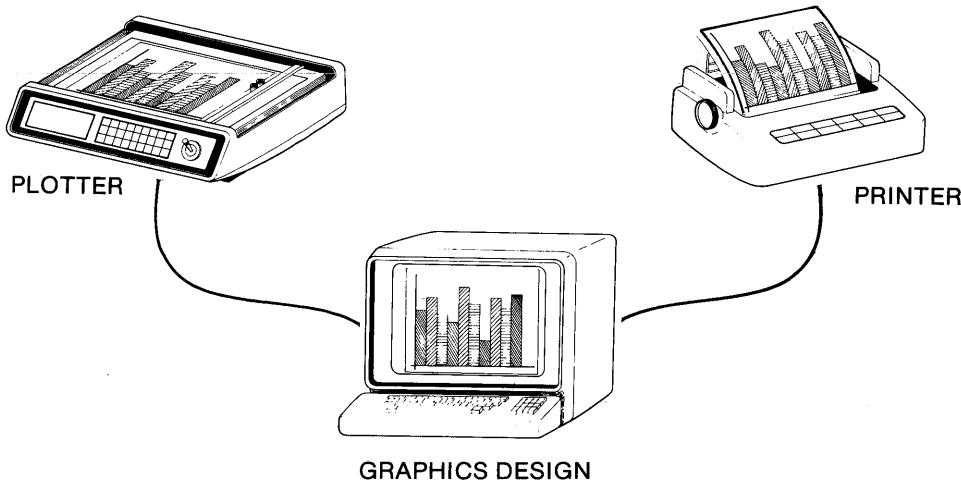
If your system is running CP/M-86®, it must have 192K bytes of memory and two disk drives with 160K bytes per disk or the equivalent to run DR Graph.

For both CP/M® systems, you also need a graphics display terminal or an alphanumeric display terminal equipped with a special graphics board. You use the terminal to create graphs, analyze the data, or preview the graphs. To make hard copies of your graphs, you also need a plotter or printer.

A TYPICAL SYSTEM   A typical system configuration consists of a microcomputer
                     with a graphics display terminal and a dot matrix printer
                     and/or a plotter for generating hard copy. The peripherals
                     must be connected physically to your microcomputer.
                     Check with your dealer and your GSX documentation for
                     a list of GSX-compatible peripherals for your computer
                     system.

PLOTTER   PRINTER

GRAPHICS DESIGN

Figure 2-1.   A Typical System

GETTING STARTED   Now you are ready to start the DR Graph program on
                     your system. To help you with that job, this section gives
                     you detailed information and a checklist to follow. This
                     section does not replace the manuals that came with your
                     computer system, but it refers you to topics in them.

INSTALLING
DR GRAPH

First, you need to set up your hardware. The operating manuals for your equipment explain how to hook up peripherals, power up your system, insert disks, and boot the system.

Next, check your DR Graph distribution disk to ensure it contains all the required files. Display a directory of the disk with the CP/M DIR command. Your *CP/M Operating System User's Guide* tells you how to use the DIR command.

CP/M-80

For CP/M-80 systems, your DR Graph distribution disk contains the following files:

- GRAPH.COM
- GRAPH1.OVL
- GRAPH2.OVL
- GRAPH3.OVL
- GRAPH4.OVL
- GRAPH5.OVL
- GRAPH6.OVL
- GRAPH7.OVL

- GRAPH8.OVL
- GRAPH9.OVL
- GRAPHA.OVL
- GRAPHB.OVL
- GRAPHC.OVL
- GRAPHY.MNU
- GRAPHZ.TBL

CP/M-86

For CP/M-86 systems, your DR Graph distribution disk contains the following files:

- GRAPH2.CMD or GRAPH.CMD
- GRAPHY.MNU
- GRAPHZ.TBL
- RUN.CMD

If any files are missing, ask your distributor for a new disk. If your disk contains all the required files, use the PIP or your copy program to make a back-up copy of your DR Graph distribution disk. For information on using these commands and creating back-up copies of your disk, refer to your *CP/M Operating System User's Guide*.

Note: Always use the back-up disk to make copies of DR Graph. Never use the distribution disk for routine operations.

Now, store your distribution disk in a safe place. You are ready to transfer the DR Graph files from the back-up disk to a working system disk.

CREATING A
WORKING SYSTEM
DISK

To create a working system disk, use the PIP or copy program to copy your CP/M system to a disk. Then, use the PIP utility to copy the DR Graph and GSX files to the system disk as described below. For detailed information on the copy and PIP programs, refer to your *CP/M Operating System User's Guide*. Before you begin creating a working system disk, ensure that the CP/M, DR Graph, and GSX back-up disks contain all the files from the distribution disks that you purchased from the dealer. If the disks are complete, you can begin to create a working system disk.

CP/M-80

Start with the copy program and copy your CP/M system to a disk. Then, use the PIP utility to copy the DR Graph files from the back-up disk to the CP/M disk. Use PIP again to copy the files, ASSIGN.SYS, GENGRAF.COM, and GSX.SYS from the GSX back-up disk to the disk with the DR Graph files and your CP/M system. If this disk has additional space, also add the device driver files for the devices that you will be using. If the disk has insufficient space for the device drivers, ensure that the drive designation, which indicates the drive on which the device driver resides, precedes each device driver in the ASSIGN.SYS file. For more information on drive designations in file specifications, refer to your *CP/M Operating System User's Guide*.

If your system has a fixed nonremovable disk, commonly called a hard disk, or you use double-sided, double-density disks, all the files can fit on one disk.

CP/M-86

Start with the copy program and copy your CP/M-86 system to a disk. Then, use the PIP utility to copy all DR Graph files to the disk containing your CP/M-86 system. Use PIP again to copy RUN.CMD, ASSIGN.SYS, and GRAPHICS.CMD, to the CP/M-86 disk. If the disk has sufficient space, add the device driver files to the disk.

If you have a hard disk or use double-sided, double-density disks, all the files can fit on one disk.

However, if the disk for your system does not have sufficient storage space for all the files, use two disks. After you copy your CP/M-86 system to a disk, use the PIP utility to copy the GRAPH2.CMD or GRAPH.CMD file to the disk containing the CP/M-86 system. Then, use PIP again to copy the remaining DR Graph files and the GSX files, including the device driver files, to a second disk.

CHECKING THE
ASSIGN.SYS FILE

Before you use DR Graph, ensure the logical device number assignments in the GSX ASSIGN.SYS file are correct.

The logical device numbers precede the device drivers in the ASSIGN.SYS file. DR Graph requires that the device driver for a specific type of logical device has a specific logical device number assignment. Table 2-1 lists the logical device number assignments for specific types of logical devices. For more information on the ASSIGN.SYS file, specific device drivers, and these assignments, refer to your GSX documentation.

Table 2-1. Logical Device Number Assignments

Logical Device Numbers	Logical Devices
1	Graphics Display Terminal
11	Plotter
21	Printer

In addition, the first file in the ASSIGN.SYS file must be the largest device driver. For example, if the device driver for the printer is larger than the device driver for the graphics display terminal, the printer device driver should be the first device driver listed in the ASSIGN.SYS file.

Using DR Graph

When your CP/M system, DR Graph, and GSX files are on one or more disks, and you have checked the ASSIGN.SYS file, you are ready to use DR Graph. Insert the disks in the appropriate drives and follow the instructions in your *CP/M Operating System User's Guide* for starting your CP/M system. If your files are on more than one disk, ensure the disk that contains CP/M is in the system drive, which is usually drive A.

CP/M-80

When you receive the CP/M system prompt, type GRAPH as shown below:

`A>GRAPH`

```
---------------------------------------------------
GSX-80 1.0  15 NOV 82    Serial No xxxx-0000-000000
Copyright (C) 1982
Digital Research, Inc.        All Rights Reserved
---------------------------------------------------
```

Your system displays the above sign-on message before it displays a menu that lets you tell DR Graph whether you want to create, edit, display, or print a graph. The next section, "Getting Started," tells you more about this and other DR Graph menus.

If the working system disk has insufficient space for the device driver files, you should not store any data files that you create with DR Graph on it. When you store or recall a data file, DR Graph prompts you for the name of the file. In response, specify the filename and include the disk drive designation of the disk on which the file exists.

CP/M-86

If your CP/M system, GSX, and DR Graph files are on one disk, insert the disk in the system drive, and follow the instructions in your *CP/M Operating System User's Guide* for starting your CP/M system. After you receive the CP/M system prompt, type the following to start DR Graph:

```
A>GRAPHICS


-----------------------------------------------------
GSX-86  Graphics System Extension    18 Mar 83 V1,1
Serial No, xxxx-0000-000000     All Rights Reserved
Copyright (c) 1983           Digital Research, Inc,
-----------------------------------------------------


GSX-86 installed
DDMX80,SYS is 17920 bytes long at 05B3:0000

A>RUN GRAPH
```

or

```
A>RUN GRAPH2


-----------------------------------------------------
DR Graph             19 May 1983              V1,0
Serial No, xxxx-0000-000000     All Rights Reserved
Copyright (c) 1983           Digital Research Inc,
-----------------------------------------------------
```

The above sign-on messages appear on your screen before the menu display. If you enter the RUN GRAPH command and receive a question mark from CP/M, you have a high-performance system. Enter the RUN GRAPH2 command instead of RUN GRAPH.

The information that you enter to start DR Graph is slightly different when all your files are not on the same disk. If your files are on two disks, type the following:

```
A>B:
B>GRAPHICS
```

```
--------------------------------------------------------
GSX-86  Graphics System Extension    18 Mar 83 V1.1
Serial No. xxxx-0000-000000    All Rights Reserved
Copyright (c) 1983         Digital Research, Inc.
--------------------------------------------------------

GSX-86 installed
DDMX80.SYS is 17920 bytes long at 05B3:0000

B>RUN A:GRAPH

or

B>RUN A:GRAPH2

--------------------------------------------------------
DR Graph          19 May 1983              V1.0
Serial No. xxxx-0000-000000    All Rights Reserved
Copyright (c) 1983         Digital Research Inc.
--------------------------------------------------------
```

Your system displays the above sign-on messages before it
displays a menu. You must specify the drive designation
when the files are on disks in different drives or DR Graph
assumes the files are on the current default disk.

Getting Started
Checklist

☐ Has the system been powered up?

☐ Is the system disk inserted in the appropriate drive?

☐ Is the system booted up?

☐ Does the DR Graph distribution disk contain all the files required?

☐ Are back-up copies of the CP/M system, GSX, and DR Graph files available?

☐ Is the original DR Graph distribution disk stored away?

☐ Are the appropriate files copied to the working system disk?

☐ Is the order of the files and the logical device number assignments in the ASSIGN.SYS file correct?

☐ Did you type the right commands to run DR Graph?

Soon after you type the appropriate commands to DR Graph on your CP/M system, DR Graph displays copyright information on the screen. After a few moments, DR Graph displays its MAIN MENU. You are ready to turn to the next section, "Getting Started." It tells you about the MAIN MENU and shows you how to use the graphing capabilities of DR Graph.

End of Section 2

Section 3

GETTING STARTED

INTRODUCTION

This section helps you teach yourself how to use DR Graph. Examples guide you through creating three of the most popular types of graphs: line, clustered bar, and the pie chart. Do not worry about making mistakes. They are easier to correct with DR Graph than on paper.

You might encounter new terminology in this section. If you do, refer to Appendix A, the "Graphic Glossary" at the back of this manual.

CREATING A
LINE GRAPH

One of the most common graphs is the simple line graph. It is the first graph that this section teaches you to create. The line graph contains most of the elements of other more complex graphs that you will create as you continue through the tutorial sections of this manual.
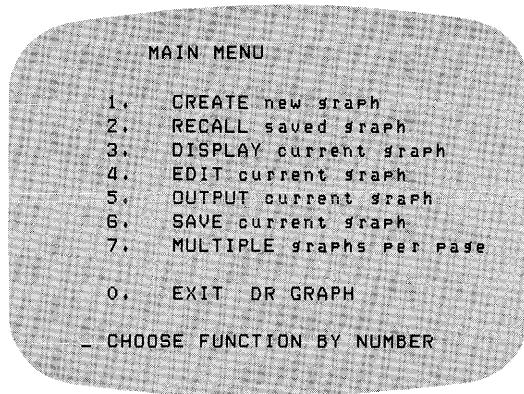
MENUS

If you want additional details on any of the menus in DR Graph, refer to Section 6, "Moving Around in the Menus." It describes all the menus in DR Graph.

THE MAIN MENU   By now you should see the MAIN MENU on your screen. This is where everything starts. Read the menu. It tells you the basic functions of DR Graph.


```
               MAIN MENU

          1.    CREATE new graph
          2.    RECALL saved graph
          3.    DISPLAY current graph
          4.    EDIT current graph
          5.    OUTPUT current graph
          6.    SAVE current graph
          7.    MULTIPLE graphs per page

          0.    EXIT DR GRAPH

        CHOOSE FUNCTION BY NUMBER
```

Figure 3-1.   MAIN MENU

You can see that DR Graph lets you create, recall, display, edit, output, and save graphs. Now, enter the number 1 to start creating a new graph.

CREATE NEW
GRAPH MENU

When you select option 1 from the MAIN MENU, DR Graph displays the CREATE NEW GRAPH Menu, which lists the types of graphs that you can create with DR Graph. For samples and definitions of each of these types, refer to the "Graphic Glossary" at the back of this manual.

The last option in this and other DR Graph submenus allows you to return to the MAIN MENU. If you feel lost, enter a 0 to return to the starting point.

To create a line graph enter the number 1.

```
              CREATE NEW GRAPH

        1.    LINE
        2.    CLUSTERED bar
        3.    STACKED bar
        4.    PIE
        5.    STEP
        6.    STICK
        7.    SCATTER
        8.    TEXT only

        0.    EXIT to Main Menu

    _ CHOOSE FUNCTION BY NUMBER
```
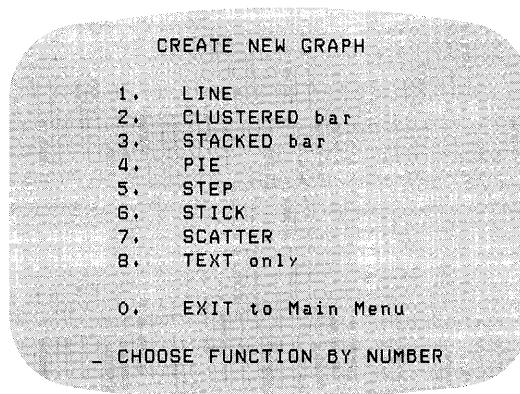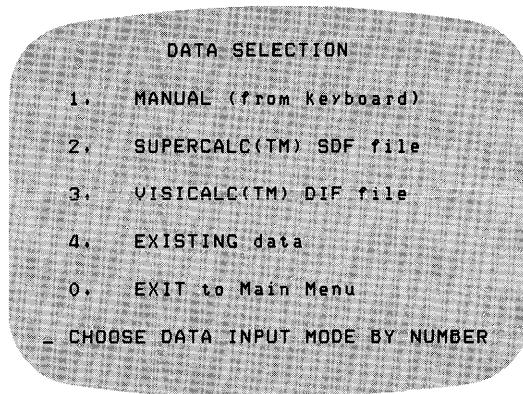
Figure 3-2.   CREATE NEW GRAPH Menu

DATA SELECTION
MENU

You cannot have a graph until you have some data. The DATA SELECTION Menu asks you to tell DR Graph what source it should use for the data.
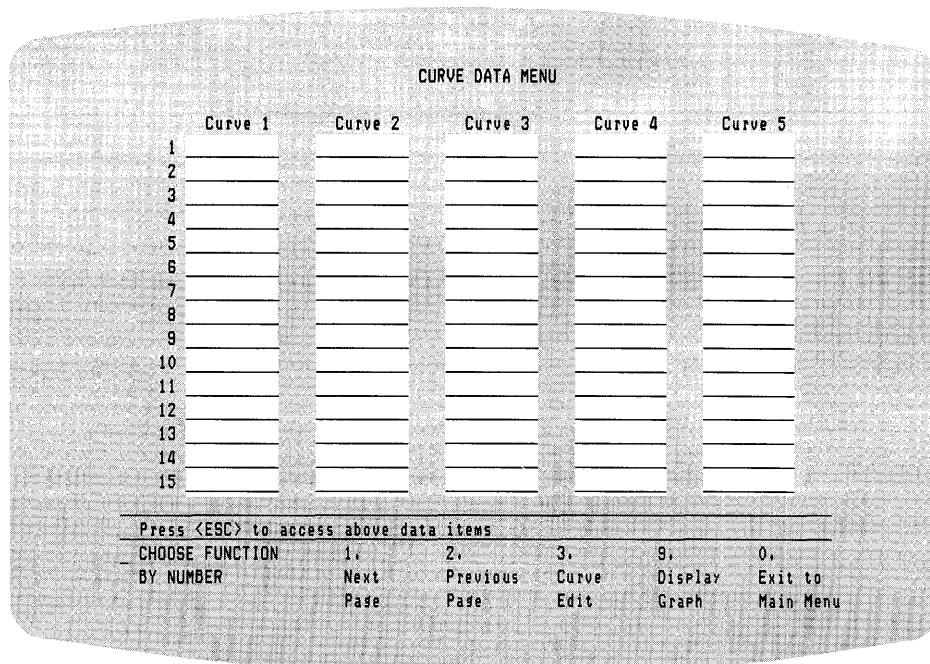
Figure 3-3.   DATA SELECTION Menu (Line Graph)

Because this is your first graph, you must generate new data. Enter the number 1 to tell DR Graph that you are entering the data from the keyboard. You will use the other options in this menu in the next section, the "Advanced Tutorial."

CURVE DATA MENU   When you select option 1 from the DATA SELECTION
                       Menu, DR Graph displays the CURVE DATA MENU,
                       which allows you to enter data from the keyboard. Notice
                       the cursor, which consists of a square block or underline
                       character. It indicates your location in the menu.

Figure 3-4. CURVE DATA MENU

Now you can begin entering data for your first graph. Start
by pressing the escape key <ESC> to move the cursor
from the CHOOSE FUNCTION section at the bottom of
the screen to the first blank in Curve 1 of the data section.
Type the data listed below. After each entry, press the
RETURN key <RETURN> to move the cursor down to
the next blank in Curve 1.

10

15

5

20

25

If you make a mistake entering the data, correct it by typing over the incorrect data. Table 3-1 lists the keys you can use to move the cursor around.

The CURVE DATA MENU should look like Figure 3-5 when you finish entering data.
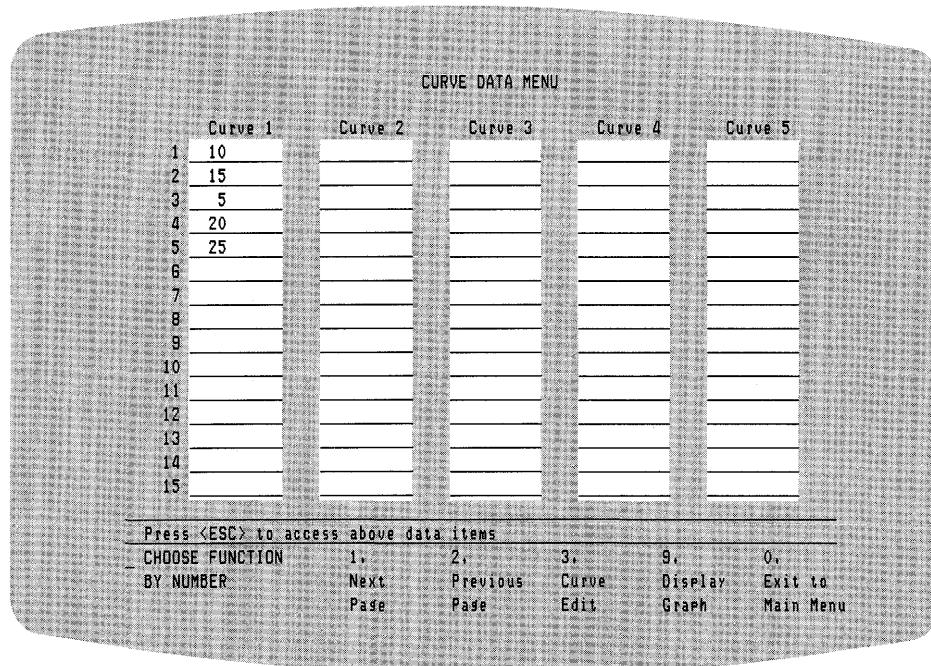
Figure 3-5.   CURVE DATA MENU with Data

VALID DATA

You can enter as many as 10 numeric characters consisting of the numbers 0 through 9. However, they must be real numbers and can optionally be signed. The following list describes invalid data items, which DR Graph ignores if you enter them:

- Alphabetic characters entered as data. DR Graph accepts numbers that precede an alphabetic character but ignores the entire entry if the first character is alphabetic.

- Numbers that follow a second decimal point. For example, in the entry 45.64.89, DR Graph ignores the second decimal point and 89.

- Arithmetic signs that follow numbers and any numbers that follow them. For example, in the entry 435 + 23, DR Graph ignores the plus sign (+) and the number 23.

If a plus or minus sign precedes an entry, DR Graph accepts it. For example, DR Graph accepts the entry + 32 and interprets it as the positive number 32.

CURSOR MOVEMENT

Because DR Graph runs on many different terminals, the keys that you normally use to move your cursor might or might not work in DR Graph.

While in the data input area of DR Graph menus, you can use the control key sequences <CTRL-X>, the <TAB>, and <RETURN> keys listed in Table 3-1 to move the cursor and insert and delete lines. Angle brackets, < >, enclose the name of a key. This convention is used in descriptions and procedures to indicate the key that you use.

Table 3-1.   Cursor Control Keys

Key	Cursor Movement/Action
<CTRL-H>	Moves cursor left and erases.
<CTRL-J>	Moves cursor down one line.
<CTRL-K>	Moves cursor up one line.
<CTRL-L>	Moves cursor right.
<CTRL-N>	Inserts a line.
<CTRL-Y>	Deletes a line.
<TAB>	Moves cursor right to data.
<RETURN>	Moves cursor down.
<ESC>	Enter and exit data area.

To use a control key sequence, hold down the key marked CTRL on your keyboard while you press the alphabetic key that follows the letters CTRL. For example, <CTRL-H> means hold down the CTRL key while you press the H key.

DISPLAY
YOUR GRAPH

The data you entered is enough to create a simple line graph. Press <ESC> to move the cursor to the CHOOSE FUNCTION area at the bottom of the screen. Enter the number 9 to display your graph. It should look like Figure 3-6.

Slight variations in the size, color, and font of the text can occur when the graph is displayed on different devices.
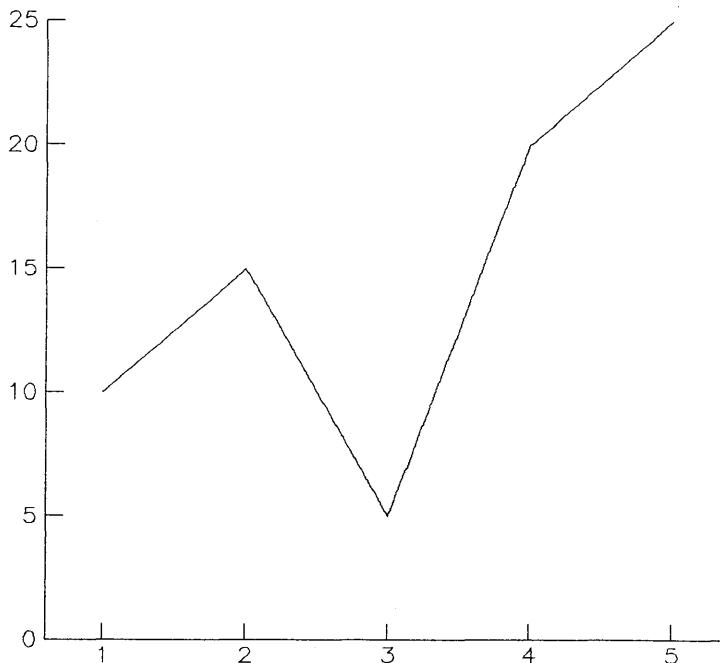
Figure 3-6.   Sample Line Graph

If your graph does not look like Figure 3-6, return to the CURVE DATA MENU by pressing <RETURN> and check the data you entered.

The graph you created has one curve plotted on the axes, with major points on both axes labeled. You will find the ability to preview a graph saves time when you create a new one.

If you have not already returned to the CURVE DATA
MENU, press <RETURN> now to go back and add more
data to the graph.

Notice that your original data is still there.
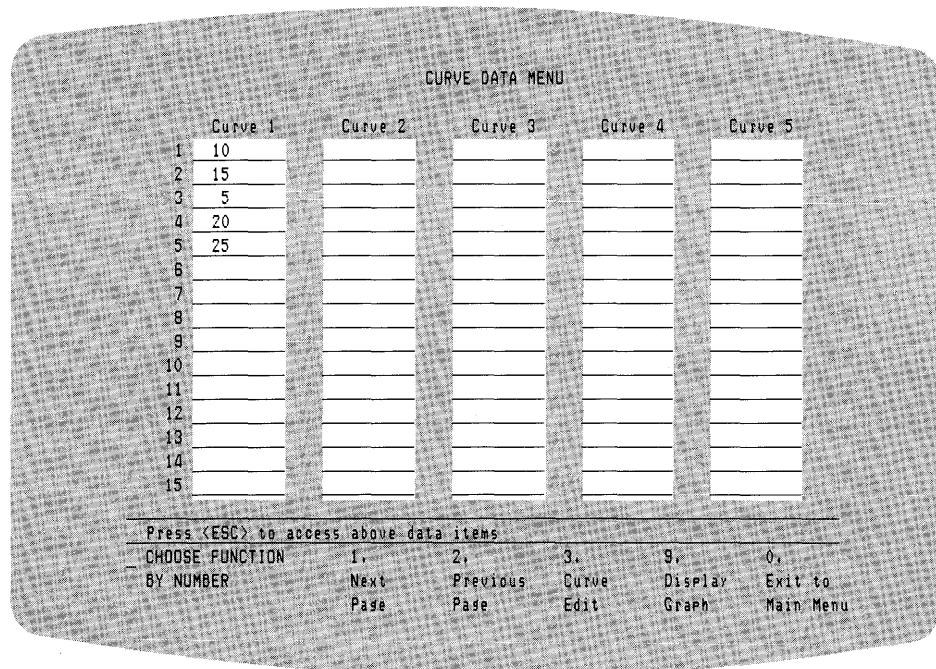
Figure 3-7.   CURVE DATA MENU with Data in Curve 1

Press <ESC> to move to the data area of this menu. Enter
the following data for Curve 2:

20

20

10

25

35

Refer to Table 3-1 for a list of keys that move the cursor.

