UNISYS

BTOS Business Graphics Package (BGP)

Operations and Programming Guide

Relative to
Release Level 5.3

Priced Item

March 1987
Distribution Code SA
Printed in U S America
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The Business Graphics Package contains software routines that drive the following hardware peripherals:

Burroughs AP 1311 Multi Function Printer

Burroughs B 9253 dot-matrix printer

Burroughs AP 1351 (80-column mode and 132-column mode) multifunction printer

Burroughs AP 1351-1 (80-column mode and 132-column mode) multifunction printer

Burroughs AP 1314 dot-matrix printer

Burroughs AP 1354 (80-column mode and 132-column mode) dot-matrix printer

Burroughs AP 9208 (portrait mode and landscape mode) non-impact laser printer

These printers are supported by Burroughs Corporation.

The Business Graphics Package also contains software routines which drive the following hardware peripherals. However, none of the following peripherals is marketed by Burroughs Corporation. Burroughs does not warrant the suitability of performance of these peripherals in customer applications.

Hewlett-Packard Model HP 7220C 8-pen plotter

Hewlett-Packard Model HP 7220T 8-pen plotter

Hewlett-Packard Model HP 7470A 2-pen plotter

Hewlett-Packard Model HP 7475A 6-pen plotter

Strobe Model 100 1-pen plotter

Printronix MVP dot-matrix printer

Envision 420 dot-matrix printer

Anadex 9620 dot-matrix printer

Okidata Microline 93 dot-matrix printer

Dataproducts 8010 dot-matrix printer

The particular device selected is the responsibility of the customer.

Before Using BGP

You may need to refer to other manuals while using Business Graphics Package. Read the following descriptions to determine which manuals you need.

BTOS Multiplan Operations Guide (2.0):
(formerly *B 20 Systems Multiplan Reference Manual*): If you are using Multiplan to create your spreadsheet data, you might want to refer to this manual for Multiplan instructions. A Multiplan lesson is available in Section 3, User Guide, but you might need more information.

BTOS Graphics Programming Reference Manual (1.0):
BGP will not operate if the Graphics for BTOS software is not installed and loaded. You also need this manual for printing and plotting information. Refer to this manual for graphics error codes that are not listed in Appendix A, Status Codes.

BTOS Reference Manual (Volumes 1 and 2):
Programmers should understand the BTOS operating system and their equipment.

BTOS Standard Software Operations Guide (SSOG): You may want to refer to this manual if you have general questions about the Burroughs operating system (BTOS).

BTOS Status Codes Reference Manual (7.0):
(formerly *B 20 Systems Status Codes*):
You will need this manual if you encounter error codes that are not graphics-specific.

The following packages require BGP to print or plot:

- BTOS Systems Draw
- BTOS Tektronix 4014 Emulator

These graphics packages are completely separate from BGP. If you are interested in learning about them, contact your local Burroughs customer support representative.

Note: *The diagrams and charts in this manual were illustrated using BTOS Systems Draw and BGP.*

How to Find Information in This Manual

Section 1: *Getting Acquainted With BGP*: Describes BGP chart types and capabilities; explains BGP screen displays and special key functions; discusses file types.

Section 2: *Installation Requirements and Procedures*: Describes hardware and software requirements; provides BGP installation procedures; lists BGP diskette files. Read this section before using BGP.

Section 3: *User Guide*: Discusses errors; provides instructions on entering and exiting BGP, provides instructions on making charts; provides a tutorial and helpful hints.

Section 4: *BGP Functions*: Provides function descriptions, instructions, and menu diagrams.

Section 5: *Programming an Interface to BGP*: Provides instructions on invoking BGP from user-written software.

Appendix A: *Status Codes*: Includes error codes and explanations.

Appendix B: *Error Prevention Techniques*: Scan this information before using BGP.

Appendix C: *Glossary*

Appendix D: *Menu Diagram*: This appendix is a removable fold out. Post it where you can easily refer to it to locate a function or menu.

Appendix E: *Printer/Plotter configuration Files* Provides instructions for configurng your system to print BGP graphics on a printer or plotter.

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Getting Acquainted With BGP

Business Graphics Package (BGP) is a product that creates and prints the following types of picture files:

- Bar, line, and pie charts created from spreadsheet data files
- Charts and tables created by merging BGP text with picture files from other graphics applications

BGP prints and plots picture files from all BTOS graphics applications, including BTOS Systems Draw and Tektronix 4014® Emulator.

Chart Types

Business Graphics Package enables you to create three types of charts from spreadsheet data:

Bar Charts

Line Charts

Pie Charts

Figures 1-1 through 1-4 illustrate four ways to represent the same data using different chart types. You choose the type of chart you want; BGP does most of the work. After BGP creates a chart, you can modify it to meet your specific design needs. Refer to Helpful Hints in Section 3, User Guide, for ideas on how to choose the right chart and modify it.

BGP Capabilities

Business Graphics Package creates two types of picture files:

- Charts created from spreadsheet data files
- Charts or tables created from text and/or picture files

Most BGP capabilities apply to both file types; however, some capabilities apply only to charts created from spreadsheets.

Figure 1-1 **Comparative Bar Chart**

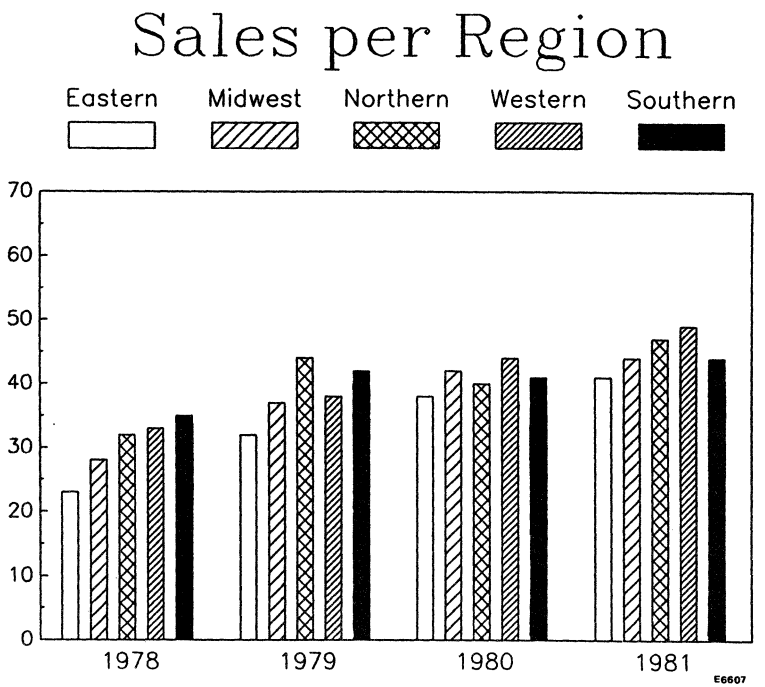


Figure 1-2 **Stacked Bar Chart**

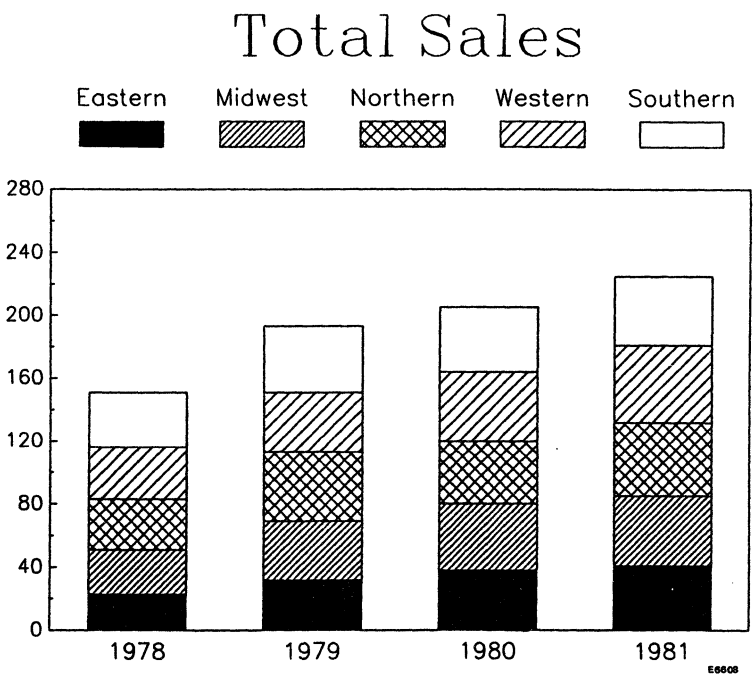


Figure 1-3 Line Chart

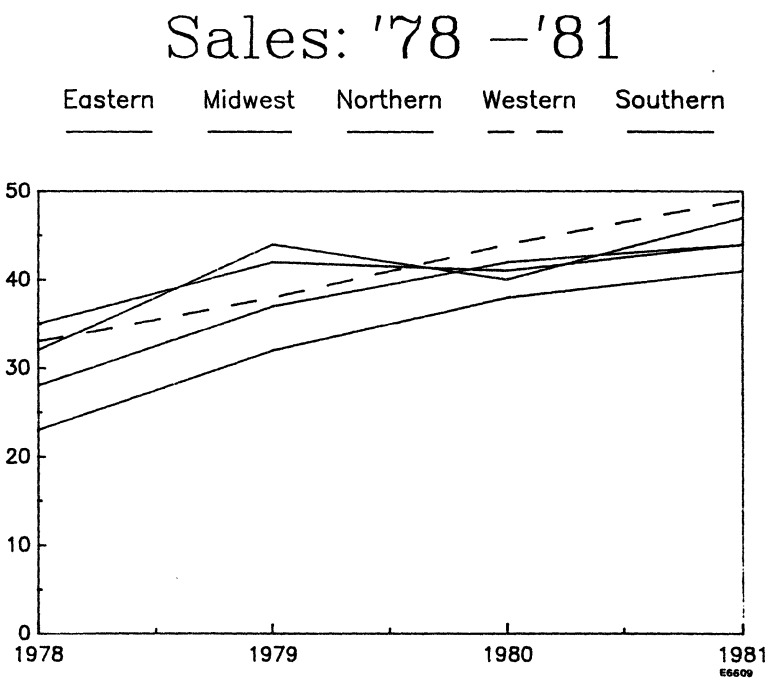
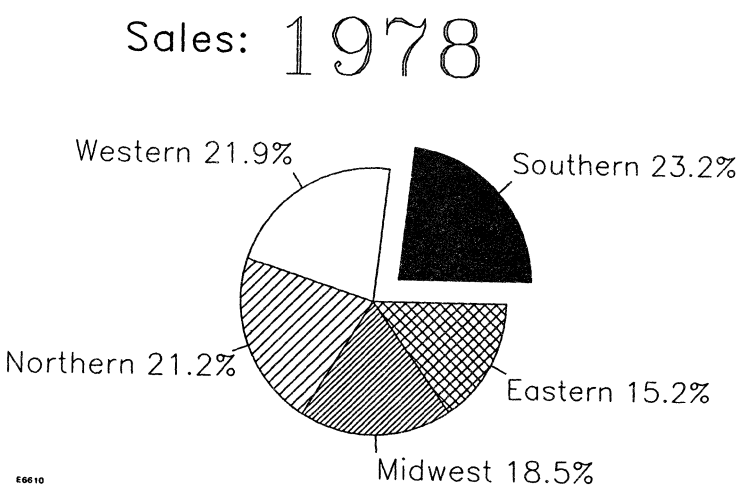


Figure 1-4 Pie Chart



The capabilities in this column apply only to charts created from spreadsheet data files.

Axes You can modify many aspects of the X and Y axes in line and bar charts. These aspects include range, space between labels, and number of tic marks between labels. In stacked bar charts, you can modify the labels on the X axis.

Patterns You can modify patterns:

- fill patterns in pie and bar charts
- line patterns in line charts

Pie Segments You can arrange pie segments either in ascending order of percentage, or as they are received from Multiplan. You can extract one or more pie segments.

Save Modifications You can save all modifications from one chart and apply them to new charts as you create them. See the Format function in Section 4.

The capabilities in this column apply to all picture files.

Merge You can merge picture files so that charts, text, and/or pictures from other graphics applications can be applied to the picture file you are modifying.

Print You can plot or print picture files from BGP, Tektronix 4014 Emulator, and BTOS Draw.

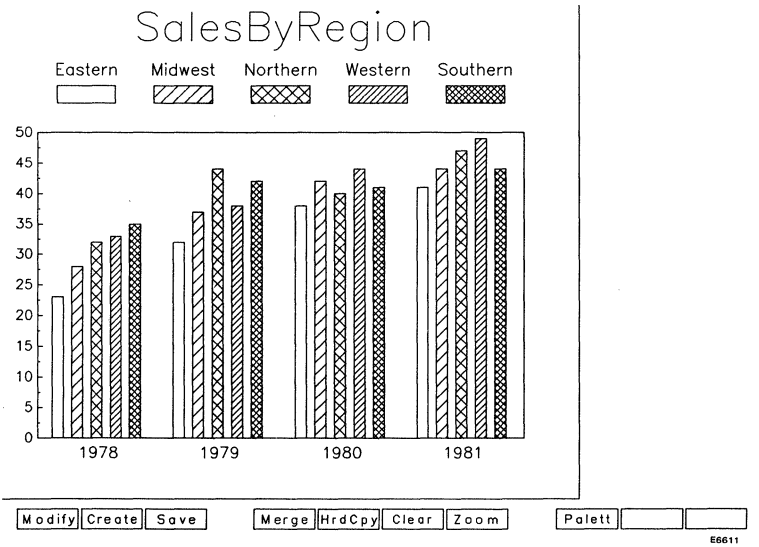
Size, Location, and Shape You can modify these aspects of labels, other objects, and charts.

Text You can add, delete, and modify text.

Zoom You can enlarge any area or object in the picture area, for both close inspection and printing.

BGP Screen Displays

Figure 1-5 **Screen With Top-Level Menu**



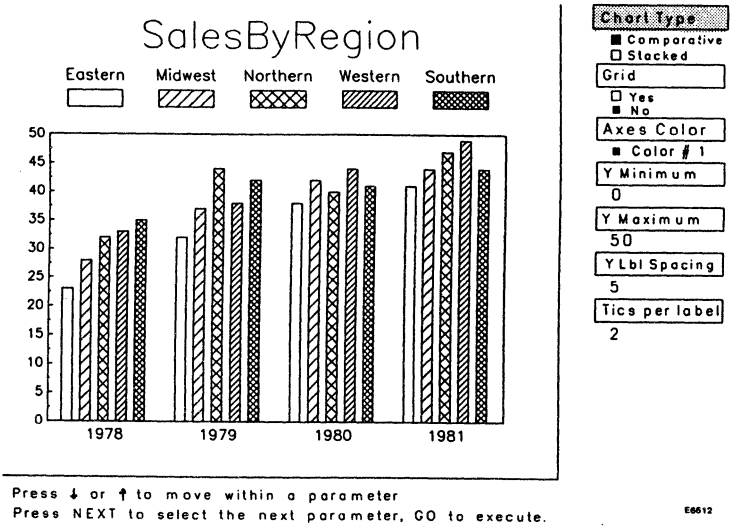
Refer to Figure 1-5 for clarification of the following information. When you open a picture file in BGP, the screen display includes the *top-level menu* at the bottom of the screen. The *picture area* is directly above the menu and displays one of the following:

- A chart when the file is created from Multiplan
- One or more objects when an existing file is accessed from the Executive
- Blank when a new file is created from the Executive

When you press certain function keys, such as MODIFY, another *menu* appears.

Refer to Figure 1-6 for clarification of the following information. When pressing certain function keys, such as the Axes function in MODIFY, a *parameter menu* appears at the right side of the screen; *messages* (not menus) appear at the bottom of the screen. The message instructs you to change *parameters* in the parameter menu. Refer to the function descriptions in Section 4, BGP Functions, for more details.

Figure 1-6 **Screen With Message and Parameters**



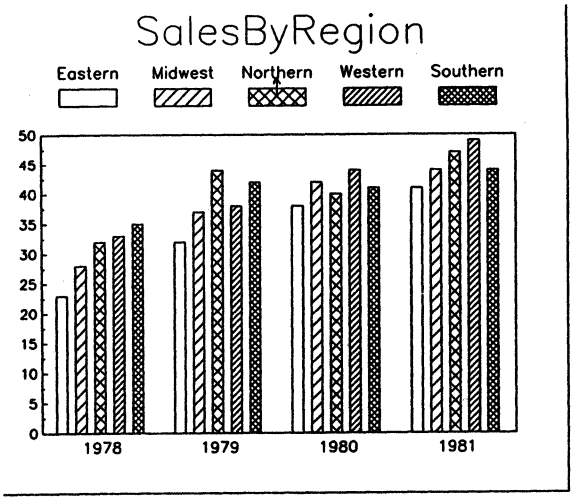
Refer to Figure 1-7 for clarification of the following information. When pressing certain function keys, such as the Add third-level function within Text, an *arrow* appears in the picture area; *size and position indicators* appear at the right side of the screen; *messages* appear at the bottom of the screen. This display also appears when pressing GO or NEXT in some functions.

The *size indicator* shows what the size of the added text will be. The *position indicator* shows the position of the arrow within the picture area. As you move the arrow vertically, the Y axis position changes. As you move the arrow horizontally, the X axis position changes.

The *message* at the bottom of the screen describes how to change the arrow's position to enter text.

Refer to Figure 1-8 for clarification of the following information. If you press GO to add text in the MODIFY function, a message appears at the bottom of the screen, prompting you to enter text in the *user-entry line*. This display appears in other functions as well.

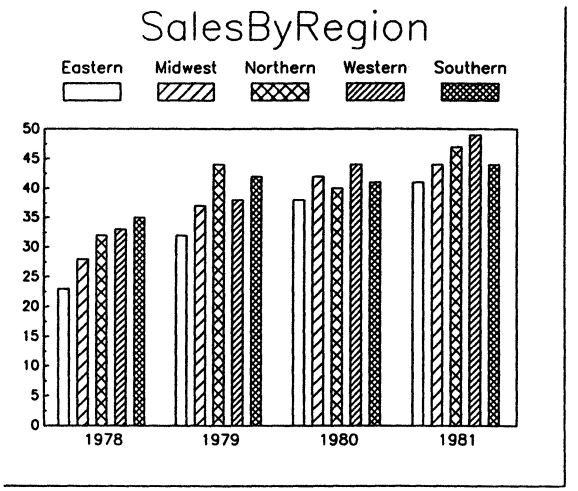
Figure 1-7 **Screen With Message and Indicators**



Using the cursor keys,
place the arrow where you want to add a label and press GO

E6613

Figure 1-8 **Screen With Message and User-Entry Line**



Enter text below. Press NEXT to change parameters, GO to execute.

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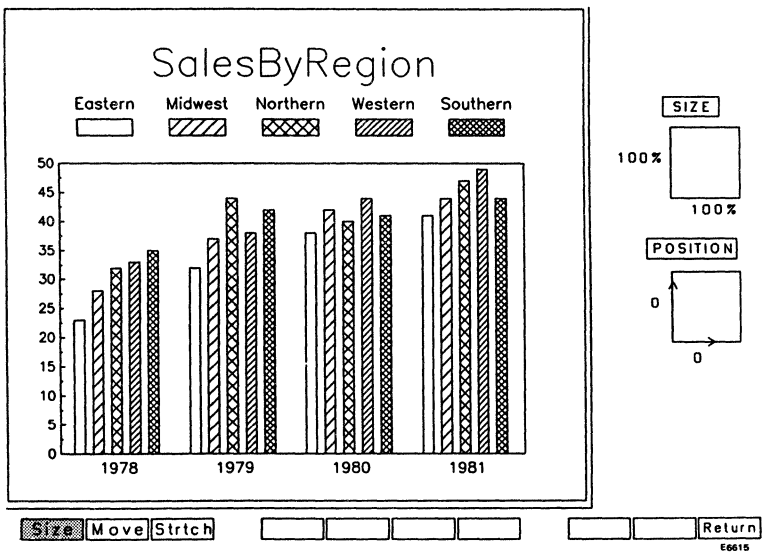
Refer to Figure 1-9 for clarification of the following information. When pressing certain function keys, such as the Scale function in MODIFY, a *box cursor* either surrounds the picture area or it appears within the picture area; *size and position indicators* appear at the right side of the screen; a *menu* appears at the bottom of the screen, including Size, Move, and Stretch. You must reduce the size of the box cursor before moving it.

The *size indicator* shows the percentage of the picture area that the box cursor is surrounding. The *position indicator* shows the location of the lower left corner of the box cursor within the picture area. As you move the box cursor vertically, the Y axis position changes. As you move the box cursor horizontally, the X axis position changes.

Refer to the descriptions of Size, Move, and Stretch in the Scale function in MODIFY, Section 4, BGP Functions.

Figure 1-9 **Screen With Box Cursor, Indicators and Menu**



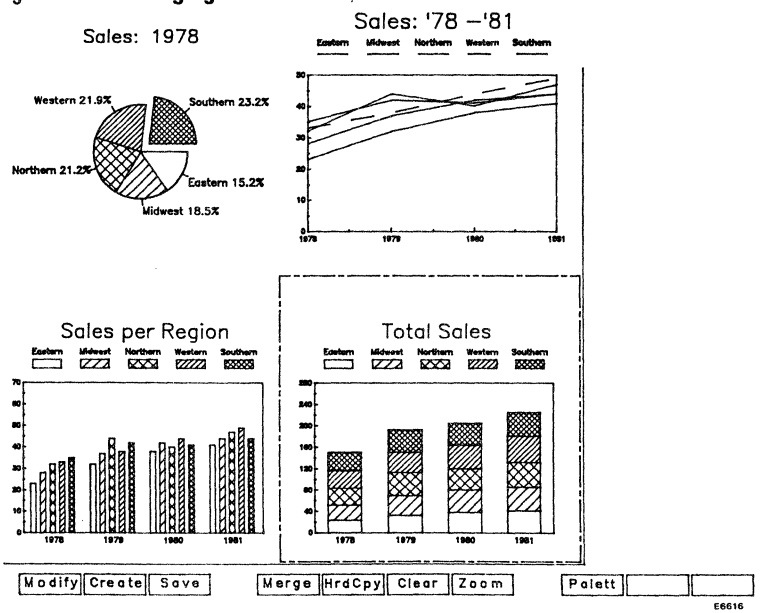
Charts and Objects

An *object* can be a chart, a label (text), or a picture from a merged file. When you enter BGP from Multiplan, BGP creates a chart, which becomes the only object in the file. A label (text) is considered an object only if it was created using the CREATE function. All other labels, such as a chart's title or axis labels, are not objects. One or more objects can appear in the picture area at one time; they can overlap each other or be separate. If the picture area contains more than one object, BGP will modify only the *current object*.

The current object can be identified by pressing CODE, holding it down, and pressing the letter **V**. A flashing box cursor surrounds the current object. If you want to change the current object, press NEXT until the object that you want to modify is current.

The picture area in Figure 1-10 displays four charts. This picture file was created by shrinking a chart from one picture file, and merging it with three other picture files. The final display contains four objects. The dotted-line box cursor that surrounds the stacked chart indicates the current object. On your screen, this dotted-line box cursor flashes a few times and then disappears.

Figure 1-10 **Merging Picture File**



Note: *If you merged this picture file into another picture file, the four charts from this file would be merged, one object at a time.*

When you refer to Section 4, BGP Functions, you will read about several terms that refer to various components of the charts. Some terms are used for all charts, such as pattern, while other terms are specific to one type of chart. For example, segments apply to pie charts, while legends apply to bar and line charts. Refer to How to Make Charts in Section 3, User Guide, for illustrations of these terms.

Special Key Functions

The following BGP key functions apply to all BTOS keyboards:

ACTION-FINISH Undo all unsaved modifications, as well as any unsaved charts created in the current session; end the session.

ARROWS Manipulate arrows and box cursors.

Modify each parameter in a parameter menu.

Multiplan key function Pressing ↑ displays Multiplan files and format files.

CODE-arrow Move the arrow or the box cursor from one side of the picture area to the other.

SHIFT-arrow Move the arrow at a faster rate. Move and modify the size of the box cursor at a faster rate.

CANCEL Use instead of GO to deny modifications.

CODE-D Redraw any blanked-out object in the picture area (including the entire picture area).

CODE-V Identify the current object in the picture area.

CODE-DELETE Delete user entry in the message area.

FINISH End a BGP session and save the picture file. (Requires GO to confirm, CANCEL to deny.)

If you enter a file name that already exists, BGP overwrites the existing file.

If you FINISH when no file name is specified, you will not overwrite the picture file; all work from your current session will be lost.

f1 through f8 These function keys vary, depending on which menu is displayed. Function key *f9* is not used in any menu.

f10 Exit from second-level and third-level menus. In some cases, pressing f10 redraws the current object.

GO Execute or confirm modifications.

HELP Use to list function descriptions for any displayed menu. (See Section 4, "BGP Functions," for additional information.)