———————————————————————————— ▥ DIGITAL RESEARCH™

After you enter the data, the CURVE DATA MENU should resemble Figure 3-8.
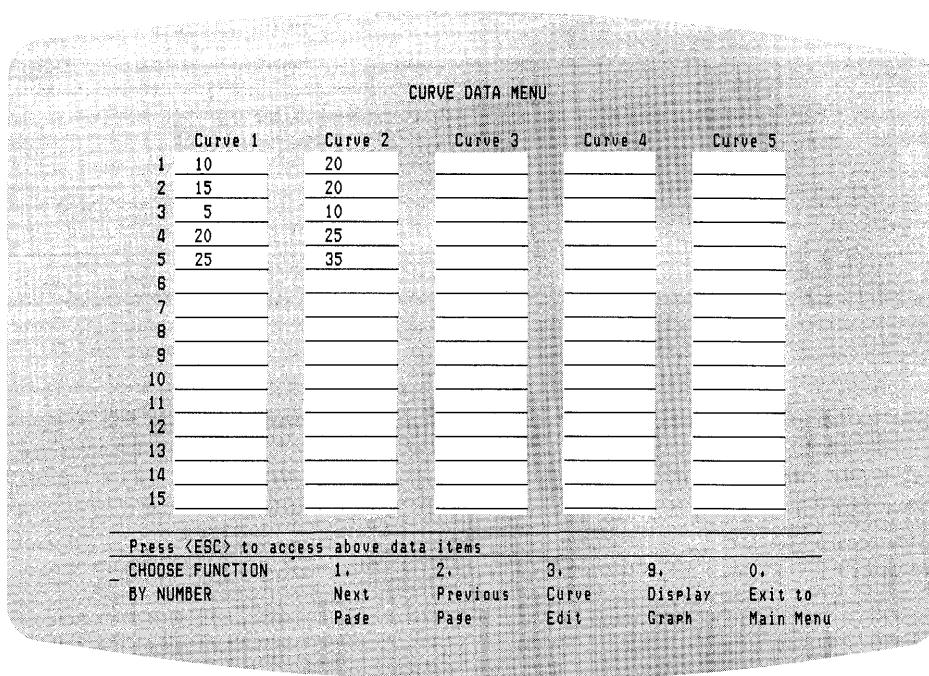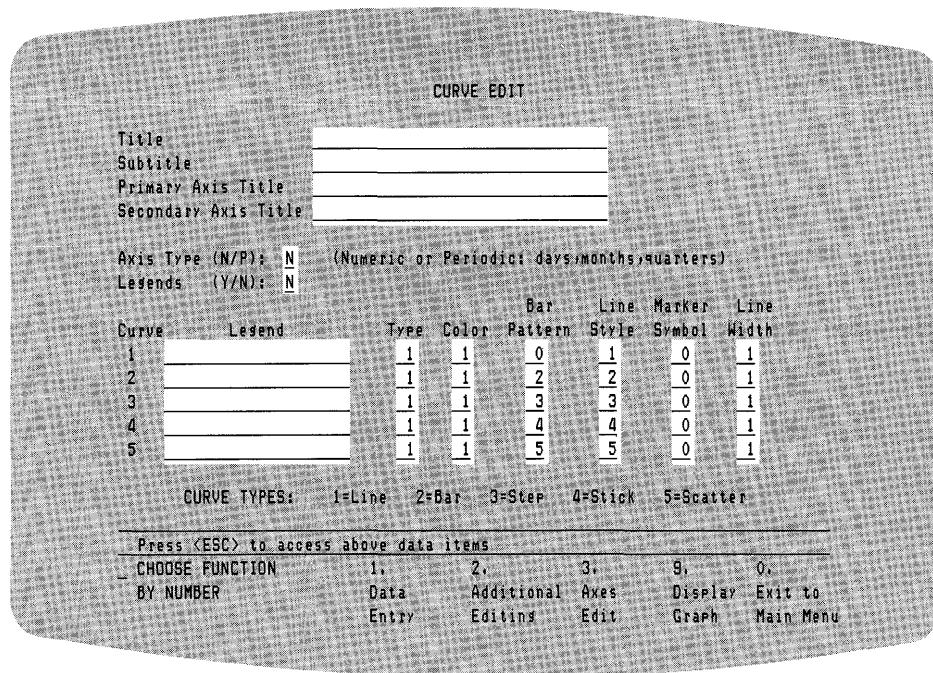
Figure 3-8.   CURVE DATA MENU with Data in Curve 2

CURVE EDIT MENU   Now press <ESC> to return to the functions area of the
                   CURVE DATA MENU. Enter the number 3 for Function
                   3, which causes the CURVE EDIT Menu to appear. This
                   menu, shown in Figure 3-9, lets you add titles, label the
                   axes, complete the legend, and define how the curves or
                   lines look.

```
                              CURVE EDIT

  Title
  Subtitle
  Primary Axis Title
  Secondary Axis Title

  Axis Type (N/P):  N    (Numeric or Periodic: days,months,quarters)
  Legends  (Y/N):   N

                                         Bar   Line  Marker  Line
  Curve        Legend          Type Color Pattern Style Symbol Width
  1                              1    1     0      1      0     1
  2                              1    1     2      2      0     1
  3                              1    1     3      3      0     1
  4                              1    1     4      4      0     1
  5                              1    1     5      5      0     1

        CURVE TYPES:   1=Line  2=Bar  3=Step  4=Stick  5=Scatter

  Press <ESC> to access above data items
  CHOOSE FUNCTION        1.       2.         3.       9.       0.
  BY NUMBER              Data     Additional Axes     Display  Exit to
                        Entry    Editing    Edit     Graph    Main Menu
```

Figure 3-9.   CURVE EDIT Menu

                   Press <ESC> to move the cursor to the Title blank. Enter
                   LINE GRAPH in the Title blank and (Multiple) in the
                   Subtitle blank. For the Primary Axis Title, type X-Axis. For
                   the Secondary Axis Title, type Y-Axis. These blanks allow
                   up to 40 alphanumeric characters. For a list of keys that
                   move the cursor, refer to Table 3-1.

                   The next few blanks contain default values that DR Graph
                   supplies for you. You can change a default value at any
                   time by replacing it with another value.

Your next entry in this menu changes a default value. Type the letter Y over the default value N to request a legend. Similar to a key on a map that defines patterns for road types, the legend in a graph defines the line or fill patterns for sets of data points. To incorporate labels in the legend, move to the blanks marked Curve Legend. For Curve 1, type Curve 1; enter Curve 2 for Curve 2.

DR Graph supplies default values for the remaining blanks. These values automatically define the linestyle of the curves for your line graph. Although you can change these values, use the default values for this graph. Figure 3-10 shows you the CURVE EDIT Menu with the data you entered.

```
                        CURVE EDIT

Title                  LINE GRAPH
Subtitle               (Multiple)
Primary Axis Title     X-Axis
Secondary Axis Title   Y-Axis

Axis Type (N/P):  N    (Numeric or Periodic: days,months,quarters)
Legends   (Y/N):  Y

                                  Bar   Line  Marker  Line
Curve       Legend       Type Color Pattern Style Symbol Width
  1      Curve 1           1    1     0      1     0      1
  2      Curve 2           1    1     2      2     0      1
  3                        1    1     3      3     0      1
  4                        1    1     4      4     0      1
  5                        1    1     5      5     0      1

        CURVE TYPES:    1=Line   2=Bar   3=Step   4=Stick   5=Scatter

  Press <ESC> to access above data items
  CHOOSE FUNCTION          1.        2.          3.        9.       0.
  BY NUMBER               Data    Additional   Axes    Display   Exit to
                          Entry    Editing     Edit     Graph    Main Menu
```

Figure 3-10.   CURVE EDIT Menu with Data

Refer to Section 6, "Moving Around in the Menus," for a detailed explanation of the remaining areas in this menu.

**DISPLAY
YOUR GRAPH
AGAIN**

Now display your graph again. Press <ESC> followed by the number 9 for Function 9. Your graph should resemble Figure 3-11.

LINE GRAPH
(Multiple)
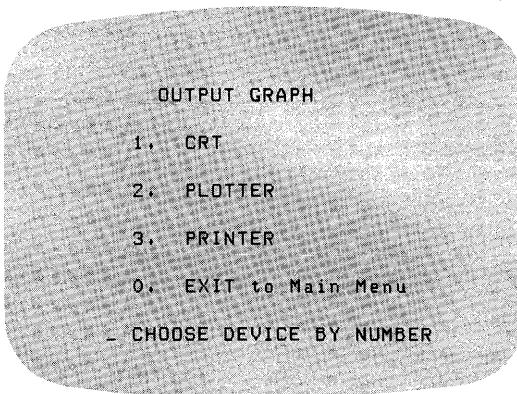
Figure 3-11.   Line Graph (Multiple)

If your graph does not resemble the one in Figure 3-11, return to the CURVE EDIT Menu. Check the data that you supplied. Make any necessary corrections and display the graph again. Notice the placement of the titles, labels, and legends. Later in this manual, you will learn how to add text and move some of these elements around.

OUTPUT
YOUR GRAPH

To make a hard copy of your graph, press <RETURN>, which displays the previous menu. Then press number 0 to return to the MAIN MENU. Read all the selections. To make a hard copy, you must output the graph to a printer or plotter. So, press number 5. DR Graph displays the OUTPUT GRAPH Menu shown in Figure 3-12.

Figure 3-12.   OUTPUT GRAPH Menu

Select the number of the device you want to use to output your graph. DR Graph automatically sends the graph that you worked on most recently to the device that you select. Press <RETURN> to go back to the MAIN MENU.

SAVE YOUR GRAPH

You are at the MAIN MENU, so enter number 6 to save your graph on disk. DR Graph prompts you for the name of the file. Type the name LINE1 and press <RETURN>. From now on, refer to this graph as LINE1. DR Graph saves your file and takes you back to the MAIN MENU, which is the menu you use to start your next graph, a bar graph.

DR Graph accepts filenames that contain one through eight characters, provided none of the characters are spaces.
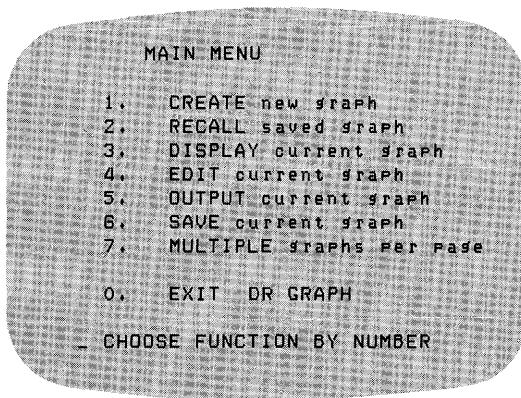
NOW, A BAR GRAPH   This time, use the same data to create a clustered bar
                    graph. A clustered bar graph is a bar graph with the bars
                    grouped together.
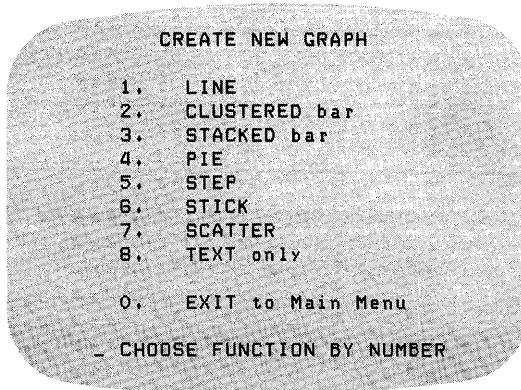
MAIN MENU   By now you probably know what to do next to create a
                    new graph. Enter the number 1.

```
              MAIN MENU

        1.    CREATE new graph
        2.    RECALL saved graph
        3.    DISPLAY current graph
        4.    EDIT current graph
        5.    OUTPUT current graph
        6.    SAVE current graph
        7.    MULTIPLE graphs per page

        0.    EXIT DR GRAPH

      _ CHOOSE FUNCTION BY NUMBER
```

CREATE NEW
GRAPH MENU

Option 1 from the MAIN MENU displays the CREATE NEW GRAPH Menu. To make a clustered bar graph, enter the number 2.

```
              CREATE NEW GRAPH

        1.    LINE
        2.    CLUSTERED bar
        3.    STACKED bar
        4.    PIE
        5.    STEP
        6.    STICK
        7.    SCATTER
        8.    TEXT only

        0.    EXIT to Main Menu

      _ CHOOSE FUNCTION BY NUMBER
```

Figure 3-14.   CREATE NEW GRAPH Menu
for the Clustered Bar Graph

DATA SELECTION
MENU

Use the data from the line graph you just created. You can
see how the same data looks when plotted differently.
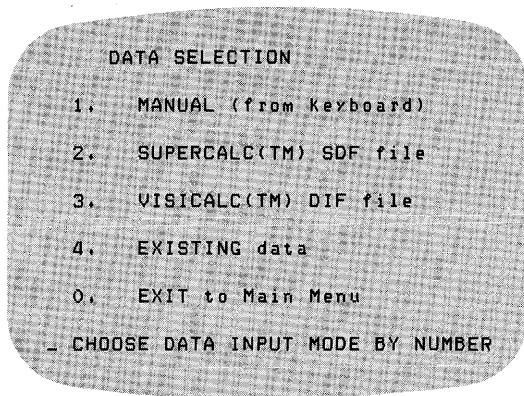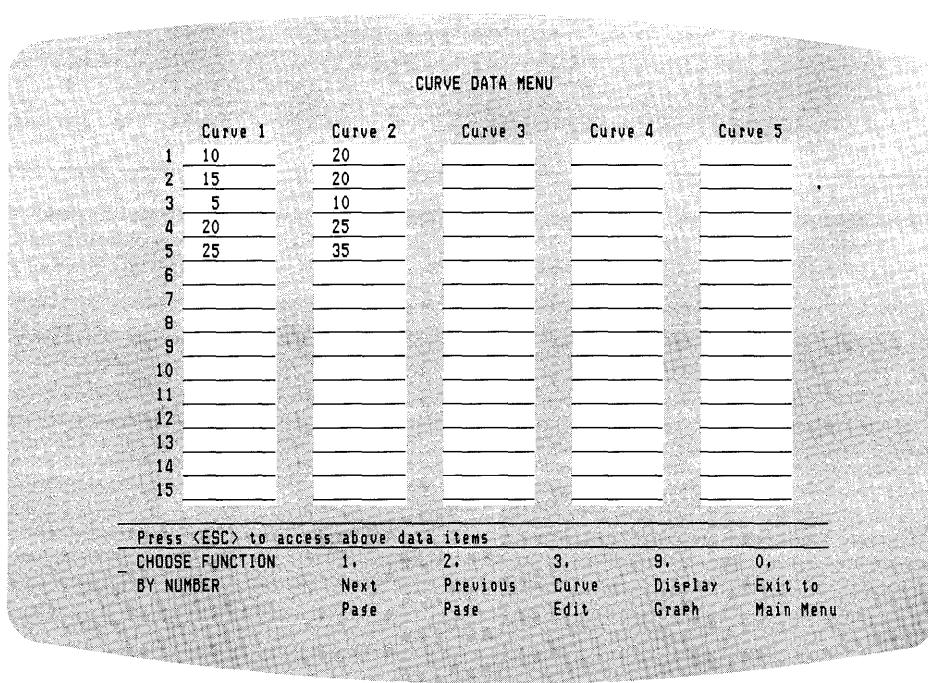
Figure 3-15.   DATA SELECTION Menu

Enter the number 4 to tell DR Graph to use the data from
your most recent graph.
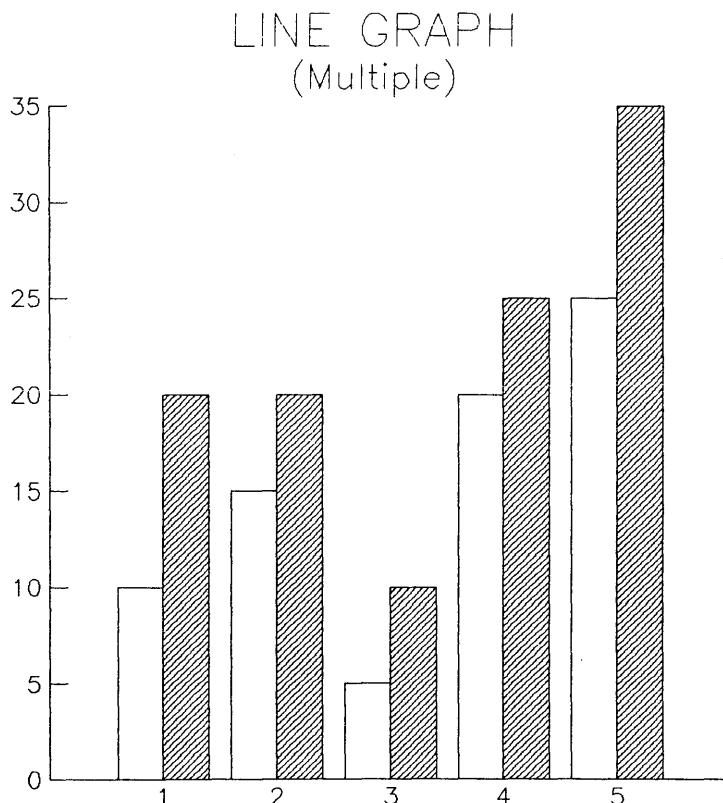
CURVE DATA MENU   When you select option 4 from the DATA SELECTION
                    Menu, DR Graph displays the CURVE DATA MENU. It
                    contains the data values that you entered for your last
                    graph.


```
                          CURVE DATA MENU

          Curve 1      Curve 2      Curve 3      Curve 4      Curve 5
     1    10           20
     2    15           20
     3     5           10
     4    20           25
     5    25           35
     6
     7
     8
     9
    10
    11
    12
    13
    14
    15

 Press <ESC> to access above data items
  CHOOSE FUNCTION      1.           2.           3.           9.           0.
  BY NUMBER            Next         Previous     Curve        Display      Exit to
                      Page          Page         Edit         Graph        Main Menu
```

Figure 3-16.   CURVE DATA MENU
for the Clustered Bar Graph

DISPLAY   Enter the number 9 to display your graph. DR Graph dis-
YOUR GRAPH   plays a clustered bar graph, like the one in Figure 3-17.
                    Notice that the graph contains the title and subtitle from
                    the previous graph.

LINE GRAPH
(Multiple)

Figure 3-17.   Clustered Bar Graph

The graph that DR Graph displays should be similar to the one in Figure 3-17. Press <RETURN> to go back to the CURVE DATA MENU. Check the data that you entered. Make any necessary corrections, such as the title and subtitle, and display the graph again.

Notice that the graph has two bars plotted at each variable specified on the horizontal axis, and it does not contain labels or a legend. Press <RETURN> to go back to the previous menu, which should be the CURVE DATA MENU.

CURVE EDIT MENU   Enter number 3 to display the CURVE EDIT Menu, which
                       lets you create and edit titles, label the axes, complete the
                       legend, and define the appearance of the bars.
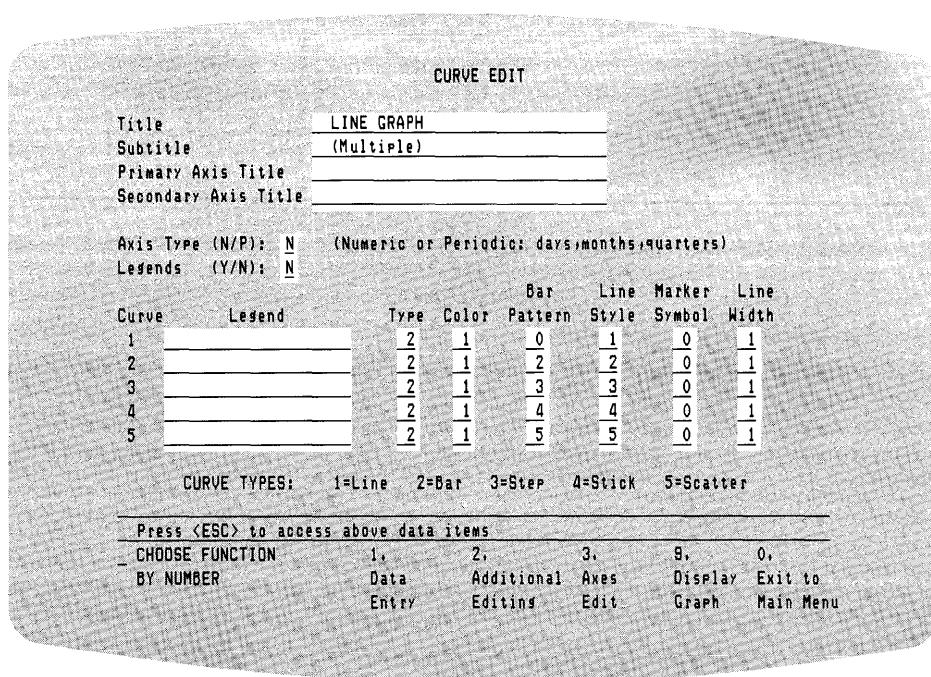
Figure 3-18.   CURVE EDIT Menu

Press <ESC> to move the cursor to the Title blank. Type
BAR GRAPH over the previous title. Move to the Subtitle
blank and type (Clustered) over the previous subtitle. Then
enter the axes titles; type X-Axis for the Primary Axis Title
and Y-Axis for the Secondary Axis Title. Move to the
Legends blank and type the letter Y over the default value
N. Move down to the Curve Legend blanks. For Curve 1,
type Data Set 1. For Curve 2, type Data Set 2.

Now, look at the Bar Pattern column. It contains default values for each data set, which means DR Graph assigns patterns to fill the bars that you plot. Change the fill pattern for Data Set 2 in Curve 2 by typing the number 3 over the current value. For additional information and examples of DR Graph fill patterns, refer to Appendix A, the "Graphic Glossary," at the end of this manual. DR Graph supplies default values for the remaining blanks in the menu. Figure 3-19 shows the CURVE EDIT Menu with your changes and the DR Graph default values.

```
                         CURVE EDIT

      Title                  BAR GRAPH
      Subtitle               (Clustered)
      Primary Axis Title     X-Axis
      Secondary Axis Title   Y-Axis

      Axis Type (N/P):  N    (Numeric or Periodic: days,months,quarters)
      Legends   (Y/N):  Y
                                      Bar    Line  Marker  Line
      Curve       Legend       Type  Color  Pattern Style Symbol Width
       1     Data Set 1          2     1      0      1      0      1
       2     Data Set 2          2     1      3      2      0      1
       3                         2     1      3      3      0      1
       4                         2     1      4      4      0      1
       5                         2     1      5      5      0      1

            CURVE TYPES:   1=Line   2=Bar   3=Step   4=Stick   5=Scatter

      Press <ESC> to access above data items
      _CHOOSE FUNCTION          1.       2.         3.      9.       0.
       BY NUMBER              Data    Additional  Axes    Display  Exit to
                             Entry     Editing    Edit    Graph    Main Menu
```

Figure 3-19.   CURVE EDIT MENU
for the Clustered Bar Graph

**DISPLAYING
YOUR GRAPH**

Now display your graph by pressing <ESC> and number 9 to see the changes that you have made. With the exception of fill patterns, which can differ on some devices, your graph should look like the one in Figure 3-20.

BAR GRAPH
(Clustered)

Figure 3-20.   Clustered Bar Graph

If your graph is not similar to the one in Figure 3-20, return to the previous menu and check the information you entered. Make any necessary corrections and display the graph again.

Making
a Hard Copy

To make a hard copy of your graph, return to the MAIN MENU and select option 5 to output the graph. DR Graph asks you to select the number of the device on which you want to output your graph.

Saving
Your Graph

Save your graph by going back to the MAIN MENU and press number 6. When DR Graph prompts you for the output filename, type the name Bar1. DR Graph saves your file and returns to the MAIN MENU. If you want the file stored on another disk, use a drive designation when you specify the filename, for example, A:BAR1.

MAKING A PIE

This section shows you how to create the last of the three most popular graphs, the pie chart. Use the same data you used for the line and the bar graph. After you create the pie chart, you can see how different the same data looks when it is plotted for each of the three basic graph types: line, bar, and pie.

MAIN MENU

Regardless what type of graph you create, you must start at the MAIN MENU. If you are not at it, return to it. Enter the number 1 to move to the CREATE NEW GRAPH Menu and begin creating your pie chart.

```
                    MAIN MENU

             1.    CREATE new graph
             2.    RECALL saved graph
             3.    DISPLAY current graph
             4.    EDIT current graph
             5.    OUTPUT current graph
             6.    SAVE current graph
             7.    MULTIPLE graphs per page

             0.    EXIT DR GRAPH

           - CHOOSE FUNCTION BY NUMBER
```
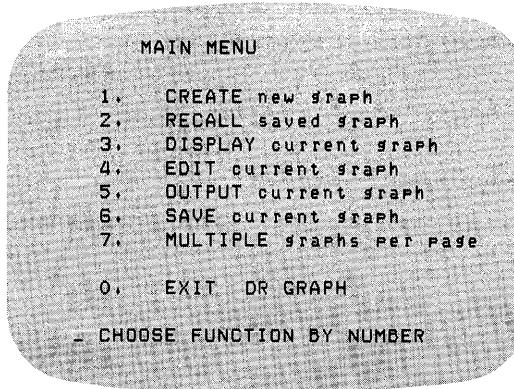
Figure 3-21.   MAIN MENU for the Pie Chart

CREATE NEW
GRAPH MENU

DR Graph displays the CREATE NEW GRAPH Menu shown below when you select option 1 from the MAIN MENU. To create a pie chart, select option 4 from the CREATE NEW GRAPH Menu.

```
                  CREATE NEW GRAPH

             1.    LINE
             2.    CLUSTERED bar
             3.    STACKED bar
             4.    PIE
             5.    STEP
             6.    STICK
             7.    SCATTER
             8.    TEXT only

             0.    EXIT to Main Menu

           - CHOOSE FUNCTION BY NUMBER
```
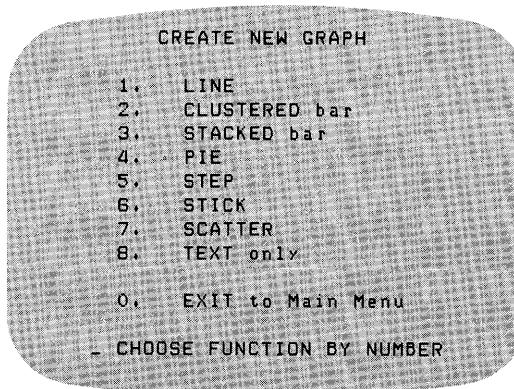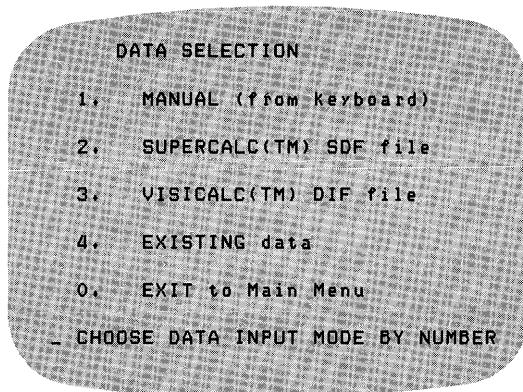
Figure 3-22.   CREATE NEW GRAPH Menu
                for the Pie Chart
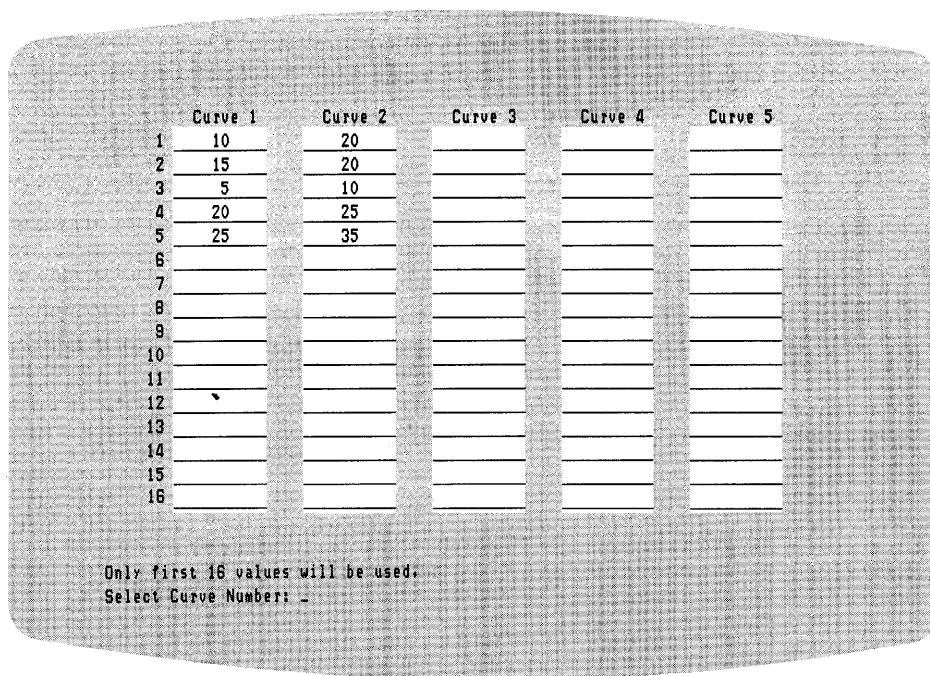
DATA SELECTION
MENU

Once again you must tell DR Graph the source of the data for the graph that you are creating. Because you are using existing data from the previous two graphs, select option 4 from the DATA SELECTION Menu.

Figure 3-23.   DATA SELECTION Menu
for the Pie Chart

DR Graph displays the curves with the existing data and prompts you to select the number of a curve. You select the curve with the data that you want plotted in the pie chart. For this example, enter number 1 for Curve 1. Only one curve of data can be plotted in a pie chart.

	Curve 1	Curve 2	Curve 3	Curve 4	Curve 5
1	10	20			
2	15	20			
3	5	10			
4	20	25			
5	25	35			
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

Only first 16 values will be used.
Select Curve Number: _

Figure 3-24.   Display of Existing Data
for the Pie Chart

PIE EDIT MENU   After you select the number of the curve, DR Graph displays the PIE EDIT Menu. DR Graph also fills in the value column with the data you select, as shown in Figure 3-25.


```
                              PIE EDIT

  Title      BAR GRAPH
  Subtitle   (Clustered)

  Slice Label          Value     Explode  Color  Fill
     1                   10         N        1      0
     2                   15         N        1      0
     3                    5         N        1      0
     4                   20         N        1      0
     5                   25         N        1      0
     6                              N        1      0
     7                              N        1      0
     8                              N        1      0


  Press <ESC> to access above data items
  CHOOSE FUNCTION              1,          2,         9,        0,
  BY NUMBER                 Remaining  Additional  Display   Exit to
                            Slices     Editing     Graph     Main Menu
```
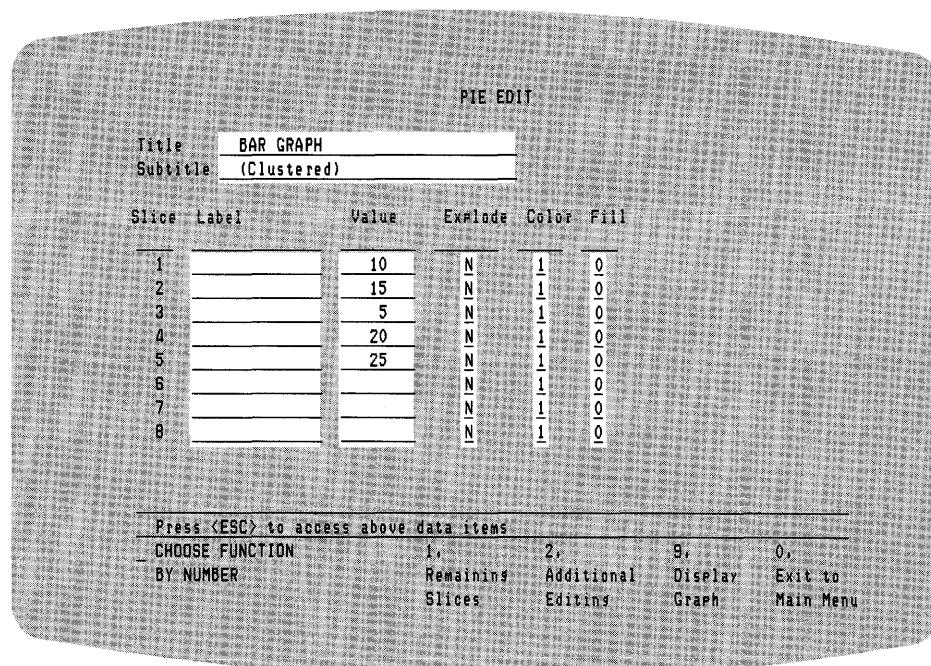
Figure 3-25.   PIE EDIT Menu

In addition to the data values, DR Graph uses the title and subtitle from the existing data. The bar graph titles are not appropriate for a pie chart, so press the <ESC> key to position the cursor on the title blank. Use the space bar to insert spaces to delete the title. Press <RETURN> and repeat the delete procedure used for the title. Press the <ESC> key to return to the menu at the bottom of the screen.

DR Graph supplies default values for explode, color, and fill sections of the menu. The result of these defaults is that none of the slices are exploded or separated from the pie; the color of each slice is the same as the foreground color; and no slice has a fill pattern.

DISPLAYING YOUR PIE CHART

Enter the number 9 to display your pie chart. It should resemble Figure 3-26.
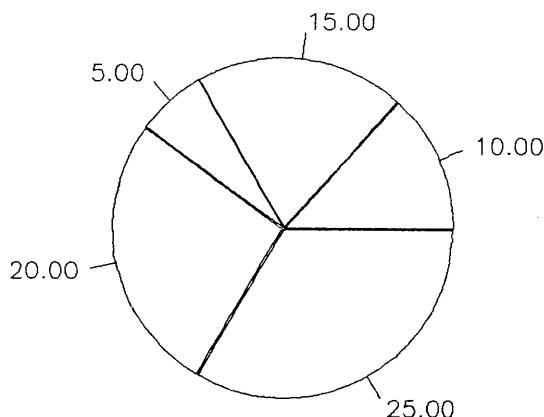
Figure 3-26.   Pie Chart

The pie is divided into pieces and labeled with the data values you specified. Press <RETURN> to go back to the PIE EDIT Menu.

PIE EDIT MENU   In addition to entering the title and subtitle, you can use
                     this menu to describe the appearance of each pie slice.


```
                              PIE EDIT

   Title
   Subtitle

   Slice  Label          Value   Explode  Color  Fill
      1                    10       N        1      0
      2                    15       N        1      0
      3                     5       N        1      0
      4                    20       N        1      0
      5                    25       N        1      0
      6                             N        1      0
      7                             N        1      0
      8                             N        1      0


   Press <ESC> to access above data items
   CHOOSE FUNCTION              1.        2.          9.        0.
   BY NUMBER                    Remaining Additional  Display   Exit to
                               Slices    Editing     Graph     Main Menu
```
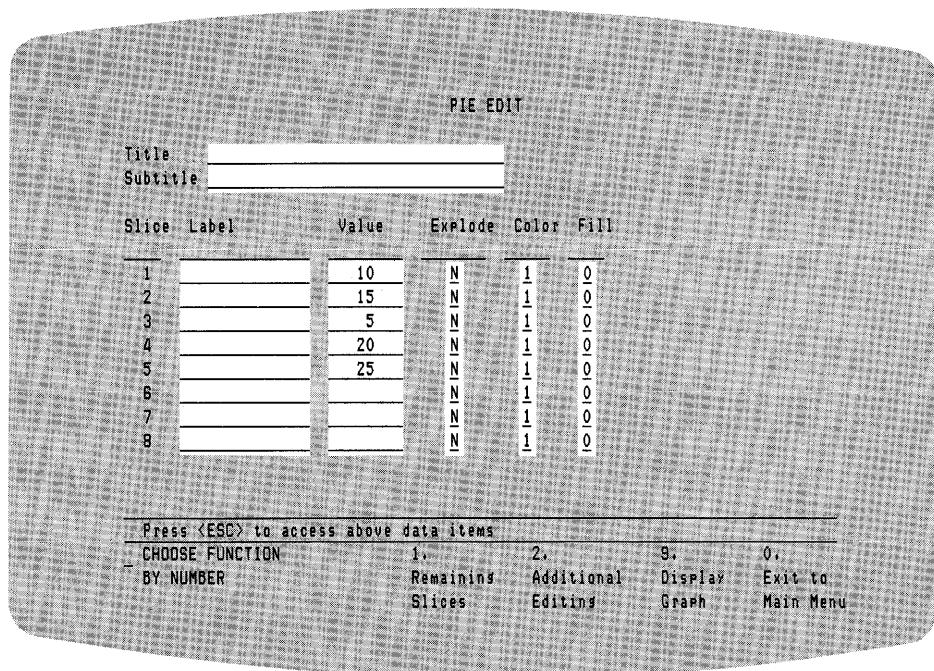
Figure 3-27.   PIE EDIT Menu

Enter the phrase,

CONTRIBUTION TO SALES

in the Title blank. For the Subtitle blank, enter the phrase,

By Region - FY '82

Move to the Label section and enter the labels in the order shown below.

Central
N.East
S.East
N.West
S.West

Explode the fifth slice by typing the letter Y over the default value N in the Explode column. Now, change the fill patterns so the slices can be differentiated more easily. Use the following values:

```
slice 1 = 0
slice 2 = 5
slice 3 = 2
slice 4 = 4
slice 5 = 3
```

DR Graph uses the data as actual numbers and does not sort the data; the slices appear in the same order that you originally enter the data. You can, however, change these conditions as explained in the next section, the "Advanced Tutorial." Figure 3-28 shows the changes you made and the DR Graph defaults for the PIE EDIT Menu.
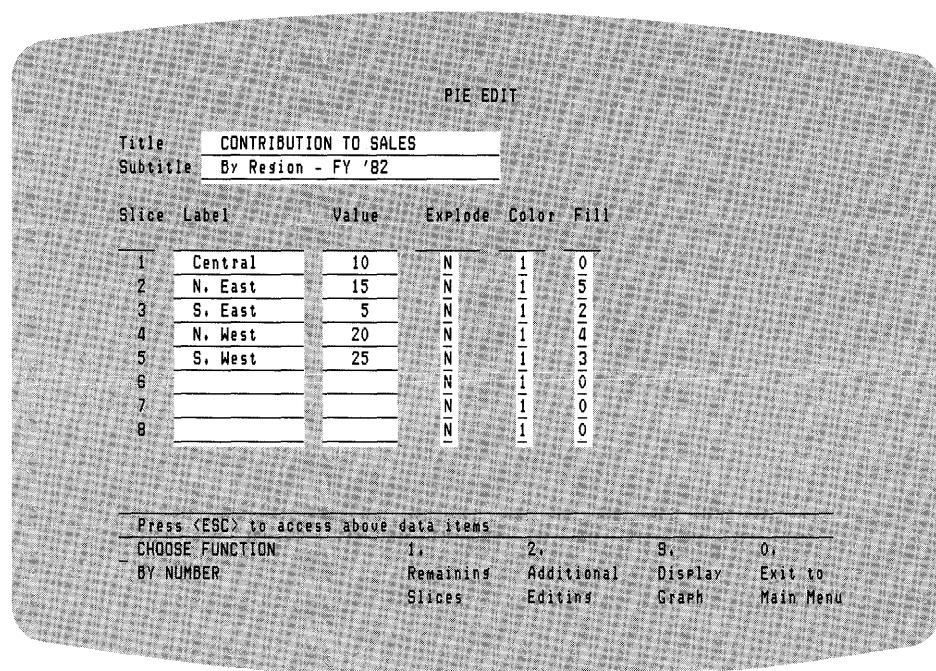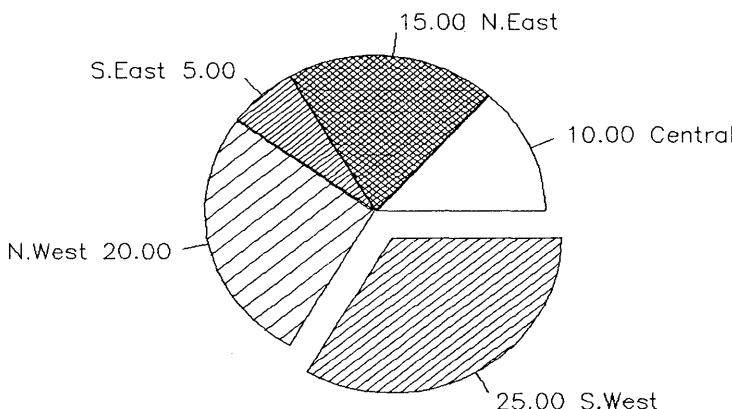
Figure 3-28.   Edited PIE EDIT Menu

DISPLAYING
YOUR PIE

Press <ESC> and then select Function 9 at the bottom of the menu to display your pie chart. With the exception of the fill patterns, which can differ for various devices, your pie chart should look like Figure 3-29.

CONTRIBUTION TO PROFIT
By Region — FY '82

Figure 3-29.   Edited Pie Chart

If your pie chart is significantly different than the one in Figure 3-29, return to the previous menu and check the data you entered.

Making
Hard Copy

To make a hard copy of your graph, go back to the MAIN MENU and select option 5. DR Graph asks you to select the number of the output device you want to use.

Saving
Your Pie

To save your chart, go back to the MAIN MENU and select option 6. DR Graph prompts you for the output filename. Enter any valid filename your operating system supports, provided it does not contain spaces.

YOUR NEXT STEP

You have finished the basic tutorial. Your next step is the "Advanced Tutorial," the next section. Before you begin the next section, you should know how to enter data and switch to and from menus easily. If you are not comfortable with these tasks, you should review this section before proceeding to the next section. If you have questions concerning the menus in this section, refer to Section 6.

End of Section 3

Section 4

ADVANCED TUTORIAL

INTRODUCTION

This section is an advanced tutorial. With the concepts that you learned in "Getting Started," this section shows you how to produce graphs containing more complex data. By now you should be familiar with all the basics of using DR Graph. You should be able to make line, bar, and pie graphs, be able to get around in the menus, and know your way around this manual.

LINE GRAPHS

The first graph in this section shows you how to transform numerical data into visual information with DR Graph. You will plot the sales of a division against the quota for the division. Monthly figures exist for 10 months, and the graph is updated monthly.

Begin at the MAIN MENU. Select option 1 to display the CREATE NEW GRAPH Menu. Select option 1 for line graph, which displays the DATA SELECTION Menu. Select option 1 from it, which takes you to the CURVE DATA MENU and lets you enter the data.

CURVE DATA MENU   Use Curve 1 to represent the quota and Curve 2 for the number of sales. Enter the following data for Curve 1:

150
160
170
180
250
260
270
280
340
365
385
400

Use <TAB> to move to Curve 2 and enter the following data:

90
122
148
263
274
281
294
402
395
434

After you enter the data, the CURVE DATA MENU should look like the one in Figure 4-1.


```
                            CURVE DATA MENU

           Curve 1      Curve 2      Curve 3      Curve 4      Curve 5
      1    150           90
      2    160          122
      3    170          148
      4    180          263
      5    250          274
      6    260          281
      7    270          294
      8    280          402
      9    340          395
     10    365          434
     11    385
     12    400
     13
     14
     15

 Press <ESC> to access above data items
 CHOOSE FUNCTION      1.        2.        3.        9.        0.
 BY NUMBER           Next     Previous   Curve    Display   Exit to
                     Page      Page      Edit     Graph     Main Menu
```
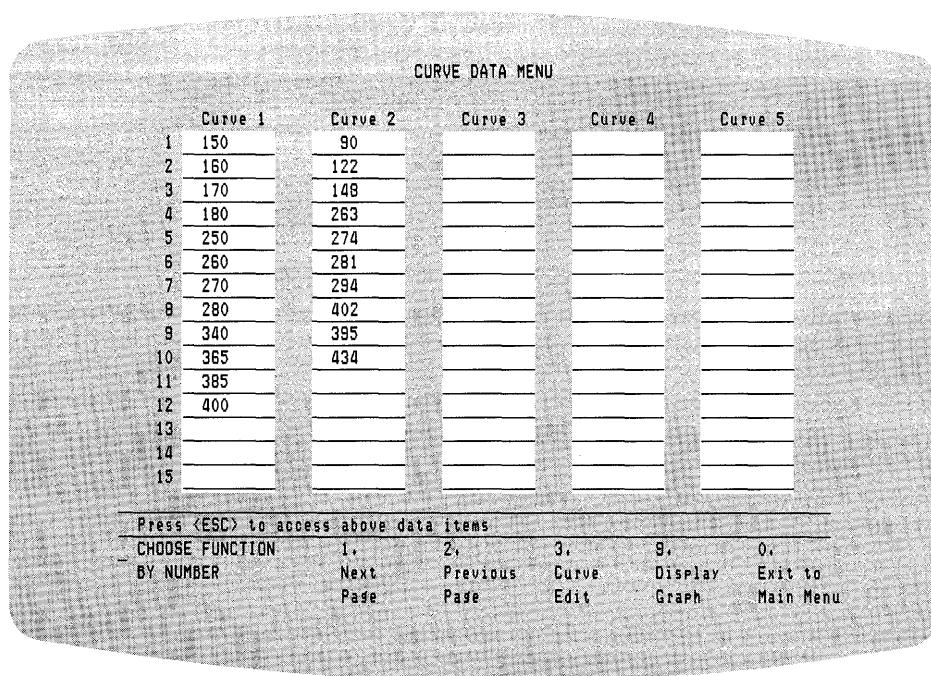
Figure 4-1.   CURVE DATA MENU

To display your line graph, press <ESC> and enter the number 9 for the Display Graph Function. Your graph should look like Figure 4-2.
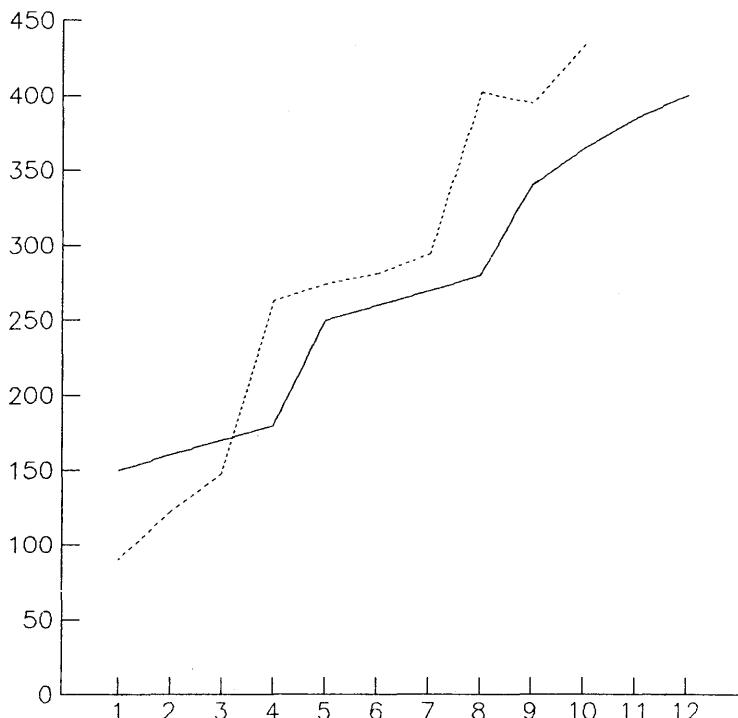
Figure 4-2.   Line Graph

CURVE EDIT MENU   Now go to the CURVE EDIT Menu to add titles and a legend. The Title of the graph is SALES EFFORT. The Subtitle is N. East Region. The Primary Axis Title is 1982. The Secondary Axis Title is Calls/Month.

Request a legend by typing the letter Y in the Legends blank. Now you can label the curves. Use Quota for Curve 1 and Actual Calls for Curve 2.

Now change the linestyle and width of the lines to make this graph more effective. Select linestyle 3 for Curve 1 and linestyle 1 for Curve 2.

DR Graph guarantees five different linestyles. Although the linestyles can differ on different devices, linestyle 1 is always solid, and linestyles 2-5 are combinations of dotted and dashed lines. Set the width for both curves to 6. Line width is measured in 1/100th of the plotting area. After you enter the data, the CURVE EDIT Menu should look like the one in Figure 4-3.

CURVE EDIT

Title	SALES EFFORT
Subtitle	N. East Region
Primary Axis Title	1982
Secondary Axis Title	Calls/Month

Axis Type (N/P): N   (Numeric or Periodic: days,months,quarters)
Legends   (Y/N): Y

Curve	Legend	Type	Color	Bar Pattern	Line Style	Marker Symbol	Line Width
1	Quota	1	1	0	3	0	6
2	Actual Calls	1	1	2	1	0	6
3		1	1	3	3	0	1
4		1	1	4	4	0	1
5		1	1	5	5	0	1

CURVE TYPES: 1=Line   2=Bar   3=Step   4=Stick   5=Scatter

Press <ESC> to access above data items

CHOOSE FUNCTION	1.	2.	3.	9.	0.
BY NUMBER	Data	Additional	Axes	Display	Exit to
	Entry	Editing	Edit	Graph	Main Menu

Figure 4-3.   CURVE EDIT Menu
for Line Graph

Press <ESC> followed by the number 9 to access the Display Function. Your graph should resemble the one in Figure 4-4.

Figure 4-4.   Sales Effort Line Graph

PERIODIC AXES
EDIT MENU

Your graph still does not have monthly values. Press <RETURN> to go back to the CURVE EDIT Menu. Type the letter P over the default value N in the Axis Type blank. Then use <ESC> to move to the functions at the bottom of the menu. Specify the number 3 to move to the PERIODIC AXES EDIT Menu.

Primary Axis

In the first blank, Primary Axis, specify the label type. In this case, enter number 6 to specify months labeled with one character (J for January, F for February, and so on). The system assumes you want to start in January so you can leave the Period Start blank empty. However, if the plotted data begins in April to reflect a fiscal rather than a calendar year, you would enter the number 4 in the Period Start blank. The number of Periods refers to the number of years; enter the number 1 for one year.

Curves for line graphs are normally indented from the primary axis. Set Axis Indent to N so the lines extend to the edge of the graph axes.

Secondary Axis

Now specify the label type for the secondary axis. Enter 2 for linear integer. An integer is a whole number. DR Graph assumes you want the data range to begin at zero and end with the highest data value. Change the default and specify 600 for Axis Maximum. Enter 100 for the Label Increment to ensure the values appear in increments of 100. DR Graph automatically creates one tick per label.

Next, enter the letter Y in the Grid blanks of both axes to put gridlines on the graph. Use the default values for style and color of the gridlines.

After you enter all the information in the PERIODIC
AXES EDIT Menu, it should look like the one in Figure
4-5.

```
                          PERIODIC AXES EDIT

                 Label    Period    Number of    Ticks      Axis
                 Type     Start     Periods      (Y/N)      Indent (Y/N)
PRIMARY Axis:     6                    1           Y          N
Label Types:
    1=Days(3 char,M-S)  3=Days(3 char,M-F)  5=Months(3 char)  7=Quarters
    2=Days(1 char,M-S)  4=Days(1 char,M-F)  6=Months(1 char)

                 Label    Axis      Axis         Label      Ticks per
                 Type     Minimum   Maximum      Increment  Label
SECONDARY Axis:   2        0         600          100          1

Label Types:  1= Default    2=Linear(integer)   4=Log(integer)
                            3=Linear(decimal)   5=Log(decimal)

  Axis   Grid(Y/N  Style  Color)       Axis    Grid(Y/N  Style  Color)
PRIMARY:     Y       1      1        SECONDARY:    Y        1      1

  Press <ESC> to access above data items
  CHOOSE FUNCTION                          8.         9.         0.
   BY NUMBER                             Return to  Display   Exit to
                                        Curve Edit  Graph    Main Menu
```

Figure 4-5.   PERIODIC AXES EDIT Menu

If you entered all the data correctly, display your graph by pressing <ESC> and entering the number 9. Does your graph look like the one in Figure 4-6? If not, go back and check the PERIODIC AXES EDIT Menu again.

SALES EFFORT
N.East Region

Calls/Month

Figure 4-6.   Sales Effort Line Graph

ADDITIONAL CURVE
EDIT MENU

Although you have created many graphs, you have used only a small set of the DR Graph capabilities. For example, you have not yet changed the size, color, or font of the text in a graph. To change any of the text attributes for your current graph, you must use the ADDITIONAL CURVE EDIT Menu. By selecting Function 2 from the CURVE EDIT Menu, you display the ADDITIONAL CURVE EDIT Menu.

Display the ADDITIONAL CURVE EDIT Menu and change the color of the Title to 2 and Subtitle to 4. DR Graph lets you specify color changes whether or not your system has a device that can display them. However, if your system does not have such a device, you cannot see the results of the color changes.

DR Graph sets default text sizes. The title is the largest. The subtitle is the second largest and the other elements in the graph are smaller. Use the default values for text size this time.

DR Graph also supplies a default font style of 1. The font types DR Graph assigns to values you supply are listed below.

1 = Device-dependent; the device font type
2 = Simplex Roman
3 = Duplex Roman
4 = Complex Italic

Enter the number 3 to change the default font type for the title and subtitle.

Now enter the letter Y in the Axes Frame blank to draw a line around the extents of the axes. Finally, specify a line width of 4 for Axes Frame.

With all the changes made, the ADDITIONAL CURVE EDIT Menu should contain the data shown in Figure 4-7.
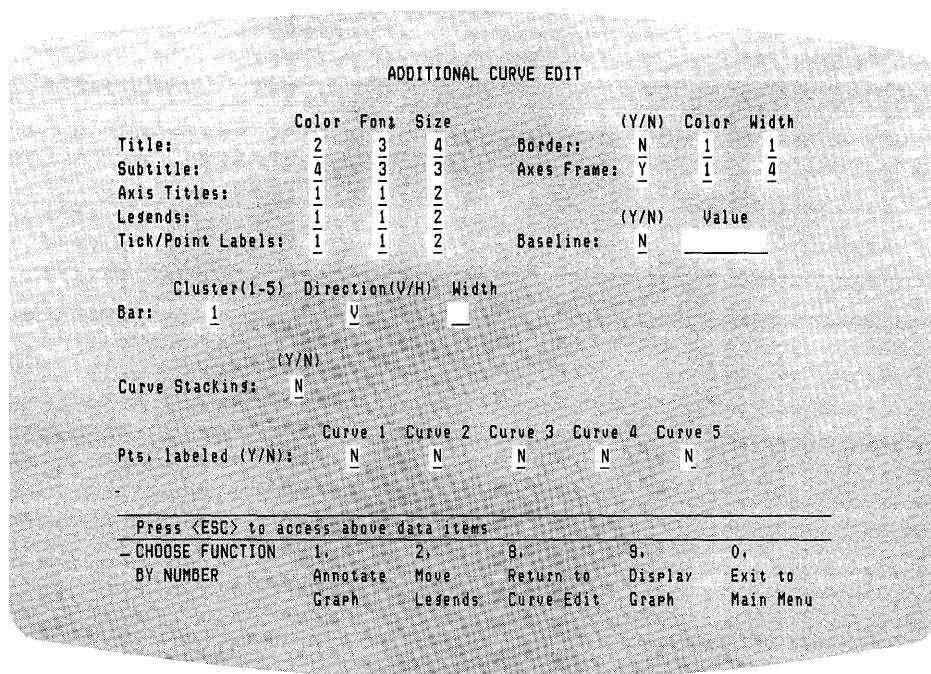
Figure 4-7.   ADDITIONAL CURVE EDIT Menu

If your changes are the same as those in Figure 4-7, press <ESC> followed by the number 9 to display your graph. Except for slight variations in the line patterns, which can occur on different devices, it should resemble the one in Figure 4-8.

SALES EFFORT
N.East Region

Calls/Month

1982
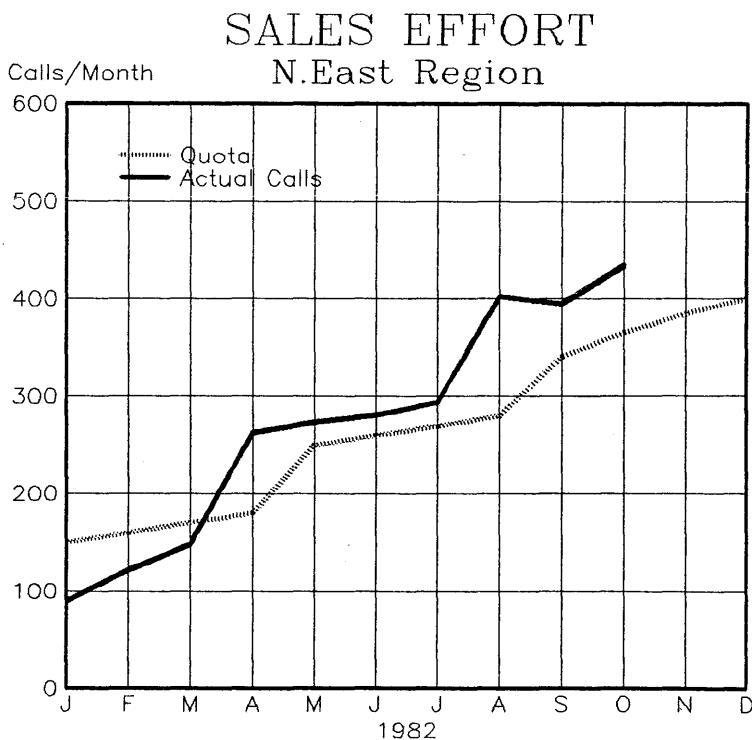
Figure 4-8.   Sales Effort Line Graph

Return to the ADDITIONAL CURVE EDIT Menu to make corrections if they are needed. To save this graph, return to the MAIN MENU and select number 6, SAVE current graph. When you are asked for the name of your output file, type SALES for the filename. The editing required to produce this graph was more complex than for previous graphs. You might want to create one or two more line graphs like this one to ensure that you understand the process.

BAR GRAPHS

The next graph that you create in this section is a vertical bar graph. The graph shows the percent of deviation of a company's planned earnings compared to the actual earnings. The graph uses vertical bars that extend on either side of the same baseline.

To start creating the graph, display the MAIN MENU. Then, select option 1 to display the CREATE NEW GRAPH Menu. From this menu, select option 3 for a stacked bar graph. When the DATA SELECTION Menu appears, enter number 1 because you are entering data from the keyboard again. You should see the the CURVE DATA MENU on your screen.

Now, you can begin entering data. The figures for the percent of deviation are listed below. Enter these in Curve 1.

1st quarter	-36
2nd quarter	-65
3rd quarter	28
4th quarter	72
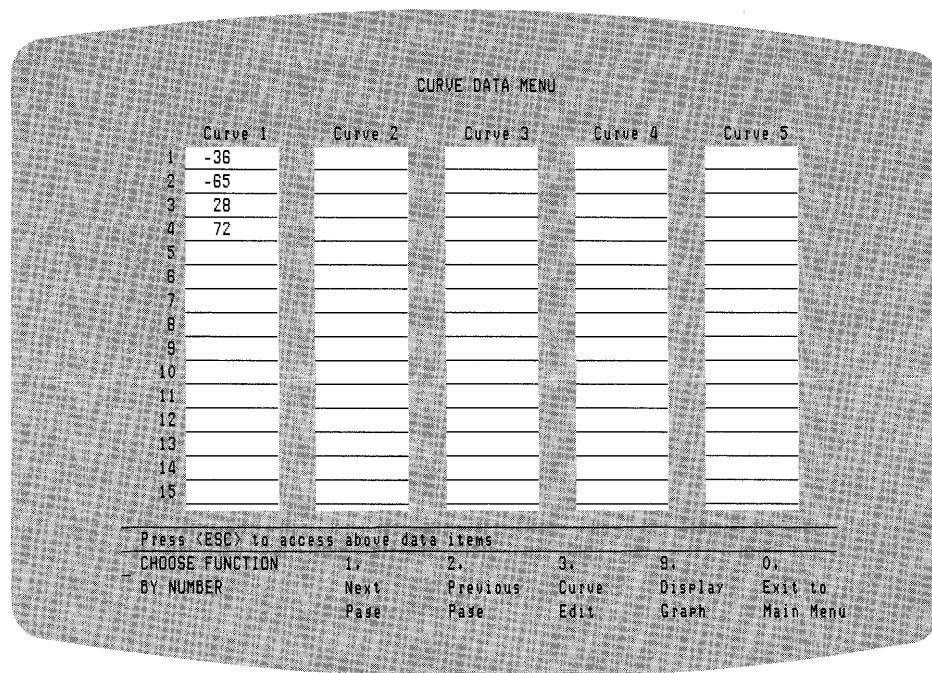
Figure 4-9.   CURVE DATA MENU
for the Bar Graph

CURVE EDIT MENU   Although the figures do not present a positive outlook for
                    the company, your graph need not be as grim. After you
                    enter the data, press <ESC> followed by the number 3 to
                    go to the CURVE EDIT Menu.

                    Now, you can enter the title, subtitle, and axes labels. For
                    the Title blank, enter

                    DIVISIONAL EARNINGS

                    For the Subtitle blank, enter

                    Deviation From Plan

Next label the axes. For the Primary Axis Title, use

`Quarterly, 1982,`

For the Secondary Axis Title, use

`Percent.`

Because this graph plots quarterly data, you also need to type a letter P over the default value N in the Axis Type blank. This graph has only one curve so you do not need to change the default value in the Legends blank.