MARK This key can be used to display a list of picture files when entering BGP from the Executive and when using the MERGE function.

NEXT Select the next parameter in the parameter menu.

Move from one object to another in the picture area.

File Types

Business Graphics Package (BGP) uses three types of files:

Format files These files enable you to create new charts in the same format as a chart that you modified previously.

Palette files These files operate in the same way as format files, except that color is the only attribute saved from the current object. You can use these files only if you use a color monitor.

Picture files These are the files that BGP uses to save charts and other objects. BGP saves all data and objects within a picture area exactly as they are displayed when you save them.

File Names and Suffixes

When you create a file in the *Picture Editor*, BGP automatically adds a suffix to the file name. Each type of file receives a unique suffix:

- .fm is applied to format files
- .pl is applied to palette files
- .pic is applied to picture files

When you create a spreadsheet, Multiplan automatically adds .mp to the file name.

These suffixes allow you to assign the same name to each file. For example, if you create a spreadsheet and save it as *Inventory*, Multiplan adds .mp to the file name. If you create a chart, you can save it as *Inventory* and BGP adds .pic to it.

If you want to create either a palette file or format file from Inventory.pic, you can save these files with the same name (Inventory). BGP adds .pl to the palette file, and .fm to the format file. Do not worry about typing uppercase or lowercase letters. BGP interprets them as the same letters.

You do not need to add a suffix when you access these files. BGP knows which file you want by the context. If you are in the Executive, however, you must type the suffix. The *Picture Editor* command is the only exception; you do not need to type the suffix when specifying which picture file you want to access in BGP.

Format Files

A format file saves the format of an object without saving the actual data. This is useful when you want two or more charts to have the same modifications. Format includes text characteristics, patterns, and color. The size, location, and shape of the object are not saved.

Accessing BGP: When you create a chart by accessing BGP from Multiplan, the following default format files are provided:

Bar Chart: [sys]<sys>Bar
(ColorBar for color workstations)

Line Chart: [sys]<sys>Line
(ColorLine for color workstations)

Pie Chart: [sys]<sys>Pie
(ColorPie for color workstations)

When you need to create several charts in the same format, save the modifications from the first chart by creating a format file. You can create a format file easily by entering MODIFY and pressing f6 (Format). Enter a name for the format file, and press GO. If you need more details, refer to Format (the second-level function within MODIFY) in Section 4, BGP Functions.

Each time you access BGP from Multiplan to create the rest of the charts, use the format file that you created from the first chart.

Note: *You cannot apply format files from one type of chart to another type. For example, if you save a format from a bar chart, you can apply it only to other bar charts.*

Example: Enter a file in Multiplan. Create the first chart, using the default format file. Modify the chart and save the format into a format file (use Inventory as a file name). Save the chart into a picture file (use *Inventory* as a file name).

Exit BGP and access another file in Multiplan. Create the next chart, using the *Inventory* format file in place of the default. The new chart appears; it already includes the modifications you made to the first chart. If you want this chart to be any different from the first chart (other than the changes in data), you can modify it further.
Exit BGP and access the rest of the files you want to create in the same format.

You cannot access a format file from the BGP *Picture Editor* command. You can access a format file only when creating a chart from Multiplan.

Palette Files

Palette files allow you to load all color modifications from one object into another object or file. The palette file operates the same way as the format file, except that you can create and access palette files from within BGP as well as from Multiplan.

A palette file saves the color of axes, labels, legends, lines, and segments within the current object. If you do not have a color monitor, the only way to save color is to create a format file.

When you enter BGP from Multiplan by accessing the Graph command, select *Options* instead of *Bar*, *Line*, or *Pie*. A palette file named *Default* is provided in the *Palette File Name* field. You can replace it by entering the name of any palette file.

You can apply any palette file to any type of chart. For example, if you created a palette file in a comparative bar chart, you can apply it to stacked bar charts, line charts, and pie charts as well.

You can modify a palette file only by loading it, modifying it, and saving it. You can also save it into a different name, thus creating a new palette file.

If you need more details about how to create, modify, and access palette files from within BGP, refer to the top-level function PALETTE in Section 4, BGP Functions.

Picture Files

You create picture files every time you press the SAVE function key or FINISH. You can modify any attribute of a picture file, except data. To modify data, you must enter the Multiplan file from which you created the chart.

If you want to create picture files with charts, you must enter BGP from a file in Multiplan. To modify picture files, you can access them from the *Picture Editor* command in the Executive.

You can also create picture files by using the BGP *Picture Editor* command from the Executive. These files do not create charts from spreadsheet data; such charts can be included only if you merge them from other BGP files.

When you create files from the Executive, you can create text and merge objects from other picture files (including files from BGP, BTOS Systems Draw, and Tektronix 4014 Emulator). Refer to the top-level functions, CREATE and MERGE, in Section 4, BGP Functions.

If you want to modify a picture file without overwriting it, save it with a different file name from the one you used to access it.

Installation Requirements and Procedures

Before you can run Business Graphics Package, you must have the proper hardware, software, and operating system installed.

Hardware Requirements

Your workstation must have graphics capabilities to run any BTOS graphics application. A color monitor is not necessary to run BGP; however, if you want to display color or have access to the palette function, you need a color monitor.

The palette function allows you to display up to eight colors from 64 possible combinations. Without the palette function, you can choose up to eight colors for plotting or printing, but they are not displayed on a monochrome monitor.

To install hardware, refer to the appropriate installation manual.

Peripherals

If you want to print the charts you create in BGP, you need either a printer or a plotter. The colors you select in BGP will print on a plotter only if you coordinate them with the plotter's pens.

For each peripheral, you must make an entry in the Sys.Printers file. When doing spooled printing, you must also make an entry in the Queue.Index file. Refer to *Appendix E, Configuration Files*, for configuration file specifications.

Operating System Requirements

You cannot run this version of BGP unless you are running the 7.0 or higher BTOS operating system.

Memory

BTOS graphics workstations require 512 K-bytes of RAM memory to run BGP. The minimum partition size in which BGP will run is 323 K-bytes. Additional memory may be required if other system services (such as ISAM, BMULTI, SNA, etc.) are installed.

Disk Space

BGP installation requires approximately 650 sectors.

BGP Diskette Files

The Business Graphics Package diskette is write protected. Do not use it for any purpose other than installation.

The BGP diskette contains the following files in the <**Unisys**>directory:

BGP.Run	BGP.hp
Bar.fm	ColorBar.fm
Line.fm	ColorLine.fm
Pie.fm	ColorPie.fm
Stacked.fm	ColorStacked.fm
Lesson.mp	Lesson.pic
SalesByRegion.mp	Sales.pic
SalesLine.fm	ColorPrinter.pl

You do not need the following files to run BGP.

Lesson.mp	Lesson.pic
SalesByRegion.mp	Sales.pic
SalesLine.Fm	

SalesByRegion and Sales.pic: These files allow you to see the Multiplan file and picture file that are discussed in the subsection on How to Make Charts in Section 3, User Guide.

Lesson.mp: This file allows you to skip Lesson 1 (Create spreadsheet in Multiplan) in the tutorial.

Lesson.pic: This file allows you to skip Lesson 2 (Create chart using BGP).

The following installation files are contained in the <**Sys**>directory:

Install.Sub
Fd.SysVersion

The following configuration files are contained in the <**Config**>directory:

Sys.printers
Entries>Sys.printers

Refer to Appendix E, Configuration Files, for configuration file specifications.

Software Requirements

Before installing Business Graphics Package, you must have the Graphics for BTOS software level 1.0 installed and loaded. Refer to the *Graphics for BTOS* manual for installation requirements and procedures.

BGP Installation Procedures

When you are instructed to enter information, type the boldface characters. Your entries do not need to use capital letters. Keys such as RETURN and GO are represented in all uppercase letters.

Installing BGP on the XE 520

If you need instructions on booting a cluster workstation, refer to either the *XE 520 BTOS User's Guide* or the *XE 520 System Administrator's Handbook*.

Login to a user file (Joe.user, not Admin.user) where you want to access BGP's *Picture Editor* command. If you install BGP when logged in to an Admin.user file, BGP will not be installed on user files.

Installing on the XE 520 and all BTOS Workstations

The following instructions apply to the XE 520 and all BTOS workstations (including the master, clusters, and hard disk standalones). Be sure to follow all instructions regarding cluster workstations. Refer to Appendix B, Error Prevention Techniques, before installing BGP.

1 If your workstation is not already turned on, turn it on now.

If you are installing on a master workstation, turn off power to all cluster workstations and leave the master turned on.

2 Set your Path to [Sys]<Sys> from the Executive:

Command: **Path**		RETURN
Path		
[Volume]	**sys**	RETURN
[Directory]	**sys**	RETURN
[Default file prefix]		(optional)
[Password]		(optional)
[Node]		(optional)
Press GO.		

3 Insert your BGP diskette into the floppy drive and close the disk drive door. (Do not reset the system.)

4 Type **Software Installation** (or a unique command abbreviation) in the command line.

5 Press GO.

The screen displays the following:

INSTALLATION OF BURROUGHS
BUSINESS GRAPHICS PACKAGE

LOGOUT ALL OTHER WORKSTATIONS
PRESS GO WHEN READY

If you have not logged out or turned off all cluster workstations, do so now.

6 Press GO.

The screen displays a list of all files copied from [f0]<Burroughs> on the BGP diskette to the <Sys> directory on your hard disk.

When all the files are copied, command *Picture Editor* is created. When this is completed, the screen displays the following:

INSTALLATION OF BURROUGHS
BUSINESS GRAPHICS PACKAGE
IS NOW COMPLETE

NORMAL CLUSTER OPERATIONS
MAY NOW BE RESUMED

done.

7 Remove the BGP diskette from your f0 drive and save it as a backup.

8 Turn on and/or login cluster workstations.

9 If you want to verify the installation, load the Graphics for BTOS software by typing **Install Graphics Manager** (or a unique command abbreviation) in the command line.

10 Press GO.

11 Type **Picture Editor** in the command line.

12 Press RETURN.

The screen displays the following:

Picture Editor
Picture File

13 Type **[Sys]<Sys>Lesson.pic** in the Picture File line.

14 Press GO.

The screen displays a chart in BGP's picture area.

You have entered BGP from the Executive. You can modify the displayed chart by using the functions described in Section 4, BGP Functions.

15 If you want to exit from the picture editor, press FINISH and then press GO.

If you want to know how BGP creates charts from spreadsheet data, do one of the following and refer to How to Enter BGP From Multiplan in Section 3, User Guide.

- Perform Lesson 1 in the tutorial in Section 3, User Guide

- Enter Multiplan and open the Lesson.mp file.

User Guide

Before you use Business Graphics Package, Graphics for BTOS software must be installed.

This section is divided into the following subsections:

- *How to Correct Errors* Explains how to recognize and correct errors.
- *How to Enter and Exit BGP* Explains how to enter and exit BGP from the Executive and from Multiplan.
- *How to Make Charts* Explains how to create each type of chart from Multiplan. Illustrations are included to show how BGP uses Multiplan data to create bar, line, and pie charts.
- *Tutorial* Divided into three lessons. In the first lesson, you will create a spreadsheet in Multiplan that you will use to create a chart in BGP. Lessons 2 and 3 help you become familiar with BGP. They do *not* show you how to use the entire package. (Section 4, BGP Functions, explains how to use all BGP functions.) Lesson 2 shows you how to create a chart, and Lesson 3 shows you how to modify it.
- *Helpful Hints* Discusses how to choose charts and design them.

How to Correct Errors

If the system displays an error code, refer to Appendix A in this manual. Read the paragraph at the beginning of Appendix A before you look for the specific error code description.

Error codes appear at the bottom of the screen. If there is no error code displayed, the system has accepted your input; it is valid.

If the system response is different from the response in the tutorial, you have typed something different from what was specified in the column labeled 'How To Do It'.

When this happens, you are no longer following the tutorial. Usually, the CANCEL key undoes your error. If the CANCEL key does not help you, end the session and begin another one. To end the session, press FINISH and then GO. You can avoid some errors by checking your entries *before* pressing GO. Use the BACKSPACE key to correct your entries.

Remember to save your work when you have done more modifications than you want to repeat. It is also wise to save before doing anything you are not sure how to do. By saving often, you will reduce the amount of modifications you lose should an error occur. Instructions for the SAVE function are in Section 4, BGP Functions.

How to Enter and Exit BGP

If the following instructions lack the detail you require, refer to the tutorial. It will guide you through all the steps you need to access BGP, both from the Executive (Lesson 3) and from Multiplan (Lesson 2).

To exit BGP, press FINISH, make sure the correct file name is entered, and press GO to save your work into a picture file.

Note: *If you want to exit BGP without saving your modifications from the current session, delete the file name before pressing GO. The system returns you to the Executive, Multiplan, or BTOS Systems Draw, depending on how you entered BGP.*

From the Executive

Enter BGP from the Executive for the following reasons:

- *Modify objects that have already been created.*
- *Create picture files that contain text and/or merged objects from other graphics applications.*
- *Print copies of picture files from any BTOS graphics application.*

Step 1 Type *Picture Editor* in the command line and press RETURN.

You can type an abbreviation, such as **p e**. If you type an abbreviation, use enough letters to make your entry unique.

Step 2 Type the name of the picture file you want to enter.

Entering a file name that does not exist creates a new picture file. If you do not enter a file name, BGP will ask you for a file name and allow you to display a list of files by pressing MARK. If you require details on how to use MARK to list files, refer to the MERGE function in Section 4, "BGP Functions."

You cannot create a bar, line, or pie chart when you enter a new file: you can create text and merge other charts into this file, but you can create bar, line, and pie charts only from spreadsheet data files.

Step 3 Press GO. The screen is blank for a moment, then the chart and BGP menu appear. If you have accessed a file that already exists, the content of that file is also displayed.

You have entered BGP from the Executive.

From Multiplan

The only way to create a bar, line, or pie chart is to enter BGP from a spreadsheet application. BGP translates spreadsheet data into graphic data and creates charts.

Note: *Make sure that you install and load BTOS Systems Graphics software (release level 1.0 or higher) before you enter Multiplan. To load this software, type* ***install graphics manager*** from the Executive and press GO.

When you access BGP from Multiplan, make it a habit to read the instructions at the bottom of the screen, especially if you need help. Refer to Appendix B, Error Prevention Techniques, before selecting the data you want to graph.

Step 1 Enter a file in Multiplan.

Step 2 Enter BGP by pressing **G** for graph.

Step 3 Select the type of chart you want or select *Option*.

If you do not know what type of chart to select, refer to the following subsections in this section:

How to Make Charts (immediately following these instructions)
Helpful Hints (at the end of this section)

If you select *Option*, you can change the chart's title, palette file, and choose whether to use labels from either the spreadsheet or the format file.

To change the palette file, you must have already created a palette file from within a picture file.

Step 8 in these instructions explains how to change a format file. These instructions also apply to palette files.

The following steps vary, depending on which type of chart you want to create. Some of the following steps apply only to bar charts. Refer to the next subsection, How to Make Charts, to see how to create stacked bar, line, and pie charts.

Step 4 Press the letter **B**.

Step 5 Select the *group* data by specifying the spreadsheet columns that contain data.

Example: *C2:6* indicates columns 2 through 6.

Note: *You can change the information in these fields by pressing DELETE and typing in new information. Do not use arrow keys, because they move the cursor in the spreadsheet. This movement causes the data in the group data field to change.*

Example: To indicate only the data in columns 2, 4, 6, and 8, type the following: **c2,c4,c6,c8**. Do not enter spaces. Capitalization is not necessary.

Step 6 Press TAB to move the highlight cursor to the *legends* field.

Select the legends data by specifying the spreadsheet rows that contain data.

Example: *R2:6* indicates rows 2 through 6.

You can change this data in the same way that you would change data in **Step 5**.

Step 7 Press TAB to move the highlight cursor to the **Y axis label** field.

If you want to place a label over the chart's Y axis, enter alphanumerics in this field.

Example: **dollars** would be an appropriate label for a Y axis representing number of dollars.

Step 8 Press TAB to move the highlight cursor to the *format file* field.

8a If you have not created other charts, skip Step 8b, because you cannot change the format file field.

8b If you have created at least one chart and saved its format, you can use that format to replace the format file default. If you do not know how to save a chart's format, refer to the Format function description within MODIFY in Section 4, BGP Functions.

Enter the format file name and press GO.

If you do not remember the name of the format file you created, press ↑. A list of format files replaces the spreadsheet area. The highlighted format file name also appears in the format file field. If you want to highlight another format file name, use the arrow keys.

If you want to dismiss the format file names, press the spacebar. The original format file name is erased. If you want to replace the original format file name, type **[sys]<sys>Bar** (if you have a color monitor, type **[sys]<sys>ColorBar**).

When you are satisfied with the format file name, proceed to Step 9.

Step 9 Press GO. The screen is blank for a moment and the chart appears with the BGP menu.

You have entered BGP from Multiplan.

How to Make Charts

Before reading this subsection, you should understand the previous subsection, How to Enter BGP from Multiplan. In that subsection, Steps 1, 2, 3, 8, and 9 show how to create any type of chart. The rest of the steps apply only to bar charts, but they can be applied to line and pie charts by following the instructions in this subsection. If you are not sure which chart you want, refer to the Helpful Hints at the end of this section.

You can create the charts in this subsection by opening the SalesByRegion.mp file and following instructions. This file was copied to your hard disk during installation.

Comparative Bar Charts

Figure 3-1 illustrates how BGP uses Multiplan's data to create comparative bar charts. Follow the instructions in How to Enter BGP from Multiplan. When you are finished following these instructions, your bar chart is created. Business Graphics Package uses the following parameters to create bar charts:

- *group by*
- *legends*
- *Y axis label*
- *format file*

Steps 5 and 6 require input for the *group by* and *legends* parameters. One parameter must specify columns, and the other parameter must specify rows. The rows and columns intersect to form cells. The values from these cells provide X and Y axes information. BGP needs this information to build bar legends.

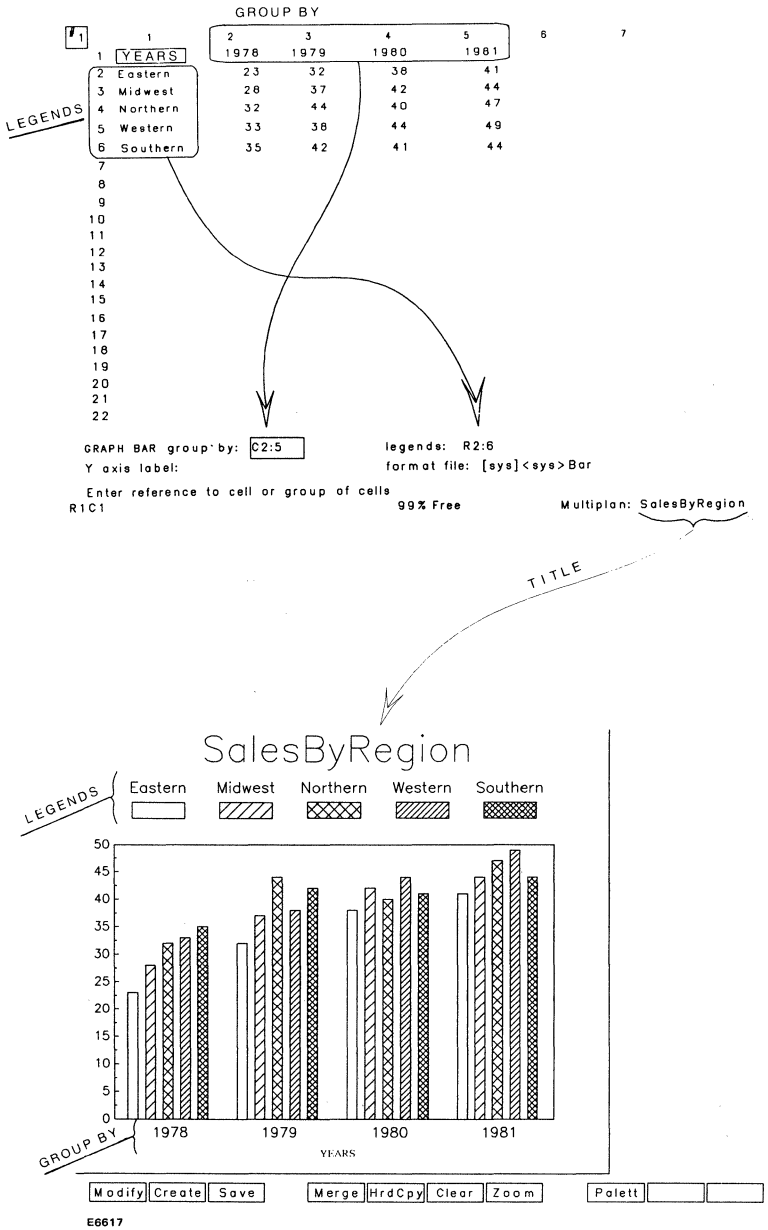
Step 7 gives you the option of specifying a label for the Y axis.

Step 8 gives you the option of using a format file other than the default.

group by At least one column or row must be entered in this field. The first cell in each column or row indicates the X axis labels.

When the spreadsheet is longer than it is wide, the default value is *C2:n*, where n equals the number of columns in the spreadsheet. This notation indicates that columns 2 through the last column will be used to indicate X axis information.

Figure 3-1 **BGP Creates Bar Chart From Multiplan**



Multiplan is assuming that column 1 contains labels for the chart's legends.

The columns or rows in this field must intersect with the rows or columns in the *legends* field. BGP uses the data from the cells in these intersections to make bars.

legends At least one column or row must be entered in this field. No more than five columns or rows will be accepted. The first cell in each column or row indicates a bar legend label.

Note: *If you specified No in the* ***Use Labels from Sheet?*** *field (Step 3 in How to Enter BGP from Multiplan), the bar legends will be labeled from the specified format file, not from this field.*

When the spreadsheet is longer than it is wide, the default value is *R2:n*, where n equals the number of columns in the spreadsheet. This notation indicates that columns 2 through the last column will be used to indicate legend labels. (No more than five legends can be represented in BGP.)

Multiplan is assuming that column 1 contains labels for the chart's legends.

The columns or rows in this field must intersect with the rows or columns in the group by field. BGP uses the data from the cells in these intersections to determine the size and X axis location of each bar.

Y Axis label If you want to place a label over the Y axis, enter alphanumerics in this field. The default is no label.

format file Change this field if you want to create a picture file in the same format as another picture file that you have already modified.

You must have previously created a format file for the picture file that you modified. If you do not know how to create a format file, refer to the Format second-level function under MODIFY in Section 4, BGP Functions.

Step 8 in the accessing instructions explains how to specify a format file for a chart you want to create.

If you need a more detailed explanation of format files in general, refer to the description of Format Files in Section 1, Getting Acquainted with BGP.

Stacked Bar Charts

Figure 3-1 illustrates how BGP uses Multiplan's data to create comparative and stacked bar charts. Follow the instructions in How to Enter BGP from Multiplan. These instructions create a comparative bar chart. To modify it into a stacked bar chart, enter the Axes function (second-level function in MODIFY).

The first parameter (*Chart Type*) allows you to select a stacked bar chart instead of a comparative bar chart. When you select the stacked bar chart, the other axes specifications change automatically after you press GO.

If you need more detailed instruction, refer to Section 4, BGP Functions.

The chart samples in Figure 3-2 show the differences between comparative and stacked bar charts.