To emphasize the deviations, change the color and pattern fill for the bars. In the Color column, type the number 2. In the Bar Pattern column, type the number 1 to change the fill pattern to solid fill.

After you enter all the data, the menu should look like the one in Figure 4-10.

```
                         CURVE EDIT

Title             DIVISIONAL EARNINGS
Subtitle          Deviation From Plan
Primary Axis Title   Quarterly, 1982
Secondary Axis Title  Percent

Axis Type (N/P):  P   (Numeric or Periodic: days,months,quarters)
Legends   (Y/N):  N

                              Bar    Line  Marker  Line
Curve      Legend       Type  Color  Pattern  Style  Symbol  Width
  1                      2     2      1        1      0       1
  2                      2     1      2        2      0       1
  3                      2     1      3        3      0       1
  4                      2     1      4        4      0       1
  5                      2     1      5        5      0       1

        CURVE TYPES:  1=Line  2=Bar  3=Step  4=Stick  5=Scatter

  Press <ESC> to access above data items
  CHOOSE FUNCTION       1.      2.        3.      9.       0.
    BY NUMBER          Data   Additional  Axes   Display  Exit to
                       Entry   Editing    Edit   Graph    Main Menu
```

Figure 4-10.   CURVE EDIT Menu
for the Bar Graph

If all the data is correct, you can exit this menu and move
to the next one, which is either the ADDITIONAL CURVE
EDIT or the PERIODIC AXES EDIT Menu. The order that
you select these menus is optional. However, for this exam-
ple, move to the ADDITIONAL CURVE EDIT Menu.
Press <ESC> and select Function 2, Additional Editing.

ADDITIONAL CURVE
EDIT MENU

Do not change the DR Graph color, size, and font defaults
for this graph. Start changing the defaults in this menu at
the Axes Frame blank. Enter the letter Y in the (Y/N)
column to specify an Axes Frame. Then, enter the number
2 in the Width blank.

Next, move to the Baseline blank and enter the letter Y. In
the Baseline Value blank enter the number 0. With a base-
line of 0 to represent the planned earnings and the devia-
tion data in Curve 1 plotted against the baseline data, the
deviation from plan can readily be seen. DR Graph auto-
matically plots the baseline perpendicular to the vertical
bars.

You have entered all the data for this menu that is required
for the graph. Figure 4-11 shows what the menu with your
data and the DR Graph defaults should look like. Look at
it before you proceed to the next menu, the PERIODIC
AXES EDIT Menu.

```
                            ADDITIONAL CURVE EDIT

                    Color  Font  Size                (Y/N)  Color  Width
       Title:          1     1     4      Border:      N      1      1
       Subtitle:       1     1     3      Axes Frame:  Y      1      2
       Axis Titles:    1     1     2
       Legends:        1     1     2                  (Y/N)  Value
       Tick/Point Labels: 1   1    2      Baseline:    Y        0


            Cluster(1-5)  Direction(V/H)  Width
       Bar:      1             V            _

                   (Y/N)
       Curve Stacking:   Y

                       Curve 1  Curve 2  Curve 3  Curve 4  Curve 5
       Pts, labeled (Y/N):   N       N        N        N        N


     Press <ESC> to access above data items
      CHOOSE FUNCTION   1,        2,        8,         9,        0,
      BY NUMBER         Annotate  Move      Return to  Display   Exit to
                        Graph     Legends   Curve Edit Graph     Main Menu
```

Figure 4-11.   ADDITIONAL CURVE EDIT Menu

PERIODIC AXES EDIT MENU	To get to the PERIODIC AXES EDIT Menu from the data area of the ADDITIONAL CURVE EDIT Menu, you must exit the data area of the menu by pressing <ESC> and return to the CURVE EDIT Menu by entering the number 8. After you display the CURVE EDIT Menu, you can enter number 3 for the Axes Edit Function. DR Graph displays the PERIODIC AXES Menu because you entered the letter P in the Axis Type blank of the CURVE EDIT Menu. Now continue refining the design of your graph.
Primary Axis	In the Label Type blank, enter the number 7 to label data by quarters. The default value for the Period Start blank is 1.

Your graph plots only one period, so you need not specify a value for this blank or the Number of Periods blank.

The last change for this axis is the Axis Indent; overwrite the default value with the letter Y to indent the bars from the axis.

Secondary Axis

Set the Label Type to 2. Your graph plots positive and negative data, so you need to specify a data range from −100 for the Axis Minimum to +150 for the Axis Maximum, with a label increment of 50. Finally, overwrite the default value for the Grid blank with a Y to add gridlines for the secondary axis. Then change the linestyle for the gridlines to number 2. Figure 4-12 shows the data you entered and the DR Graph default values.
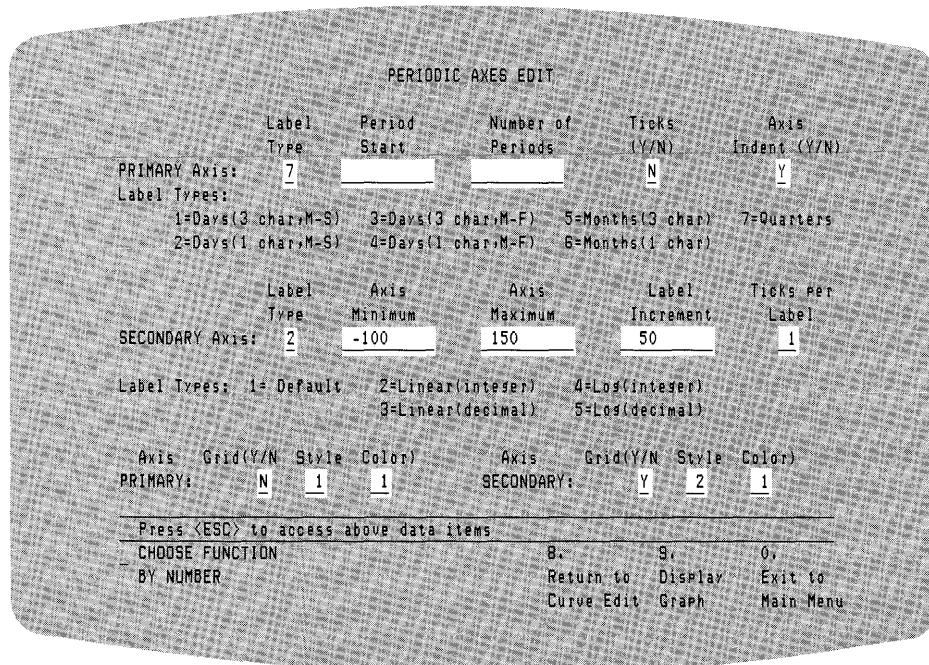
Figure 4-12.   PERIODIC AXES EDIT Menu

If the data on the PERIODIC AXES EDIT Menu on your screen matches that in Figure 4-12, press <ESC> followed by the number 9 to display your graph. With the exception of fill patterns, which can differ on some devices, your graph should resemble the one in Figure 4-13.

DIVISIONAL EARNINGS
Percent   Deviation From Plan
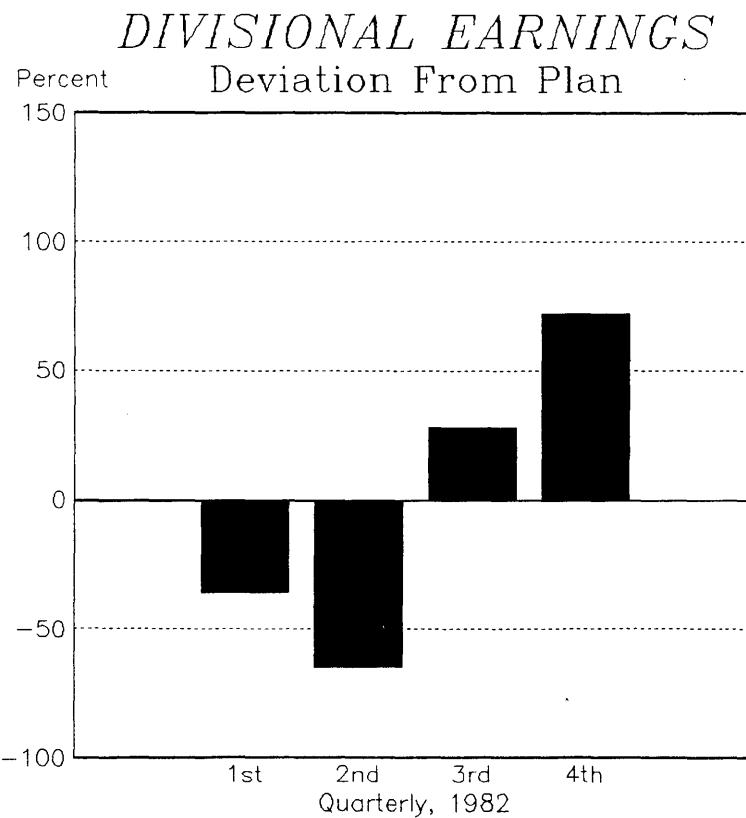
Figure 4-13.   Deviation Bar Graph

COMBINING GRAPHS   DR Graph allows you to combine and plot graphs in different ways. You can plot more than one type of curve on a single axis or combine several graphs on one page. Using what you learned in creating line and bar graphs, try plotting more than one type of curve on a single axis.

For this graph, plot the actual sales of two divisions of a company against forecasted sales during a six-month period that runs from May through October. A clustered bar graph is a good choice for comparing the sales activities of the divisions.

Start at the MAIN MENU and enter number 1 to create a new graph. When the CREATE NEW GRAPH Menu appears, enter number 2. DR Graph displays the DATA SELECTION Menu. You are entering the data from the keyboard, so enter number 1 to display the CURVE DATA MENU.

CURVE DATA MENU

Enter the following sales data for the six accounting periods:

Robotic Controllers Division:

176
211
254
570
376
512

Process Controllers Division:

259
299
343
293
352
438

Forecasted Sales:

260
320
340
375
400
435

Ⅲ DIGITAL RESEARCH™

After you enter the data, the CURVE DATA MENU
should look like the one in Figure 4-14.

```
                              CURVE DATA MENU

          Curve 1      Curve 2      Curve 3      Curve 4      Curve 5
    1        176          259          260
    2        211          299          320
    3        254          343          340
    4        570          293          375
    5        376          352          400
    6        512          438          435
    7
    8
    9
   10
   11
   12
   13
   14
   15

   Press <ESC> to access above data items
   CHOOSE FUNCTION        1.           2.           3.           9.           0.
   BY NUMBER              Next         Previous     Curve        Display      Exit to
                         Page         Page         Edit         Graph        Main Menu
```
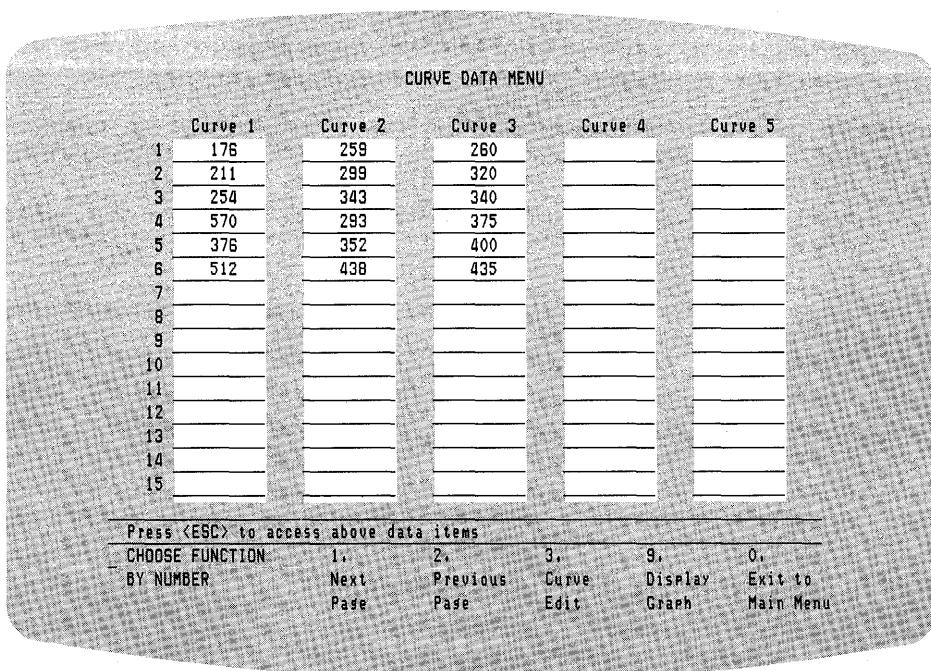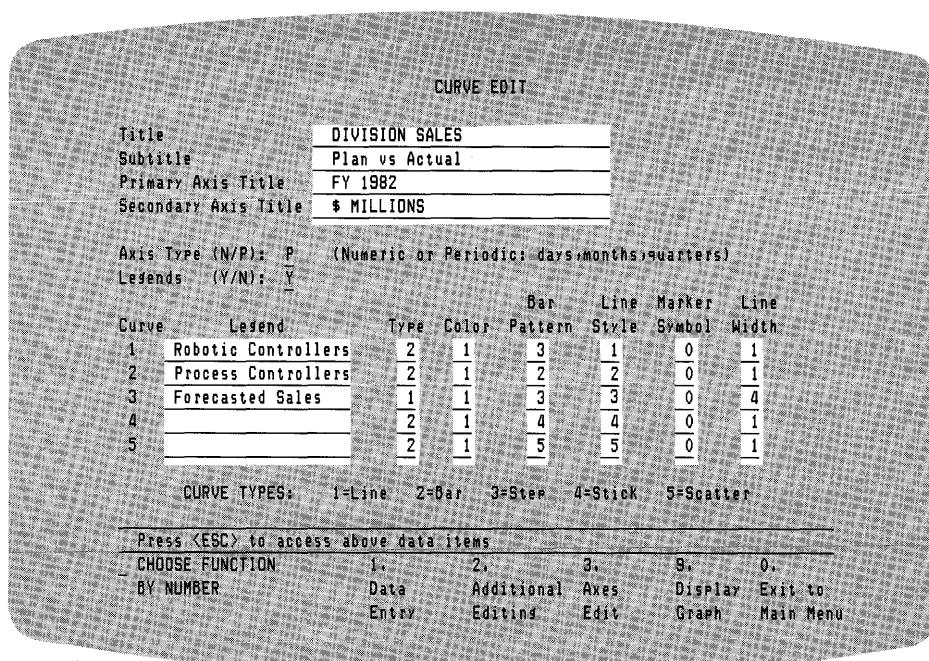
Figure 4-14.   CURVE DATA MENU

CURVE EDIT MENU   Now go to the CURVE EDIT Menu. Enter the graph and
                      axes titles and legends shown in Figure 4-14. Enter the
                      letter P for PERIODIC AXES EDIT Menu in the Axis Type
                      blank. Enter the letter Y in the Legends blank to overwrite
                      the default value N for no legend. Until now, you have
                      done nothing new. Look at the values under the Type col-
                      umn for each Curve. The default value is 2 for a bar graph.
                      Change curve 3 to be a line graph by overwriting the de-
                      fault value with the number 1. By changing the default
                      value in the Curve Type blank, you can combine different
                      types of graphs on one axis.

While you are at this menu, change the Bar Pattern for the first curve to 3. Also change the line width for the third curve to 4. You are finished editing this menu. Look at Figure 4-15 to ensure the data you entered matches that shown in the figure.


```
                          CURVE EDIT
   Title              DIVISION SALES
   Subtitle           Plan vs Actual
   Primary Axis Title FY 1982
   Secondary Axis Title $ MILLIONS

   Axis Type (N/P):  P   (Numeric or Periodic: days,months,quarters)
   Legends   (Y/N):  Y
                                     Bar   Line  Marker  Line
   Curve    Legend          Type Color Pattern Style Symbol Width
    1   Robotic Controllers    2    1     3     1     0     1
    2   Process Controllers    2    1     2     2     0     1
    3   Forecasted Sales       1    1     3     3     0     4
    4                          2    1     4     4     0     1
    5                          2    1     5     5     0     1

        CURVE TYPES:   1=Line  2=Bar  3=Step  4=Stick  5=Scatter

   Press <ESC> to access above data items
   CHOOSE FUNCTION       1.       2.        3.     9.      0.
   BY NUMBER            Data    Additional Axes   Display Exit to
                       Entry     Editing   Edit    Graph  Main Menu
```

Figure 4-15.   CURVE EDIT Menu
for the Combination Graph

PERIODIC AXES
EDIT MENU

Now press <ESC> followed by the number 3 to go to the PERIODIC AXES EDIT Menu. This menu lets you define the axes labels for the primary and secondary axes.

For the Primary Axis Label Type, enter the number 5 for three-character month labels such as JAN for January, FEB for February, and so on. In the Period Start blank, enter the number 5 so the graph shows the period begins in May, rather than the January default. Finally for this Axis, enter the letter Y (Yes) in the Primary Axis Indent blank.

Enter the number 2 in the Secondary Axis Label Type blank. Then enter the number 0 for the Axis Minimum blank and 800 in the Axis Maximum blank. For the Label Increment blank, enter the number 100.

You are finished modifying this menu. To ensure you entered the data correctly, before you move to the next menu, refer to Figure 4-16.
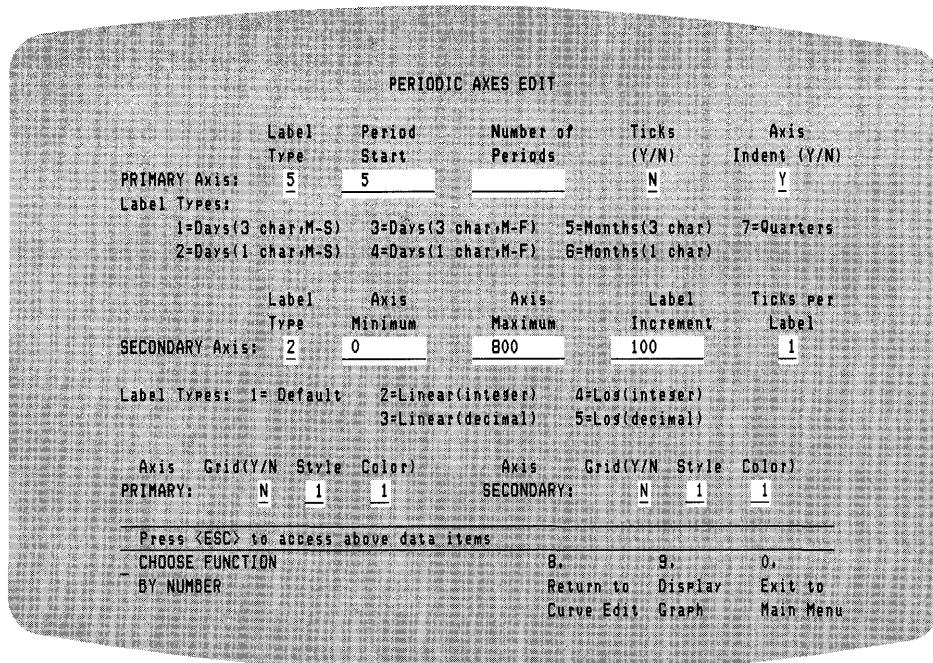

Figure 4-16. PERIODIC AXES EDIT Menu

ADDITIONAL CURVE
EDIT MENU

To display the ADDITIONAL CURVE EDIT Menu from the data area of the PERIODIC AXES Menu, press <ESC> followed by the number 8. This returns you to the CURVE EDIT Menu. Now press number 2, Additional Editing to display the ADDITIONAL CURVE EDIT Menu.

Press number 9 to preview your graph. Notice the graph is bottom heavy. You can use this menu to improve its design. Press <RETURN> to go back to the ADDITIONAL CURVE EDIT Menu.

The first element to add is an Axes Frame; enter the letter Y to overwrite the default value N.

Moving Legends

Next, move the legend. Press <ESC> followed by the number 2. This displays the graph and enables the graphics cursor, a special cursor designed for moving text. The appearance of the graphics cursor can vary from system to system. Most look like a large plus sign (+) in which two lines intersect at 90 degree angles. You can move the graphics cursor around with the arrow keys, a mouse, or whatever keys drive your graphics input device. Refer to GIN in your GSX documentation.

Now position the cursor so the legend appears in the center of the white space above the bars. Imagine the legend is a box, and you are positioning the upper left-hand corner with the cursor. Position the cursor at a location, then press any key to send this position information to DR Graph. After you press the key, DR Graph displays the ADDITIONAL CURVE EDIT Menu again. Before you proceed with more changes, enter the number 9 to display the graph and ensure the legend is in the correct position.

ANNOTATE MENU   After you display your graph, press <RETURN> to go
                 back to the ADDITIONAL CURVE EDIT Menu. After DR
                 Graph displays the menu, select Function 1 to annotate the
                 current graph. DR Graph displays your graph, the default
                 and selected text attributes, and several functions that you
                 can use as shown in Figure 4-17.
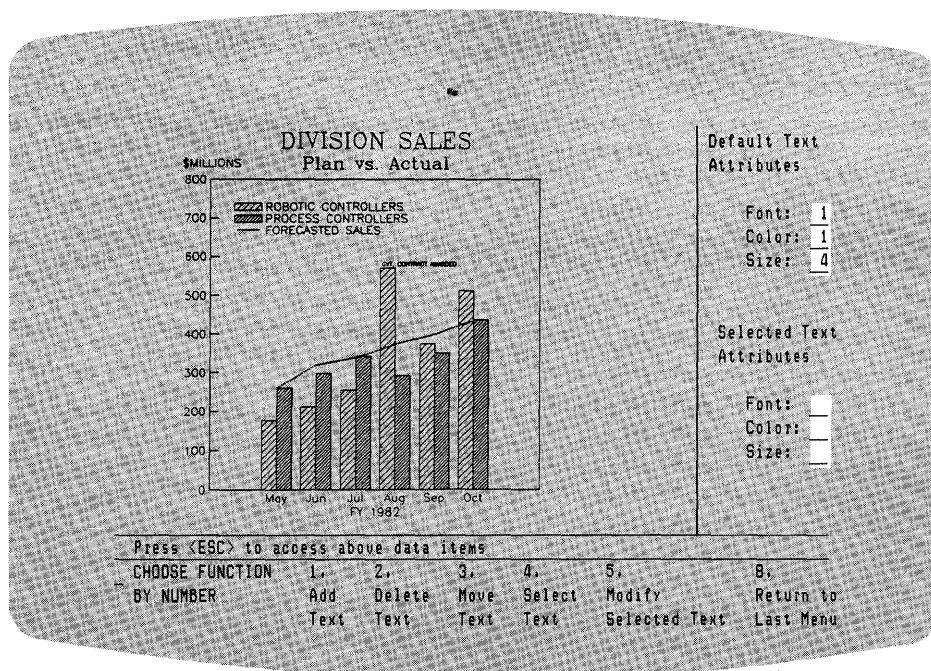
Figure 4-17.   Annotate Display
in the ADDITIONAL CURVE EDIT Menu

This menu lets you add text to a graph to clarify or empha-
size a point. You can add up to 40 characters. For example,
add text to show that in August, the sales for the Robotics
Division were influenced by a large government contract.

To begin adding text, select Function 1. When DR Graph
prompts you for the text to be added, type the phrase,
GVT.CONTRACT AWARDED and press <RETURN>.

The graphics cursor appears on the screen and DR Graph prompts you with the message:

`Position cursor and press any key.`

Using the arrow keys on your keyboard, move the cursor until the text is centered over the tallest bar. Imagine the text is one continuous string that you are moving and the beginning of the string is positioned in the lower left section of the cursor. After you position the string at the appropriate location, press any key except <RETURN> to send the location coordinates to DR Graph.

Once you enable and move the graphics cursor during an editing session, it remains at the last location until you move it again.

The text size probably surprised you. You can change the text attributes font, color, and size by pressing <ESC> and moving the cursor to the attribute you want to change. Try changing the text size to 2.

Check Figure 4-18 to compare your annotation placement with the example and to verify the text attribute changes.
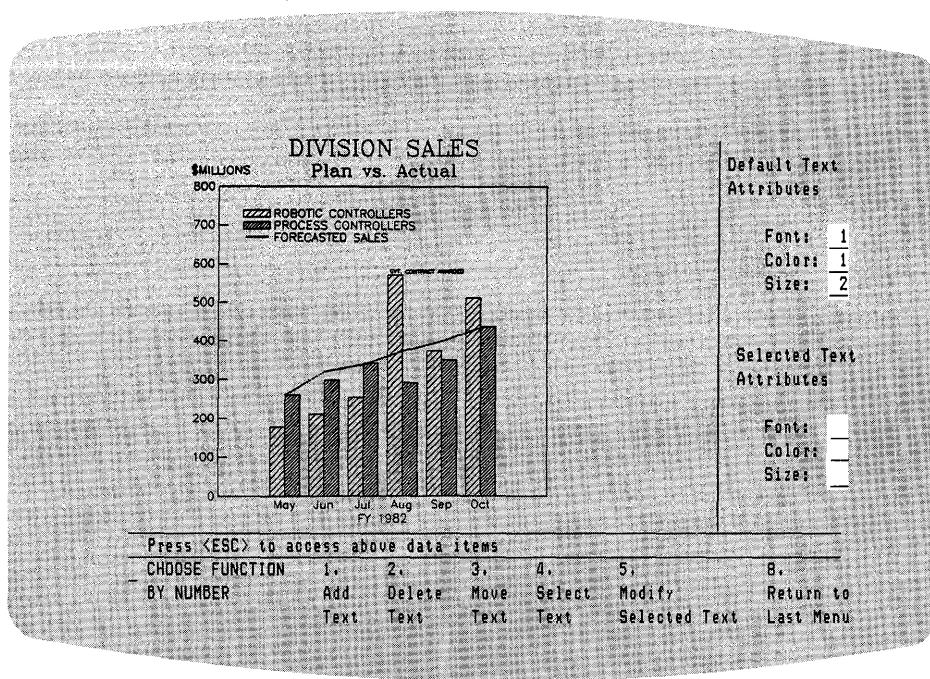
Figure 4-18.   ANNOTATE Menu

Press <ESC> and enter the number 8 to return to the ADDITIONAL CURVE EDIT Menu. Enter the number 9 to display your graph. It should resemble the one in Figure 4-19. If it does not resemble that graph, return to the menus you used and check your data.

DIVISION SALES

$MILLIONS   Plan vs. Actual
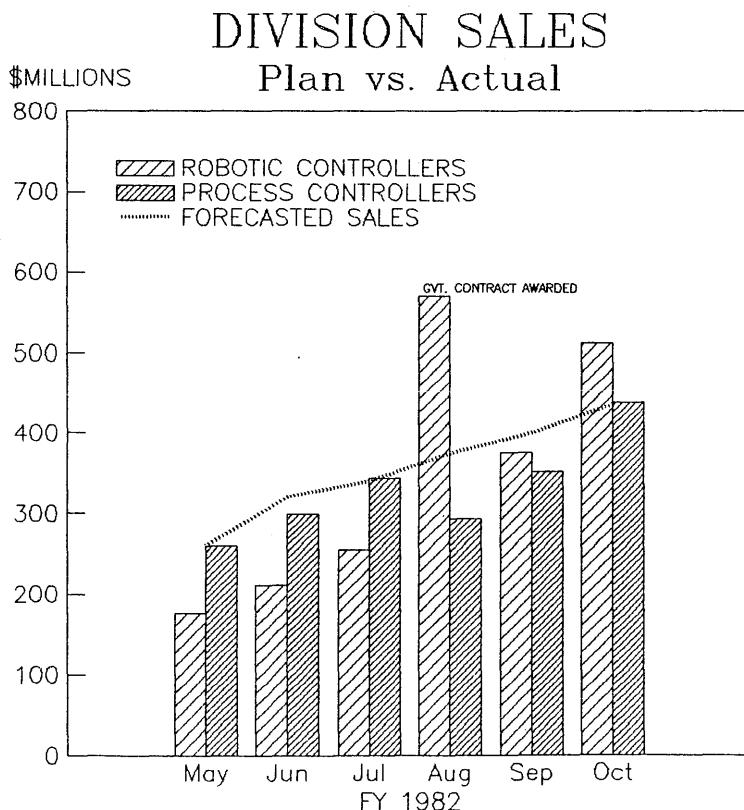
Figure 4-19.   Combination Line/Bar Graph

MULTIPLE GRAPHS   DR Graph also lets you combine as many as four graphs on one page. The graphs can consist of any combination of those listed in the CREATE NEW GRAPH Menu.

To create multiple graphs on the same page, start at the MAIN MENU. Select option 7, and the MULTIPLE GRAPHS Menu appears.