Line Charts

Figure 3-3 illustrates how BGP uses Multiplan's data to create line charts. Business Graphics Package uses the following parameters to create line charts:

- *X cells*
- *Y cells*
- *Y axis label*
- *format file*

Note: *If your spreadsheet contains any blank cell, that is, a cell without a value, BGP will receive a value of zero and graph it as such. The following line chart is an example of the result with the blank cell for 1982 in line 1.*

```
|#1        1          2          3          4          5          6          7
|  1                  1980       1981       1982       1983
|  2                    10         13          0         25
|  3
|  4
|  5
|  6
|  7
|  8
|  9
| 10
| 11
| 12
| 13
| 14
| 15
| 16
| 17
| 18
| 19
| 20
| 21
| 22
COMMAND: Alpha Blank Copy Delete Edit Format Graph Help Insert Jump Lock
         Move Name Options Print Quit Sort Transfer Value Window Xternal
Select option or type command letter
R4C5                                    99% Free      Multiplan: sales
```

Spreadsheet for Line 1

```
|#1        1          2          3          4          5          6          7
|  1                  1980       1981       1982       1983
|  2                    10         13         15         25
|  3
|  4
|  5
|  6
|  7
|  8
|  9
| 10
| 11
| 12
| 13
| 14
| 15
| 16
| 17
| 18
| 19
| 20
| 21
| 22
COMMAND: Alpha Blank Copy Delete Edit Format Graph Help Insert Jump Lock
         Move Name Options Print Quit Sort Transfer Value Window Xternal
Select option or type command letter
R3C2                                    99% Free      Multiplan: sales2
```

Spreadsheet for Line 2

Linegraph

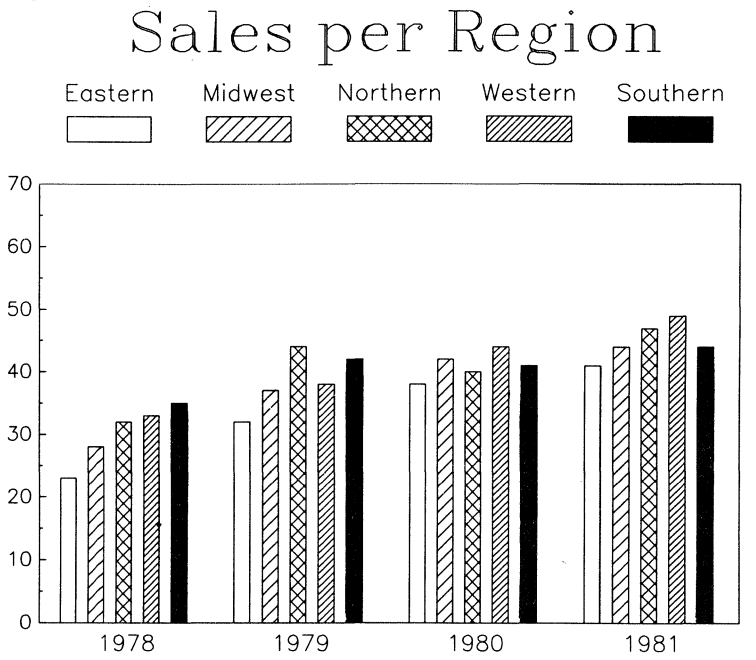
Follow steps 1 through 3 in How to Enter BGP from Multiplan (in the previous subsection). Instead of pressing the letter **B** in step 4, select a line chart by pressing the letter **L**.

Steps 5 and 6 are slightly different. Instead of using the parameters *group by* and *legends*, BGP uses the following parameters to build line legends: *X cells* and *Y cells*.

Hint: specify elements of time in the *X cells* parameter.

If you specify a row in the *X cells* parameter, you must specify rows in the Y cells parameter. (The spreadsheet data that these parameters specify must be parallel, not intersecting.)

Figure 3-2 **Comparative and Stacked Bar Charts**



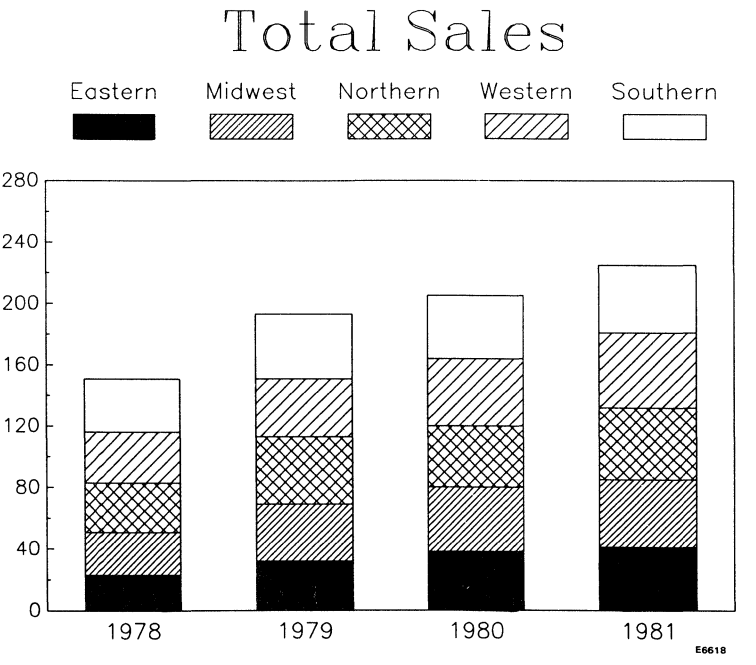
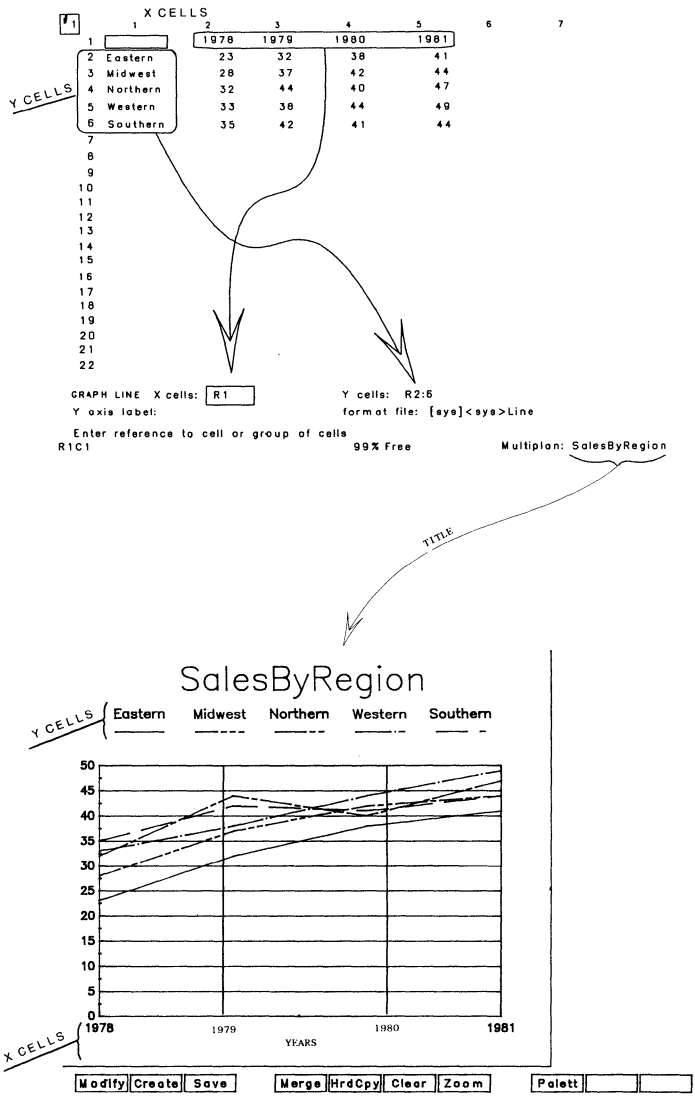


Figure 3-3 **BGP Creates Line Chart From Multiplan**



The row (or column) in the *X cells* parameter indicates a label for each line legend. Each row (or column) specified in the *Y cells* parameter creates a line legend. If a cell from one parameter does not have a corresponding cell in the other parameter, the cell is ignored. (BGP cannot use a cell's value if it does not have both X and Y information.)

The instructions in steps 7 and 8 apply to both bar and line charts. Refer to the comparative bar chart description for definitions of *Y axis label* and *format file*. The only difference is that the format file default uses *Line* in place of *Bar*.

X cells Only the first column or row must be entered in this field. The cells in this column or row indicate X axis labels and X coordinates for each line legend. Any cells that do not have corresponding data in the *Y cells* field are not used. When the spreadsheet is longer than it is wide, the default value is *C1*. This notation indicates that the cells in column one will be used to indicate X axis information.

Y cells At least one column or row must be entered in this field. No more than five columns or rows will be accepted.

The first cell in each column or row indicates a label for each line legend .

Note: *If you specified* ***No*** *in the* ***Use Labels from Sheet?*** *field (Step 3 in How to Enter BGP from Multiplan), the line legends will be labeled from the format file, not from this field.*

Each column or row in this field indicates the location and curve of each line legend. Any cells that do not have corresponding data in the *X cells* field are not used.

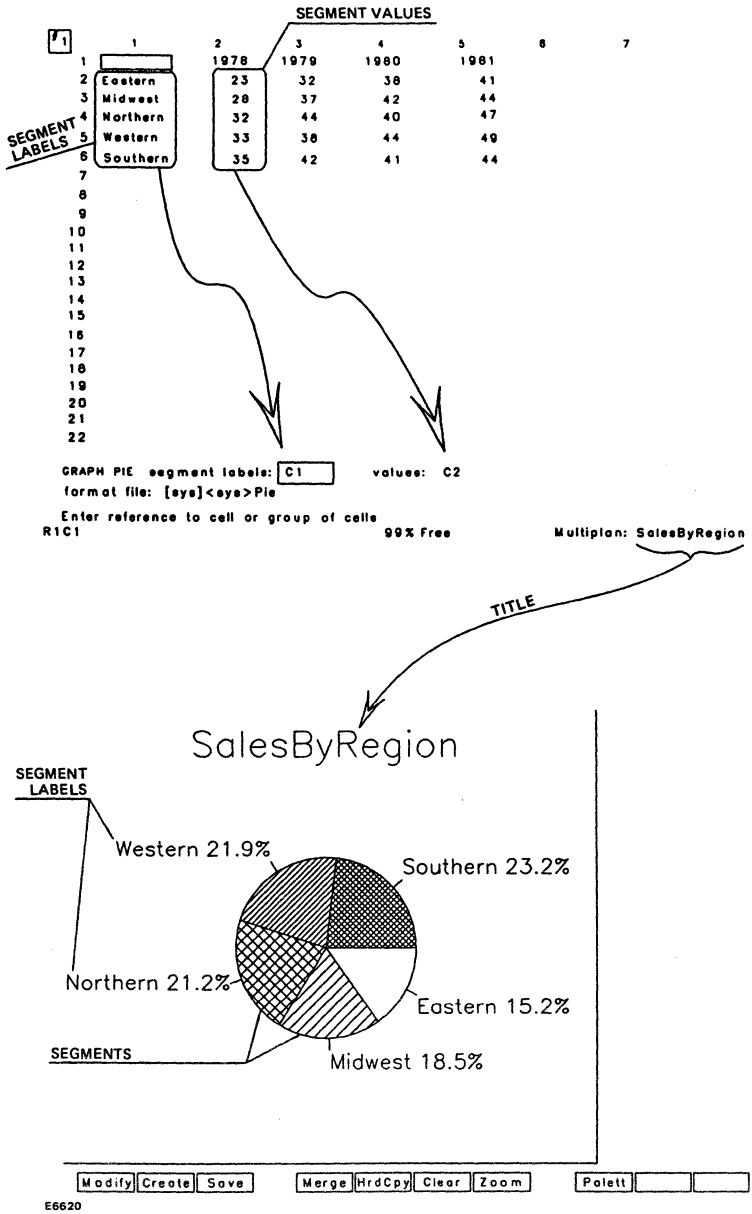
When the spreadsheet is longer than it is wide, the default value is *C2*. This notation indicates that the cells in column two will be used to indicate Y axis information for a line chart with only one line legend.

Pie Charts

Figure 3-4 illustrates how BGP uses Multiplan's data to create pie charts. Business Graphics Package uses the following parameters to create pie charts:

- *segment labels*
- *values*
- *format file*

Figure 3-4 **BGP Creates Pie Chart From Multiplan**



Follow steps 1 through 3 in the BGP accessing instructions (in the previous subsection). Instead of pressing the letter **B** in step 4, select a pie chart by pressing the letter **P**.

Steps 5 and 6 are slightly different. Instead of using the parameters *group by* and *legends*, BGP uses the following parameters to build pie segments: *segment labels* and *values*.

If you specify a row in the segment labels parameter, you must specify a row in the values parameter. (The spreadsheet data that these parameters specify must be parallel, not intersecting.)

The row (or column) in the *segment labels* parameter indicates a label for each pie segment. Each row (or column) specified in the *values* parameter creates a pie segment. If a cell from one parameter does not have a corresponding cell in the other parameter, the cell is ignored. (BGP cannot use a cell's value if it does not have both X and Y information.)

Step 7 does not apply to pie chart creation.

The instructions in Step 8 apply to both bar and pie charts. Refer to the comparative bar chart description of format file. The only difference is that the format file default uses Pie in place of *Bar*.

segment labels Only the first column or row must be entered in this field. The cells in this column or row indicate labels for each pie segment. Any cells that do not have corresponding data in the values field are not used.

Note: *If you specified No in the* ***Use Labels from Sheet?*** *field (Step 3 in How to Enter BGP from Multiplan), the pie segments will be labeled from the format file, not from this field.*

When the spreadsheet is longer than it is wide, the default value is *C1*. This notation indicates that the cells in column one will be used to indicate labels for each pie segment.

values Only one column or row must be entered in this field. Each cell in the column or row indicates the relative size of each pie segment. As many as eight cells from this column or row will be accepted; however, you should limit your pie to five segments. Any cells that do not have corresponding data in the segment labels field are not used.

When the spreadsheet is longer than it is wide, the default value is *C2*. This notation indicates that the cells in column two will be used to indicate the relative size of each pie segment.

The Helpful Hints at the end of this section suggests a few ways to use BGP to create interesting and effective charts.

Use the following tutorial if you need more detail about how to create charts.

Tutorial

The tutorial is formatted in columns:

What To Do	This column tells you what to do.
How To Do It	This column tells you exactly what to type (characters in **boldface**).
What To Expect	This column tells you what the terminal displays in response to your action.

Menus correspond to the menus displayed on your screen. These displays indicate what your function keys do.

Lesson 1: Create Spreadsheet in Multiplan

If you do not want to do this lesson, enter Multiplan and load the SalesByRegion.mp file and proceed to Lesson 2. (The SalesByRegion.mp file is provided on the BGP diskette; it was copied to your workstation's hard disk during BGP software installation.)

Preparation Multiplan must be installed.

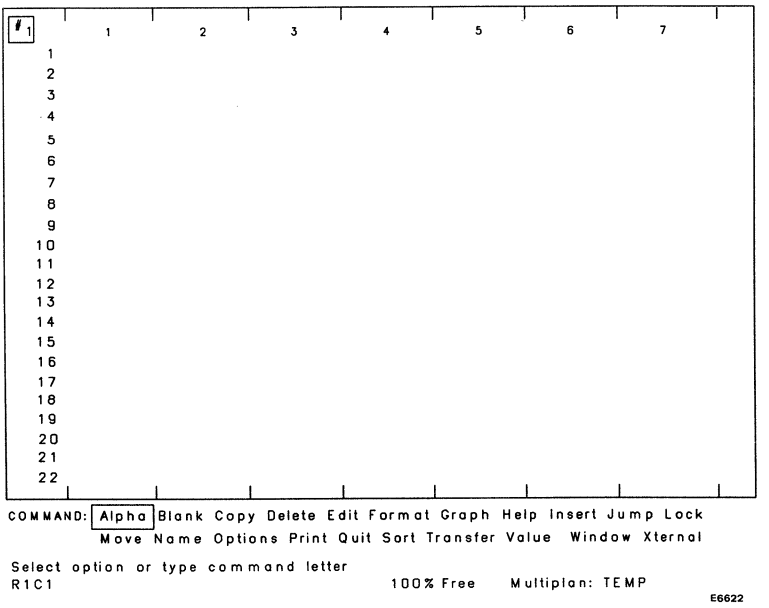
What you will do in this lesson

- Begin this lesson from the Executive.

- Enter Multiplan and fill in a spreadsheet.

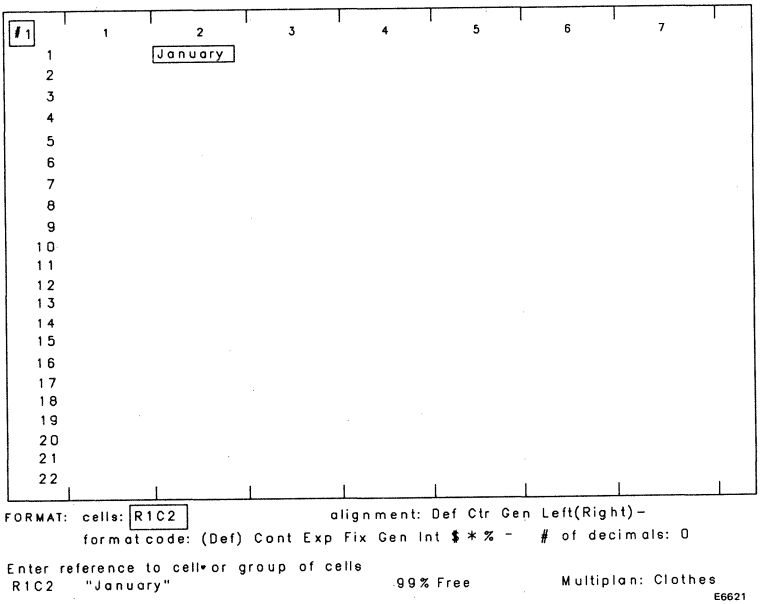
What To Do	How To Do It	What To Expect
Enter Multiplan. **1**	Type the command for Multiplan and press GO.	Multiplan entry screen is displayed. *Alpha* is highlighted.
Enter a column heading in row 1: column 2. **2**	Position the cursor to row 1: column 2 by pressing the right arrow key once. Press GO.	The *Alpha* command appears for row 1: column 2.
	Type **January** and press GO.	*January* appears in row 1: column 2.

Lesson 1, Steps 1 and 2



What To Do	How To Do It	What To Expect
Move *January* to the right of the column area. **3**	Change the format by typing **F**.	The *Format* command appears and *Cells* is highlighted.
	Press GO again.	The *Format* command appears and *R1C2* is highlighted.
	Press **TAB** once.	The cursor highlights *Def* in the *Alignment* field.
	Press **R**.	*Right* is highlighted.
	Press GO.	*January* moves to the right of the cell. The Multiplan entry screen appears.
Enter column headings in quarterly increments. **4**	Repeat steps 2 and 3, replacing *January* with *April*, then *July*, then *October*. Enter the new headings in columns 3, 4, and 5.	

Lesson 1, Steps 2 and 3



Continue Lesson 1

If you have stepped through the tutorial by actually performing the actions, you will be able to complete the remainder of the lesson.

Step 5

Now that you have entered the headings, enter text in column one (use the arrow keys, press GO for the Alpha command, and enter the following text in the indicated cells):

Text	Cell
shoes	row 3: column 1
shirts	row 4: column 1
pants	row 5: column 1
jackets	row 6: column 1

Step 6

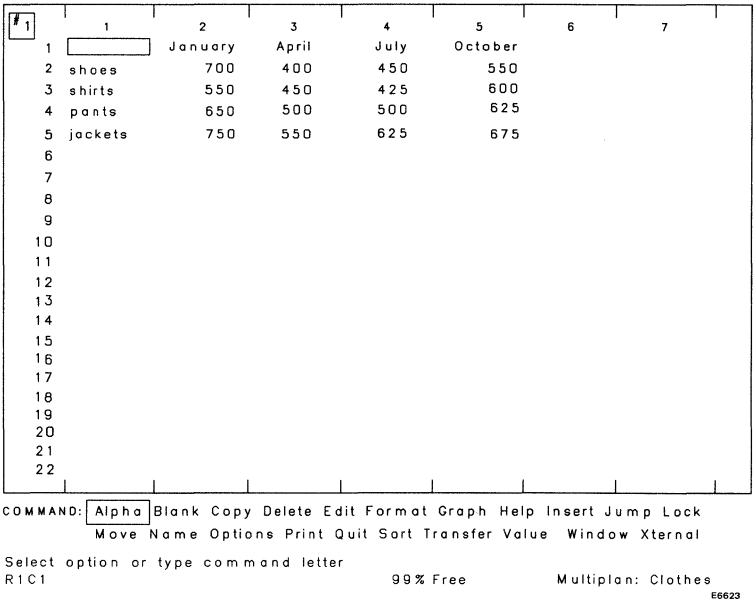
Your headings are in place. Now enter numeric amounts in each matrix cell. For this example, the numeric amounts reflect quarterly net income (dollars) for each item listed in column 1.

Fill in your Multiplan spreadsheet so it matches Figure 3-5. It is important that you match the listed numbers, so that your BGP chart resembles the example in the BGP tutorial.

Hint: Numerics cannot be entered in the *Alpha* command. Select the *Value* command. Try to align each value to the right side of each cell.

Refer to How to Make Charts (in this section) to see how BGP uses this data.

Figure 3-5 **Multiplan Spreadsheet with Data**



Step 7

Before ending this lesson, save this data with a unique file name. The file name you choose will be displayed as the title of the chart that BGP creates.

Press **T** (transfer). Then press **S** (save). The file name *temp* is highlighted. Replace it with **Clothes** and press GO. (Use a capital C.)

Exit Multiplan by pressing **Q** (quit) and then pressing GO. Your spreadsheet is complete. You have enough information to create a chart using Business Graphics Package.

Lesson 2: Create Chart Using BGP

If you do not want to do this lesson, access the Sales.Pic file and proceed to Lesson 3. (The Sales.Pic file is provided on the BGP diskette; it was copied to your workstation's hard disk during BGP software installation.)

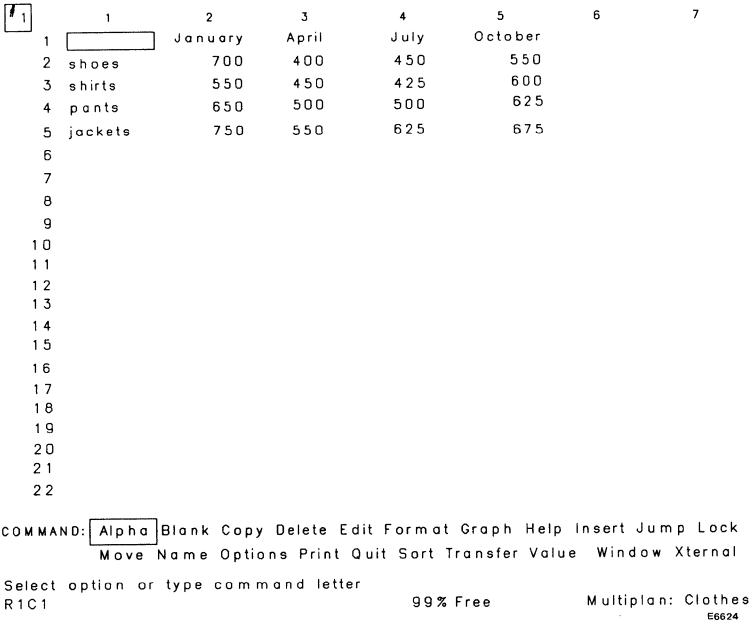
Preparation Multiplan, Graphics for BTOS, and BGP software must be installed. Graphics for BTOS software must also be loaded by typing *install graphics manager.*

What you will do in this lesson

Enter Multiplan, access the spreadsheet you created in Lesson–1, and create a bar chart using BGP.

What To Do	How To Do It	What To Expect
Enter Multiplan. 1	Type the command for Multiplan and press GO.	Multiplan entry screen is displayed. *Alpha* is highlighted.
Access the spreadsheet you created in Lesson 1. 2	Type **T**.	The *Transfer* command is displayed.
	Type **L**.	The *Load* command is displayed.
	Type **Clothes** and press GO.	The spreadsheet that you created in Lesson 1 is displayed.
Enter BGP by entering the Graph command. 3	Type **G** (graph).	The *Graph* command is displayed and *Bar* is highlighted.

Lesson 2: Step 3.



What To Do	How To Do It	What To Expect
Select the type of chart you want to create (bar chart). **4**	The system already chose a bar chart to represent the data. Press GO.	The *Graph* command's next level is displayed and *C2:5* is highlighted.
Examine the first data field: *group by: C2:5* **5**	Columns 2 through 5 are selected to send the numeric values and column headings to BGP. BGP uses this data to make groups.	

Lesson 2: Steps 4 through 6.

	1	2	3	4	5	6	7
1		January	April	July	October		
2	shoes	700	400	450	550		
3	shirts	550	450	425	600		
4	pants	650	500	500	625		
5	jackets	750	550	625	675		
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							

GRAPH BAR group by: C2:5 legends: R2:6
Y axis label: format file: [sys]<sys>Bar

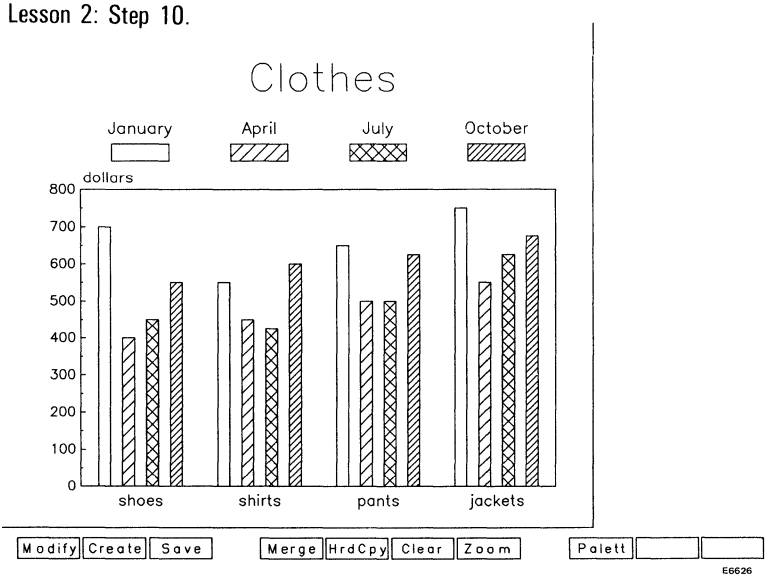
Enter reference to cell or group of cells
R1C1 99% Free Multiplan: Clothes

E6625

What To Do	How To Do It	What To Expect
(Step 5 Continued)	(Groups = *January*, *April*, *July*, and *October*.) This field specifies the correct columns.	
Examine the second data field: *legends:R2:6* **6**	Press TAB.	The cursor moves to the *legends* field. *R2:6* is highlighted.
	Rows 2 through 6 are selected to send each row's labels and data to BGP. BGP uses this data to make legends for the bar chart. (Legends = *shoes*, *shirts*, *pants*, and *jackets*.) This field specifies the correct columns.	
Examine the third data field: *Y axis label* **7**	Press TAB.	The cursor moves to the Y axis label field.

What To Do	How To Do It	What To Expect
Enter a label for the Y axis. **8**	Type **dollars**.	When you create the chart, *dollars* will appear above the Y axis. (See screen sample for Lesson 2: Step 10.)
Examine the fourth data field: **format file** **9**	Press TAB.	The cursor moves to the *format file* field. *[sys]<sys>Bar* or *[sys]<sys>ColorBar* is highlighted. This format file contains the specifications to create a chart from your spreadsheet. You might change this field later when you want to create a chart that matches another chart's format. This format file is correct.
You have checked every field. Create the chart. **10**	Press GO.	The screen is blank for a moment. The chart is formed and the BGP screen appears with the top-level menu.

Lesson 2: Step 10.



Helpful Hints

When BGP creates a chart, it automatically shrinks any label that doesn't fit in its allotted space. For example, if the label *jackets* had been *jackets & overcoats*, it would have been scaled down to fit under its group of bars so that it didn't extend beyond the picture area's boundary.

If you don't like the effect of a scaled-down label, you can move it and then enlarge it. See the Text function in Section 4 for details on modifying text size. (Text is a second-level function under MODIFY.)

As an alternative, you could return to your spreadsheet, abbreviate the label, and then recreate the chart. See the Format function in Section 4 for details on saving any modifications that you may have already made to your chart. (Format is a second-level function under MODIFY.)

What To Do	How To Do It	What To Expect
Save the chart. (You do not need to do this if you are about to end your session. However, you should make it a habit to save your work periodically.) **11**	Press f3 (Save).	The menu disappears, BGP asks for a file name, and then instructs you to press GO.
	Type **Clothes** (same file name as Multiplan file) and press GO.	The menu re-appears.
Exit BGP. **12**	Press FINISH.	The menu disappears, the system asks for a file name, and then instructs you to press GO. The file name **Clothes** is already displayed.
	Press GO.	The system returns you to the spreadsheet file you created in Multiplan.
Exit Multiplan. **13**	Press FINISH.	The *Quit* command is displayed.
	Press GO.	The screen is blank for a moment. The system returns you to the Executive.

You have created a bar chart to represent your spreadsheet data. If you are not completely satisfied with it, you can modify it.

Lesson 3: Modify Chart Using BGP

You can modify a chart before ending the BGP session or by entering BGP from the Executive. In this lesson, you will modify the chart by entering BGP from the Executive.

Preparation Graphics for BTOS and BGP must be installed. Graphics for BTOS software must also be loaded by typing *install graphics manager.*

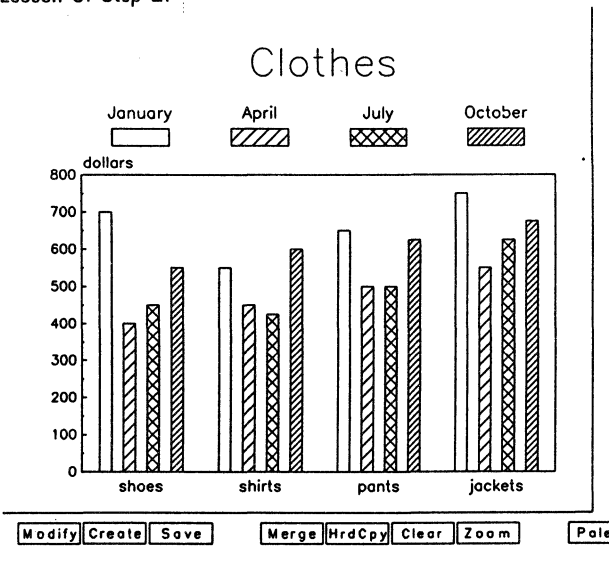
You need the chart from Lesson 2. If you prefer not to do Lesson 2, this chart is in the Lesson.Pic file. (The Lesson.Pic file is provided on the BGP diskette; it was copied to your workstation's hard disk during BGP software installation.)

What you will do in this lesson:

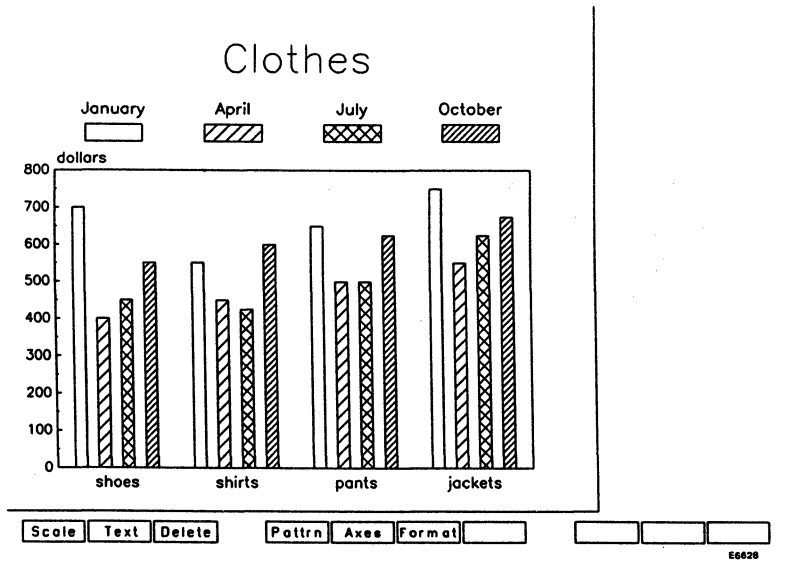
Enter BGP, access the chart you created in Lesson 2, and modify it.

What To Do	How To Do It	What To Expect
Enter BGP. 1	Type **picture editor**, or a unique abbreviation, and press RETURN.	The words, *Picture Editor* appear and the bar moves to a line labeled *picture file*.
Access the chart you created in Lesson 2. 2	Type the file name of the chart you created (**Clothes**) and press GO. If you did not do Lesson 2, type **Lesson** instead.	The screen is blank for a moment. The chart appears.
Enter the MODIFY menu. 3	Press f1 (MODIFY).	The MODIFY menu appears.

Lesson 3: Step 2.

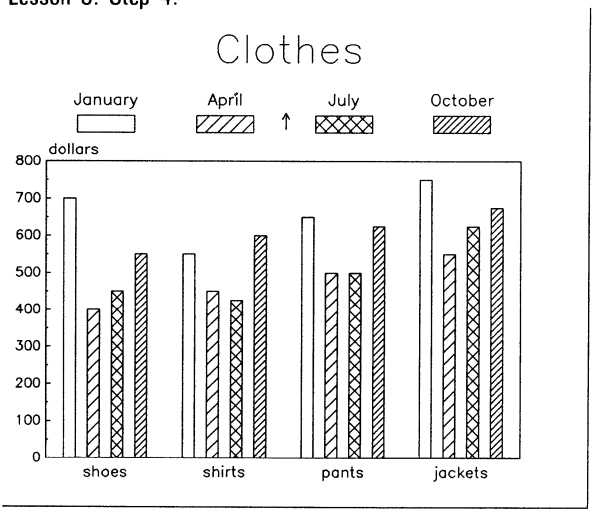


Lesson 3: Step 3.



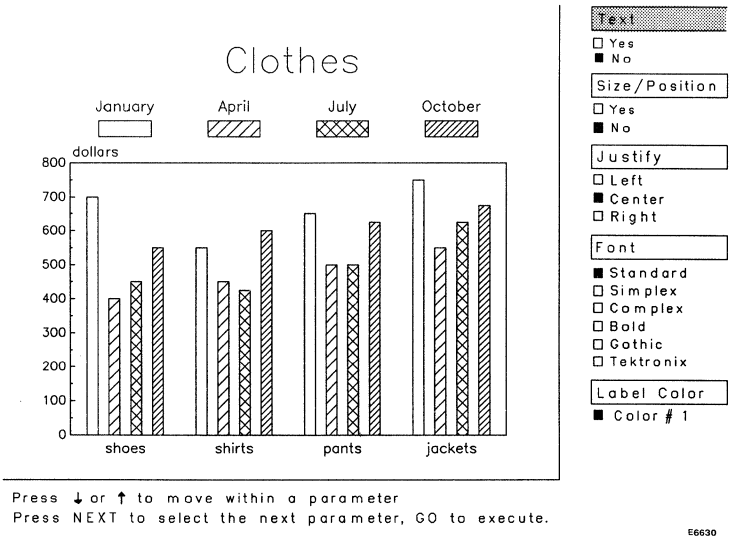
What To Do	How To Do It	What To Expect
Modify text. **4**	Press f2 (Text).	The Text message appears.
	Press f3 (Modify).	Instructions appear at the bottom of the screen, and the arrow's location within the picture area is indicated at the right.

Lesson 3: Step 4.



What To Do	How To Do It	What To Expect
Modify the label, *Clothes*. **5**	Use the arrow keys to move the arrow until it is positioned anywhere on the *Clothes* label. (To increase the cursor's speed, press SHIFT and then press the arrow key.) Press GO.	Instructions appear at the bottom of the screen, and a parameter menu appears at the right. The *Text* parameter is highlighted.

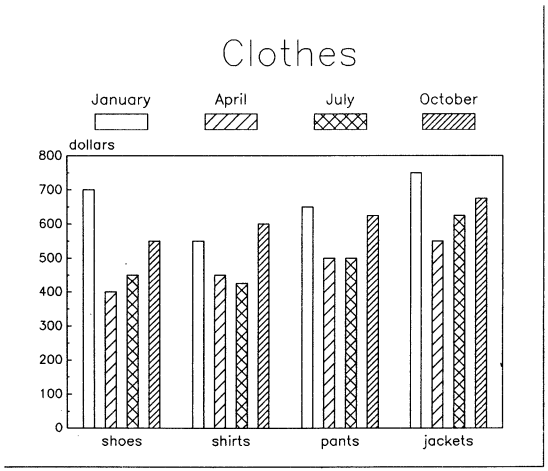
Lesson 3: Step 5.



Note: *Your list of fonts may be different, depending on whether or not your workstation has access to other graphics software.*

What To Do	How To Do It	What To Expect
Replace *Clothes* with a different title. **6**	Press ↑ or ↓ to select *Yes* in the *Text* parameter. Press GO.	The OVERTYPE light on the keyboard turns on. The menu disappears; BGP asks you to enter text and then press NEXT or GO.

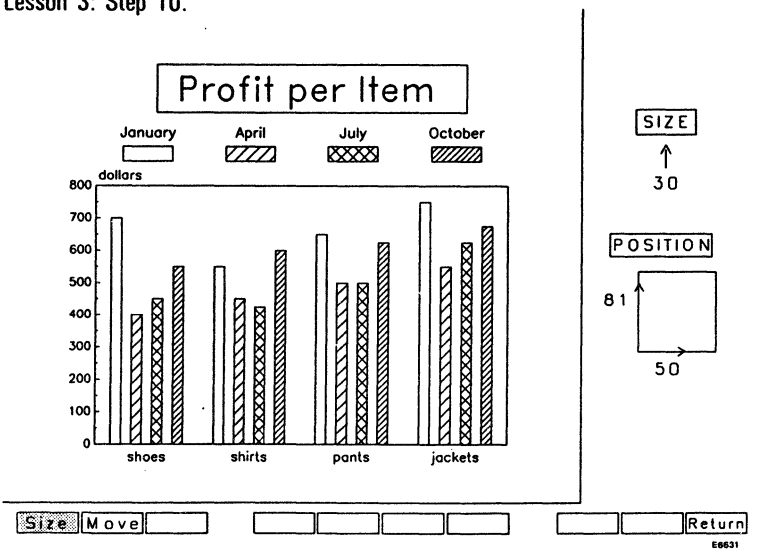
Lesson 3: Step 6.



What To Do	How To Do It	What To Expect
Modify the new title before pressing GO. **7**	Type **Profit per Item** and press NEXT.	Instructions appear at the bottom of the screen, and the parameter menu re-appears at the right. The *Size/Position* parameter is highlighted.
Modify the new title so that it appears in bold. **8**	Read the instructions at the bottom of the screen. Move to the *Font* parameter and specify bold font. Press GO when you are ready.	*Profit per Item* appears in place of the title, *Clothes*. The menu disappears. The text modifying instructions re-appear at the bottom of the screen, and the arrow's location and size are indicated at the right.
Modify *Profit per Item* again. **9**	The cursor is positioned on the title. Press GO.	Instructions re-appear at the bottom of the screen, and the parameter menu re-appears at the right. The *Text* parameter is highlighted.

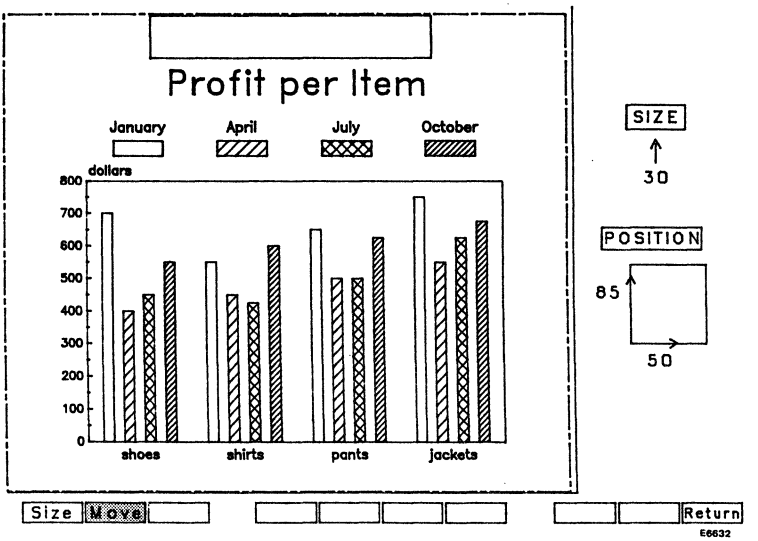
What To Do	How To Do It	What To Expect
Move the *Profit per Item* label to the top of the picture area. **10**	Press NEXT (so that *Size/Position* is highlighted). Press either the up or down arrow key so that the *Yes* box is highlighted. Press GO.	The *Profit per Item* label is outlined in a box cursor. The *Size/Position* menu is displayed at the bottom of the screen. The arrow's size and position are indicated at the right. The displayed f1 key (Size) is highlighted.

Lesson 3: Step 10.



What To Do	How To Do It	What To Expect
Select the Move function. **11**	Press f2 (Move).	The displayed f2 key (Move) is highlighted.
Move the title and observe the position indicator at the right side of the screen. **12**	Press ↑ until a flashing box cursor surrounds the picture area.	The position indicator changes as you move the box cursor.
	Press GO.	The title is redrawn in the new position.

Lesson 3: Step 12.



What To Do	How To Do It	What To Expect
Exit from Modify. **13**	Press f10.	The *Text* menu re-appears.
Exit from Text. **14**	Press f10.	The MODIFY menu (higher level) appears.
Exit from MODIFY. **15**	Press f10.	The top-level menu appears.
End the session. **16**	Press FINISH.	A message appears at the bottom of the screen, asking you to type a picture file name and press GO.
	If *Clothes* is not displayed in the user-entry line, type **Clothes**. Press GO.	The BGP display disappears and you are returned to the Executive.

You have completed the tutorial; however, it is possible to make other modifications. Refer to Helpful Hints for ideas; refer to Section 4, BGP Functions, for function descriptions.

Helpful Hints

Before choosing the right chart, ask the following questions:

What do you want to communicate?

What key point do you want to make?

Do you want to show relationships, totals, percentages, or trends?

If you have a spreadsheet with more than five columns of data, you will need to select a portion of the data that best represents the whole. This BGP limitation is not a disadvantage; it disciplines you to keep your charts simple and effective. If you are making a pie chart, BGP accepts eight segments per chart; however, you should limit your pies to five segments.

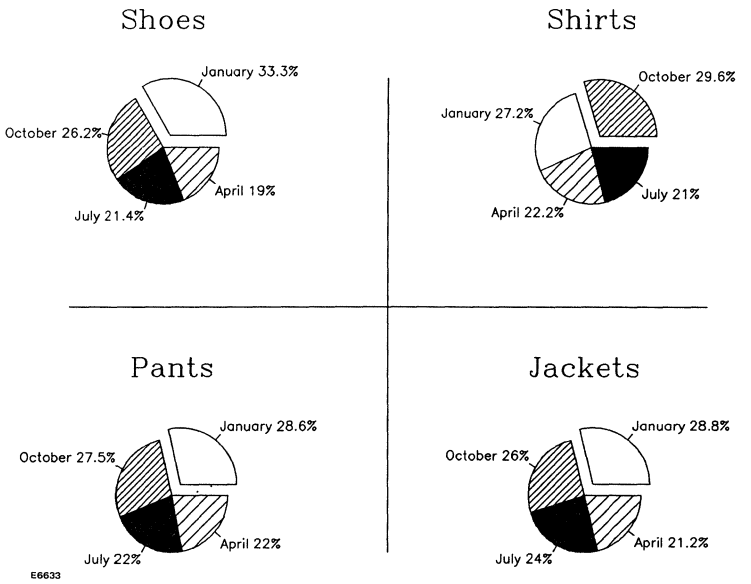
Choosing the Right Chart

You should be able to choose the right chart by matching the type of chart with the purpose you have in mind.

Type Of Chart	Purpose
Line Charts	Show continuous change for one or more variables over a period of time. Show annual trends, increases, decreases, and fluctuations.
Comparative Bar Charts	Compare one or more variables with respect to factors other than time (people, items, geographic locations, etc.). Show parts of the whole. Show monthly fluctuations that line charts tend to disguise.
Stacked Bar Charts	Compare two or more totals at different points in time.
Pie Charts	Compare parts of the whole (percentages, market shares, portions, etc.).

You can include more than one chart or object in a picture file (and on a printout). This is useful when you want to illustrate more than one column of spreadsheet data when using a pie chart. Make a pie chart for each column of data and then merge the charts into one picture file (refer to Figure 3-6).

Figure 3-6 **Four Pie Charts; One For Each Column Of Data**



Designing Effective Charts

Keep it simple. Cluttered charts send unclear messages and tend to frustrate your audience.

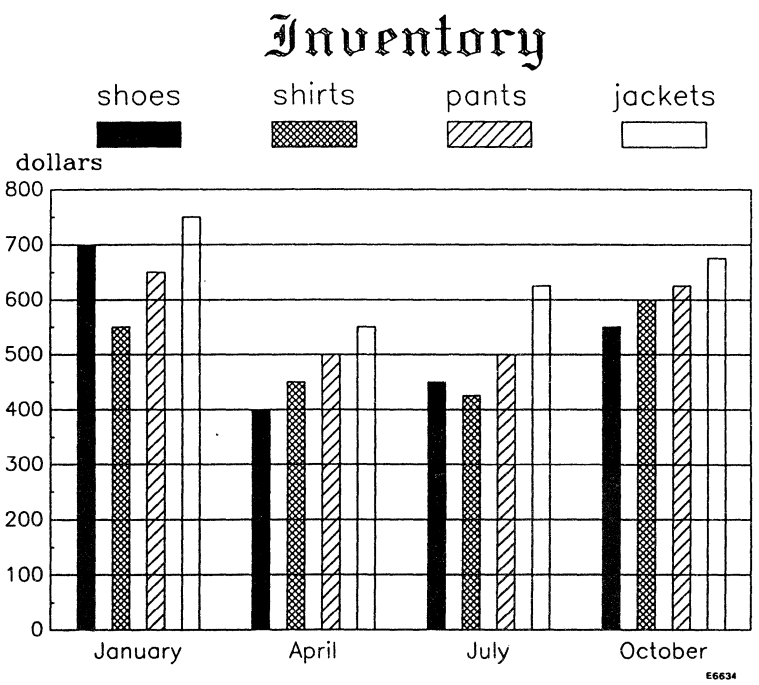
Add labels, grids, BTOS Draw objects, and Tektronix 4014 Emulator pictures only if they communicate missing information.

Use patterns, colors, sizes, and fonts with communication in mind. Think about similarities and relationships. For example, two legends in a chart may represent similar categories, so similar patterns may be appropriate. On the other hand, you may want to use the same pattern in different colors.

Labels and Fonts

Refer to Figure 3-7 for some of the points in this discussion. You might want to have the Y axis label and the chart title in one font (typeface) and have the legend labels in another font. Save the fancier fonts for the title. Some fonts change the size of your labels, so be careful with overlapping and spacing when you change fonts.

Figure 3-7 **Labels and Fonts**



If you add or move labels, you might need some hints about how to position them. For example, if a letter with a descender (g, j, p, q, and y) is above a letter with an ascender (b, d, f, h, k, etc.), leave enough space to keep them from looking like they are attached.

If you need to judge how much space to leave between two labels that do not have descenders or ascenders (a, c, e, i, m, n, etc.), use this rule: the space between one line of text and another should be equal to two-thirds of the height of the letter.

Note: *This rule applies only to letters that do not have descenders or ascenders.*

If the labels are different sizes, the space should be two-thirds of the height of the smaller label.

Patterns

For bar legends and pie segments, arrange your patterns so that they progress from filled to empty (or darkest to lightest). As an alternative, you might want to save a dark, solid pattern for only one legend, and have the rest of the legends in a light or empty pattern. When you create a stacked bar chart, place the darkest legend on the bottom and the lightest legend on top.

For line legends, use solid lines and long dashes for current and historical data. Reserve the dotted lines for projections if possible. Line charts with several legends are difficult to read unless one legend has a unique pattern and the other legends share a different pattern.

Another approach to this problem is to include several line charts in one file. (Refer to Figure 3-8.) Each line chart includes two legends. One of the legends is represented in every chart with the same line pattern. The other legend represents different data in each chart. The effect is to compare one legend with several other legends, without the problem of clutter and ambiguity.

Colors

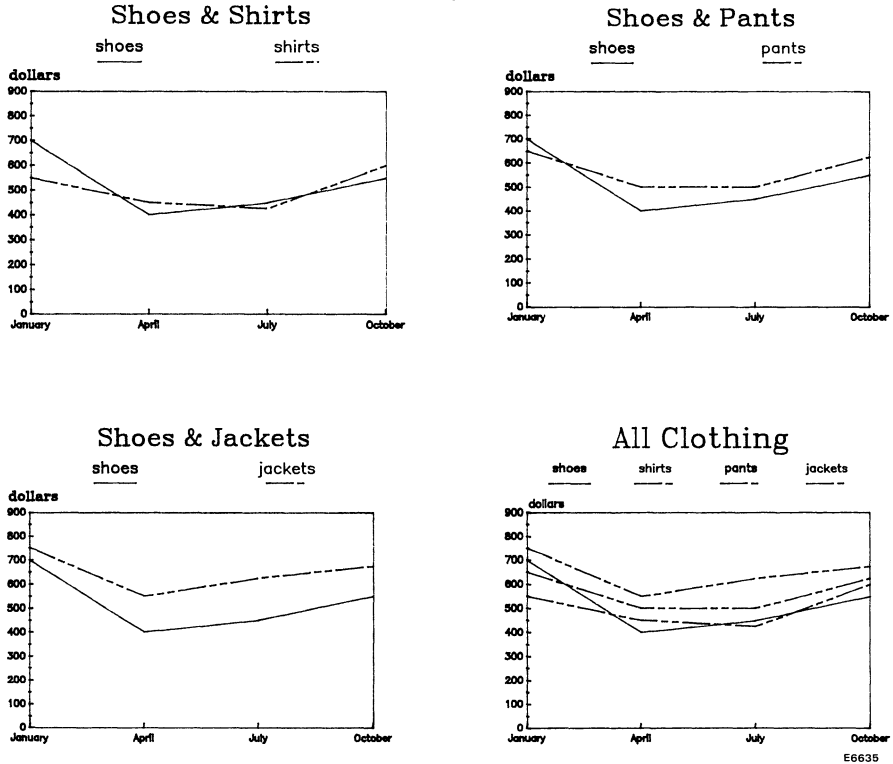
An object looks larger when it is represented in a bright color. You can use this technique to draw the viewer's attention to a particular label and/or legend. For example, blue and yellow may not belong next to each other when both of them are bright, but if the blue is replaced with a more subdued shade, it supports the yellow nicely.