By now you have created and saved enough graphs to combine several of these on a page. DR Graph gives you five different formats from which to choose. Choose number 5. Then enter the filenames of the graphs you have saved. After you enter the data, the MULTIPLE GRAPHS Menu should resemble the one in Figure 4-20.
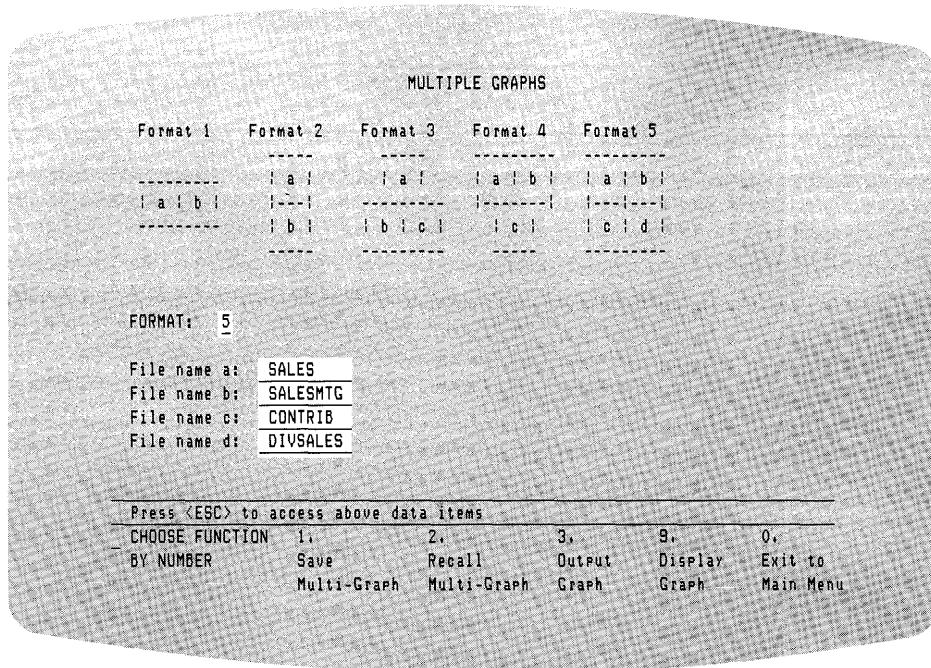
Figure 4-20.   MULTIPLE GRAPHS Menu

You can display the page by pressing <ESC> and entering the number 9. The appearance of your page depends on the graphs you specified. Figure 4-21 shows a page containing multiple graphs.
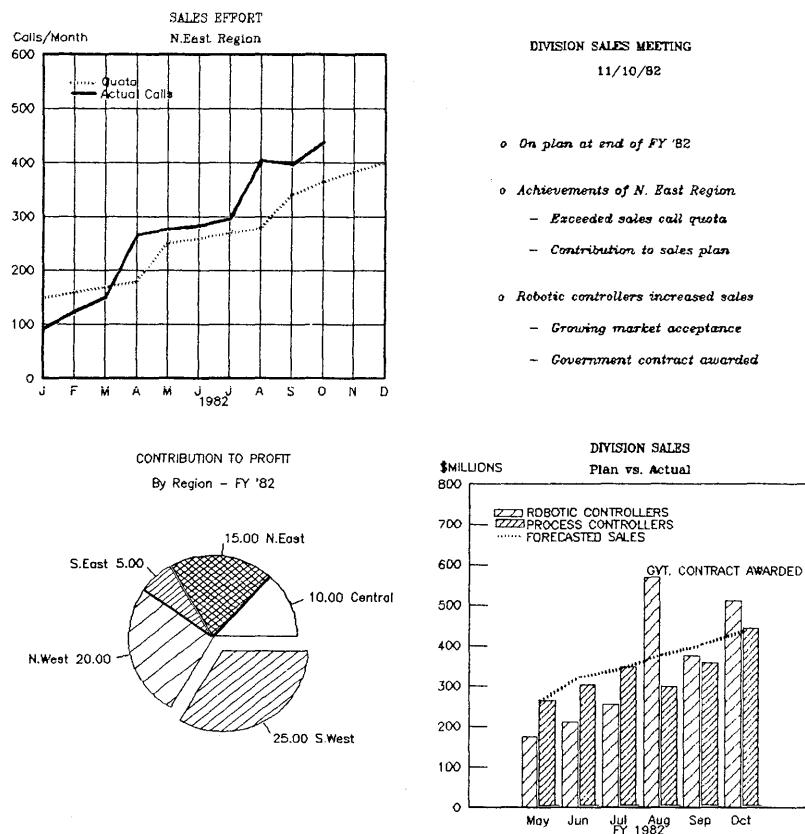
Figure 4-21.   Multiple Graphs

End of Section 4

Section 5

DATA INTERFACE

INTRODUCTION

Now that you have mastered the more mechanical parts of computer graphing, you are ready to learn about the sources of the data you choose. DR Graph accepts data from several sources besides the keyboard. This section describes these sources, how you access data from them, and use it in your graphs.

DATA SELECTION MENU

The DATA SELECTION Menu in Figure 5-1 shows you the sources from which DR Graph accepts data.

- the keyboard (option 1).
- types of spreadsheet files (option 2 or 3).
- a DR Graph file consisting of either data from the current graph or a graph that you had saved previously (option 4).


```
          DATA SELECTION

    1.    MANUAL (from keyboard)

    2.    SUPERCALC(TM) SDF file

    3.    VISICALC(TM) DIF file

    4.    EXISTING data

    0.    EXIT to Main Menu

    CHOOSE DATA INPUT MODE BY NUMBER
```
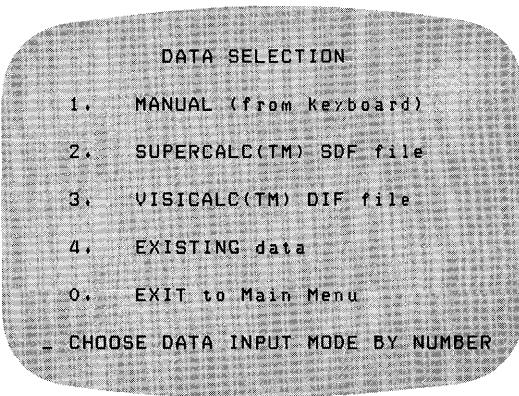
Figure 5-1.   DATA SELECTION Menu

MANUAL DATA
ENTRY

You use the keyboard to display menus and enter data in the appropriate blanks. Cursor control can vary among different types of systems. If you normally use arrow keys to position the cursor, they might not function now. However, DR Graph defines its own set of keys to move the cursor when you enter data. Refer to Table 3-1 in Section 3, "Getting Started."

SPREADSHEET FILES

You need not enter data from the keyboard each time you create a graph. DR Graph lets you use data from stored VisiCalc® DIF or SuperCalc® SDF files. Procedures for transferring these files are described on the following pages. However, before you use these procedures, you should be familiar with your spreadsheet program.

Your First Steps

In addition to familiarizing yourself with your spreadsheet program, follow the steps below before you begin transferring the spreadsheet files to DR Graph.

■ If the model has a great deal of data, delete unnecessary columns and rows before you create an output file.

■ Print a copy of the spreadsheet model. You can use it to verify the data transfer and sort data while you use DR Graph.

Preparing a
SuperCalc SDF File

The steps below outline the procedure to prepare a Super-Calc SDF file for use with DR Graph.

Note: You must have the SDI program extension for SuperCalc.

1. Create a model with SuperCalc.
2. Make a hardcopy of the model for later reference.
3. Save the model with the /SAVE function. When it asks, A(LL) or V(ALUE), select either response.
4. Boot the SDI program; refer to the SDI manual for instructions.
5. Select OPTION C, Converting a SuperCalc file to a SuperData Format File.
6. When the program asks, Output A(LL) or V(ALUE), select VALUES.

Now you can use this file with DR Graph.

Preparing a
VisiCalc File

To prepare a VisiCalc file for use with DR Graph, follow these steps:

1. Create the model with VisiCalc.
2. Print a copy of the model for later reference.
3. Use the STORAGE command with the DI option to save the model. The command is /S#S. Position the cursor to mark the upper-left corner of the data area to be saved. The program then prompts you to mark the lower-right corner of the data. Use this opportunity to reduce the size of the model, which makes the data transfer faster and easier.
4. The program prompts, Data save: R, C, or RETURN. Select R for rows.

Now you can use this file with DR Graph.

Using a
Spreadsheet File

The following example shows you how to use data from a SuperCalc SDF file to create a line graph. Assume you selected option 2, SuperCalc SDF File, from the DATA SELECTION Menu. DR Graph displays the FILE ACCESS METHOD Menu shown in Figure 5-2.

FILE ACCESS METHOD

1.   By ROW

2.   By COLUMN

3.   EXIT to Main Menu

Curve/Pie Data Displayed in Spreadsheet by: _
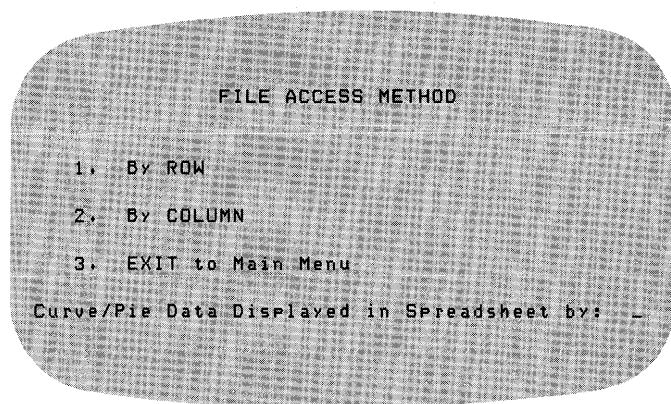
Figure 5-2.   FILE ACCESS METHOD Menu

FILE ACCESS   The FILE ACCESS METHOD Menu lets you select and
METHOD MENU   plot the data by row or column. This method allows you to
                     take full advantage of your spreadsheet file. Look at the
                     example of the SuperCalc SDF file in Figure 5-3.

Figure 5-3.   SuperCalc SDF File of Computer Sales

The entries in Figure 5-3 show quarterly computer sales
over a period of years.

Using Row Data

To compare the sales of a quarter across a number of years, select option 1 from the FILE ACCESS METHOD Menu. This tells DR Graph to extract and plot the row data from the file.

After you select an option from the FILE ACCESS METHOD Menu, DR Graph prompts you for a filename; enter the filename.

DR Graph displays the CURVE/PIE DATA Menu. Because you chose to have the row data plotted, DR Graph then displays each row of data and asks you whether to keep it or reject it. DR Graph plots it if you keep it. DR Graph might display several empty rows because any headings or data consisting of alphabetic characters are not transferred. The row containing the dates is one of the first shown. You want to reject this row also; you do not want to plot the dates. You can plot as many as five rows of data. When you have chosen the data that you want to plot, DR Graph displays the CURVE DATA Menu with all the figures from the rows selected as shown in Figure 5-4.

```
                            CURVE DATA MENU

           Curve 1       Curve 2       Curve 3       Curve 4       Curve 5
      1       23            30            56            79
      2       45            60            23            53
      3       32            20            32            39
      4       89            50            76           165
      5       34            50            34            68
      6       67            72            87           118
      7       67            50            87           140
      8
      9
     10
     11
     12
     13
     14
     15

  Press <ESC> to access above data items
  _ CHOOSE FUNCTION     1,           2,           3,           9,           0,
    BY NUMBER           Next         Previous     Curve        Display      Exit to
                        Page         Page         Edit         Graph        Main Menu
```
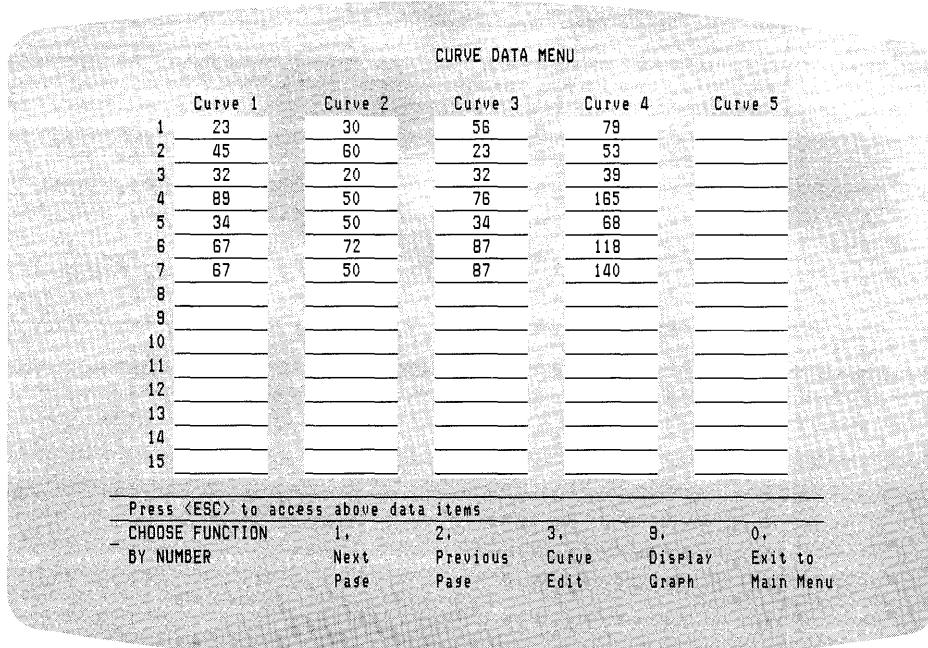
Figure 5-4.   CURVE DATA MENU

Displaying Your
Graph

To display the graph, enter number 9 for the Display Graph Function. Figure 5-5 shows you what the graph looks like with the data from the CURVE DATA MENU in Figure 5-4.
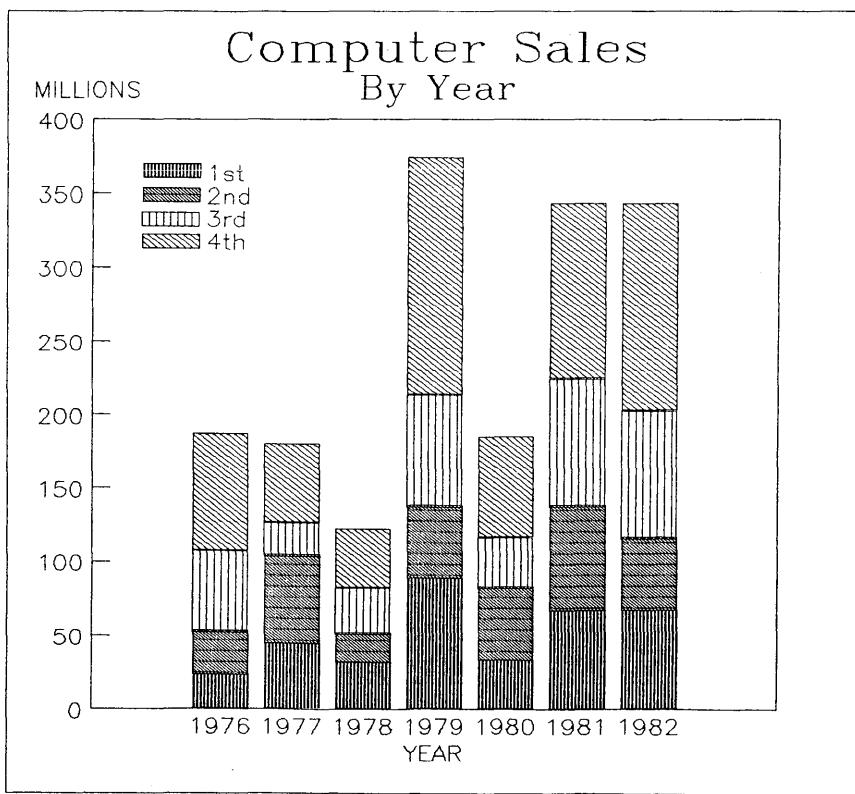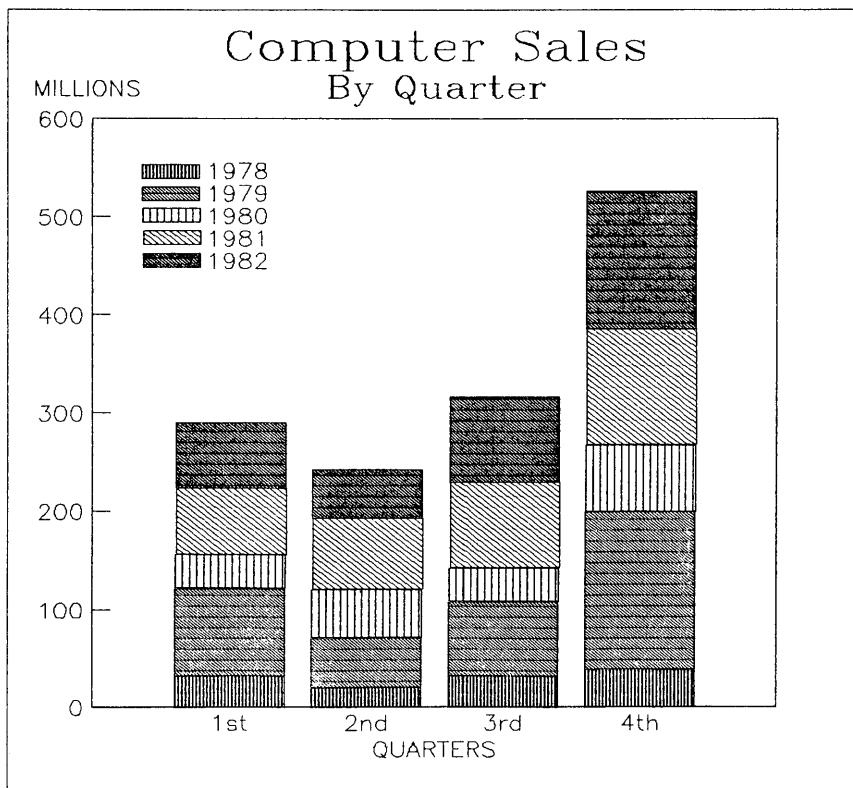
Figure 5-5.   Computer Sales by Year

Using Column Data   If you plotted the data by column to compare the annual
                           sales by quarter, the graph would look like the one in
                           Figure 5-6.

Figure 5-6.   Computer Sales by Quarter

End of Section 5

Section 6

MOVING AROUND IN THE MENUS

INTRODUCTION

This section summarizes each DR Graph menu and screen display, describes its use, and relations to other menus or displays. The menu map in Figure 6-1 guides you through routes you can take to access all the menus.

After you work through the tutorials in Sections 3 and 4, use this section to reference specific types of graphs, menus, and functions that they do not explain.

This section shows each menu with a description of each option available to you. The description includes possible entries for each blank.

As you read through this section, the phrase current graph is used to describe the graph you last created, edited, or named in a recall operation.

CURSOR
MOVEMENT

Because DR Graph runs on many different terminals, the keys that you normally use to move your cursor might not work now. DR Graph defines keys that move the cursor and enter and modify data in Table 3-1 in Section 3.

If you make a mistake while you are entering data, you can correct the mistake by typing over the incorrect data.
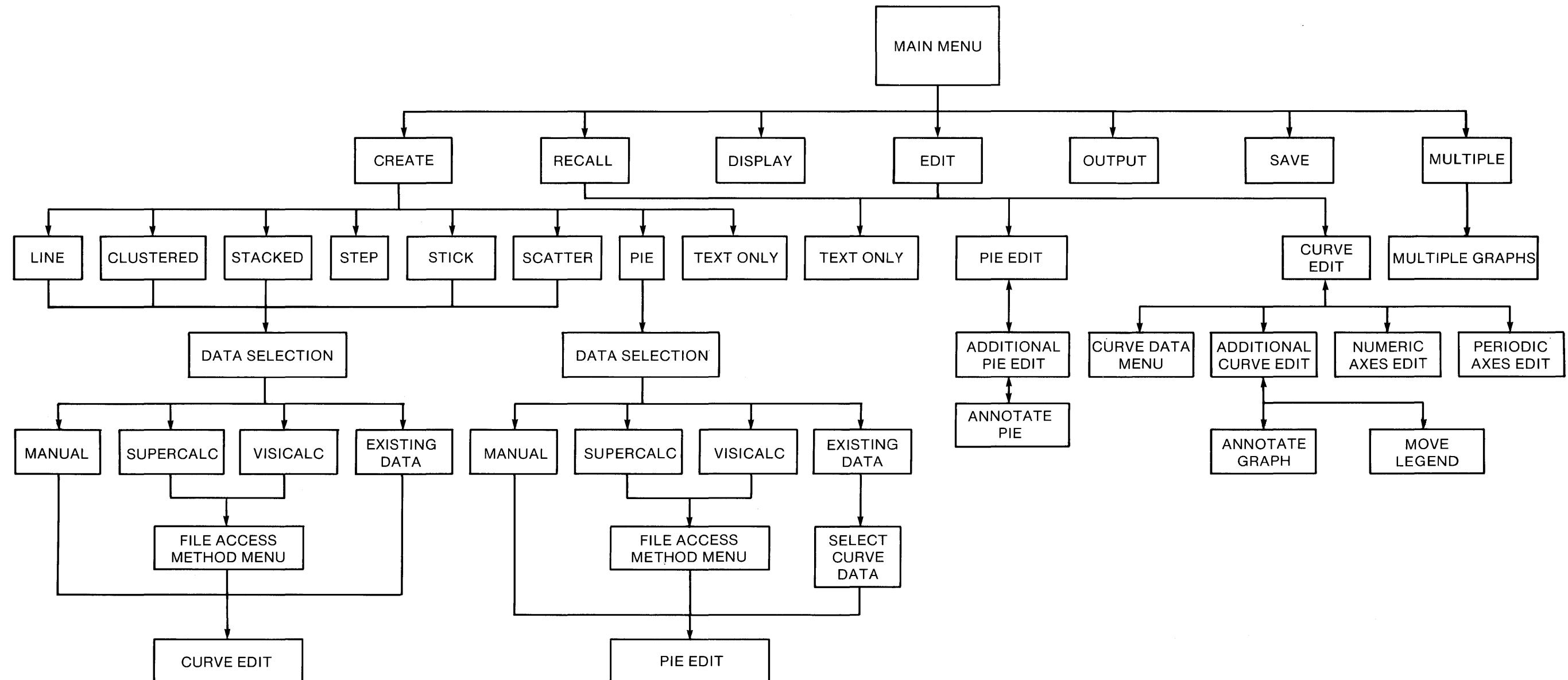
Figure 6-1.   DR Graph Menu Map

All Menus except Annotate and Move legends have the option to
return to the Main Menu.
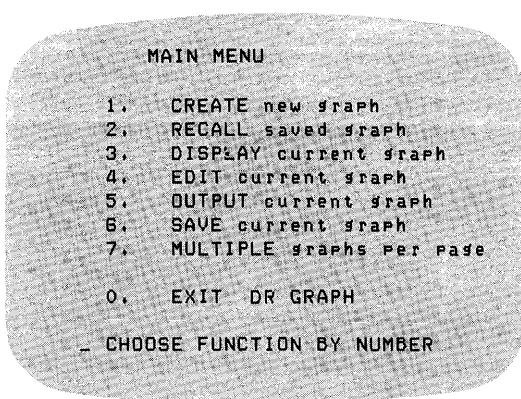
Figure 6-2.   MAIN MENU

MAIN MENU

This is where everything starts—the MAIN MENU. It is the first menu presented by DR Graph and the one you return to when you have completed a graphing operation such as outputting, saving, or displaying a graph.

1. CREATE new graph

Select option 1 to create a graph that does not yet exist. After you select this option, DR Graph diplays the CRE-ATE NEW GRAPH Menu.

2. RECALL saved graph

If you have saved a graph in a disk file you can recall it by selecting option 2. A prompt appears asking for the name of the file containing your saved graph. Ensure you include the disk drive designation if your graph is stored on a different disk than the one on which you are currently working. After you enter the filename of the graph, DR Graph displays the appropriate edit menu for the type of graph you are creating.

3. DISPLAY current graph

This option displays the current graph.

4. EDIT current graph

If you wish to change any aspect of the current graph, use
this option to display the CURVE EDIT or PIE EDIT
Menu. DR Graph displays the appropriate menu based on
the type of graph you selected previously.

5. OUTPUT current graph

When you are satisfied that your graph is complete, you
can display, print, or plot it with this option. After you
select this option, DR Graph displays the OUTPUT
GRAPH Menu, which allows you to select one of the fol-
lowing output devices: CRT, plotter or printer.

6. SAVE current graph

You can save your graph in a disk file with this option (see
Section 2 for suggestions on configuring your disks). DR
Graph prompts you for the filename that you want to
assign to your graph.

7. MULTIPLE graphs per page

Several graphs can be combined on a single screen or page.
Option 7 displays the MULTIPLE GRAPHS Menu, which
allows you to enter the filenames of the graphs where the
desired graphs are saved and also the placement of the
graphs on the display surface.

0. EXIT DR GRAPH

Option 0 terminates DR Graph and returns you to the
operating system.

```
                    CREATE NEW GRAPH

              1.    LINE
              2.    CLUSTERED bar
              3.    STACKED bar
              4.    PIE
              5.    STEP
              6.    STICK
              7.    SCATTER
              8.    TEXT only

              0.    EXIT to Main Menu

            _ CHOOSE FUNCTION BY NUMBER
```
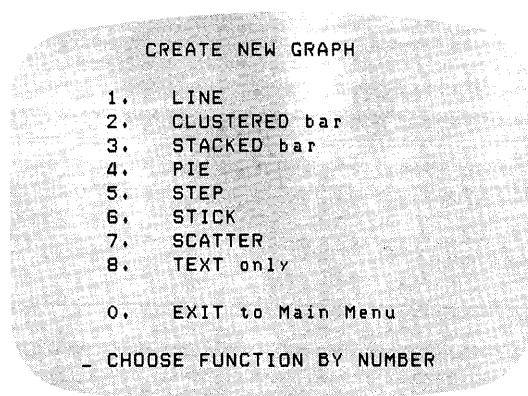
Figure 6-3.   CREATE NEW GRAPH Menu

CREATE NEW
GRAPH MENU

This menu appears when you select the CREATE new graph option from the MAIN MENU. It lets you specify the type of graph you want to create. After you select the type of graph, DR Graph displays the DATA SELECTION Menu.

1. LINE

Create a line graph. The data points are connected by a continuous line.

2. CLUSTERED bar

Create a clustered bar graph. The data is represented by bars. Multiple data sets can be shown with the bar for each set clustered next to each other on the same baseline.

3. STACKED bar

Create a stacked bar graph. The data is represented by bars. Multiple data sets can be shown with the bar for each set stacked on top of each other.

4. PIE

Create a pie graph. Data is represented by sections of a pie graph.

5. STEP

Create a step graph. Data points are plotted as a series of contiguous steps whose height corresponds to the data value.

6. STICK

Create a stick graph. Data points are shown as straight vertical lines at each X data point extending from the primary axis to a height representing the Y data value.

7. SCATTER

Create a scatter graph. Data values are plotted as discrete points on the X-Y plane.

8. TEXT only

Create a graph consisting only of text.

0. EXIT to Main Menu

Return to the MAIN MENU.
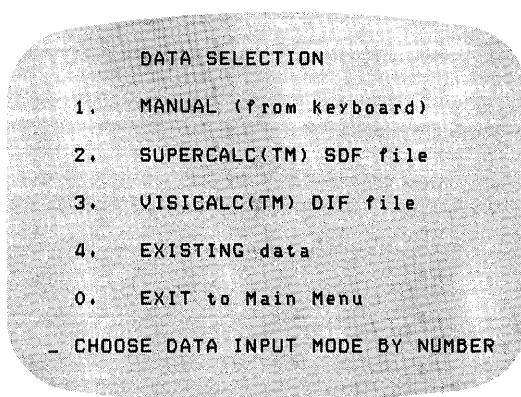
Figure 6-4.   DATA SELECTION Menu

DATA SELECTION
MENU

The DATA SELECTION Menu tells DR Graph the source
of data for the graph. DR Graph automatically displays
this menu after you select any option except 0 from the
CREATE NEW GRAPH Menu.

1. MANUAL (from keyboard)

DR Graph accepts data from the console keyboard.

2. SUPERCALC SDF file

DR Graph uses data from an existing SuperCalc SDF data
file. See Section 5 for instructions on preparing these files.
After you select this option, DR Graph prompts you for the
filename.

3. VISICALC DIF file

DR Graph uses data from an existing VisiCalc DIF data
file. Section 5 tells you how to prepare these files. After you
select this option, DR Graph prompts you for the filename.

4. EXISTING data

DR Graph uses data from the current graph or from a graph that you have stored on a disk file. If you use data from a stored file, DR Graph prompts you for the filename after you select this option.

0. EXIT to Main Menu

Return to the MAIN MENU.
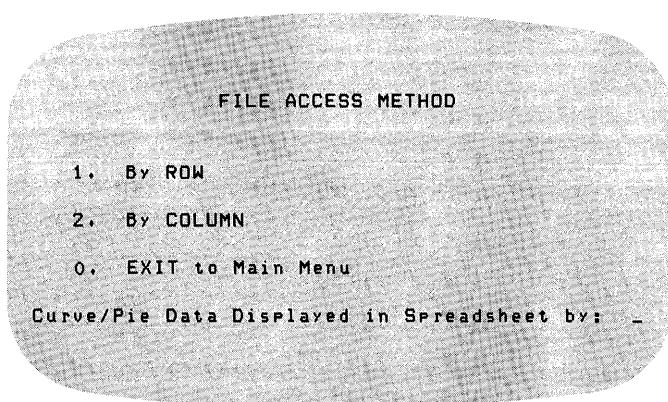
Figure 6-5.   FILE ACCESS METHOD Menu

**FILE ACCESS
METHOD MENU**

The FILE ACCESS METHOD Menu follows the SUPER-CALC or VISICALC options in the DATA SELECTION Menu. It allows you to specify whether to plot the row or column data from spreadsheet data file.

`1, By ROW`

DR Graph uses the row data from the spreadsheet file to plot the Curve.

`2, By COLUMN`

DR Graph uses the column data from the spreadsheet file to plot the Curve.

`0, EXIT to Main Menu`

Return to the MAIN MENU.