Warm colors (reds, oranges, and yellows) tend to jump out at the viewer (yellow is the most aggressive color). Cool colors (blues and greens) tend to pull away from the viewer. A bright yellow legend will solicit a viewer's attention more than a dark blue.

Combinations of warm and cool colors create different ranges of warm and cool effects. For example, a red with a touch of blue is slightly more cool, more reserved, than a pure red.

Placing two or more colors next to each other requires a few considerations. First, you want to have enough contrast to make legends or labels unique, but you do not want to create an ugly, annoying effect. Think about coordinating your legends and labels with your axes as well.

Figure 3-8 **Four Line Charts: Two Lines per Chart**



If you want to use colors to attract your audience, blue is preferred by most adults. Red is the second favorite and green is the third. Some studies indicate that men prefer blues and women prefer reds. Younger adults seem to be attracted to bright, harsh colors.

Axes

When modifying your axes, use only enough labels to provide information, not distraction. Allow space at the top of the chart so that your legends do not appear to continue off the chart.

Use tics between labels instead of labeling every tic. This provides greater readability of each label and highlights the more significant intervals.

Use the same label spacing when you want to compare the data between two charts. Refer to Figure 3-8; the line charts in this figure have the same range in their axes. Notice the tics between labels.

If your axes information does not begin at zero, notify your audience. If you are preparing a written presentation to accompany your chart(s), perhaps a caption or side paragraph will suffice.

On the other hand, if you are relying on your charts to communicate all information, you should consider a visual cue (from BTOS Draw or Tektronix 4014 Emulator), or a label to make sure your viewer understands the range of your chart. A visual cue could be a horizontal line under the X axis, labeled 0.

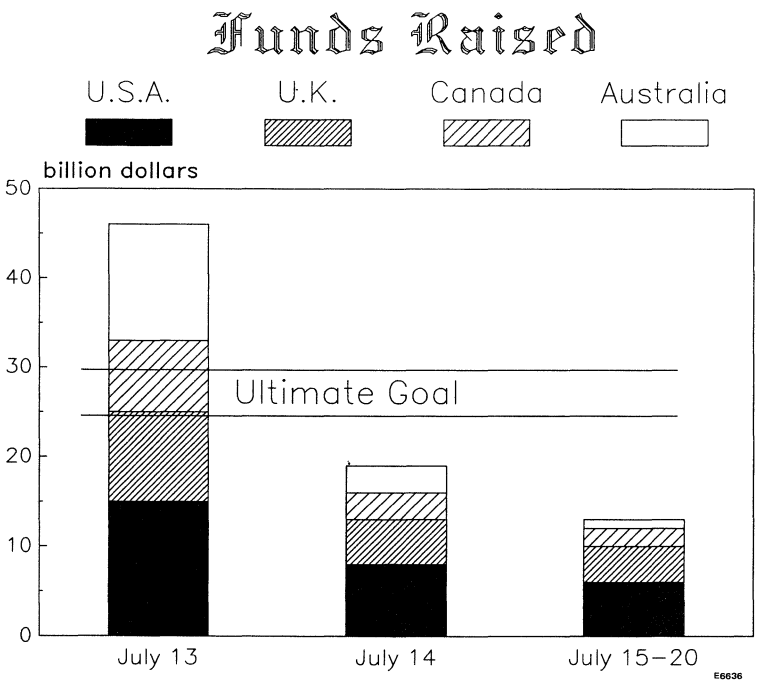
If you want to represent axes numbers in the thousands, millions, and so on, eliminate the zeroes and represent the thousands (or millions, etc.) with an axis label. For example, if you want a chart that indicates sales within the range of $10 million through $90 million, create a spreadsheet that uses two-digit numbers from 10 to 90. When you enter BGP from Multiplan, you could type **$ million** in the *y-axis label* parameter.

Similarly, when you want to represent small decimal fractions on an axis (hundredths, thousandths, etc.), scale these numbers by multiplying by 100, 1000, and so on, and indicate the scaling effect on the axis label.

Merging Objects from BTOS Draw or Tektronix 4014 Emulator

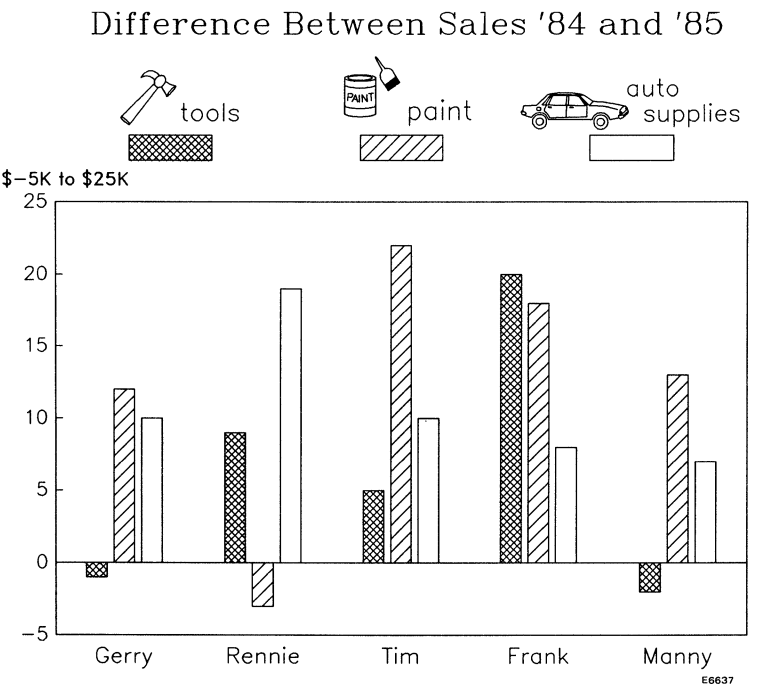
You might want to use pictures from other graphics applications to help communicate information. For example, you could indicate a projected goal with a horizontal line that some legends overlap and others do not reach. Refer to Figure 3-9.

Figure 3-9 **Merging Objects: Projected Goal**



You can also use BTOS Draw or Tektronix 4014 Emulator to superimpose relevant illustrations. Refer to Figure 3-10.

Figure 3-10 **Merging Objects: Illustrations**



Helpful Hints are also included for some of the functions in Section 4, BGP Functions.

References

Some of the suggestions for choosing the right chart are based on written material from the following reference:

> Nelson, N. and Paller, A. and Szoka, K., *Choosing the Right Chart*: *A Comprehensive Guide for Computer Graphics Users*, Integrated Software Systems Corporation, San Diego, 1982.

Some of the suggestions for choosing effective colors are based on written material from the following reference:

> Nelson, R., *The Design of Advertising*, Wm. C. Brown Publishers, Dubuque, 1985, pp. 212-222.

BGP Functions

This section contains descriptions and procedures for each function within Business Graphics Package (BGP). If you need a quick description of a displayed menu, press HELP.

Note: The HELP screen displays only text. Graphics is turned off to increase operating speed. If you want to view graphics again, press CANCEL.

Each function is described within the following categories:

- Purpose
- Required conditions
- Position in menu structure
- How to enter from the top level
- How to exit from this function
- How to use
- Details
- Helpful Hints

How to Choose the Right Function

The diagram in Appendix D illustrates BGP's overall menu structure. Remove the diagram from the book and post it where you can easily refer to it. The menus in this diagram represent the menus displayed on the bottom of your screen. These menus identify the function keys' current functions.

Exercise

Try finding a function to modify the size of a label (text) by following the diagram from the top, down to the actual function.

First, decide which top-level function will direct you to your goal. Look at the top-level functions in the diagram. Before reading the next paragraph, choose the top-level function that will direct you to your goal.

The key words in locating this function are *modify*, *size*, and *text*. The only function in the top level that corresponds to any of these words is MODIFY. Look at the second-level functions in MODIFY. Before reading the next paragraph, choose the second-level function that will direct you to your goal. Hint: Look at the third-level functions before you decide.

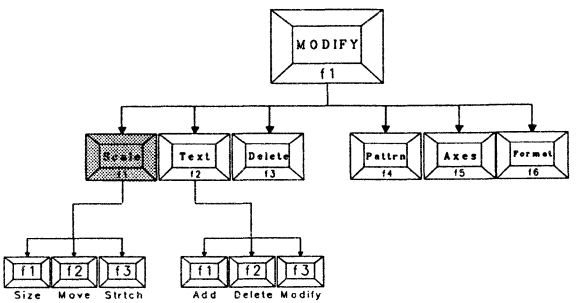
Text is a second-level function that obviously qualifies as one of the key words; it is the correct choice. The third-level function, Modify, seems to complete the search. By pressing f1 (MODIFY) in the top level, then pressing f2 (Text) in the second-level, and then pressing f3 (Modify) in the third-level, you will find the function.

Scale is also a second-level function that appears to be a correct choice because of its third-level function, Size. If you are trying to modify the size of a label within a chart, such as the chart's title, Scale would not be the correct choice. This is because Scale modifies an entire object, and the chart is the object. Therefore, selecting Scale and then Size would modify the size of the entire chart. For additional information regarding charts, objects, and labels, refer to "Charts and Objects" in Section 1.

How to Locate Function Descriptions

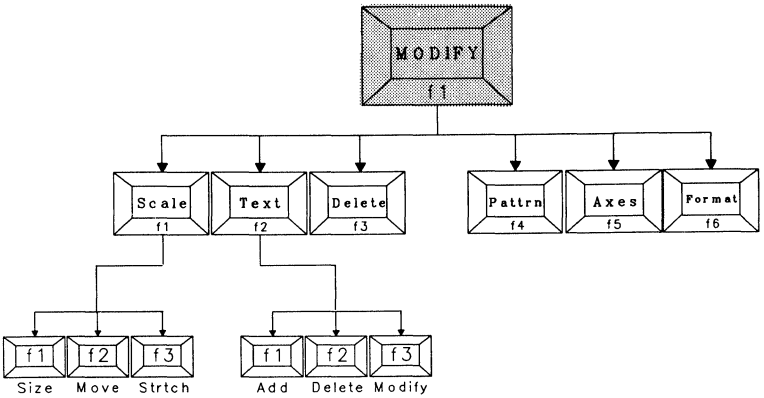
Functions are described in the same order as they appear in the diagram. In order to distinguish one level function from another, each level is introduced with a different heading. The heading indicates the function level and is followed by a diagram in which the function is shaded.
For example:

Scale (Second-Level Function)



Because MODIFY is the first function in the diagram, it is the first top-level function that this section describes. All descriptions of top-level functions also include lower level function descriptions. Top-level functions are represented in uppercase letters.

MODIFY (Top-level function)



Purpose	To change or modify an object.
Required conditions	An object must already exist.
Position in menu structure	Enter from the top-level.
How to enter from the top level	Press f1.
How to exit from this function	Press f10.

How to Use

Press f1 to enter from the top level.

The MODIFY menu includes the following second-level functions:

Scale Modify the size, position, or shape of an object.

Text Add, delete, or modify text.

Delete Delete an object.

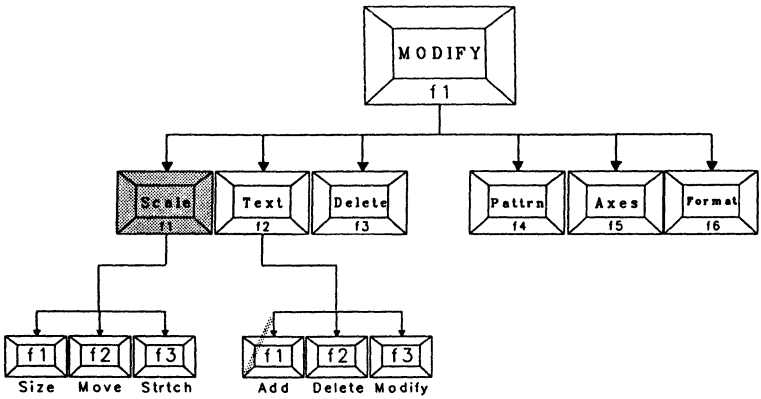
Pattern Modify line patterns or fill patterns.

Axes Modify axes information, add grid lines, or change bar chart (stacked vs. comparative).

Format Save the format of a picture file.

Choose the function that allows you to make your first modification. Find the description for that function by scanning the next few pages. For example, if you want to delete an object, look for the description of Delete. Because it is accessed with f3, it is the third description in this section.

Scale (Second-level function)



Purpose	To modify size, position, or shape of an object.
Required conditions	An object must already exist.
Position in menu structure	Enter from MODIFY.
How to enter from the top level	Press f1 twice.
How to exit from this function	Press f10.

How to Use

Press f1 to enter from MODIFY.

When you enter the Scale function, the shape of the box cursor surrounds an object. You can manipulate the box cursor into any size, position, or shape.

When you are finished indicating the size, shape, and location of the box cursor, press GO.

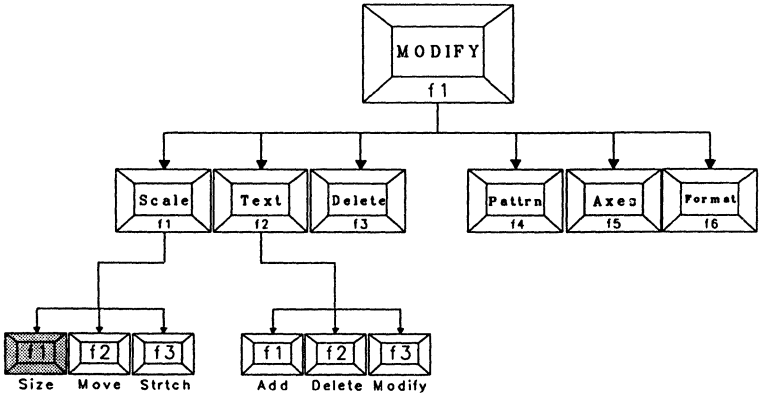
The picture is erased and redrawn in the size, position, and shape you indicated.

The Scale menu presents the following third-level functions:

Size Modify the size of an object.
Move Move an object (can only be done after decreasing the size).
Stretch Modify the height or width of an object.

This is the lowest level of functions; the actual task is described and completed at this level. Choose the function you want; each function is described in the following pages. .

Size (Third-level function)



Purpose

To modify the size of an object.

Required conditions

To increase an object's size to 100 percent, it must be positioned in the lower left corner of the picture area. (Use the Move function.)

Position in menu structure

Enter from Scale (from MODIFY).

How to enter from the top level

Press f1 twice.

How to exit from this function

Press f10. You can use Size, Move, and Stretch without returning to the Scale function.

How to Use

If Size is not highlighted, press f1 to enter from Scale.

Use only ↑ and ↓ to modify size. When you are satisfied with the size you have indicated, do one of the following to implement the change in size:

- Press f10 if you want to exit from Scale.
- Press GO if you want to remain in Scale.

The picture is erased and redrawn at the size you indicated.

Note: *If you try to make the box cursor too small or too large, you will hear a beep. If this happens, use the arrow keys without SHIFT. Also, try changing the shape of the object.*

Details

Press the ↓ three times. The box cursor indicates what the object's size will be when you press f10.

Press SHIFT while pressing ↓ three times. The box cursor indicates larger increments of change.

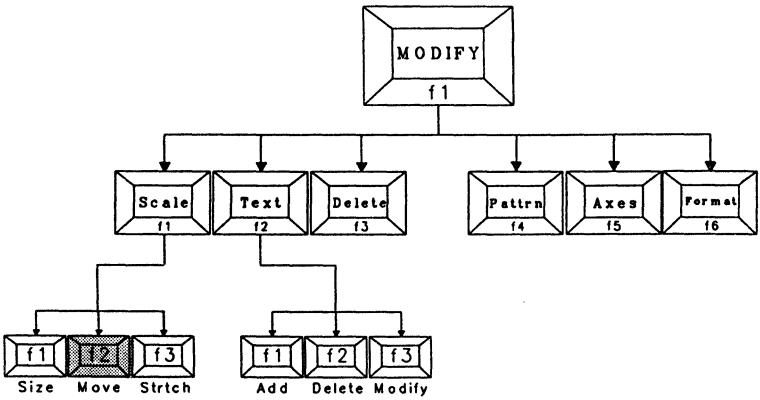
You will hear a beep if you try to make the object too small or too large. If this happens, use the arrow keys without pressing SHIFT. Also, try changing the position (Move) and/or shape (Stretch) of the object.

Helpful Hints

There are two boxes on the right side of the screen. The box on top is labeled "SIZE." The left and bottom sides of the box are labeled with percentages. When the object is full size, the box is labeled 100%.

The percentages change every time you press ↑ or ↓. The only time these percentages do not match is when the Stretch function is used.

Move (Third-level function)



Purpose	To move an object.
Required conditions	The object must be reduced in size.
Position in menu structure	Enter from Scale (from MODIFY).
How to enter from the top level	Press f1 twice; then press f2.
How to exit from this function	Press f10. You can use Size, Move, and Stretch without returning the Scale function.

How to Use

Press f2 to enter from Scale.

Use any arrow key to move the object. When you are finished, do one of the following to implement the move:

- Press f10 if you want to exit from Scale.
- Press GO if you want to remain in Scale.

The object is erased and redrawn at the size you indicated.

Details

Press → three times. The box cursor indicates where the object will be when you press f10.

Press SHIFT while pressing the ↓ key three times. The box cursor indicates larger increments of change.

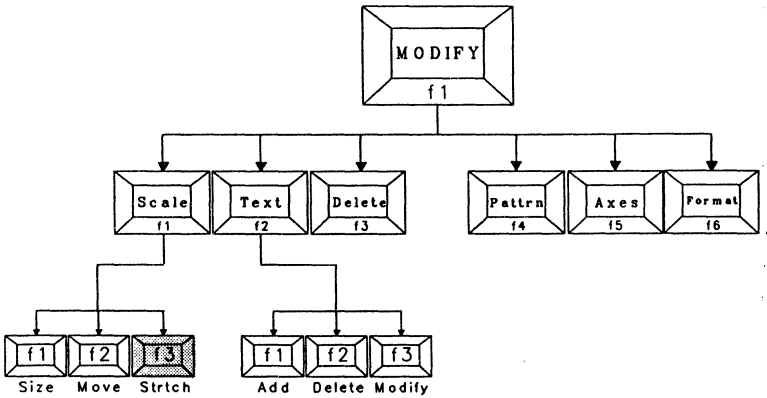
You will hear a beep if you try to move the object outside of the picture area. If this happens, use the arrow keys without SHIFT. Also, try changing the size and/or shape of the object.

Helpful Hints

There are two boxes on the right side of the screen. The box on the bottom is labeled "POSITION." The left and bottom sides of the box are labeled with numbers. These numbers indicate the location of the current object's lower left corner.

The numbers change as you move the object. If you are pressing the SHIFT key while pressing the arrow keys, the numbers change in elements of 5.

Stretch (Third-level function)



Purpose	To modify the height or width of an object.
Required conditions	To increase height or width, size must be reduced, and the object must be positioned so that the it has room to stretch.
Position in menu structure	Enter from Scale (from MODIFY).
How to enter from the top level	Press f1 twice; then press f3.
How to exit from this function	Press f10. You can use Size, Move, and Stretch without returning to the Scale function.

How to Use

Press f3 to enter from Scale.

Use ↑ or ↓ keys to modify the height. Only the top of the box cursor changes.

Use ← or → to modify width. Only the right side of the box cursor changes.

When you are satisfied with the shape you have indicated, do one of the following to implement the stretch:

- Press f10 if you want to exit from Scale.
- Press GO if you want to remain in Scale.

The object is erased and redrawn in the shape you indicated.

Details

Press → three times. The right side of the box cursor indicates how much the object's width will stretch when you press f10.

Press SHIFT while pressing the ↓ three times. The top of the box cursor indicates that you are reducing the object's height in larger increments.

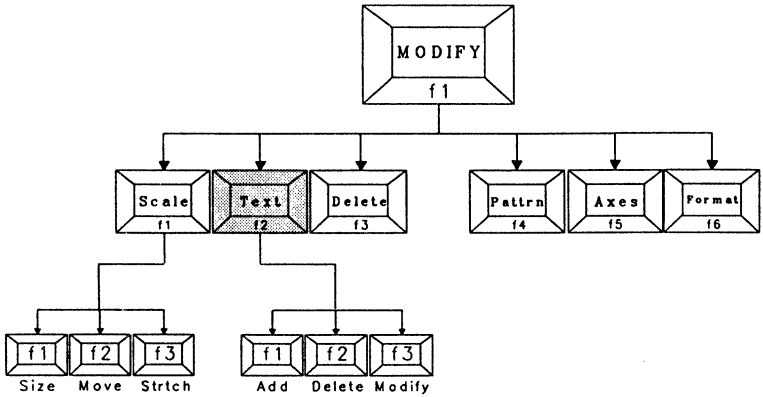
You will hear a beep if you try to stretch the object outside of the picture area. If this happens, make sure you use the arrow keys without SHIFT. Also, try moving the object and/or changing its size.

Helpful Hints

There are two boxes on the right side of the screen. The box on top is labeled "SIZE." The left and bottom sides of the box are labeled with percentages.

The percentages on the left side of the box change every time you press ↑ or ↓. The percentages on the bottom of the box change every time you press ← or →.

Text (Second-Level Function)



Purpose	To add or modify a label in the following ways: delete, overwrite ,move, change size, color or font.
Required conditions	An object must already exist. An empty object created from the CREATE function is acceptable.
Position in menu structure	Enter from MODIFY.
How to enter from the top level	Press f1; then press f2.
How to exit from this function	Press f10.

How to Use

Press f2 to enter from MODIFY.

The TEXT menu presents the following third-level functions:

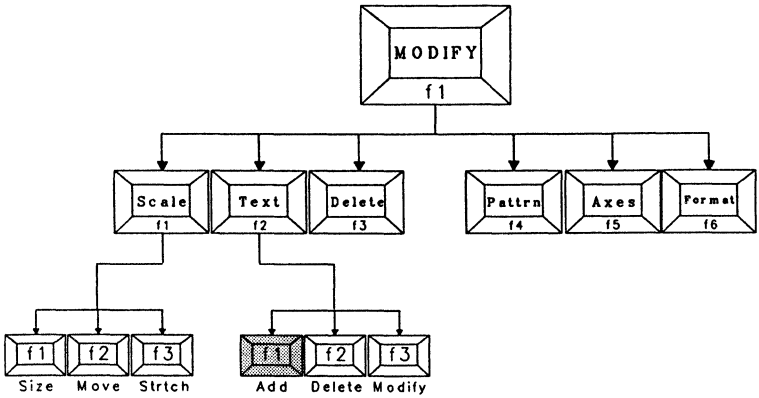
Add Add text.

Delete Delete text.

Modify Overwrite, move, modify size, font or color of text. (Color depends on your printing capabilities.)

This is the lowest level of functions; the actual task is described and completed at this level. Choose the function you want; each function is described in the following pages.

Add (Third-level function)



Purpose

To add text.

Required conditions

An object must already exist. An empty object created from the CREATE function is acceptable.

Position in menu structure

Enter from TEXT (from MODIFY).

How to enter from the top level

Press f1, f2, and then f1.

How to exit from this function

Press f10. Press CANCEL to exit before adding text.

How to Use

Press f1 to enter from TEXT.

Follow the instructions at the bottom of the screen.

Details

A small arrow blinks three or four times and then remains constant. The right side of the screen indicates the position of the arrow and the size of the text to be added. Use the arrow keys to move the arrow where you want the text to be centered; press GO.

Read the instructions at the bottom of the screen.

Enter the text you want to add and press NEXT or GO. If the text does not fit, BGP automatically gives you the option to scale it down.

Pressing NEXT allows you to modify the label's size, justification, font and color. If you press NEXT, refer to the description of Modify (third-level function within Text) for details. The only difference is that in the Add function, you can overwrite our entry by specifying *No* in the *Text* parameter and then pressing GO.

Pressing GO adds the label immediately. You can add another label by pressing GO again; the user-entry line will appear.

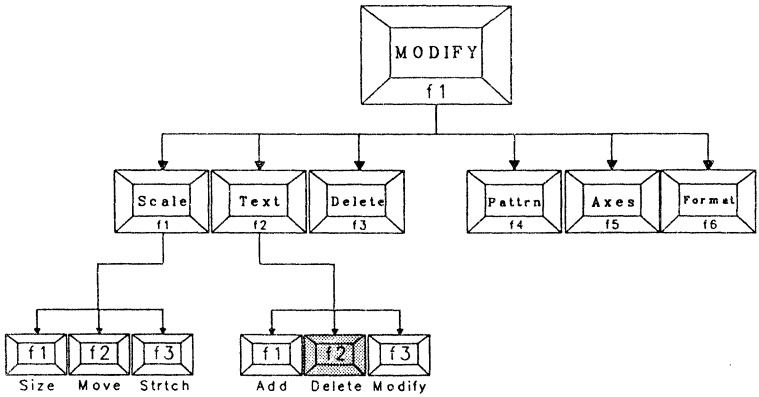
Helpful Hints

When positioning the arrow, remember that the label will be centered around the arrow. The arrow indicates the lowest possible point where the text will be positioned.

Text with descenders, such as *y, g, p,* etc., rest on an imaginary line that the point of the arrow touches. If your text does not include descenders, it will appear to be raised.

If the label you added overlaps something else, use the modify function (from this level) to reduce and move it. Do not worry if the overlapped text (or graphics) is blanked out. Press CODE, hold it down, and press the letter **D**. The blanked out area is redrawn.

Delete (Third-Level Function)



Purpose	To delete text.
Required conditions	An object must already exist.
Position in menu structure	Enter from TEXT (from MODIFY).
How to enter from the top level	Press f1; then press f2 twice.
How to exit from this function	Automatic. Press CANCEL to exit before deleting text.

How to Use

Press f2 to enter from TEXT.

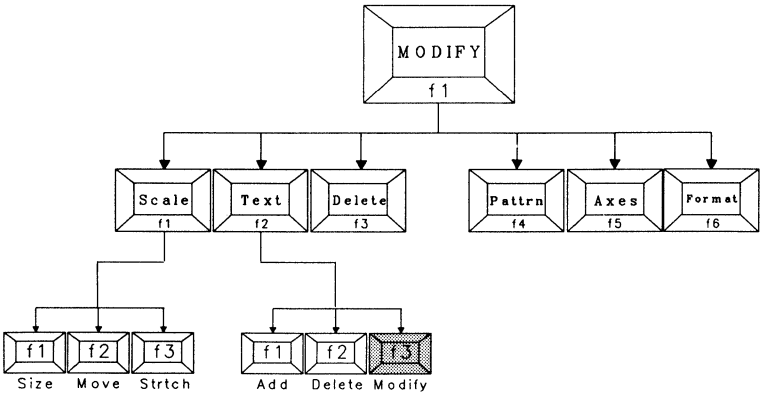
Follow the instructions at the bottom of the screen. Refer to the warning under Details.

Details

A small arrow blinks three or four times and then remains constant. The right side of the screen indicates the position of the arrow. Position the arrow on the text you want to delete and press GO.

Warning: *Your label will be deleted as soon as you press GO. You can retrieve the label only by adding it again.*

Modify (Third-Level Function)



Purpose

To overwrite text. To modify size, position, justification (right, left, or centered), font or color of text. (Color depends on your printing capabilities.)

Required conditions

An object must already exist.

Position in menu structure

Enter from TEXT (from MODIFY).

How to enter from the top level

Press f1, f2, and then f3.

How to exit from this function

Press f10. Press CANCEL to exit before modifying text.

How to Use

Press f3 to enter from TEXT.

Follow the instructions at the bottom of the screen.

Details

A small arrow blinks three or four times and then remains constant. The right side of the screen indicates the position of the arrow. Position the arrow on the text you want to modify and press GO.

Read the instructions at the bottom of the screen and apply them to the menu on the right.

There are five parameters in the menu on the right:

Text Use ↑ or ↓ to indicate whether you are modifying text or not. In this case, you are modifying text, so press either arrow key (to mark *Yes*). Press GO and enter your modifications. Press NEXT if you want to change other parameters. Press GO if not.

Size/Position If you want to modify the label's size or position, press either arrow key (to mark Yes) and press NEXT. Press f1 to modify the label's size; press f2 to move the label.

Justify Use ↑ or ↓ to indicate left, right, or center justification.

Left justification Text begins at the arrow.

Center justification Text is centered at the arrow.

Right justification Text ends at the arrow.

Press NEXT.

Font If you want to modify the label's font, use ↑ or ↓ and press NEXT.

Label Color If you have color printing capabilities, use this function to modify a label's color. (If you have a monochrome terminal, you cannot see color on the screen.)

To modify color, press ↑ to increase the color number. Press ↓ to decrease the color number.

When you are finished defining the parameters, press GO. BGP implements your modifications and gives you the opportunity to make more modifications.

Helpful Hints

If you are modifying a label that overlaps something else, do not worry if the overlapped text (or graphics) is blanked out. It is still there, and you will see it the next time BGP redraws the picture. If you want to redraw the object immediately, press CODE, hold it down and press the letter **D**.

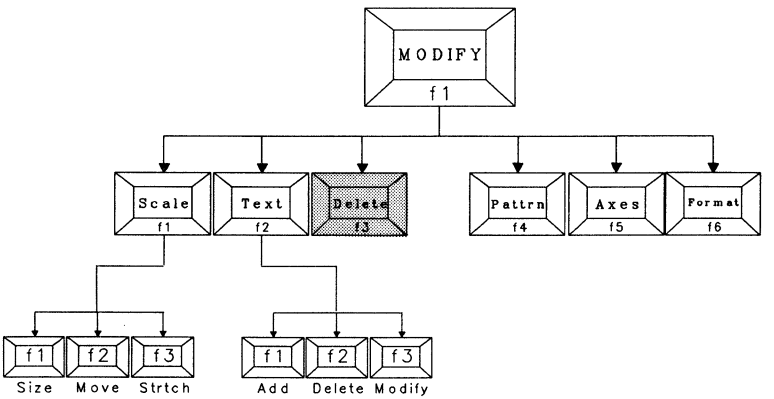
You must return to your Multiplan spreadsheet to modify X- and Y-axis labels on a line chart.

You must return to your Multiplan spreadsheet to modify Y-axis labels on a bar chart.

You can modify pie chart labels in BGP.

To move the box cursor from corner to corner (or side to side), press CODE, hold it down and press the arrow key you want.

Delete (Second-Level Function)



Purpose	To delete an object.
Required conditions	An object must already exist.
Position in menu structure	Enter from MODIFY.
How to enter from the top level	Press f1; then press f3.
How to exit from this function	Press f10. Press CANCEL to exit before deleting.

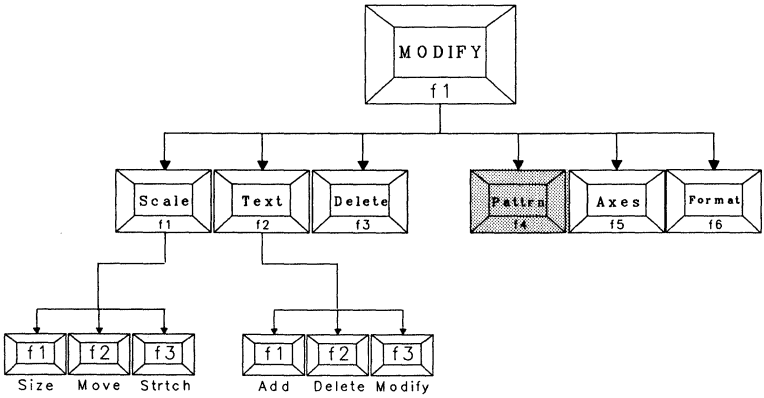
How to Use

Press f3 to enter from MODIFY.

Read the instructions at the bottom of the screen. A box cursor flashes momentarily around the current object. BGP asks you to press GO to confirm the deletion or press CANCEL to deny it.

Warning: *If you press GO, you will delete the object, and you will not be able to retrieve it.*

Pattern (Second-Level Function)



Purpose

Bar charts To modify fill patterns in legends.

Line charts To modify line patterns.

Pie charts To modify fill patterns in segments.

To extract a segment.

Required conditions

A chart must already exist.

Refer to Appendix B, Error Prevention Techniques, before choosing colors.

Position in menu structure

Enter from MODIFY.

How to enter from the top level

Press f1; then press f4.

How to exit from this function

Press f10.

How to Use

Press f4 to enter from MODIFY.

Follow the instructions at the bottom of the screen and apply them to the menu at the right. *Legend*, *Pattern*, and *Pattern Color* are the parameters. The pie chart parameters include *Extract?* as a fourth parameter.

The *Extract?* parameter allows you to extract the segment that you choose in the *Legends* parameter. There is no limit to the number if segments you can extract; however, you should extract a segment only to draw attention to it.

You can modify the pattern for only one legend at a time. Choose the legend you want to modify by pressing ↑ or ↓.

Press NEXT and choose the pattern you want.

Details

If you want to modify color and/or extract pie segments, press NEXT to access each of these parameters and modify them by pressing ↑ or ↓. Refer to the Helpful Hints at the end of this function description.

Color If you want to modify color, choose a number from 1 through 7. These numbers represent the colors in which patterns can be plotted. Color 8 is background black on the screen; it cannot be printed or plotted.

When you are finished, press GO.

The chart is erased and redrawn, reflecting your modification(s). If you choose a pattern that is already specified in another legend, BGP does not automatically modify the other legend.

Helpful Hints

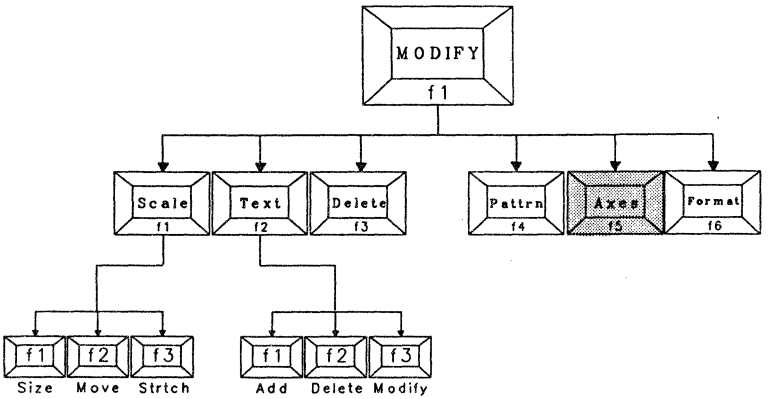
Arrange your patterns so that they proceed from lightest to darkest. For example, empty patterns are always first and filled patterns are always last.

Choose patterns that look as different from each other as possible. For example, do not use a diagonal line pattern in two or more legends. If you must, do not place them next to each other.

Refer to Appendix B, Error Prevention Techniques, in When You Are Modifying, for the following hints:

- Remembering what colors the BGP numbers represent.
- Knowing which pens to put in your plotter.
- A list of the default colors in BGP.

Axes (Second-Level Function)



Purpose

Bar charts and line charts To modify axes characteristics and insert or remove the background grid.

Pie charts To re-arrange segments from largest to smallest(moving clockwise), or in the same order as the data received from Multiplan.

Required conditions

A chart must already exist.

Refer to Appendix B, Error Prevention Techniques, before choosing colors.

Position in menu structure

Enter from MODIFY.

How to enter from the top level

Press f1; then press f5.

How to exit from this function

Press f10.

How to Use

Press f5 to enter from MODIFY.

Follow the instructions at the bottom of the screen and apply them to the menu at the right.

Bar and Line Charts The following parameters appear for both bar charts and line charts. They specify grids and axes characteristics.

Grid When the grid is indicated, horizontal lines appear at each labeled tic on the Y axis. In line charts, vertical lines appear at each labeled tic on the X axis as well.

Axes Color Choose a number from 1 through 7. These numbers represent the colors in which axes components can be plotted. Color 8 is background black on the screen; it cannot be printed or plotted. Refer to the Helpful Hints at the end of this function description.

Y Minimum The value in this parameter specifies the beginning of the Y axis range. If you specify this parameter with a number other than zero, inform your audience. People tend to expect zero as the beginning of the range. Refer to Helpful Hints at the end of Section 1, Getting Acquainted with BGP.

Y Maximum The value in this parameter specifies the top of the Y axis range. This value should exceed the highest value in the chart. This technique prevents your information from running off the edge of the chart. For example, if your highest value is 750, specify 800 in this parameter.

Y Lbl Spacing The value in this parameter indicates the interval used to place labeled tics along the Y axis. For example, if your range is 0 through 800, and you specify 100 in this parameter, BGP will label tics at 100, 200, 300, 400, 500, 600, and 700.

The value in this parameter must be within a reasonable range. If it is not, BGP will return an **Invalid Entry** message. This message can appear if changing one or more of the following parameters invalidates that range: *Y Maximum, Y Minimum,* or *Y Lbl Spacing*.

A reasonable range requires the value for the *Y Lbl Spacing* parameter to be between the *Y Maximum* and the *Y Minimum*. Also, the spacing between labels should be enough so that the labels do not look overcrowded. There should be just enough labels to give the viewer visual reference points.

Tics per label The value in this parameter indicates how many tics to place within each interval. For example, if you want each interval divided in two, you would specify 2.

In bar charts, this parameter applies only to the Y axis. In line charts, this parameter applies to both the X and Y axes.

Bar Charts Only There are seven parameters, including chart type and grid and axes specifications. *Chart Type* applies only to bar charts.

Chart Type Choose a stacked or comparative bar chart. The comparative bar chart is the default that BGP creates. A stacked bar chart allows you to stack legends on top of each other.

Line Charts Only There are ten parameters, including grid and axes specifications. The following parameters apply only to line charts.

X Minimum The value in this parameter specifies the beginning of the X axis range.

X Maximum The value in this parameter specifies the top of the X axis range.

X Minimum and X Maximum values can be either numeric or alphanumeric.

Alphanumeric strings cannot be modified within a BGP session (they can be replaced with one of the other alphanumeric strings, but they cannot be modified). The only way to modify alphanumeric strings is to return to Multiplan. Before doing so, you might want to save all previous modifications by saving the format (refer to the next second-level function within MODIFY: f6 Format).

The difference between modifying an alphanumeric string and replacing one is as follows: If your X values are the labels *shoes, shirts, pants,* and *jackets*, you cannot modify *shoes* by changing it to *footwear*. To make such a change, you would have to return to Multiplan. You can, however, replace *shoes* with *shirts* or *pants*. The X axis and the chart's lines will change as a result of this modification.

If you want to eliminate one or more of the alphanumeric labels (and the data that applies), BGP enables you to replace the X Minimum *(shoes)* and/or X Maximum *(jackets)* value with one of the other X values.

X Lbl Spacing The value in this parameter indicates the interval used to place labeled tics along the X axis. For example, if your range is 0 through 800, and you specify 100 in this parameter, BGP will label tics at 100, 200, 300, 400, 500, 600, and 700.

The value in this parameter must be within a reasonable range. If it is not, BGP will return an **Invalid Entry** message. This message can appear if changing one or more of the following parameters invalidates that range: *X Maximum*, *X Minimum*, or *X Lbl Spacing*.

Pie charts The only parameter is *Autosort*. If *Yes* is indicated, BGP arranges segments from largest to smallest (going clockwise). If *No* is indicated, BGP arranges the segments in the same order as the data was received from Multiplan.

Helpful Hints

If you want to represent axes numbers in the thousands, millions, and so on, eliminate the zeroes and represent the thousands (or millions, etc.) with an axis label. For example, if you want a chart that indicates sales within the range of $10 million through $90 million, create a spreadsheet that uses two-digit numbers from 10 to 90. When you enter BGP from Multiplan, you could type **$ million** in the *y-axis label* parameter.

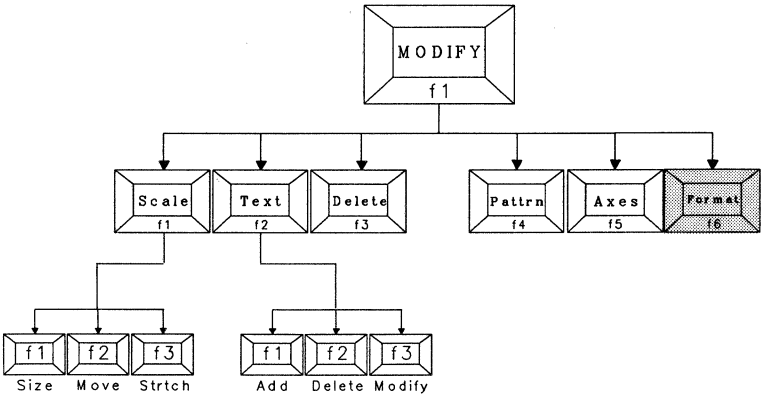
Similarly, when you want to represent small decimal fractions on an axis (hundredths, thousandths, etc.), scale these numbers by multiplying by 100, 1000, and so on, and indicate the scaling effect on the axis label.

If your pie segment labels overlap, indicate *No* in the autosort parameter and modify the labels by shrinking and moving them.

Refer to Appendix B, Error Prevention Techniques, in When You Are Modifying, for the following hints:

- Remembering what colors the BGP numbers represent.
- Knowing which pens to put in your plotter.
- A list of the default colors in BGP.

Format (Second-Level Function)



Purpose

To store all modifications from a specific object into a format file. Use the format file to create new objects with these modifications already done for you.

Scale information (Size, Move, and Stretch) of object within picture area is not saved.

Required conditions

The box cursor must indicate the object that contains the format you want to store.

Position in menu structure

Enter from MODIFY.

How to enter from the top level

Press f1; then press f6.

How to exit from this function

Press f10.
Press CANCEL before pressing GO.

How to Use

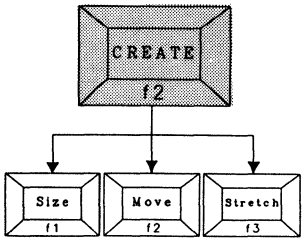
Press f6 to enter from MODIFY.

Follow the instructions at the bottom of the screen. Enter a file name that will remind you of this chart. For example: you could enter the chart's title or the name of the font you selected for the chart's title. Press GO.

The format files you create are specific to the chart type. For example, if you create a format file for a pie chart, it applies only to pie charts.

When you want to create similar charts from Multiplan, you can request a list of the format files that you created. For details, refer to STEP 8 in How to Enter BGP From Multiplan in Section 3, User Guide.

CREATE (Top-Level Function)



Purpose	To create objects and fill them with text. (An object filled with text is a label.)
Required conditions	None.
Position in menu structure	Enter from the top level.
How to enter from the top level	Press f2.
How to exit from this function	Press f10 or the CANCEL key.

How to Use

Press f2 to enter from the top level. Read the instructions at the bottom of the screen. BGP asks you to press GO to create a new object or press CANCEL to deny the request.

Warning: *Pressing GO creates an object, whether you fill it or not. If you decide not to create an object after you press GO, you need to delete it. If you do not delete it, you will have an empty object in your picture file. This may not sound like a problem, but it becomes confusing when you try to identify the current object or merge the file into another file. Refer to When You Are Modifying in Appendix B, Error Prevention Techniques, should this problem occur.*

The **CREATE** menu includes the following second-level functions:

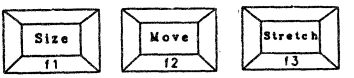
Size Indicate the size of the object to be added.

Move Move the box cursor to where you want the object to appear.

Stretch Modify the height or width of the box cursor.

If you need more information, refer to the third-level function descriptions of Size, Move, and Stretch within the top level description of MODIFY. These descriptions include operating details and helpful hints.

CREATE's Second-Level Functions



These functions operate the same as they do in MODIFY. The only difference is that in MODIFY, you are changing an object that already exists; in this top-level function (CREATE), you are changing the size, shape, and location of the object that you are about to add.

When you enter the CREATE function, the shape of the box cursor surrounds the picture area. You can manipulate the box cursor into any size, shape, and location.

When you are finished indicating the size, shape, and location of the box cursor, exit this level by pressing f10.

From Create to Modify

You are automatically placed in the MODIFY top-level function. The second-level functions, Scale, Text, and Delete, are displayed. These functions operate the same as they do in MODIFY. Again, the only difference is that in this top-level function (CREATE), the modifications apply to the object you are adding. The functions Pattern, Axes, and Format are displayed only if the new object is a chart.

Press f2 (Text); then press f2 (Add). The arrow appears in the center of where you left the box cursor.

The instructions at the bottom of the screen ask you to move the arrow. You do not need to move it; this is only an option. Press GO.

Enter the text you want to add and press GO.

The text appears where the arrow was pointing.

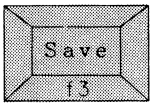
If you want to modify the text, continue as if you were working within the modify function (see the top level MODIFY descriptions of Scale, Text, and Modify).

If you want the new object to contain more than one label, you can create another one by positioning the arrow, pressing GO, adding text, and then pressing GO again.

The same is true for deleting labels (you can delete the labels that you created without exiting the CREATE function): press f2 (Text); then press f2 (Delete). Position the arrow on the label to be deleted; press GO.

Warning: *If you delete all labels from an object that you created, the object will not be deleted. Your picture file will contain an empty object which may confuse you during future modifications. To delete the object, press f3 (Delete, the second level function); then press GO.*

SAVE (Top-Level Function)



Purpose	To save your work periodically. To save your work in a specific file.
Required conditions	You must have already created a picture file.
Position in menu structure	Enter from the top level.
How to enter from the top level	Press f3.
How to exit from this function	Press CANCEL to quit or GO to execute. (See "How to Use.")

How to Use

Press f3 to enter from the top level.

Enter a file name. If BGP responds with a message that the file name already exists, be careful. If you want to replace the old file with the new work, press GO to overwrite.

If you want to keep the work in your old file, press CANCEL and enter a file name that is slightly different from the other one. Press GO. After you press GO, you are automatically exited from SAVE and returned to the top-level menu.

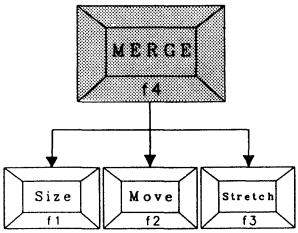
Helpful Hint

Save your files periodically to avoid losing valuable work. There will be occasions when you need to undo some work, but want to keep most of it. Sometimes, the only way to undo your work is by pressing ACTION, holding it down, and pressing FINISH.

If you did not save at any time during the session, you will lose everything you did in that session. This means that if you created an object or chart and modified it in one session, you would have to create it again. If you save periodically, you will lose only the work done after the last save.

Remember, the more often you Save, the less work you lose.

MERGE (Top-Level Function)



Purpose

To merge this picture file with all of the objects from another picture file.

Required conditions

The other picture file must exist (a picture file is one that ends in *.pic*). If you are merging a BTOS Draw file, it must be converted into BGP format from within BTOS Draw.

Position in menu structure

Enter from the top level.

How to enter from the top level

Press f4.

How to exit from this function

Press f10.

How to Use

Press f4 to enter from the top level.

Read the instructions at the bottom of the screen. If you press MARK to view picture files, use the arrow keys to position the cursor on the file you want to merge. Press GO.

The picture area is redrawn and a box cursor is displayed. If necessary, manipulate the box cursor to indicate the size, location and shape of the file you want to merge. If you want the merged file to be the same size and position as it was in its original file, make the box cursor fill the entire picture area.

Press GO.

If there is more than one object in the file you are merging, the box cursor re-appears, allowing you to manipulate it before pressing GO. Pressing f10 will add the next object as well, because you cannot exit MERGE until all objects from the new file are merged. If you do not want all the objects, delete the ones you do not want.

How to Modify

If you want to modify the size or position of the merged file, use the size and Move functions keys with the arrow keys; then press GO. If some of the picture area is blanked out, press CODE, hold it down, and press the letter **D**. The correct image is redrawn. Press f10 to exit.

Before You Continue ...

After you exit the MERGE function, press CODE, hold it down and press the letter **V**. A flashing box cursor appears, indicating the shape of the last object you merged. That object is the current object. To change the current object, press NEXT until the box cursor surrounds the object you want to modify.

A Chart vs. Another Object

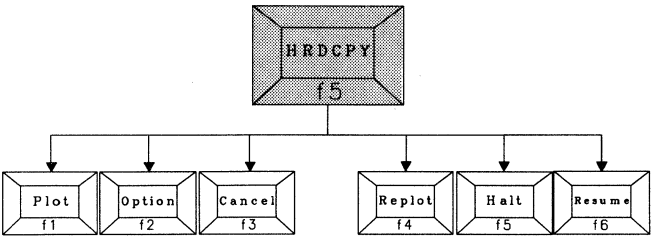
Consider the following picture file: two objects fill the same amount of space in the picture area. One object is a chart, and the other object is a label. You want to modify the label, but you do not remember which object is current.

To identify the current object, press CODE-v. The box cursor flashes around the entire picture area, so you decide the chart is current. To change the current object, you press NEXT again. The cursor still flashes around the entire picture area. You repeat these actions and the box cursor continues to surround the entire picture area. The problem is that both objects are the same size. Pressing NEXT does not help you.

The only way to distinguish the label from the chart is to return to the top level and then enter MODIFY. If the second-level functions in MODIFY do not include Pattern, Axes, and Format, the current object is not the chart.

Press NEXT until the entire MODIFY menu appears. This identifies the chart as the current object. Because you want to modify the label, press NEXT. The Pattern, Axes, and Format functions disappear.

HARD COPY (Top-Level Function)



Purpose

To print the picture in the picture area.

Required conditions

Refer to Appendix B, Error Prevention Techniques, before plotting or printing.

BGP and BTOS Systems Graphics software must be installed, and an output device must be available to your workstation and specified in the sys.printers file. BTOS Systems Graphics must also be loaded by typing **install graphics manager**.

Refer to Printers and Plotters, Section 10, in the *BTOS System's Graphics Programming Reference Manual* (relative to release 1.0 or higher).