If you select option 1 or 2, DR Graph automatically displays your data on the CURVE/PIE DATA VALUE Menu and prompts you for the data that you want plotted.
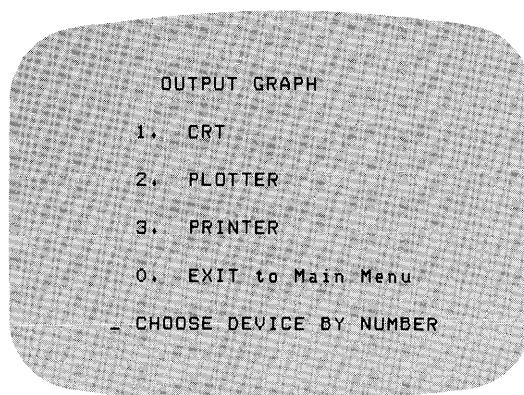
Figure 6-6.   OUTPUT GRAPH Menu

OUTPUT GRAPH
MENU

The OUTPUT GRAPH Menu allows you to select the output device for displaying a graph. See your GSX documentation to make sure the right devices are available for your system. This menu appears when you select the OUTPUT current graph option from the MAIN MENU.

1. CRT

Display graph on graphics display terminal.

2. PLOTTER

Plot graph on plotter.

3. PRINTER

Draw graph on graphics printer.

0. EXIT to Main Menu

Return to the MAIN MENU.

Ensure the logical device assignments in the ASSIGN.SYS file are correct. Refer to the information on checking the ASSIGN.SYS file in Section 2.

```
                          MULTIPLE GRAPHS

        Format 1    Format 2    Format 3    Format 4    Format 5
                    ------      ------      ---------   ---------
        ---------   | a |       | a |       | a | b |   | a | b |
        | a | b |   |---|       ---------   |-------|   |---|---|
        ---------   | b |       | b | c |   | c |       | c | d |
                    ------      ---------   ------      ---------


        FORMAT:    _

        File name a: _____
        File name b: _____
        File name c: _____
        File name d: _____

    _____
    Press <ESC> to access above data items
    CHOOSE FUNCTION   1.          2.          3.       9.        0.
    BY NUMBER         Save        Recall      Output   Display   Exit to
                      Multi-Graph Multi-Graph Graph    Graph     Main Menu
```
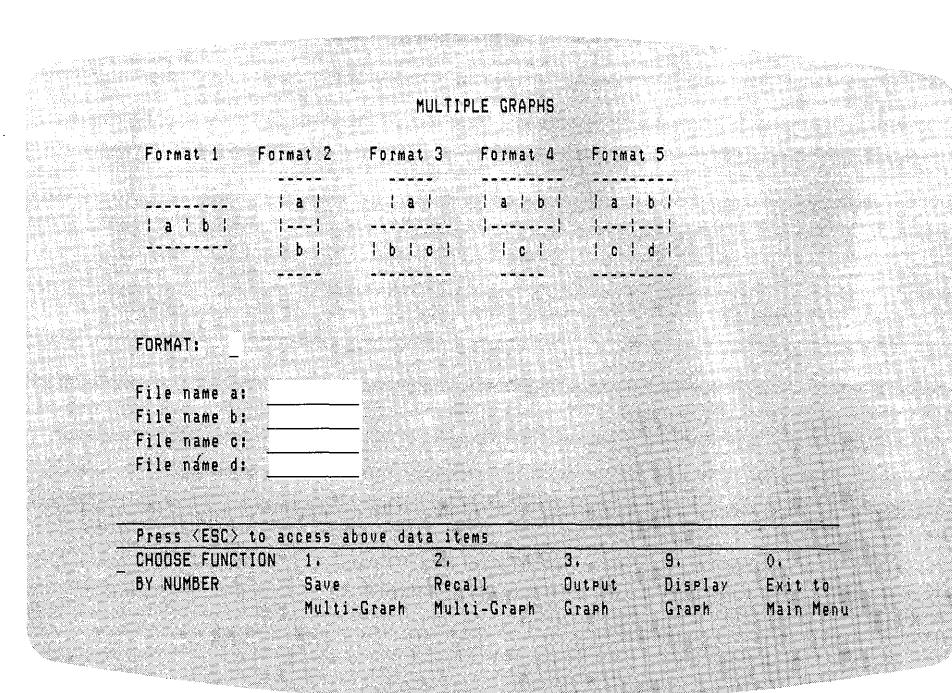
Figure 6-7.   MULTIPLE GRAPHS Menu

MULTIPLE GRAPHS
MENU

This menu lets you choose one of five formats for display-
ing up to four graphs on the same screen or page. The
format choices appear on the screen. You enter the names
of the graph files. You can also select options to save,
recall, output, and display the multiple graph.

The following list describes the blanks and the data you
enter.

1. Format

    One of five possible formats for displaying multiple
    graphs.

2. File name a: File name b: File name c: File name d:

    Names of the files containing graphs. Enter the graph
    names in the desired position.

Functions

1. Save Multi-Graph

Save the multiple graph file on a disk file. DR Graph prompts you to supply a filename for this combined graph.

2. Recall Multi-Graph

Recall a graph from a disk file. DR Graph prompts you for the filename of your saved graph.

3. Output Graph

Output a graph on a selected output device. After you select this option, DR Graph displays the OUTPUT GRAPH Menu.

9. Display Graph

Display the current graph on your terminal.

0. Exit to Main Menu

Return to the MAIN MENU.

Ensure you include the drive designation of a graph file that is not on the disk you are currently working.

DR Graph does not let you exit, save, or restore this menu, if it cannot find any of the files you entered. When the files cannot be found, DR Graph displays the message:

```
File not found (delete or replace)
Not available graph file
```

This message tells you to delete or replace the filename of the file that cannot be found from those entered.
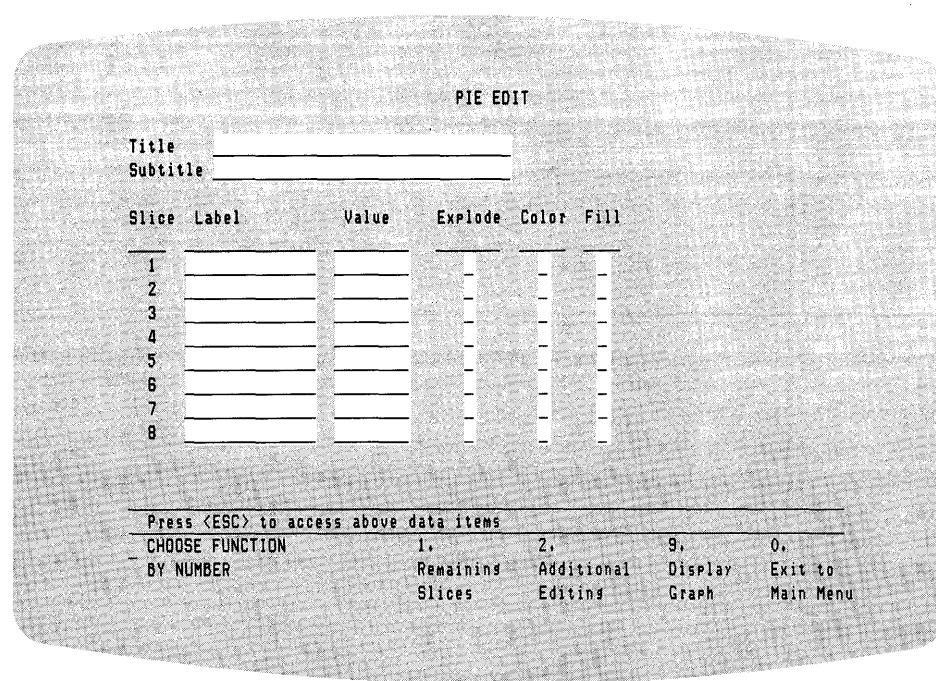
Figure 6-8.   PIE EDIT Menu

PIE EDIT MENU   The PIE EDIT Menu provides options for generating or
                     modifying a pie chart. It also provides options to allow
                     additional slice entries, initiate additional editing, and dis-
                     play the pie chart.

                     You supply the following data.

Title	Title for a pie chart. You can enter up to 40 alphanumeric characters in this blank. DR Graph centers it at the top of the graph.
Subtitle	Subtitle for your chart. DR Graph centers and positions the subtitle below the title at the top of the graph. You can enter up to 40 alphanumeric characters.
Slice Label	Caption for a single pie slice. You can enter up to 18 alphanumeric characters.
Value	Value of a pie slice. The data value can be up to 10 digits. Negative values are ignored.
Explode	Answer Y (yes) to explode slice. The default is N (no).
Color	Color index for the slice. 0 = background 1 = foreground 2 = red 3 = green 4 = blue 5 = yellow 6 = cyan 7 = magenta The index range and color values are different for various devices. Refer to the device-dependent section of your GSX documentation for details. Default color is set to 1, the foreground color.

Fill   Fill pattern index for slice.

                                    0 = no fill
                                    1 = solid fill
                                    2 = narrow 45 degree crosshatch
                                    3 = medium 45 degree crosshatch
                                    4 = wide 45 degree crosshatch
                                    5 = narrow 45 degree double crosshatch
                                    6 = medium 45 degree double crosshatch
                                    7 = wide 45 degree double crosshatch

                                    The default is 0, no fill.

                                    The above fill patterns are the ones supplied by DR Graph.
                                    Your peripheral device might have different fill patterns.

Functions   1. Remaining Slices

                                    You can describe up to 16 slices. If you need more than 8
                                    lines for data entry, select option 1.

                                    2. Additional Editing

                                    Go to ADDITIONAL PIE EDIT Menu.

                                    3. Display Graph

                                    Display the current pie chart.

                                    0. Exit to Main Menu

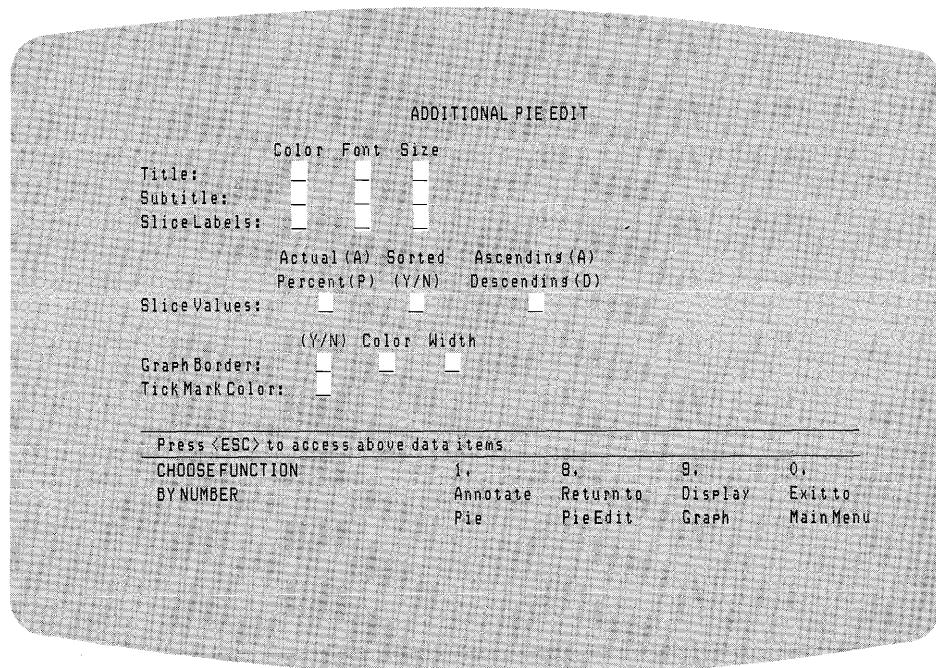   Return to the MAIN MENU.

Figure 6-9.   ADDITIONAL PIE EDIT Menu

ADDITIONAL PIE
EDIT MENU

This menu includes advanced editing features for pie charts. It also has several additional functions to return to the last menu, display the chart, and annotate the pie chart. You can supply the following data in the menu.

Title, Subtitle, Slice Label Color	Color index for title text.

0 = background
1 = foreground
2 = red
3 = green
4 = blue
5 = yellow
6 = cyan
7 = magenta

Refer to the device-dependent section of your GSX documentation for details about your specific devices. The default is 1, foreground color.

Title, Subtitle, Slice Label Font	Font index for title text. Refer to the device-dependent section of your GSX documentation for details. The default is 1. DR Graph values for fonts you supply are listed below.

1 = Device-dependent; the device default font type.
2 = Simplex Roman
3 = Duplex Roman
4 = Complex Italic

Title, Subtitle, Slice Label Size	Size of title text characters. Specified in 100ths of a graphing area. For example, a value of 5 for title size would produce characters 5/100ths of the graphing area in height. The defaults size of the title is 4, the subtitle is 3, and the label is 2.

Slice Values A/P	The slice values can be represented as actual (A) or percentages (P) of the total pie. The default is A.

Slice Values Sorted   Y (yes) requests that the slices be drawn in order of size
                           going counterclockwise, starting at the 3:00 position. The
                           default is N (no).

Slice Values A/D   If the sort option above is selected, slices are drawn in
                           ascending (A) or descending (D) order going counterclock-
                           wise, starting at the 3:00 position. Selecting ascending
                           means the slices are drawn smallest to largest; descending
                           means largest to smallest. The default is A.

Graph Border   Y (yes) requests a graph border around the graph. The
                           default is N (no).

Border Color   Color index for graph border.

                           0 = background
                           1 = foreground
                           2 = red
                           3 = green
                           4 = blue
                           5 = yellow
                           6 = cyan
                           7 = magenta

                           Refer to the device-dependent section of your GSX docu-
                           mentation for details about your specific devices. The de-
                           fault is 1, foreground color.

Border Width   Width of graph border. Line width is specified in 100ths of
                           the graphing area. The default is 1.

Tick Mark Color   Color index of axis tick labels.

                                0 = background
                                1 = foreground
                                2 = red
                                3 = green
                                4 = blue
                                5 = yellow
                                6 = cyan
                                7 = magenta

                                Refer to the device-dependent section of your GSX docu-
                                mentation for details. The default is 1, foreground color.

Functions   1. Annotate Pie

                                Select the Annotate Menu and you can place additional
                                text at any location in the graph.

                                2. Return to Last Menu

                                Return to the PIE EDIT Menu.

                                9. Display Graph

                                Draw the current graph on the console display.

                                0. Exit to Main Menu

                                Return to the MAIN MENU.
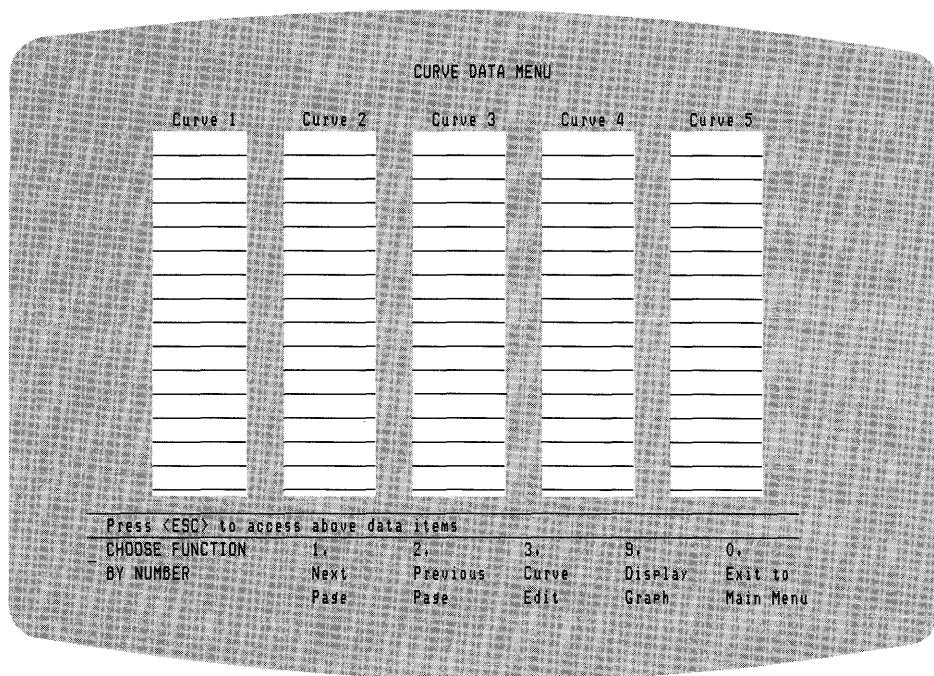
Figure 6-10.   CURVE DATA Menu

CURVE DATA MENU   The CURVE DATA MENU appears when you want to
                       create a new graph and enter the data from keyboard for
                       the following curves.

                       Curve 1
                       Curve 2
                       Curve 3
                       Curve 4
                       Curve 5

                       There is a column of blanks for each curve. Enter either
                       signed or unsigned numerical values for each curve you
                       want to plot. The maximum size of the value cannot ex-
                       ceed 10 digits including the sign. You can enter decimal
                       points also. To move the cursor while in this menu, refer to
                       Table 3-1 in Section 3.

                                                    ▥ DIGITAL RESEARCH™

Functions   1. Next Page

                       This displays the next 15 values in a data set. If you run out
                       of blanks in a column, you can request another page of
                       blanks with this function. You can enter up to 75 data
                       values for each page because you can enter 15 data values
                       for each of the 5 curves on each page. The maximum num-
                       ber of pages is 5.

                       2. Previous Page

                       Return to the previous page of data values.

                       3. Curve Edit

                       Display the CURVE EDIT Menu.

                       9. Display Graph

                       Draw the current graph on the display. Control returns to
                       this menu.

                       0. Exit to Main Menu

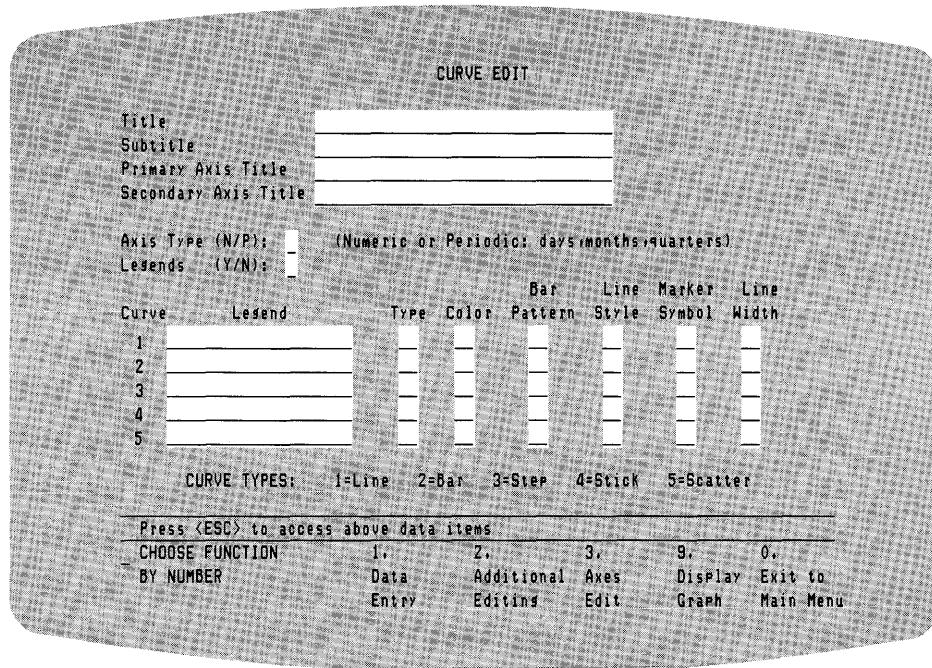   Return to the MAIN MENU.

Figure 6-11.   CURVE EDIT Menu

CURVE EDIT MENU	The CURVE EDIT Menu lets you specify additional data for your graph and modify existing default values. The data areas you can supply or modify are described below.
Title	Graph title displayed at the top of the graph. You can enter up to 40 alphanumeric characters.
Subtitle	Enter the subtitle that will be displayed below the title. You can enter up to 40 alphanumeric characters.

Primary Axis Title	Label for the primary axis. You can enter up to 40 alphanumeric characters.
Secondary Axis Title	Label for the secondary axis. You can enter up to 40 alphanumeric characters.
Axis Type	N displays the Numeric Axes Menu. P displays the Periodic Axes Menu. N is the default.
Legends (Y/N)	Y (yes) requests a legend. The default is N (no).
Legend	Legend labels. You can enter up to 18 alphanumeric characters.
Type	Curve type: 1 = line 2 = bar 3 = step 4 = stick 5 = scatter The program assigns the type according to the kind of graph you selected from the CREATE NEW GRAPH Menu. You can change the way data is plotted by changing this parameter. You can also combine two kinds of graphs on one axis by selecting different types for different curves.

Color

Color index for curve.

0 = background
1 = foreground
2 = red
3 = green
4 = blue
5 = yellow
6 = cyan
7 = magenta

Refer to the device-dependent section of your GSX documentation for details. The default is 1, foreground color.

Bar Pattern

Fill pattern index for bars.

0 = no fill
1 = solid fill
2 = narrow 45 degree crosshatch
3 = medium 45 degree crosshatch
4 = wide 45 degree crosshatch
5 = narrow 45 degree double crosshatch
6 = medium 45 degree double crosshatch
7 = wide 45 degree double crosshatch

Line Style

Line style for the curve. Use line style to specify the type of line your line or stick graph contains. Refer to the device-dependent section of your GSX documentation for details about your specific devices.

1 = solid
2-5 = combination of dotted and dashed lines

The default is 1, solid.

Marker Symbol	Symbols used at data points. The marker symbol is ignored if specified for step, stick, and bar graphs. Refer to the device-dependent section of your GSX documentation for details. The default is 0, no marker.

Line Width	Width of curve line. Line width is specified in 100ths of the graphing area.

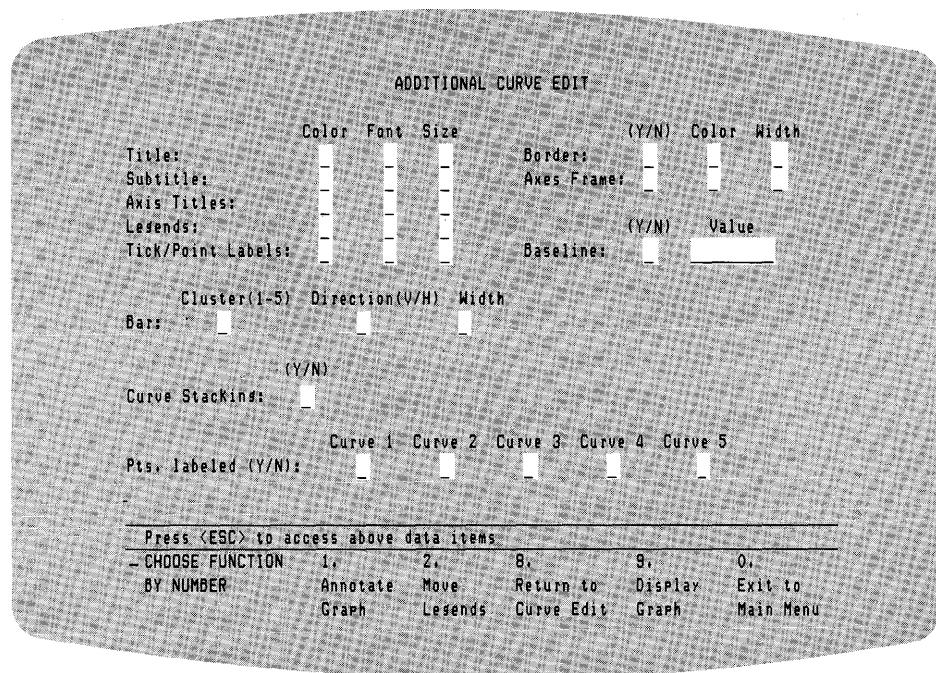|	
Functions	**1. Data Entry** Display CURVE DATA MENU to input or change data values. **2. Additional Editing** Display ADDITIONAL CURVE EDIT Menu to set additional parameters for the graph. **3. Axes Edit** Display the appropriate axes edit menu to set axes parameters. **9. Display Graph** Display the current graph on the console. **0. Exit to Main Menu** Return to the MAIN MENU.

Figure 6-12.   ADDITIONAL CURVE EDIT Menu

ADDITIONAL CURVE   The ADDITIONAL CURVE EDIT Menu lets you set addi-
EDIT MENU   tional data for your graph. The data areas you can supply
                       or modify are described below.

Text Color   Color index for text.

                       0 = background
                       1 = foreground
                       2 = red
                       3 = green
                       4 = blue
                       5 = yellow
                       6 = cyan
                       7 = magenta

	Refer to the device-dependent section of your GSX documentation for details about your specific devices. The default is 1, foreground color.
Text Font	Font index for text. Refer to the device-dependent section of your GSX documentation for details about your specific devices. The default is 1.
Text Size	Size of text characters, specified in 100ths of total screen height. For example, 5 requests a character height of 5/100ths of the total screen height. The default size is 4 for titles, 3 for subtitles, and 2 for the rest of the text.
Border (Y/N)	Y (yes) requests a border around the graph. The default is N (no).
Border Color	Color index for border. 0 = background 1 = foreground 2 = red 3 = green 4 = blue 5 = yellow 6 = cyan 7 = magenta Refer to the device-dependent section of your GSX documentation for details. The default is 1, foreground color.
Border Width	Width of border line, specified as 1/100th of the graphing area. The default is 1.

Axes Frame (Y/N)	Y (yes) requests an axes frame around the axes. The default is N (no).
Axes Frame Color	Same as for border.
Axes Frame Width	Same as for border.
Baseline (Y/N)	Y (yes) requests an axis baseline other than zero. The default is N (no).
Baseline Value	Numeric value only, with decimals and negative numbers allowed.
Bar Cluster (1–5)	The number of bars to be clustered together (one to five allowed). This takes precedence over stacking. If all bars are to be stacked, set to 1.
Bar Direction (V/H)	Bar direction lets you use the same data and labels you have already specified while you change the direction of the bars. The H changes vertical bars to horizontal bars. The V changes horizontal bars to vertical bars. The default is V.
Bar Width	Width of bars, specified as a percentage of the graphing area. DR Graph determines bar width depending on the number of curves plotted as the default value.

Curve Stacking (Y/N)	Y (yes) requests curves to be stacked. That is, multiple curves are stacked on top of each other, each curve using the previous curve as a baseline rather than the X-axis. If a Bar Cluster greater than 1 is specified, only the nonclustered bars are stacked. The default is N (no).

Pt. Labeled (Y/N)	Y (yes) requests points to be labeled with their numeric values. The default is N (no). This value is ignored for step and stick graphs.

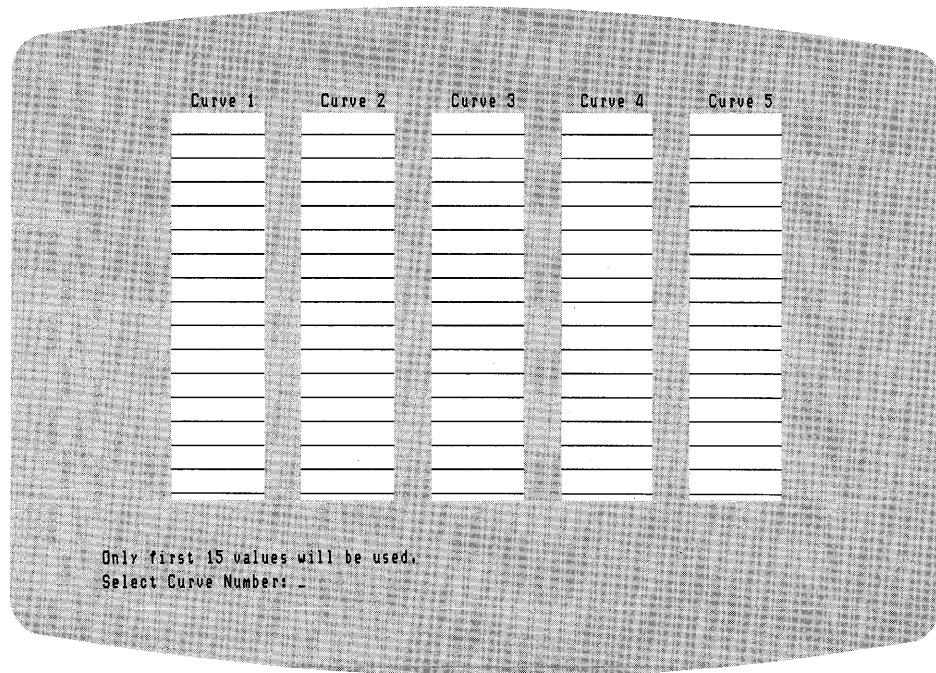|	
Functions	**1. Annotate Graph** Display the Annotate Graph Menu. This allows you to add more text at any position on the graph. **2. Move Legends** Move legends to a new position. You select the new position by positioning the graphic cursor. Visualize the legend as an imaginary box, then position the upper-left corner of it with the graphic cursor. **8. Return to Last Menu** Return to the CURVE EDIT Menu. **9. Display Graph** Display the current graph on the terminal. **0. Exit to Main Menu** Return to the MAIN MENU.