For each peripheral, you need to make an entry in your <sys>Sys.Printers file. When doing spooled printing, you must also make an entry in the <sys>Queue.Index file, and the <sys>SplCnfg.sys file. Refer to Appendix E, Configuration Files, for additional information.

Position in menu structure

Enter from the top level.

How to enter from the top level

Press f5.

How to exit from this function

Press f10.

How to Use

Press f5 to enter from the top level.

If the sys.printers file is empty, this function will not work. The terminal will beep, and BGP will tell you that no output device is specified.

Helpful Hint

Save your picture file before printing. This is important, because if you need to cancel a direct print, or if an error occurs which terminates your session, you will lose any modifications that you did not save in this session.

The HARD COPY menu includes the following second-level functions:

Plot Execute printing on the device specified in the Option function.

Option Select output device, paper or transparency Hard Copy, and number of copies.

If you have one or more files in the spool queue, the HARD COPY menu returns with the following second-level functions as well:

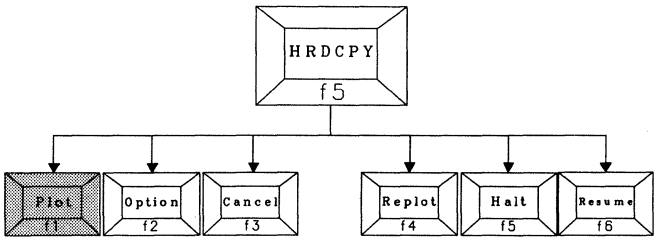
Cancel Cancel a file from being plotted or printed by removing it from the spool queue.

Replot Halt a spooled file and reprint it from the beginning.

Halt Halt a spooled file temporarily.

Resume Resume halted printing from either Replot or Halt.

Plot (Second-Level Function)



Purpose

To execute printing on the specified output device or file.

Required conditions

Output device must be specified in the sys.printers file.

If printing directly, the output device must be connected to the workstation.

If spooling, Queue Manager and Spooler must be installed and loaded. The output device must be specified in the Queue.index and SplCnfg.sys files also.
Refer to "When You Are Making Hard Copies" in Appendix B, "Error Prevention Techniques." See Appendix E for information on setting up printing.

Position in menu structure

Enter from HARD COPY.

How to enter from the top level

Press f5; then press f1.

How to exit from this function

Automatic exit to top-level menu.

How to Use

Press f1 to enter from HARD COPY.

This function plots the contents of the picture area. Read the instructions at the bottom of the screen.

The user-entry line displays one of the following defaults:

- plotter or printer from the configuration file
- file name

Refer to Spooled Printing/Plotting (after the next subsection) for instructions on how to print to a file.

Before plotting, you might want to enter the Option function:

- To specify a different output device.
- To change the hard copy from paper to transparency.
- To request more than one copy.

When you are ready to plot, press GO.

Note: *Match the pens in your plotter with the colors that you specified in MODIFY or PALETTE.*

Direct Printing/Plotting

If you are printing directly, you must wait for the printer or plotter to finish before you can continue. The only way to cancel a direct print is to press ACTION, hold it down, and press FINISH.

Warning: *If you perform an ACTION-FINISH, you will lose all unsaved modifications from the current session, as well as any unsaved charts that you created.*

Spooled Printing/Plotting

When spooling, three parameters appear at the right:

Plotter Name The device name that receives spooled output. This name can be changed in the Option function.

STATUS Status of the spooled file at the top of the FILES QUEUED list.

FILES QUEUED List of spooled files. The file at the top is either printing or paused.

When spooling, you can continue working as the plot executes. You can continue to modify the current picture file, or close it and enter another file. Also, you can exit BGP and enter other software. However, you must be in one of the following software applications to receive and respond to plotting prompts.

- BGP
- Spooler Status
- Any BTOS word processor

Printing to an Output Device

If you want to print to an output device, do the following:

1 When you press f1 (Plot) from HARD COPY, enter an output device in the user-entry line (or use the default).

2 Press GO.

3 The following messages appears momentarily:

```
Spooling...
```

This message indicates that the picture is being added to the queue. When the picture is successfully added to the queue, it appears in the *Plotter Name* parameter.

Printing to a File

If you want to print to a file instead of an output device, do the following:

1 When you press f1 (Plot) from HARD COPY, enter a file name in the user-entry line (or use the default).

2 Press GO.

3 The following message appears:

```
Spooling to file xxxxxx
        Press GO to confirm, CANCEL to deny.
```

The xxxxxx represents the file name.

4 Press GO to confirm.

5 The following messages appears momentarily:

Spooling...

This message indicates that the picture is being added to the queue. When the picture is successfully added to the queue, it appears in the FILES QUEUED parameter.

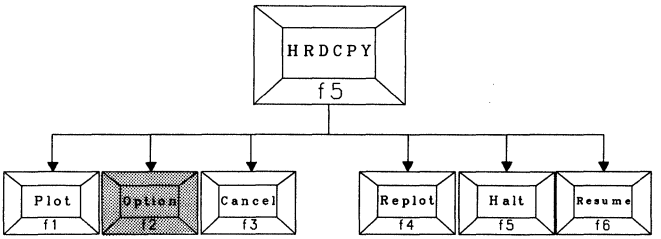
Plotters

If you are printing to a plotter, BGP asks you to load paper and then press GO. If you press GO before loading paper (or a transparency), nothing will happen. You must load paper (or a transparency) before plotting.

If you want to plot on paper or transparency other than 8-1/2 by 11 inches, you must reset the plotter before pressing GO. If you do not reset the plotter at this point, BGP does not recognize any paper size other than 8-1/2 by 11.

Note: *If you are trying to plot a picture that specifies more colors than the pens in your plotter, BGP will instruct you to change specific pens. For example: Place pen number 6 in the right pen position, and press f6. This BGP message instructs you to place the pen labeled P6 in the pen holder so that the plotter's arm takes it next.*

Option (Second-Level Function)



Purpose	To select output device, type of hard copy, and number of copies.
Required conditions	All conditions for plotting are required.
Position in menu structure	Enter from HARD COPY.
How to enter from the top level	Press f5; then press f2.
How to exit from this function	Automatic exit to HARD COPY.

How to Use

Press f2 to enter from HARD COPY.

Read the instructions at the bottom of the screen and apply them to the menu at the right.

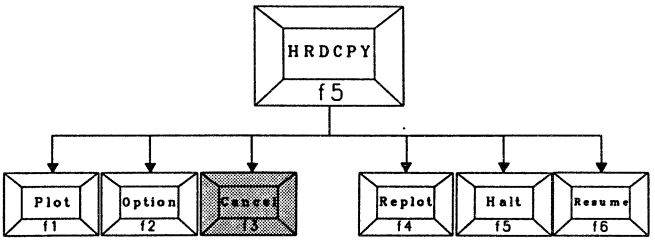
Note: *The plotter names specified in the first parameter equal the output device names specified in the sys.printers file.*

After specifying the output device, type of hard copy, and number of copies, press GO. BGP returns you to the second-level menu.

Helpful Hint

When you are plotting on paper, you can make slightly thicker lines by selecting *Transparency* in the Hardcopy *parameter*. (When *Transparency* is selected, the plotter pens move more slowly.)

Cancel (Second-Level Function)



Purpose	To cancel a file from being printed by removing it from the spool queue.
Required conditions	You must have a picture file in the spool queue. If you are plotting to a printer, refer to Appendix B, Error Prevention Techniques, before canceling.
Position in menu structure	Enter from HARD COPY.
How to enter from the top level	Press f5; then press f3.
How to exit from this function	Automatic.

How to Use

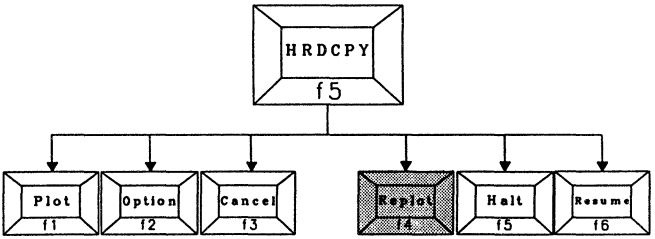
Press f3 to enter from HARD COPY.

This function prevents picture files from being printed. Read the instructions at the bottom of the screen. If there is only one file in the *FILES QUEUED* parameter, press GO.

The instructions at the bottom of the screen are replaced with a message verifying that the file is being canceled.

BGP returns you to the second-level menu.

Replot (Second-Level Function)



Purpose	To halt a spooled picture file and replots it from the beginning.
Required conditions	All conditions for spooling hard copies are required. You must have a picture file in the spool queue. You must be spooling to a plotter, not a printer.
Position in menu structure	Enter from HARD COPY.
How to enter from the top level	Press f5; then press f4.
How to exit from this function	Automatic to HARD COPY.

How to Use

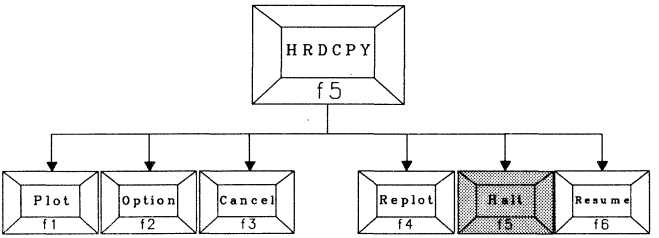
Press f4 to enter from HARD COPY.

This function halts a spooled picture file and starts it from the beginning. The message **Restarting the plot** appears briefly.

When this function is finished executing, the plotter stops and the Resume function is added to the menu. If your output device is a plotter, the following message appears:

```
Load a piece of paper in the plotter and
press f6.
```

Halt (Second-Level Function)



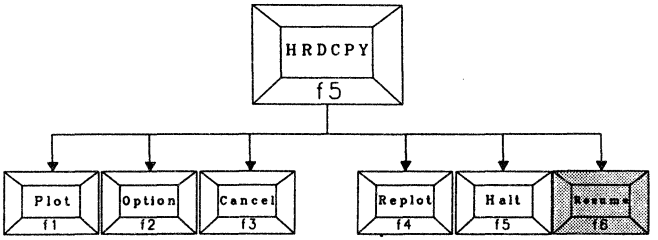
Purpose	To halt a spooled picture file temporarily.
Required conditions	All conditions for spooling hard copies are required. You must have a picture file in the spool queue.
Position in menu structure	Enter from HARD COPY.
How to enter from the top level	Press f5 twice.
How to exit from this function	Automatic.

How to Use

Press f5 to enter from HARD COPY.

This function stops the plotter. The message, *Halting the plot* appears briefly. When this function is finished executing, the plotter stops and the Resume function is added to the menu. The plotter does not continue unless you press f6.

Resume (Second-Level Function)



Purpose	To resume printing from either the Halt or the Replot function.
Required conditions	All conditions for spooling hard copies are required. You must have entered either the Halt or Replot function. The following message must be displayed: Press f6 to resume plotting must be displayed.
Position in menu structure	Enter from HARD COPY.
How to enter from the top level	Press f5; then press f6.
How to exit from this function	Automatic.

How to Use

Press f6 to enter from HARD COPY.

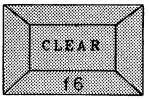
This function enables you to resume printing, either from the beginning of the file again, or from where you interrupted it. If you want to resume from the beginning of the file, you need to enter the Replot function first.

Press f6 when the following message is at the bottom of the screen:

```
Press f6 to resume plotting.
```

The message Resuming the plot flashes, and then the printing resumes.

CLEAR (Top-Level Function)



Purpose	To clear the screen by deleting all objects.
Required conditions	None
Position in menu structure	Enter from the top level.
How to enter from the top level	Press f6.
How to exit from this function	Automatic.

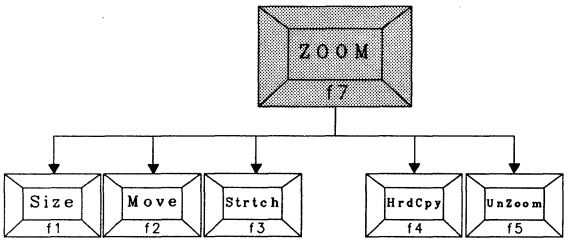
How to Use

Press f6 to enter from the top level. Read the instructions at the bottom of the screen. BGP asks you to press GO to confirm (to create a new object) or press CANCEL to deny the request.

If you want to clear the picture area, press GO. BGP automatically returns you to the top-level menu.

Warning: *If you press GO, you will delete all objects in the picture area, and you will not be able to retrieve them.*

ZOOM (Top-Level Function)



Purpose

To enlarge a small portion of the picture area for inspection and/or printing.

Required conditions

None.

Position in menu structure

Enter from the top level.

How to enter from the top level

Press f7.

How to exit from this function

Press f10.

How to Use

Press f7 to enter from the top level.

When you enter ZOOM for the first time in a BGP session, the box cursor surrounds the picture area. You can manipulate the box cursor into any size, position, or shape.

When you enter ZOOM again, the box cursor is in the same size, position, and shape as it was the last time you exited ZOOM. This enables you to exit ZOOM, modify an object, return to ZOOM, and enlarge the same area without specifying it again.

Note: *The box cursor specifications in ZOOM are saved with respect to the picture area, not the object. Therefore, if you change the size, position or shape of any object before you reenter ZOOM, the box cursor in ZOOM will not surround the same portion of your object; it will surround the same portion of the picture area.*

When you are finished indicating the size, shape, and location of the box cursor, press GO.

The picture is erased and the portion you indicated fills the picture area. You can enlarge the picture even more, and/or you can print the enlarged area by using the Hard Copy function.

The UnZoom function allows you to regain view of the entire picture and indicate another portion for enlargement.

The ZOOM menu presents the following second-level functions:

Size Indicate the size of the area you want to enlarge.

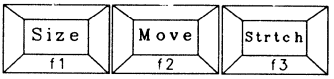
Move Move the box cursor to the area you want to enlarge. (This can be done only after decreasing the size.)

Stretch Modify the height or width of the area you want to enlarge. (This can only be done after decreasing the size.)

Hard Copy Print the enlarged view.

UnZoom Regain full view of the original picture and remain in the ZOOM function.

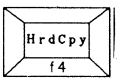
ZOOM's Second-level Functions



The Size, Move, and Stretch functions in ZOOM operate similarly to the Size, Move, and Stretch functions in MODIFY. The only difference is that in MODIFY, you are changing an object that already exists; in this top-level function (ZOOM), you are changing the size, shape, and location of the area that you want to view. For example, by decreasing the size of the box cursor in ZOOM, you are selecting a smaller portion of the picture, which will fill the entire picture area when you press GO.

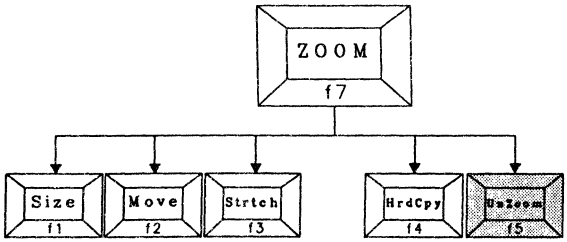
If you need more instruction, refer to the third-level function descriptions of Size, Move and Stretch within the top-level description of MODIFY. These descriptions include operating details and helpful hints.

(Second-Level Function in ZOOM)



You can print a hard copy of an enlarged area by entering Hard Copy after entering ZOOM and enlarging the area. The Hard Copy function in ZOOM operates the same as the top-level HARD COPY function. For detailed instructions, refer to the top-level HARD COPY description.

UnZoom (Second-Level Function)



Purpose	To regain view of the original picture and indicate another area for enlargement.
Required conditions	You are in the ZOOM function with an area already enlarged.
Position in menu structure	Enter from ZOOM.
How to enter from the top level	Press f7, enlarge an area, and then press f5.
How to exit from this function	Press f10.

How to Use

Press f5 to enter from ZOOM.

The enlarged area is erased and the original picture is redrawn. The box cursor surrounds the last area it enlarged.

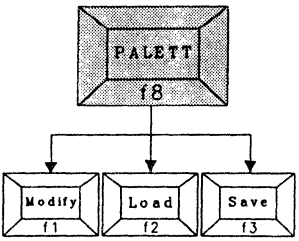
The advantage to this function is that if you want to enlarge another area, you need only manipulate the box cursor from where you left it.

When you are finished Zooming, exit by pressing f10. The original picture is redrawn and you are returned to the top-level menu.

Helpful Hint

Before you enlarge anything, think about the areas you want to enlarge. Plan them in an order that requires the least amount of box cursor manipulation.

PALETTE (Top-Level Function)



Purpose

To modify the tone (palette) of one or more colors that exist in a picture file.

Note: This function modifies only existing colors. If you want to specify new colors, refer to the Axes and/or Pattern functions in MODIFY.

Required conditions

You must have a color monitor. If you do not, this function does not appear in the top-level menu.
A picture file must already exist.
Refer to Appendix B, Error Prevention Techniques, before choosing colors.

Position in menu structure

Enter from the top level.

How to enter from the top level

Press f8.

How to exit from this function

Press f10.

How to Use

Press f8 to enter from the top level.

This function allows you to alter existing colors in a picture file. Any color you modify will be affected in all objects in the picture area, regardless of which object you specified.

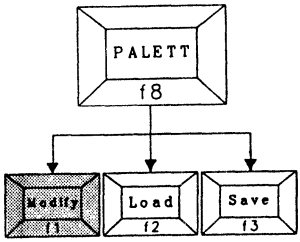
The PALETTE menu includes the following second-level functions:

Modify Modify existing colors by accessing the parameter menu.

Load Specify colors for a new picture file by accessing a previously saved palette file.

Save Save the colors from this picture file into a palette file for future use.

Modify (Second-Level Function)



Purpose	To access the parameter menu for changing colors that already exist.
Required conditions	Colors already exist in the picture file you want to modify. You must have a color monitor.
Position in menu structure	Enter from PALETTE.
How to enter from the top level	Press f8; then press f1.
How to exit from this function	Press f10. Press CANCEL before pressing GO.

How to Use

Press f1 to enter from PALETTE.

Follow the instructions at the bottom of the screen and apply them to the parameter menu at the right.

Pen

Press ↑ or ↓ to select a color that exists in the current picture file. If you specify the eighth pen, you will modify the background color (the background color appears only on the screen, not in hard copies). For each new pen you specify, the Red, Green, and Blue parameters change to reflect any differences already specified. Press NEXT.

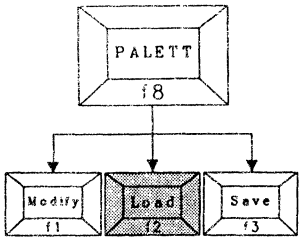
Red, Green, and Blue

Press ↑ or ↓ in these parameters to adjust the amount of red, green, and blue in the color you are modifying. The colors change as you press the arrow keys.

Note: *On your screen display, you can choose eight colors from 64 possible combinations. Remember, however, that colors in your hard copies are limited to the pens in your plotter and the colors in your printer. Refer to Appendix B, Error Prevention Techniques, for the following hints:*

- Remembering what colors the BGP numbers represent.
- Knowing which pens to put in your plotter.
- A list of the default colors in BGP.

Load (Second-Level Function)



Purpose	To access a palette file to specify colors that you previously saved.
Required conditions	You must have already saved a palette file from the PALETTE function.
Position in menu structure	Enter from PALETTE.
How to enter from the top level	Press f8; then press f2.
How to exit from this function	Press f10. Press CANCEL before pressing GO.

How to Use

Press f2 to enter from PALETTE.

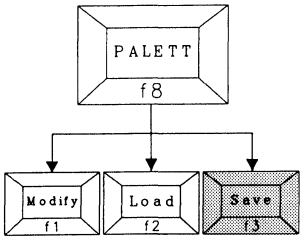
Read the instructions at the bottom of the screen. Press MARK. The picture is erased and the palette file names that you created are displayed. The file name in the upper left corner is highlighted. Choose the palette file by doing one of the following:

Press GO to execute the highlighted palette file name.

Press MARK to enable you to type another palette file name and then press GO.

The object is redrawn in the colors that were saved in the loaded palette file.

Save (Second-Level Function)



Purpose	To save all palette information from a specific object into a palette file. This enables you to apply palette information from one file to one or more objects in another.
Required conditions	The box cursor must indicate the object that contains the palette information you want to save.
Position in menu structure	Enter from PALETTE.
How to enter from the top level	Press f8; then press f3.
How to exit from this function	Press f10. Press CANCEL before pressing GO.

How to Use

Press f3 to enter from PALETTE.

Follow the instructions at the bottom of the screen. Enter a file name that will remind you of this picture file. For example, you might want to type a combination of the file name and its color (Clothes.color). Press GO.

Note: *If the name you entered already exists, BGP will ask if you want to overwrite the existing file. If you do not want to overwrite the existing file, press CANCEL and enter another palette file name. If you want to overwrite the existing file name, press GO.*

After you press GO, the second-level menu reappears. The file name you specified is saved. If you want to verify it, enter the Load function (f2). Press MARK. The palette file name you specified should be listed.

Programming an Interface to BGP

This section is written for the experienced programmer who is knowledgeable of the BTOS operating system. Any software package that generates spreadsheet data can use Business Graphics Package (BGP) to create bar, pie, and line charts. A Pascal program example is included at the end of this section.

In order to access the *Picture Editor* command from software other than BTOS Multiplan, you must do the following:

1 For each type of chart, specify chart data in the Variable Length Parameter Block (VLPB).

2 Write the chart's data values to either a file or a long-lived memory segment, arranged in a format defined by the chart's size and type.

This section is organized into the following subsections:

- Alternate Methods of Invoking BGP
- Parameter Definition
- Bar Chart Data Storage
- Pie Chart Data Storage
- Line Chart Data Storage
- Pascal Program

The parameters are defined first in general, and then again as they apply to each type of chart. Refer to the Pascal program to clarify any definitions you do not understand.

Use the standard BTOS parameter procedures to set the parameters. For detailed information about parameter procedures, refer to the Parameter Management section in the *BTOS Reference Manual*, Volume 1 and Volume 2.

Alternate Methods of Invoking BGP

There are two ways to pass data to BGP. One way is to store spreadsheet data into an area of long-lived memory. The address and length of the long-lived memory are then stored in the Variable Length Parameter Block (VLPB) with the data values. The other way is to store spreadsheet data in a disk file and write the data values to a VLPB.

To set the parameters (that are required in the VLPB) to pass data to BGP, use the following BTOS parameter procedures:

- RGParamInit
- RGParamSetEltNext
- RgParamSetEltNext
- RgParamSetSimple

For detailed information, refer to the *BTOS Reference Manual (Volumes 1 and 2)*.

Invoking BGP Using Long-Lived Memory

This method is more efficient than creating a file on disk, because file-system support is not required. Allocate an area of long-lived memory for data storage. The data file parameter in the VLPB is then set up differently to reflect this. Instead of using a data file name, the data file parameter in the VLPB holds a pointer to the memory address as well as the size of the used area. Use the following format:

'@' pbMemory, cbMemory

- '@' BGP uses this symbol to distinguish memory files from data files.
- pbMemory The address
- cbMemory The size of the memory area. (The memory area contains the values to be plotted.)

The VLPB is set up by defining the following parameters:

- Picture file name
- Format file name
- Memory name
- Title
- Labels
- Palette file name

Invoking BGP Using a Data File on Disk

Spreadsheet data is placed in a disk file and the data values are written to the VLPB. The VLPB is set up by defining the following parameters:

- Picture file name
- Format file name
- Data file name

- Title
- Labels
- Palette file name

Parameter Definition

This subsection defines the parameters needed to store data values on disk or in long-lived memory.

Picture file The value of this parameter equals the name of the picture file. Business Graphics uses the picture file name for the following purposes:

- To open a user-specified picture file in write mode;
- To save a chart in the specified picture file;
- To overwrite a picture file's contents when the user specifies a file that already exists.

Format file The value of this parameter equals the name of the format file. The format file contains only the format of the chart (no data).

Format files are used so that new charts can be created without extensive editing. A format file for each of the three types of charts is provided on the BGP diskette.

Data file The value of this parameter equals the name of the data file. The data file provides the absolute values needed to draw the chart. These values are entered as standard short real numbers.

FORTRAN and Pascal application programs can enter these values directly into the data file.

In BASIC applications, however, the values must be converted to standard short reals. The procedure used to convert the values is:

```
rNew = ConvertTo8087 (rOld)
```

The data file format varies depending on type of chart. Each format includes both an entry (to identify the type of chart) and a reserved area.

Title	The title is the label that appears above the chart. If the title parameter is not set, a default title is taken from the format file.
Labels	The type and number of label parameters vary depending on the type of chart. The pie chart, for example, has labels only for its segments, while the bar and line charts can have labels for the axes and legends.
Palette file	The value of this parameter equals the name of the color palette. If the palette file parameter is not set, the default color palette is used.

Once the data has been placed in the data file and the parameter block has been created, the application program can access Business Graphics Package.

Detailed information about creating a run file and chaining from the current application can be found in the Task Management section in the *BTOS Reference Manual*, Volume 1 and Volume 2.