Figure 6-13.   CURVE SELECTION Menu

CURVE SELECTION   The CURVE SELECTION Menu is displayed after select-
MENU   ing option 4, Existing Data, from the DATA SELECTION
                         Menu when you are creating a pie chart. It displays the first
                         16 current data values for each curve. The data areas in
                         this menu you supply or modify the following:

                         Curve 1
                         Curve 2
                         Curve 3
                         Curve 4
                         Curve 5

Existing data is shown in columns for each curve. Select the curve number that contains data you want to display in your pie chart. A pie chart can use data values from only one of the five curves. If you do not save the data prior to selecting a curve number, DR Graph erases the data for the other curves. Also, negative numbers are ignored in a pie chart because a pie chart represents parts of a whole, a negative slice cannot exist.
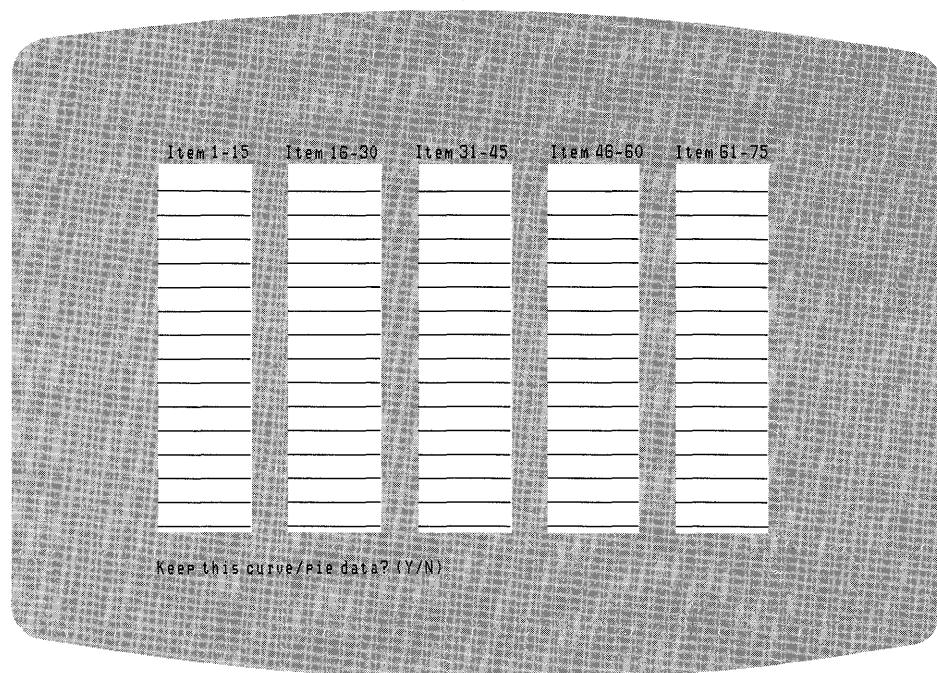
Figure 6-14.   CURVE/PIE DATA VALUES Menu

CURVE/PIE DATA   When DR Graph displays the CURVE/PIE DATA
VALUES MENU   VALUES Menu, you select SuperCalc SDF or Visicalc DIF
                      from the DATA SELECTION Menu. It displays the cur-
                      rent data values. The data values you supply or modify in
                      this menu are the following:

                      Items 1-15
                      Items 16-30
                      Items 31-45
                      Items 46-60
                      Items 61-75

The data values are displayed in columns, one column/row at a time (depending on how the data was selected). This curve data is taken from spreadsheet files. For pie graphs, only the first 16 values are accepted.

Keep This Data?   Y (yes) indicates that you want to keep the displayed data
(Y/N)   for the selected pie or curve.
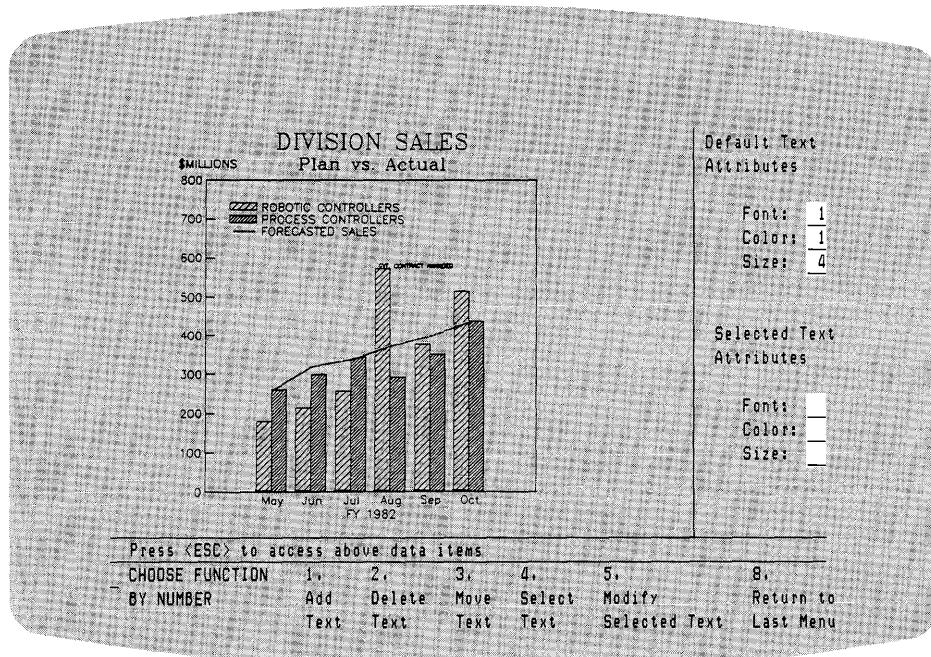
Figure 6-15. ANNOTATE Menu

ANNOTATE MENU

The ANNOTATE Menu allows you to add or delete text at any position on a graph, and to change the attributes (appearance) of selected text. The values you can supply or modify in this menu are described below.

Default Text
Attributes:

Font
Color
Size

You can set the default values of font, color, and size for text entered on this menu with these fields. Refer to the device-dependent section of your GSX documentation for details about your specific devices.

Selected Text
Attributes:

Font
Color
Size

You can keep or change the values of font, color, and size for selected text strings. Text is selected using the Select Text Function below, then modified if desired with the functions described below:

Functions

1. Add Text

Add text to the graph at the current position of the graphic cursor. DR Graph provides default values for the Selected Text Attributes.

2. Delete Text

Delete selected text. Text is selected by positioning the graphic cursor at the beginning of the string.

3. Move Text

Move the selected text to the current graphic cursor position.

4. Select Text

The graphic cursor is positioned on the desired text to examine the attributes.

5. Modify Selected Text

Causes the Selected Text Attributes (see above) to be assigned to the text selected with Function 4.
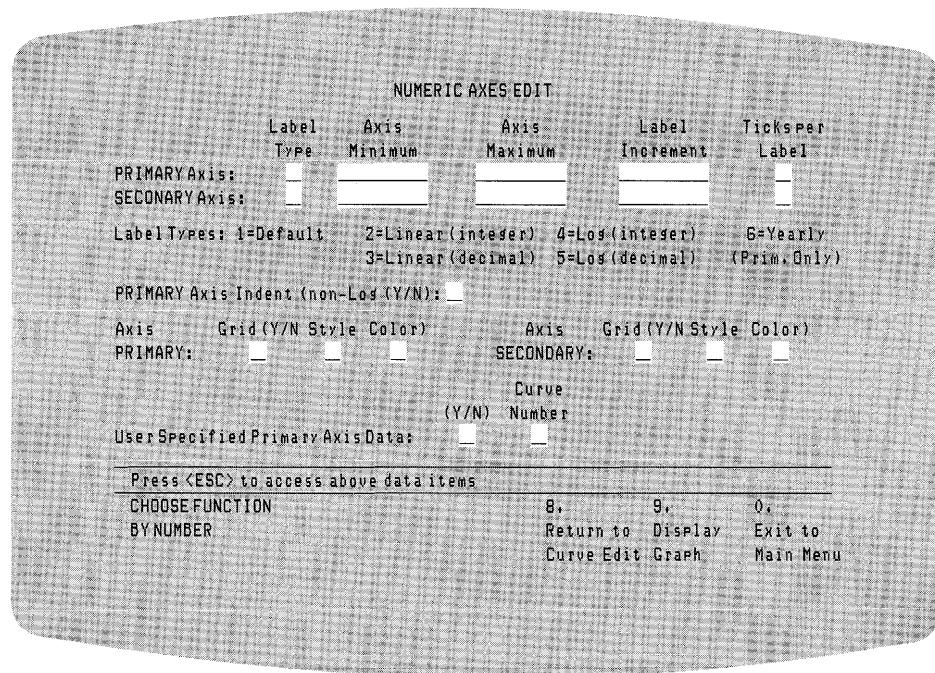
0. Return to Last Menu

Return to the previous menu.

Figure 6-16.   NUMERIC AXES EDIT Menu

NUMERIC AXES
EDIT MENU

The NUMERIC AXES EDIT Menu lets you set values for the graph axes. You can also display the graph, return to the CURVE EDIT Menu or exit to the MAIN MENU. The values that you can supply or modify in this menu follow.

Primary Axis

Label Type   Selects the label type for the primary (horizontal) axis:

                            1 = default
                            2 = linear integer
                            3 = linear decimal
                            4 = log integer
                            5 = log decimal
                            6 = yearly

                            The default is linear integer. If you select yearly, you can
                            specify numeric labels that correlate one for one with the
                            data values of the curve.

Axis Minimum   The first value shown on the primary axis (far left).

Axis Maximum   The maximum value shown on the horizontal axis (right
                            extreme). Unless otherwise specified, DR Graph uses the
                            maximum value from the CURVE DATA MENU for Axis
                            Maximum.

Label Increment   Increment between axis labels. DR Graph defines the incre-
                            ments between values.

Ticks per Label   Number of ticks per label:

                             0 = no ticks
                             1 = major ticks only
                            >1 = minor ticks

                            The default is 1.

Secondary Axis

Label Type	Selects the label type for the secondary axis (vertical):

1 = default
2 = linear integer
3 = linear decimal
4 = log integer
5 = log decimal

The default is integer if the data permits, but if the data range is less than 5, DR Graph uses linear decimal.

Axis Minimum	The first value shown on the secondary axis (bottom).
Axis Maximum	The maximum value shown on the vertical axis (top). Unless specified otherwise DR Graph assumes the highest data value from the CURVE DATA MENU.
Label Increment	Increment between labels. The program chooses appropriate intervals if not specified.
Ticks per Label	Number of ticks per label:

　0 = no ticks
　1 = major ticks only
>1 = minor ticks

The default is 1.

Primary Axis Indent	Specifies if spaces are left on either side of the bars or lines. If axis is indented, the graph is set in from the axis. If the axis is not indented, the graph is flush with the axis and begins at the axis. The default for line, stick, or scatter graph is Y (yes) for indent but the default for a bar graph is N (no) for no indent.
Primary Axis Grid (Y/N)	Y (yes) requests vertical grid lines to be drawn on the graph corresponding to primary axis tick marks.

Primary Axis Grid Style	1 = solid 2-5 = combination of dashed and dotted lines
Primary Axis Grid Color	Color index of primary axis grid lines.
Color Index	0 = background 1 = foreground 2 = red 3 = green 4 = blue 5 = yellow 6 = cyan 7 = magenta

Secondary Axis Indent	Specifies whether the graph is indented or adjacent to the axis. The default is Y (yes) for line graphs and N (no) for bar graphs.
Secondary Axis Grid (Y/N)	Y (yes) requests horizontal grid lines to be drawn on the graph corresponding to secondary axis tick marks.
Secondary Axis Grid Color	Color index of secondary axis grid lines.
Color Index	0 = background 1 = foreground 2 = red 3 = green 4 = blue 5 = yellow 6 = cyan 7 = magenta
Secondary Axis Grid Style	1 = solid 2-5 = combination of dashed and dotted lines

User Specified
Primary Axis Data

Allows you to create custom labels for the primary axis or specify data to be used, rather than that provided by the NUMERIC AXES EDIT Menu. You can specify your own data in one of the curves in the CURVE DATA MENU. After you enter the data, use the NUMERIC AXES EDIT Menu. Specify the letter Y in the blank for User Specified Primary Axis Data and in the blank below specify the number of the curve in the CURVE DATA MENU that contains the data.

You can create custom labels with the annotate graph option in the ADDITIONAL PIE EDIT Menu. Refer to the desciption of this menu.

Functions

8. Return to Last Menu

Return to previous menu.

9. Display graph

Display the current graph on the terminal.

0. Exit to Main Menu

Return to the MAIN MENU.
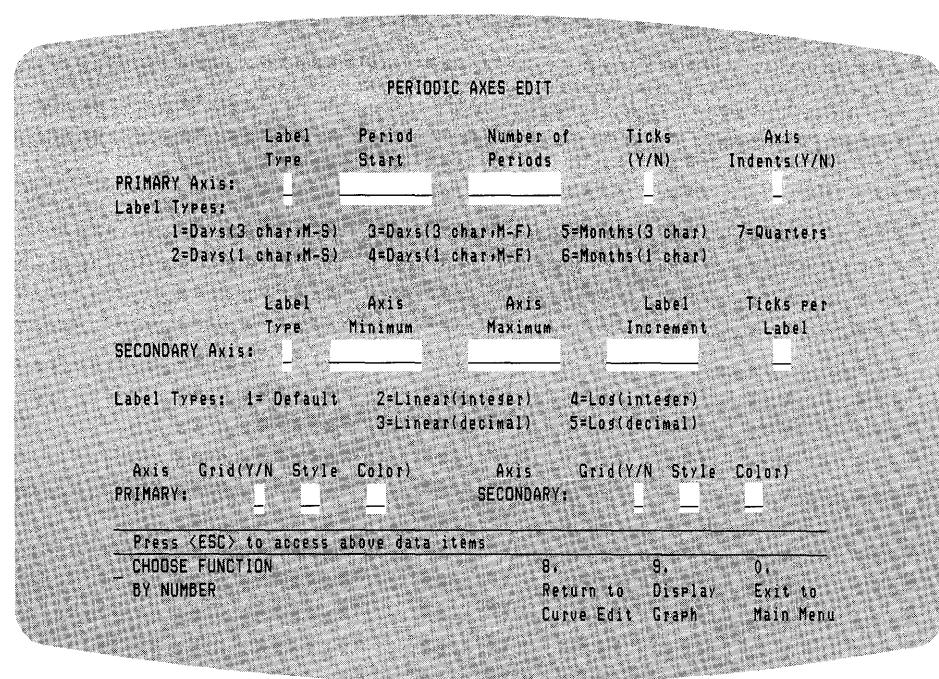
Figure 6-17.   PERIODIC AXES EDIT Menu

PERIODIC AXES
EDIT MENU

The PERIODIC AXES EDIT Menu lets you modify the
periodic axes that you specified in the CURVE EDIT
Menu. You can also display the graph, return to the
CURVE EXIT Menu or exit to the MAIN MENU. The
values that you enter or modify in this menu follow.

Primary Axis

Label Type	Selects the label type for the primary axis: 1 = days (3 char, M–S), 2 = days (1 char, M–S), 3 = days (3 char, M–F), 4 = days (1 char, M–F), 5 = month (3 char), 6 = months (1 char), 7 = Quarters. The default is 1.
Period Start	Specifies starting period. DR Graph assumes labels start at the beginning of a period unless otherwise specified. The default for the start of yearly data is January. If you want yearly data to begin in June instead of January, enter the value 6.
Number of Periods	Specifies the number of periods to be plotted.
Ticks	Specifies if tick marks appear on the primary axis.
Axis Indent	Specifies whether the graph is adjacent to or indented from the axis. The default for line, scatter, or stick graph is Y for indent. The default for a bar graph is N, for no indent.

Secondary Axis

Label Type	Selects the label type for the secondary axis: 1 = default, 2 = linear integer, 3 = linear decimal, 4 = log integer, and 5 = log decimal. The default is integer if the data permits, but if the data range is less than 5, DR Graph uses linear decimal.
Axis Minimum	The first value shown on the secondary axis (bottom).
Axis Maximum	The maximum value shown on the vertical axis (top). Unless specified otherwise DR Graph assumes the highest data value from the CURVE DATA MENU.

Label Increment   Increment between labels. The program chooses appropri-
                                ate intervals if not specified.

Ticks per Label   Number of ticks per label:

                                  0 = no ticks
                                  1 = major ticks only
                                 >1 = minor ticks

                                The default is 1.

Primary Axis Grid   Y (yes) requests vertical grid lines be drawn on the graph
(Y/N)   corresponding to horizontal axis tick marks.

Primary Axis   1 = solid
Grid Style   2-5 = combination of dashed and dotted lines

Primary Axis   Color index of horizontal axis grid lines.
Grid Color

Color Index   0 = background
                                  1 = foreground
                                  2 = red
                                  3 = green
                                  4 = blue
                                  5 = yellow
                                  6 = cyan
                                  7 = magenta

Secondary Axis   The letter Y (yes) requests vertical grid lines be drawn on
Grid (Y/N)   the graph corresponding to horizontal axis tick marks.

Secondary Axis   Color index of horizontal axis grid lines.
Grid Color

Color Index   0 = background
                         1 = foreground
                         2 = red
                         3 = green
                         4 = blue
                         5 = yellow
                         6 = cyan
                         7 = magenta

Secondary Axis   1 = solid
Grid Style   2-5 = combination of dashed and dotted lines

Functions   8. Return to Last Menu

                         Return to previous menu.

                         9. Display graph

                         Display the current graph on the terminal.

                         0. Exit to Main Menu

                         Return to the MAIN MENU.

                         End of Section 6

Appendix A

GRAPHIC GLOSSARY

Annotation	Process of adding commentary or explanatory notes to a graph. You can do this with the ANNOTATE Menu, or you can create text-only charts.
Axes	Axes are intersecting lines that define a coordinate system. They usually intersect at the origin 0,0. The axes are divided into units; the units are marked off by short lines at regular intervals. These short lines are called tick marks. Axes can have two kinds of tick marks, major and minor ticks. Major ticks are longer than minor ticks. Tick marks should be at major scale divisions (5, 10, 20, instead of 8, 11, 17) and frequent enough to make it possible to accurately interpret data.

Normally, the primary axis, or scale, represents the independent variable, and the secondary axis represents the dependent variable. Usually, time is considered the independent variable and a related amount is the dependent variable. The divisions on the X-axis are determined by time units in the original data and can be represented by days, months, quarters, or other specified periods.

The amount scale is always represented on the secondary or Y-axis. The intervals specified for the vertical scale should be easy to read and cover the entire range of data values.

Secondary Axis
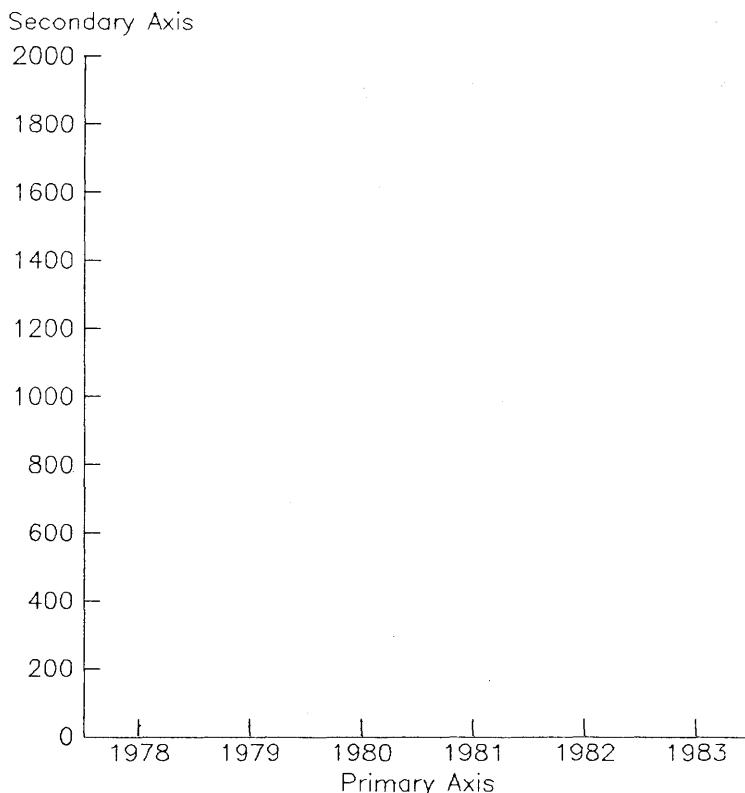
Figure A-1.   Axes

Bar Graph   Type of graph used to compare magnitude or size of coor-
                              dinate items, or parts of a whole. Comparison is based on
                              direct linear values; the length of the bars is determined by
                              the value or amount of each category. A bar graph can be
                              specified in the CREATE NEW GRAPH Menu or changed
                              in the CURVE EDIT Menu.

Theoretically, bars are arranged horizontally in bar graphs and vertically in column graphs. The arrangement of the bars should be adapted to the objectives of the data. Usually bars are arranged in order of size, with the smallest plotted first. Sometimes, however, an alphabetic, geographic or other systematic ordering of the data is more appropriate.

DR Graph automatically draws bars of consistent and appropriate width, but you can also change the width. The width of bars should be consistent. The size and proportions of the graph and the number of bars influence the width. A general rule is that the space between bars should be half the width of the bars. Also, the bars should not be disproportionately long and narrow, or short and wide.

Usually bars in a simple bar chart are colored or filled in with a pattern. DR Graph provides five possible fill patterns; the colors available are device-dependent. The choice of fill pattern is critical because a chart with too many fill patterns can defeat its original purpose and be confusing to the reader. Good judgment is required. It is better to position a less textured pattern next to a more textured pattern for emphasis. You can specify the fill pattern for bars in the CURVE EDIT Menu.
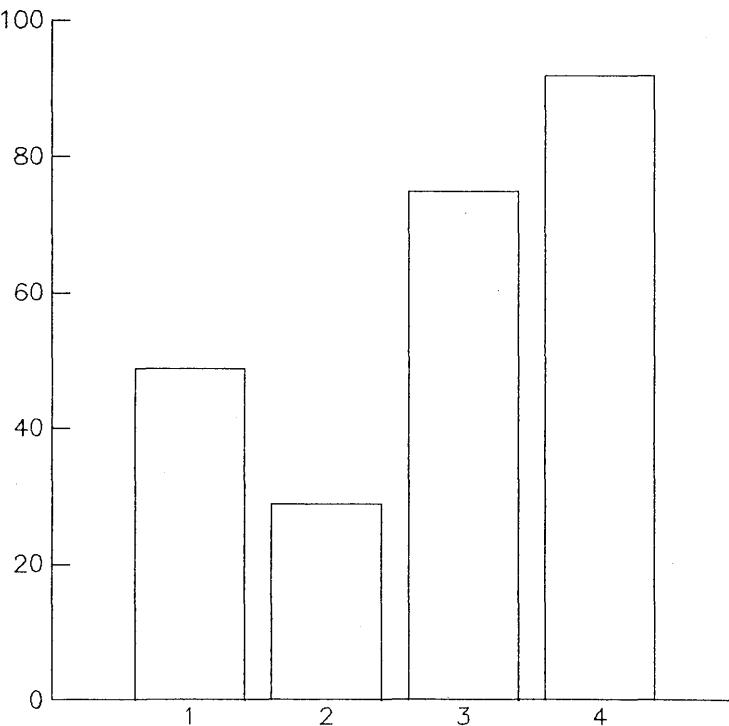
Figure A-2.   Bars

Baseline   When a baseline is specified, subsequent data is plotted as a
                                relative distance to the baseline. This feature is useful in
                                representing deviations of data; for example, positive-
                                negative or profit-loss data. A baseline value is specified in
                                the ADDITIONAL CURVE EDIT Menu.
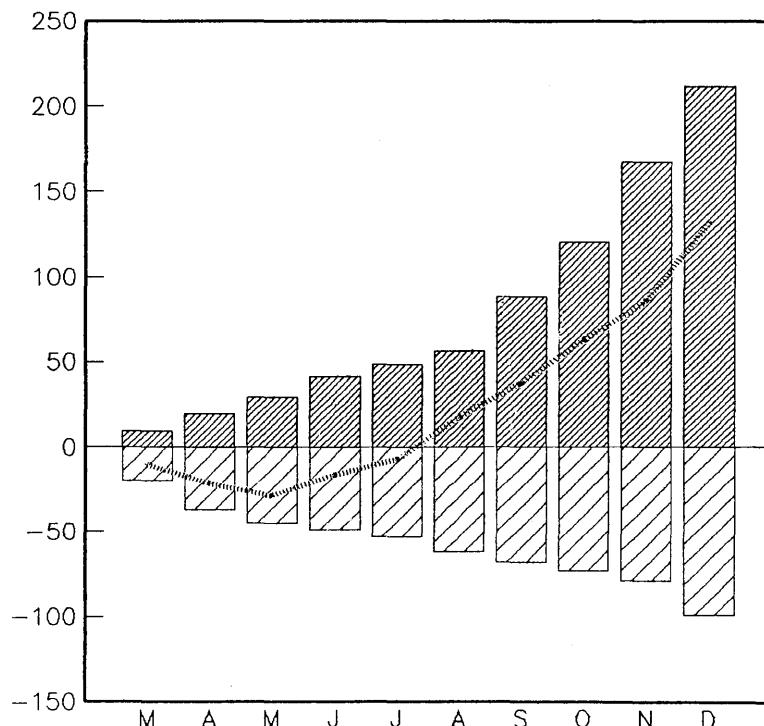
Figure A-3.   Baseline

Booting up   Process that gives the operating system control of your
                                computer. You must do this before you can run DR Graph.
                                Some systems have a button or switch to press, others load
                                themselves automatically. Consult your hardware manual
                                for details.

Border   Frame around the graph which includes space for legends.
                                You can specify a border in the ADDITIONAL CURVE·
                                EDIT Menu.

Cartesian
Coordinate
System

Coordinate system composed of an X-axis (horizontal) increasing positively towards the right, and a Y-axis (vertical) increasing positively upwards. The axes are positioned at right angles, and the point of intersection is the origin (0,0). The position of any point is defined by the displacement from the origin along first the X- and then the Y-axis.

Clustered
Bar Graph

Type of bar graph that compares two or three sets of data by grouping together the bars for each specified period of time. You can specify a clustered bar graph in the ADDITIONAL CURVE EDIT Menu or by selecting this type in CREATE NEW GRAPH Menu.

Clustered Column
Graph

See **Clustered Bar Graph.** A clustered column graph can be specified in the ADDITIONAL CURVE EDIT Menu.
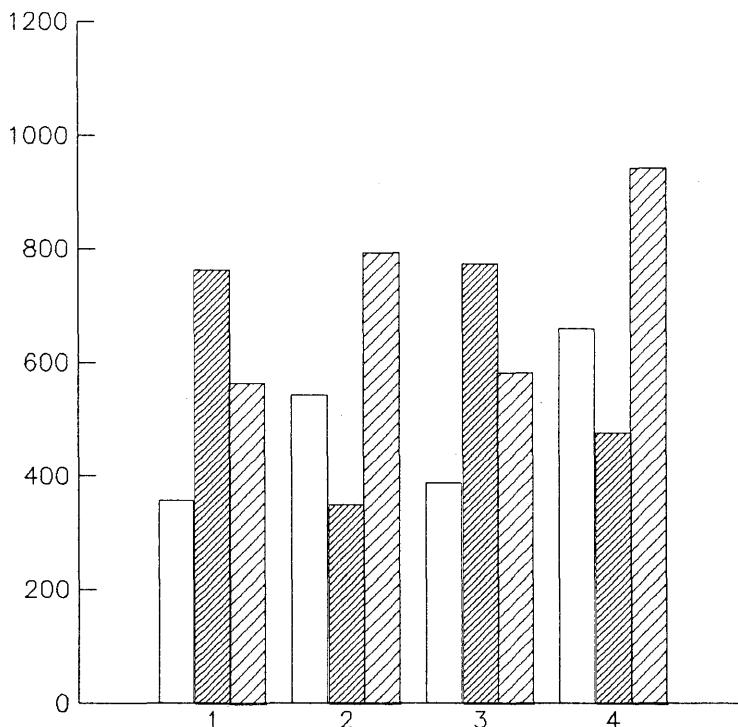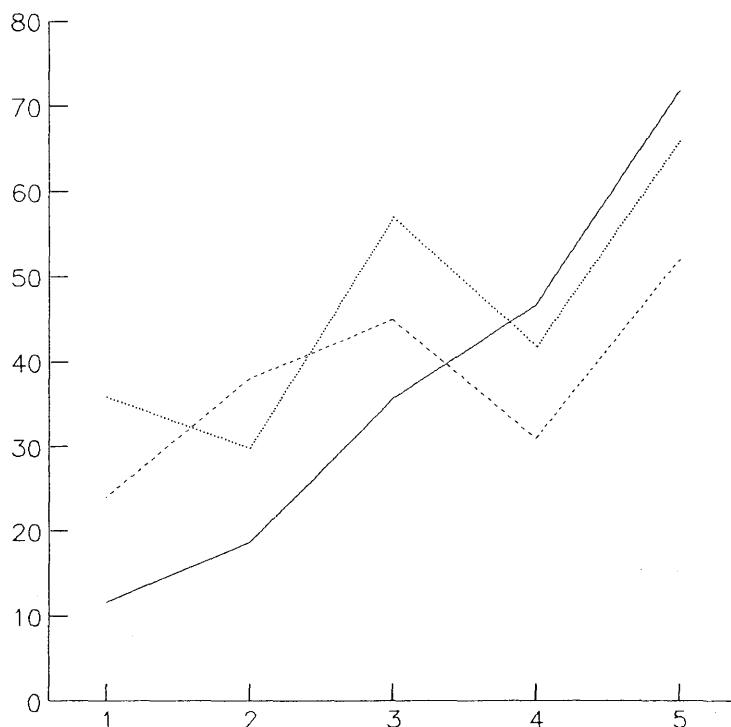
Figure A-4.   **Clustered Column Graph**
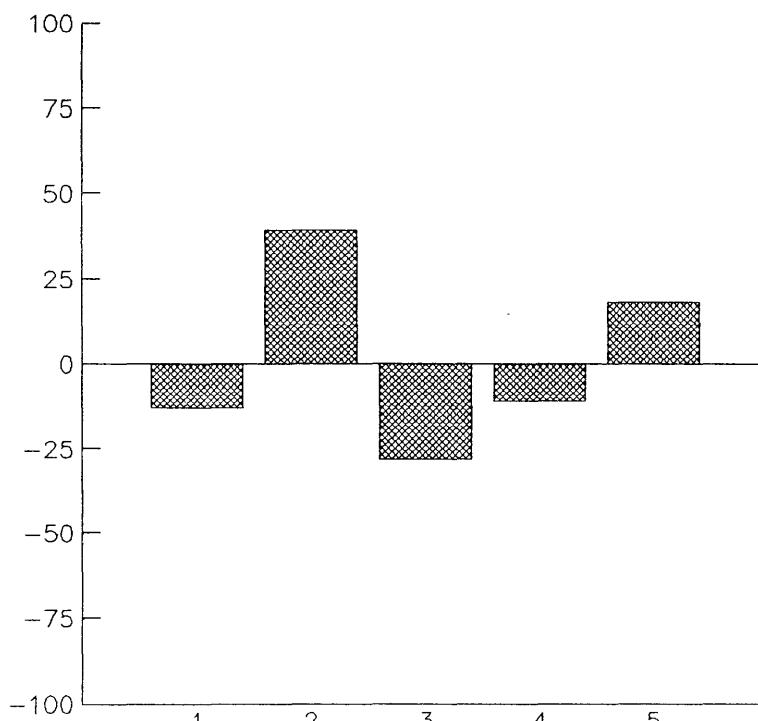
Column Graph   Type of bar graph with bars arranged vertically. See **Bar Graph.** A column graph can be specified in the ADDITIONAL CURVE EDIT Menu as a stacked bar.

CRT   Cathode Ray Tube, your display screen.

Curve   A continuous line joining data points on a line graph. Curves for any kind of line graph should stand out prominently (be thicker than grid lines).

                        In multiple line graphs the curves should be clearly distinguished from one another. This is accomplished by specifying different line styles or colors or both. You can specify these line attributes in the CURVE EDIT Menu.

Figure A-5.   Curves

Deviation
Bar Graph

Type of graph where the bars extend to either side of the same baseline. This kind of bar graph represents positive-negative and profit-loss data. A deviation bar graph can be specified with baseline in the ADDITIONAL CURVE EDIT Menu.

Figure A-6.   Deviation Bar Graph

Default

Value assigned to a parameter by DR Graph and used when you do not specify a value.

Dependent
Variable
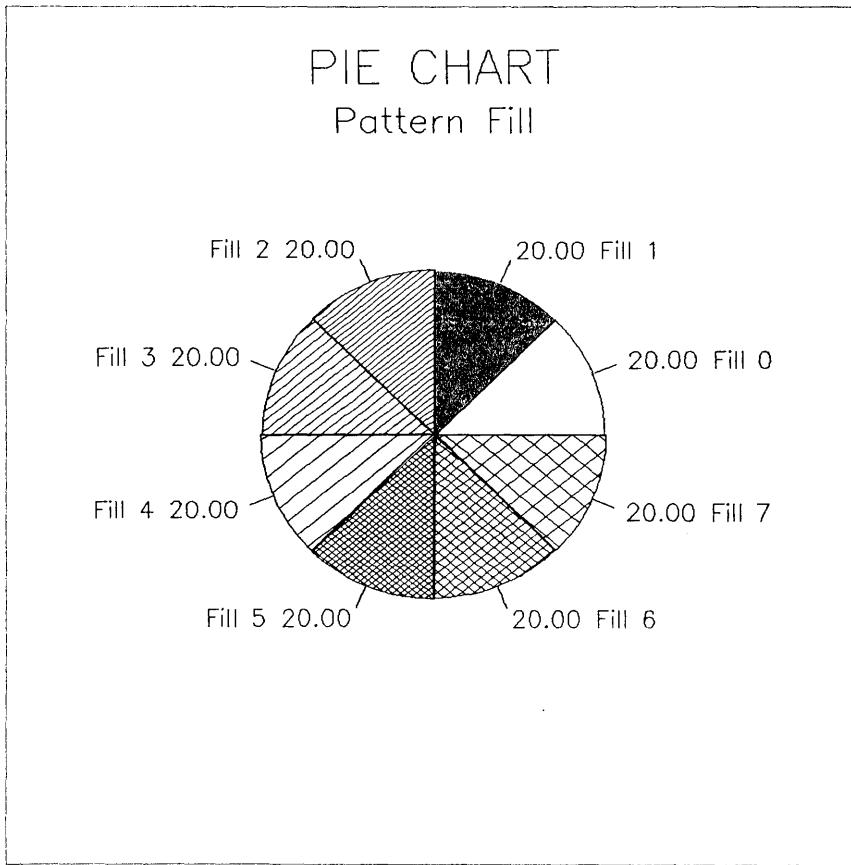
Data restricted to a value for every value assumed by an independent variable.

Device
Independent

Ability to be used on more than one type of graphics display device.

⚅ DIGITAL RESEARCH™

Fill Patterns   DR Graph provides the following fill patterns for bars and
                                      pie slices:

PIE CHART
Pattern Fill

Fill 2 20.00 — 20.00 Fill 1

Fill 3 20.00 — 20.00 Fill 0

Fill 4 20.00 — 20.00 Fill 7

Fill 5 20.00 — 20.00 Fill 6

Figure A-7.   Fill Patterns
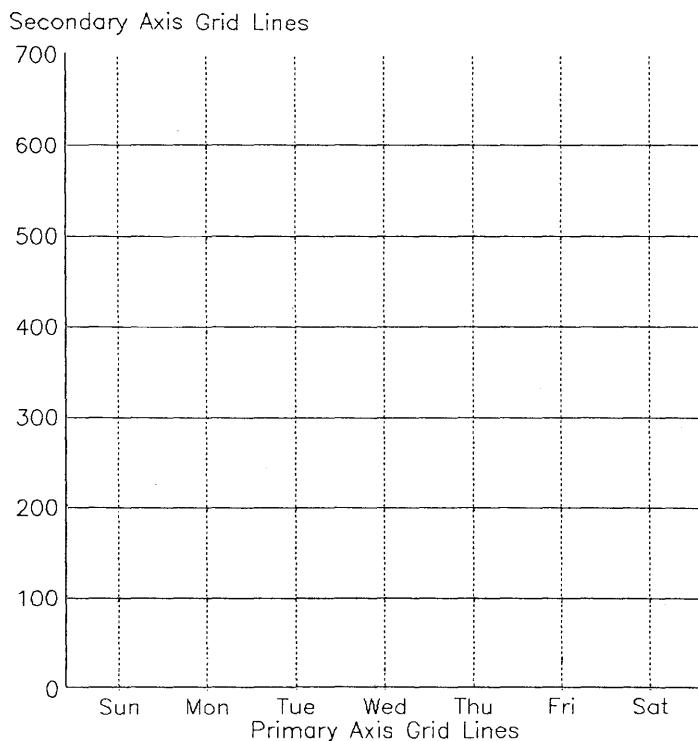
Frame   Outline around your graph defined by the axis extents.
                                      This can be set in the ADDITIONAL CURVE EDIT Menu.

Grids   Grids extend the major tick marks all the way across the graph. In laying out grid lines for a graph, it is important to keep the scales in balance. That is, consider the proportions that best suit the data because the proportions of the grid have a significant effect on the appearance of the curve. A graph can have accurate data, but the proportions of the grid lines can visually distort the information. Grids are also specified in the axis edit menus.

Keep the number of grid lines to a minimum (determined by the number of tick marks specified). There should be enough coordinate lines in the graph for you to easily interpret the values at any point. This, of course, depends on the size of the graph, the type and range of the data, the number of curves, and the length and detail of the period covered.

Secondary Axis Grid Lines

Figure A-8.   Grid Lines

℗ DIGITAL RESEARCH™

Hard Copy   Printed or plotted copy of a graph. You can specify a hard
                             copy in the MAIN MENU.

100% Stacked   Type of bar graph that consists of two or more stacked
Bar Graph   bars with each bar totaling 100%. The various divisions of
                             the bars represent percentages of the whole. You can spec-
                             ify this type of graph in the ADDITIONAL CURVE EDIT
                             Menu or CREATE NEW GRAPH Menu.

COMPANY COMPOSITION
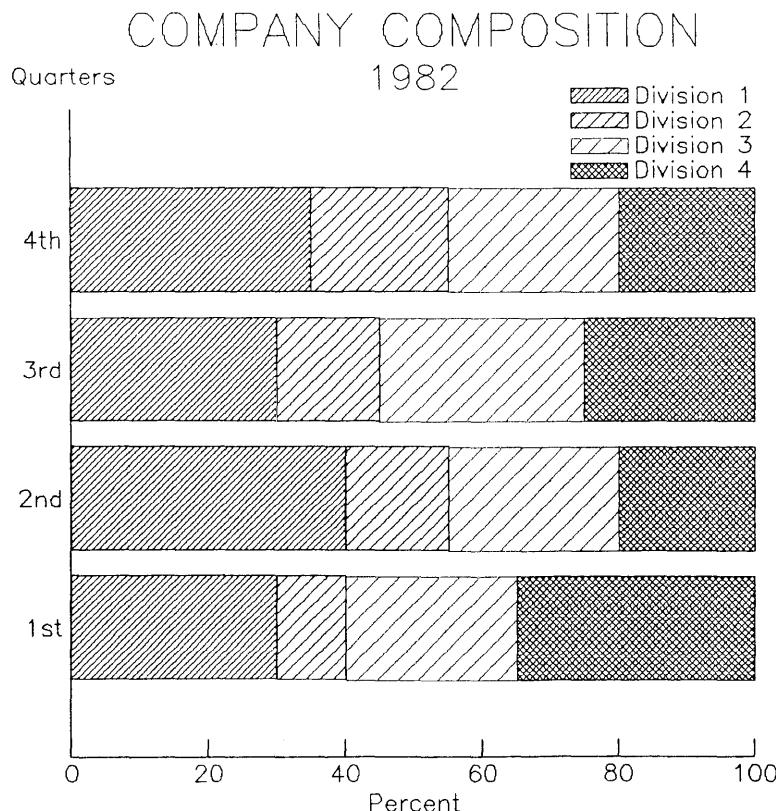
Figure A-9.   100% Bar Graph

Independent   Data that exists separate from other variables; for exam-
Variable   ple, time.

Legend   Explanatory caption accompanying a graph. You can spec-
                                        ify and/or move a legend in the ADDITIONAL CURVE
                                        EDIT Menu. A legend is essential when plotting curves of
                                        differing line styles. If you specify a legend, DR Graph
                                        places it in the upper-left corner of the graph within the
                                        axes extents. You can also move the legend when you are
                                        in the ADDITIONAL CURVE EDIT Menu. The placement
                                        depends on the size and type of graph, and the data plot-
                                        ted, but it is typically within the grid or axis extents.
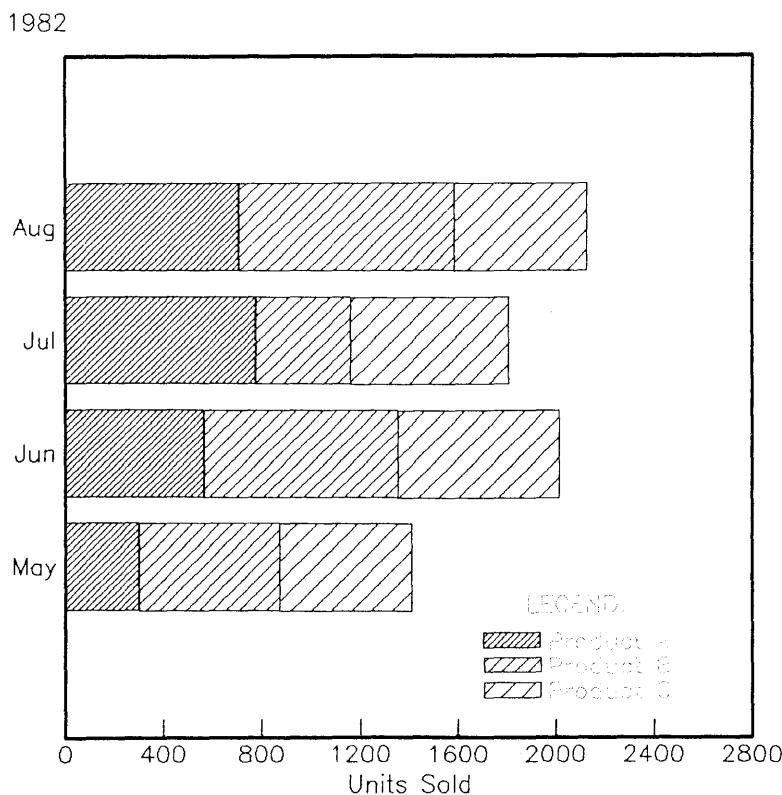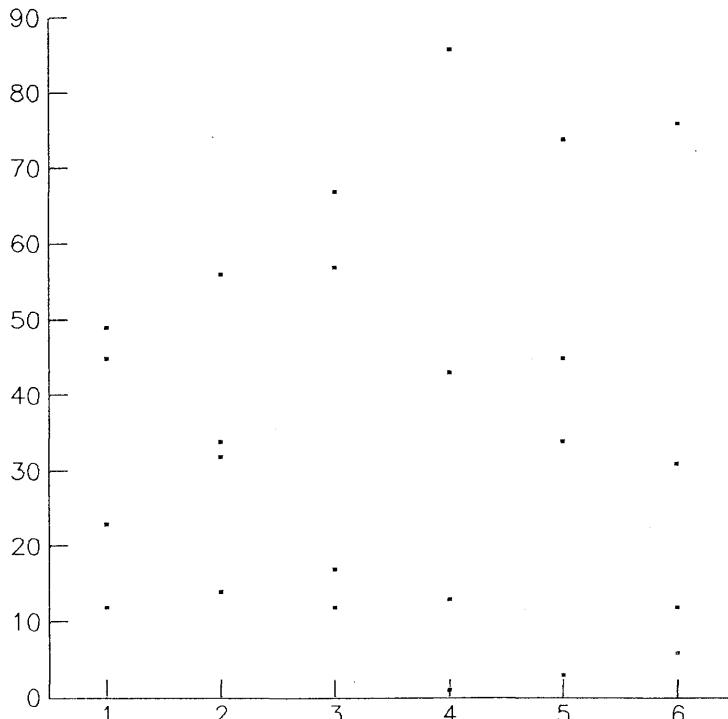
Figure A-10.   Legend

Line Graph	Type of graph made by plotting one (simple line graph) or more sets of data (multiple line graph) on a coordinate surface. The points are joined together in a continuous line, or curve. You can select a line graph from the CREATE NEW GRAPH Menu or change a bar or pie into a line in the CURVE EDIT Menu.
Linestyle	DR Graph provides five linestyles. 1 equals solid and 2–5 are combinations of dashed and dotted lines.
Multiple Line Graph	See **Line Graph.**
Periodic Pie Graph	Axes defined by repeated cycles. Type of circular graph with radii dividing the circle into sectors or pieces, each proportional in angle and area to the relative size of the data represented. A pie can be chosen from the CREATE NEW GRAPH Menu.
	Each segment or slice should be clearly identified with some kind of explanatory or descriptive label. Often, slices are identified by means of a legend placed outside of the pie itself.
	To clearly differentiate slices, use either different colors or patterns in a density sequence from light to dark or vice versa. You can also explode one of the slices to further emphasize the relationship of that part to the whole as well as to the other parts. You can specify pie slice attributes in the PIE EDIT Menu.
Scales	Axes of a graph. The primary scale usually represents the independent variable and the secondary scale, the dependent variable. You can modify scales in the axes edit menus.

Scatter Graph   Type of graph that portrays the degree and type of rela-
                           tionship or covariation between two data sets. You can
                           specify a scatter graph in the CREATE NEW GRAPH
                           Menu or select it later in the CURVE EDIT Menu.

Figure A-11.   Scatter Graph

Simple Bar Graph   Type of graph that compares two or more coordinate
                           items. You can choose a bar graph from the CREATE
                           NEW GRAPH Menu or change it in the CURVE EDIT
                           Menu.

Simple Line Graph   See **Line Graph.**

Step Graph   Variation of a line graph. The basis for reading these
                                  graphs is the distance between plotted lines, not the dis-
                                  tance of the lines from the zero baseline. Only the total and
                                  the bottom stratum are read from the baseline. You can
                                  choose a step graph from the CREATE NEW GRAPH
                                  Menu or change it in the CURVE EDIT Menu.
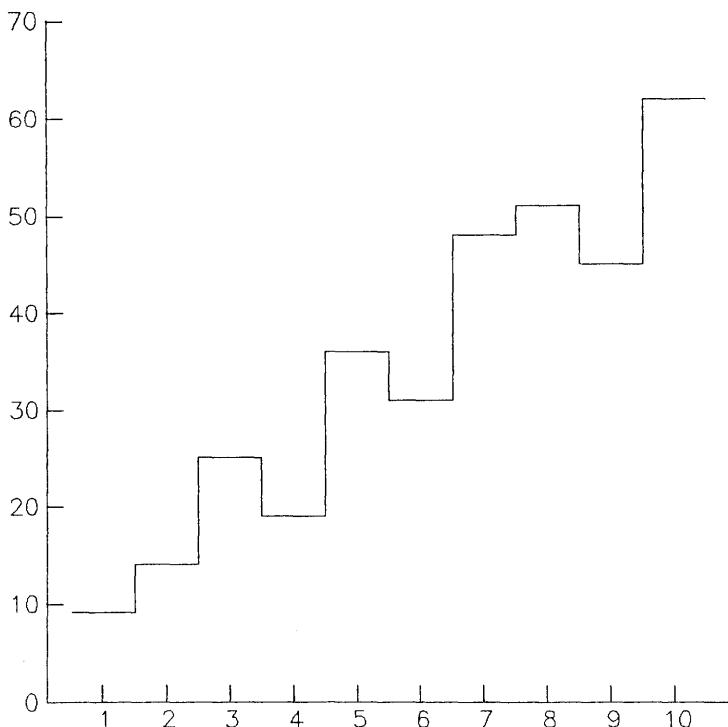
Figure A-12.   Step Graph

Stick Graph   Variation of the simple column graph used to represent
                                 many discrete points. You can choose a stick graph from
                                 the CREATE NEW GRAPH Menu or change it in the
                                 CURVE EDIT Menu.
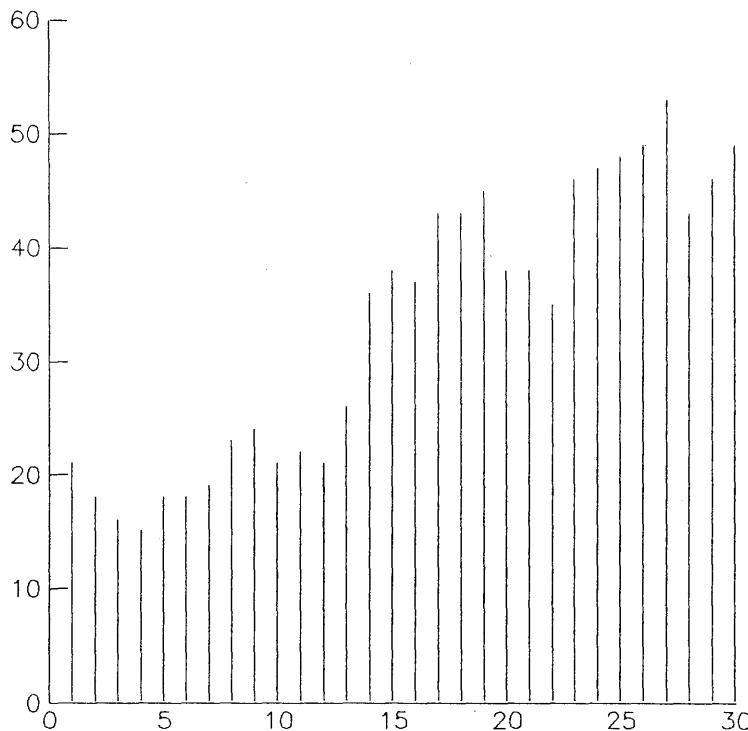
Figure A-13.   Stick Graph

Stacked   Type of bar graph that consists of two or more stacked
Bar Graph   bars, with the scale values shown in absolute numbers. A
                                 stacked bar graph can be specified in the ADDITIONAL
                                 CURVE EDIT Menu or CREATE NEW GRAPH Menu.

Stacked   See **Stacked Bar Graph.**
Column Graph

Ticks   Divisions along a scale line, scale points. Tick marks can be
                                 specified in the axes edit menus.

Titles

DR Graph automatically places the title of the graph at the top outside of the axis extents. (If you frame your graph the title will be outside the frame.) The text size of the title should be larger than any other text that appears on the graph. Titles should be brief but descriptive, and always directed towards your specific audience, their interests and experience. These are specified in the PIE EDIT and CURVE EDIT Menus.
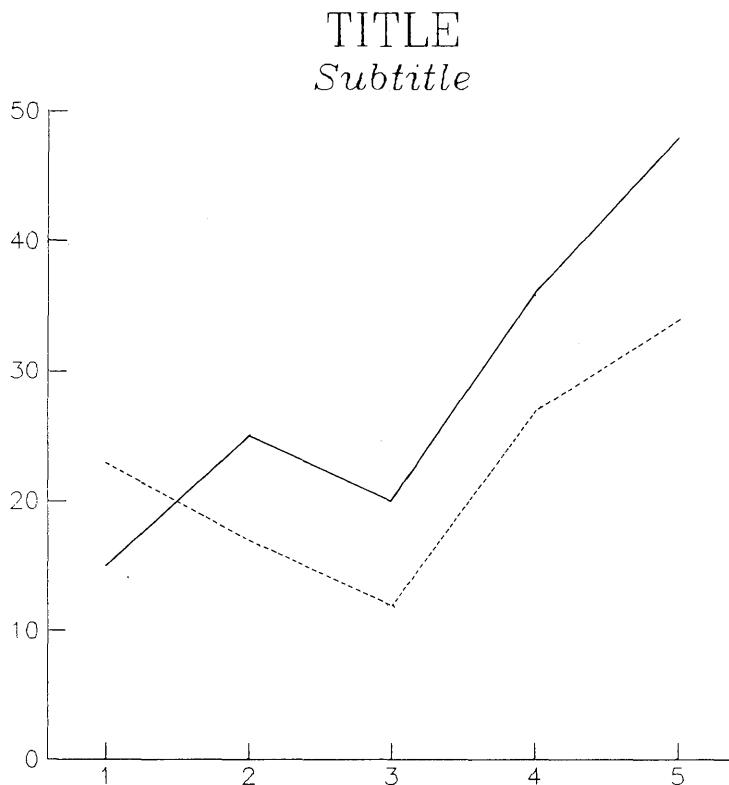
Figure A-14.   Titles

End of Appendix A

Index

D

DATA SELECTION Menu, 3-4, 3-
18, 6-7 to 6-8
default, 1-3, A-8
    values, 3-13, 3-22, 3-29
    text size, 6-17
dependent variable, A-1, A-8
design graph, 1-4
deviation bar graph, 4-19, A-8
device driver, 2-5
device independent, A-8
distribution disk, 2-3
drive designation, 2-7, 2-8, 3-24

E

escape key, 3-5
explode default, 3-29, 6-14

F

FILE ACCESS METHOD Menu, 5-
4, 6-9
filename, 3-24
files, 2-3
fill
    default, 3-29
    linestyle, 1-4
    pattern, 3-22, A-9
    pattern index, 6-15
font,
    types, 4-9
    value, 6-17
frame, A-9
    axes, 4-16, 4-24

G

graph
    100% stacked bar, A-11
    bar, 1-3, 4-13
    clustered bar, 3-17, 3-20, 4-20,
        A-6
    combining, 4-19
    column, A-7
    design, 1-4
    deviation bar, 4-19, A-8
    display a, 3-9
    line, 1-3, 3-1, A-14
    multiple line, 4-28, A-13
    output, 3-24
    output a, 3-15
    pie, 1-3
    save, 3-24
    scatter, 1-3, A-14
    simple bar, A-14
    simple line, A-14
    stacked bar, A-16
    step, 1-3, A-15
    stick, 1-3, A-16
    vertical bar, 4-13
graphics cursor, 4-24
grid, A-10
    color, 6-39
    style, 6-39
    lines, 4-7

H

hard copy, 2-1, 3-15, A-11
horizontal axes, 1-3

I

indent, 6-39
independent variable, A-1, A-11
installation, 2-3
integer, 4-7

L

legend, 1-4, 3-12, 3-22, A-12
  moving a, 4-24
line graph, 1-3, 3-1, A-14
  figure, 4-4
line width, 4-5
linestyle, 3-13, 4-5, A-13
logical device number
  assignments, 2-5

M

MAIN MENU, 1-4, 3-2, 3-16, 3-24,
    6-3
marker symbols, 1-4
memory requirements, 2-1
menu, 1-3 to 1-4, 3-1
Menus
  ADDITIONAL CURVE EDIT, 4-
    9, 6-26 to 6-29
  ADDITIONAL PIE EDIT, 6-16 to
    6-19
  ANNOTATE, 4-27, 6-34 to 6-35
  CREATE NEW GRAPH, 3-3, 3-
    17, 3-25, 6-5 to 6-6
  CURVE DATA, 3-5, 3-19, 6-20 to
    6-21
  CURVE EDIT, 3-12, 3-21, 6-22
    to 6-25
  CURVE SELECTION, 6-30 to
    6-31

CURVE/PIE DATA VALUES, 6-
    32 to 6-33
  DATA SELECTION, 3-4, 3-18, 6-
    7 to 6-8
  FILE ACCESS METHOD, 5-4,
    6-9
  MAIN MENU, 3-2, 3-16, 3-24, 6-
    3 to 6-4
  MULTIPLE GRAPHS, 6-11 to
    6-12
  NUMERIC AXES EDIT, 6-36 to
    6-40
  OUTPUT GRAPH, 3-15, 6-10
  PERIODIC AXES EDIT, 4-6, 4-
    17, 4-22, 6-41 to 6-44
  PIE EDIT, 3-28, 3-30, 6-13 to
    6-15
moving legends, 4-24
MULTIPLE GRAPHS Menu, 4-28,
    6-11 to 6-12
multiple line graph, A-13

N

NUMERIC AXES EDIT Menu, 6-36
    to 6-40
numerical characters, 3-7

O

options, 1-3 to 1-4
OUTPUT GRAPH Menu, 3-15,
    6-10
output a graph, 3-15, 3-24

P

pattern fill, 3-22
periodic, A-13
PERIODIC AXES EDIT Menu, 4-6,
    4-17, 4-22, 6-41 to 6-44
peripherals, 1-1
pie chart, 3-24, 3-33
PIE EDIT Menu, 3-28, 3-30, 6-13
pie graph, 1-3, A-13
PIP, 2-3
plotter, 1-1, 2-2
primary axis, 3-21, 4-7, 4-22, 6-38
printers, 1-1, 2-2

R

RETURN key, 3-5, 3-8
row data, 5-4 to 5-6

S

save a graph, 3-24
scales, A-13
scatter graph, 1-3, A-14
secondary axis, 3-21, 4-7, 4-23, 6-38
signs, 3-7
simple,
    bar graph, A-14
    line graph, A-14
spreadsheet files, 5-2 to 5-4
stacked bar graph, A-11, A-16
step graph, 1-3, A-15
stick graph, 1-3, A-16
submenus, 1-4
subtitles, 1-4
SuperCalc, 5-2 to 5-3, 6-32

T

TAB key, 3-8
terminal, 1-1, 2-2
text,
    attributes, 4-26
    color, 4-9
    font, 4-9
    size, 4-9
    size default, 6-17
tick, 6-37, A-1
    color index, 6-18
title, 1-4, A-17
    axes, 3-21
    label the axes, 3-12
    primary axis, 3-21
    secondary axis, 3-21
    size, 6-17
types of font, 4-10

V

value,
    default, 3-22
    fonts, 6-17
variable
    dependent, A-8
    independent, A-11
vertical
    axes, 1-3
    bar graph, 4-13
VisiCalc, 5-2, 5-3, 6-32

W

working system disk, 2-4

X

X-axis, 3-12, 3-21, A-6

Y

Y-axis, 3-21, A-6

Reader Comment Card

We welcome your comments and suggestions. They help us provide you with better product documentation.

Date _____ Second Edition: June 1983

1. What sections of this manual are especially helpful?

_____

_____

_____

_____

2. What suggestions do you have for improving this manual? What information is missing or incomplete? Where are examples needed?

_____

_____

_____

_____

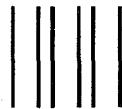3. Did you find errors in this manual? (Specify section and page number.)

_____

_____

_____

_____

DR Graph™ User's Guide

From: _____
_____
_____
_____

BUSINESS REPLY MAIL
FIRST CLASS / PERMIT NO. 182 / PACIFIC GROVE, CA

POSTAGE WILL BE PAID BY ADDRESSEE

[D] DIGITAL RESEARCH™
P.O. Box 579
Pacific Grove, California
93950

Attn: Publications Production