Bar Chart Data Storage

See Figure 5-1 for a sample BGP bar chart. The format of the bar chart data file consists of an array of values. These values equal the sum of all values to be plotted in each legend. The complete format is described in Table 5-1.

Figure 5-1 Bar Chart

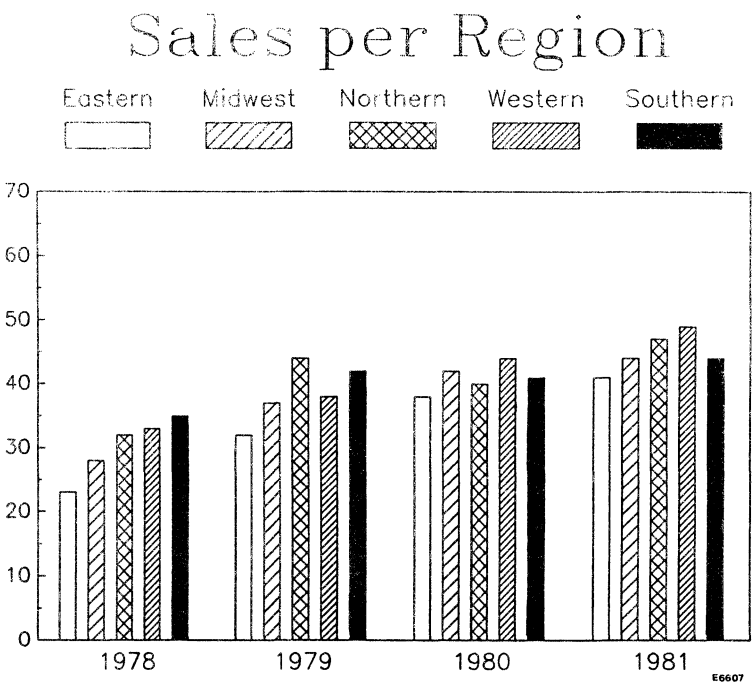


Table 5-1 **Bar Chart Data File**

Item	Size	Value
ChartType	WORD	0
reserved	16 bytes	0FFh
nValuesPerLegend	WORD	number of values per legend (max: 12)
nLegends	WORD	number of legends (max: 5)
rgValues*	4 bytes	absolute value for data item, specified as a short, real number

* *The number of entries for rgValues is determined by the following formula:* ***(nValuesPerLegend) multiplied by (nLegends)***

The entries for the rgValues must be placed in the data file as follows:

1 The nValuesPerLegend values for the first legend.

2 The nValuesPerLegend values for the second legend.

.
.
.

n The nValuesPerLegend values for the nLegends legend.

Bar Chart Parameter Definition

To create a bar chart, build a parameter block with the following parameters (depending upon which method you use to invoke BGP, use either a data file or a memory file):

Picture file

Name of the picture file that BGP uses to save the chart. (Parameter 1)

Use RgParamSetSimple.

Format file

Name of the format file that BGP uses to build the chart: (Parameter 2)

Use RgParamSetSimple.

Standard name for monochrome: [sys]<sys>bar.fm

Standard name for color: [sys]<sys>ColorBar.fm

The format file saves colors, patterns, axes information, title, group labels, and legend labels. It does not save data or information about the chart's size, position, or shape.

Data file

Name of the data file that contains the values to be plotted. (Parameter 3)

Use RgParamSetSimple.

or

Memory file

@ pbMemory, cbMemory (Parameter 3)

Use RgParamSetListStart; then use RgParamSetEltNext for each of the two subparameters (pbMemory and cbMemory).

'@' followed by the address (subparameter 1) and size of the memory area (subparameter 2). The memory area contains the values to be plotted.

***Title**

Label that appears above the chart. (Parameter 4)

Use RgParamSetSimple.

***X axis label**

Label that appears below the X axis. (Parameter 5)

Use RgParamSetSimple.

***Y axis label**	Label that appears above the chart, left-justified to the Y axis. (Parameter 6) Use RgParamSetSimple.
***Legend labels**	Labels that appear above the chart to describe the nlegends. (Parameter 7) Use RgParamSetListStart; then use RgParamSetEltNext.
***X axis Group labels**	Labels that appear below each cluster of bars to describe the nLegendsperValue bar groups. (Parameter 8) Use RgParamSetListStart; then use RgParamSetEltNext.
Override format	A flag indicates whether or not the title and labels in the format file should override the format file. (Parameter 9) Use RgParamSetSimple. The default = YES To prevent overriding, enter NO
****Palette file**	Name of the color palette. (Parameter 10)

* *The title and label parameters are optional. When these parameters are not entered, default values from the format file are used.*

** *The palette file is also optional. If a color palette is not specified, the default value from the format file is used.*

Pie Chart Data Storage

See Figure 5-2 for a sample BGP pie chart. The format of the pie chart data file consists of an array of values needed to create pie segments. Using absolute values, Business Graphics calculates relative percentages to divide a circle into proportional segments. The complete format is described in Table 5-2.

Figure 5-2 **Pie Chart Data File**

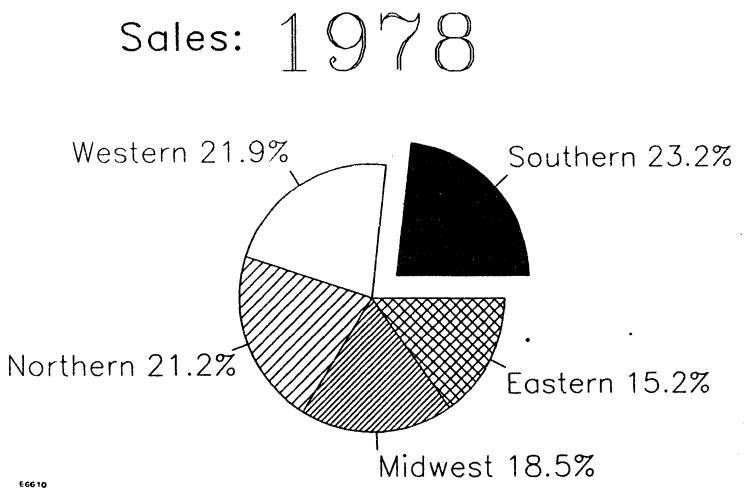


Table 5-2 **Pie Chart Data File**

Item	Size	Value
ChartType	WORD	1
reserved	16 bytes	0FFh
nSegments	WORD	number of segments (max: 8)
rgValues*	4 bytes	absolute value for a segment, specified as a short, real number

* *The number of entries for rgValues equals nSegments.*

Pie Chart Parameter Definition

To create a pie chart, build a parameter block with the following parameters. (Depending upon which method you use to invoke BGP, use either a data file or a memory file.)

Picture file

Name of the picture file that BGP uses to save the chart. (Parameter 1)

Use RgParamSetSimple.

Format file

Name of the format file that BGP uses to build the chart. (Parameter 2)

Use RgParamSetSimple.

Standard name for monochrome: [sys]<sys>pie.fm

Standard name for color: [sys]<sys>ColorPie.fm

Data file

Name of the data file that contains the values to be plotted.

Use RgParamSetSimple.

or

Memory file

@ pbMemory, cbMemory (Parameter 3)

Use RgParamSetListStart; then use RgParamSetEltNext for each of the two subparameters (pbMemory and cbMemory).

'@' followed by the address (subparameter 1) and size of the memory area (subparameter 2). The memory area contains the values to be plotted.

***Title**

Label that appears above the chart. (Parameter 4)

Use RgParamSetSimple.

***Segment labels**

Labels that describe pie segments. (Parameter 5)

Use RgParamSetListStart; then use RgParamSetEltNext.

Override format	A flag indicates whether or not the title and labels in the format file should override the format file. (Parameter 6) Use RgParamSetSimple. The default = YES To prevent overriding, enter NO
****Palette file**	Name of the color palette. (Parameter 7) Use RgParamSetSimple.

* *The title and label parameters are optional. When these parameters are not entered, default values from the format file are used.*

** *The palette file is also optional. If a color palette is not specified, the default value is used.*

Line Chart Data Storage

See Figure 5-3 for a sample BGP line chart. Line charts can use either numeric values or alphanumeric strings to label the X axis. Alphanumeric strings are particularly useful when describing yearly trends in monthly increments.

The complete format for a numeric line chart data file is described in Table 5-3.

Figure 5-3 **Line Chart**

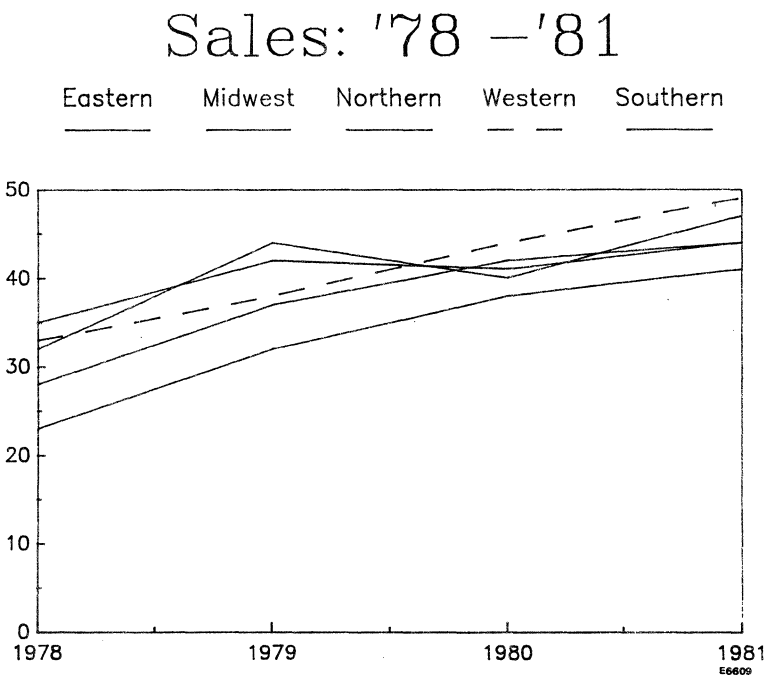


Table 5-3 **Line Chart Data File (Numeric)**

Item	Size	Value
ChartType	WORD	2
reserved	16 bytes	0FFh
nLegends	WORD	number of legends (and lines) (max:5)
nCoordinates	WORD	number of X, Y pairs for the legend (and line)
*RgxValues	4 bytes	X values for the legend (and line), specified as short, real numbers
*RgyValues	4 bytes	Y values for the legend (and line), specified as short, real numbers

* *The number of entries for both RgxValues and RgyValues equals nCoordinates (number of X,Y pairs per line).*

The number of entries for each set of nCoordinates, RgxValues, and RgyValues equals nLegends. For each line, specify all x values; then specify all y values.

The complete format for an alphanumeric line chart data file is described in Table 5-4.

Table 5-4 **Line Chart Data File (Alphanumeric)**

Item	Size	Value
ChartType	WORD	3
reserved	16 bytes	0FFh
nLegends	WORD	number of legends (and lines) (max: 5)
nCoordinates	WORD	number of X, Y pairs for the legend (and line)
*RgyValues	variable (nCoordinates multipled by 4 bytes)	Y values for the legend (and line), specified as short, real numbers
*RgxValues	variable	X values for the legend (and line), specified as alphanumeric strings

* *Each legend must have the same number of RgyValue entries. Because the number of Y values is fixed, you need specify nCoordinates only once.*

After all Y values are specified, a single set of X values is entered. Each X string within the set is entered according to the following format:

- *A word containing the length (in bytes) of the string*
- *The actual string*
- *If the string is not even, set the trailer byte to zero to give the entry an even length. For example, the string, **January**, would be 10 bytes long, entered as follows:*

7,January,0

7 represents 007h
0 represents 00h

Note: *h represents hexadecimal.*

- *Strings are entered sequentially, without spaces or separators between strings.*

Line Chart Parameter Definition

To create a line chart and build a parameter block with the following parameters. (Depending on which method you use to invoke BGP, use either a data file or a memory file.)

Picture file Name of the picture file that BGP uses to save the chart. (Parameter 1)

Use RgParamSetSimple.

Format file Name of the format file that BGP uses to build the chart. (Parameter 2)

Use RgParamSetSimple.

Standard name for monochrome: [sys]<sys>line.fm

Standard name for color: [sys]<sys>ColorLine.fm

Data file Name of the data file that contains the values to be plotted. (Parameter 3)

Use RgParamSetSimple.

or

Memory file @ pbMemory, cbMemory (Parameter 3)

Use RgParamSetListStart; then use RgParamSetEltNext for each of the two subparameters (pbMemory and cbMemory).

'@' followed by the address (subparameter 1) and size of the memory area (subparameter 2). The memory area contains the values to be plotted.

***Title** Label that appears above the chart. (Parameter 4)

Use RgParamSetSimple.

***X axis label** Label that appears below the X axis. (Parameter 5)

Use RgParamSetSimple.

***Y axis label** Label that appears above the chart, left-justified to the Y axis. (Parameter 6)

UseRgParamSetSimple.

***Legend labels** Labels that appear above the chart to describe the nLegends. (Parameter 7)

Use RgParamSetListStart; then use RgParamSetEltNext.

Override format A flag indicates whether or not the title and labels in the format file should override the format file. (Parameter 8)

Use RgParamSetSimple.

The default = YES

To prevent overriding, enter NO

****Palette file** Name of the color palette file. (Parameter 9)

Use RgParamSetSimple.

* *The title and label parameters are optional. When these parameters are not entered, default values from the format file are used.*

** *The palette file is also optional. If a color palette is not specified, the default value is used.*

Pascal Program Description

The following Pascal program is interactive; it allows you to enter values for most of the parameters that will be passed to Business Graphics Package (BGP). However, the parameters *picture file, format file,* and *data file* are fixed; you cannot enter values to change them.

Note: *This program can be modified to accept values for these parameters (**picture file, format file,** and **data file*** as well).

The data file, *Barfile* is defined as a file of WORD; however, the values for each bar (*Barval*) are to be entered as REALs. This program uses a record type named "TrickType" to avoid any problems with mixed data types. Trick Type allows REAL and WORD values to share the same space in the record. This coding convention eliminates the need to define multiple data items.

Note: *This program runs on both monochrome and color workstations. Using the format file [Sys]<Sys>ColorBar.fm on a monochrome workstation will set each of the bars to different colors. Although not visible on a monochrome display, a hardcopy of the picture on a color output device will display them.*

Pascal Sample Program: BGP_Interface

```
{   BGP_Interface: This program uses BGP to create a bar
    chart in picture file BarChartData.Pic. BGP_Interface uses
    the interface described in this section to pass data to
    BGP. The Variable Length Parameter Block (VLPB), which
    the variable VLPB_Entry addresses, requests BGP to create
    a chart using the data contained within the VLPB:

        *  Picture file:    BarChartData.Pic
        *  Format file:     [Sys]<sys>ColorBar.fm
        *  Data file:       BarChartData
        *  Chart title:     (User input)
        *  etc.

    (See "Bar Chart Parameter Definition" in this section for
    the complete list of the parameters in the VLPB.)

    The file BarChartData contains following:

        *  Type of chart (bar chart)
        *  The number of legends (nLegends)
        *  The number of groups (nGroups)
        *  A value for each of the (nLegends*nGroups) bars.


    User input is accepted for the chart's title, number of
    legends, and number of groups. The number of legends and
    groups is then used to request data values for groups of
    legends and their labels.}


BGP_Interface: (input,output);

Const

    PW              = ' ';          ! Password, assume none

Type

    ErcType     = WORD;
    POINTER     = ADS OF WORD;
    Quad        = POINTER;
    ParamType   = Lstring(40);

    VLPB_Entrytype = record             ! specify params in a VLPB
      pbParam   : ADS OF ParamType;     ! address of sub-parameter
      cbParam   : WORD;                 ! length of sub-parameter
    END

{   Declaring TrickType to be a variant record of types REAL
    and WORD allows real values to be stored in a file of
    words (BarChartMaker). Generally, using variant records is
    not recommended, because doing so violates the strict
    typing rules of Pascal.}
```

```
VAR

  Barfile    : file of WORD;      {  This program will create Barfile (the
                                     pointer that will access the external
                                     data file BarChartData).  The file
                                     BarChartData will contain the data for
                                     this chart. }

  VLPB_Entry     : VLPB_EntryType;   ! used to enter values in VLPB
  pMemory        : POINTER;
  Barval         : TrickType;        ! Variant record type
  Erc            : WORD;
  I,J            : WORD;
  W              : WORD;
  StringVal      : ParamType;        ! used for text strings (labels & titles)


! External function definitions from CTOS.Lib

Function  AllocMemoryLL(cBytes: WORD; ppSegmentRet:POINTER): ErcType;
          EXTERN;

Function  rgParamInit(pVarParams: POINTER; sVarParams: WORD;
                      iParamMax: INTEGER): ErcType; EXTERN;

Function  rgParamSetListStart(iParam: INTEGER): ErcType; EXTERN;

Function  rgParamSetEltNext(pVLPB: POINTER): ErcType;  EXTERN;

Function  rgParamSetSimple(iParam: WORD; pVLPB: POINTER): ErcType; EXTERN;

Function  Chain(pbFS: POINTER; cbFS: INTEGER; pbPW: POINTER; cbPW: INTEGER;
                Priority: INTEGER; ercTermination: ErcType;
                fDebug: BOOLEAN): ErcType;
          EXTERN;

Procedure ErrorExit(W: ErcType); EXTERN;

Procedure CheckErc(W: ErcType); EXTERN;
```

```
! Program source statements begin here

{   Procedure StoreNext uses the variable VLPB_Entry to store the string
    Param in the Variable Length Parameter Block (VLPB).  StoreNext sets up
    the variable VLPB_Entry with the address and length of the passed
    parameter string.  Note that VLPB_Entry.pbParam contains the address of
    the first letter of the string (Param[1]), and VLPB_Entry.cbParam is the
    length of that string (Param[0]).  iParam is the parameter number within
    the VLPB.

    Note that procedure StoreNext only stores single value parameters.
}
Procedure StoreNext(iParam: WORD; Param: ParamType);
BEGIN
    VLPB_Entry.pbParam := ads Param[1];
    VLPB_Entry.cbParam := wrd (ord (Param[0]));
    CheckErc(rgParamSetSimple(iParam, ads VLPB_Entry))
END {StoreNext};



{   SetUpChart requests the count and names of all the legends and groups
    within the chart and stores these in the VLPB.  It then requests the value
    of each bar within the chart and stores these values in the file
    BarChartMaker.
}
Procedure SetupChart;

VAR
    nGroup, nLegend : WORD;

! Prompt user for the number of legends, and groups within the chart

BEGIN
    Write('Number of Legends (above x Axis): ');
    Readln(nLegend);
    Write('Number of Bar Groups (x Axis labels): ');
    Readln(nGroup);

    ! Ask user for the Y Axis label, and store it in VLPB.
    Write('Y Axis LABEL: ');
    Readln(StringVal);
    StoreNext(5,StringVal);

    ! Ask user for the Y Axis label, and store it in VLPB.
    Write('X Axis LABEL: ');
    Readln(StringVal);
    StoreNext(6,StringVal);
```

```
    ! Store the number of groups, legends in the external file
    Barfile? := nGroup;
    put(Barfile);
    Barfile? := nLegend;
    put (Barfile);

    ! Set up and store the legend labels in the VLPB.
    CheckErc(rgParamSetListStart(7));
    FOR j:=1 to nLegend DO
    BEGIN
        Write('Label for legend ',j,' : ');
        Readln(StringVal);
        VLPB_Entry.pbParam := ads StringVal[1];
        VLPB_Entry.cbParam := wrd (ord (StringVal[0]));
        CheckErc(rgParamSetEltNext(ads VLPB_Entry))
    END {FOR j};

    ! Set up and store the group labels in the VLPB
    CheckErc(rgParamSetListStart(8));
    FOR i:=1 to nGroup DO
    BEGIN
        Write('Label for group ',I,': ');
        Readln(StringVal);
        VLPB_Entry.pbParam := ads StringVal[1];
        VLPB_Entry.cbParam := wrd (ord (StringVal[0]));
        CheckErc(rgParamSetEltNext(ads VLPB_Entry))
    END {FOR i};

    ! Request bar values; then store them in external file
    FOR i := 1 to nGroup DO
        FOR J:= 1 to nLegend DO
        BEGIN
            Write('VALUE for Group: ',i:2,' Legend:',j:2,': ');
            Readln(Barval.r);
            {   Variant record Barval is used to store the real
                number Barval.r into the file Barfile, which was
                defined as a file of WORDs.
            }
            Barfile?:=Barval.i;
            put(Barfile);
            Barfile? := Barval.j;
            put(Barfile);
        END {FOR j};

    StoreNext(9,'YES');

END;                ! SetupChart
```

```
{ Main Program }
BEGIN
    ! Allocate long lived Memory for the VLPB
    CheckErc(AllocMemoryLL(2048, ads pMemory));
    ! Mark the memory as a VLPB
    CheckErc(rgParamInit(pMemory, 2048, 9));
    StoreNext (1, 'BarChartData');        ! Picture file name
    { Format file for chart could use user-made format file, or accept user
      input.   }
    StoreNext (2, '[sys]<sys>ColorBar.fm');
    StoreNext (3, 'BarChartData');        ! External data file name

    Write ('Title of Bar Chart: ');  ! Store title in VLPB
    ReadLn(StringVal);
    StoreNext (4, StringVal);

    Assign (Barfile,'BarChartData');      ! Create output file
    Rewrite(Barfile);

    ! write reserved bytes to file
    Barfile? := 0;
    PUT (Barfile);
    FOR i := 0 to 7 DO
    BEGIN
        Barfile? := #FFFF;
        PUT (Barfile);
    END {FOR i};

    SetupChart;                  ! get legend & group labels along with values
    CLOSE(Barfile);              ! finished, now start BGP

    stringval:='[sys]<sys>bgp.run';
    ! chain to BGP.  It will pick up the VLPB & use the given data

    CheckErc(Chain(ads StringVal[1], ord(StringVal[0]), ads pw, 0,
                   128, 0, false));

END.  {BGP_Interface}
```

Status Codes

This appendix lists BGP status codes and their messages.

Note:** Additional status codes (7600 - 7699) are listed in the **BTOS Graphics Programming Reference Manual.

If you receive a non-graphics status code, refer to the *BTOS Status Codes Reference Manual.*

***Warning:** When you receive a fatal error code, the system automatically returns you to the Executive or the application from which you accessed BGP, and you lose all your work from the most current session. To prevent this, save your work periodically during each session.*

See Appendix B, Error Prevention Techniques.

Error Code	Error Message and Explanation
33	**Service Not Available** Graphics for BTOS software (release level 1.0) must be installed and loaded. Press CANCEL and refer to the *Graphics for BTOS* manual for installation requirements and procedures.
7602	**Internal Graphics Error** This is an internal error in the graphics library. There is nothing you can do to avoid it. Ask your system administrator to report it to Burroughs customer service center.
7670	**Format and Data Inconsistent** Inconsistent data and format files are passed to BGP. Make sure that the correct chart type data i passed to BGP. When a user-written application attempts to access BGP, this error occurs when the chart typ in the format file does not match the chart type i the VLPB.

Error Code	Error Message and Explanation
7671	**Too Many Bar Legends** Data passed to BGP is for a bar chart and the maximum number of legends is exceeded. The maximum number of legends currently allowed is five.
7672	**Too Many Bar Groups** Data passed to BGP is for a bar chart and the maximum number of data groups is exceeded. The maximum number of groups currently allowed is 13.
7673	**Too Many Pie Segments** Data passed to BGP is for a pie chart and the maximum number of segments is exceeded. The maximum number of segments currently allowed is eight.
7674	**Too Many Line Legends** Data passed to BGP is for a line chart and the maximum number of legends is exceeded. The maximum number of legends currently allowed is five.
7675	**Negative Number in Pie** Data passed to BGP is for a pie chart and the value is negative. Only non-negative values are accepted.
7676	**Bad Palette File Specification** The file you indicated is not a palette file. Indicate a valid palette file or use the default. A valid palette file created by BGP ends in **'.pl'**.
7677	**Only One Value for Line** Line chart is specified and at least one of the lines contains only one data point. Each line must contain a minimum of two data points.
7690	**Bad Printer Specification** Printer is specified incorrectly. Ask your system administrator to check the parameters in the [sys]<sys>sys.printers file.

Error Code	Error Message and Explanation
7691	**Bad Font Specification** Font is specified incorrectly. Ask your system administrator to check the font file name in the [sys]<sys>graphics.fonts file.
7692	**Standard Font Not Specified** Standard font, SimplexRoman, is not specified in the [sys]<sys>graphics.fonts file. If you want to use this font, it must be specified in this file.
7693	**Bad Output Device** Invalid output device is specified. Ask your system administrator to check the parameters in the [sys]<sys>sys.printers file.

Error Prevention Techniques

Before Installing BGP

- Business Graphics Package (BGP) requires BTOS Operating System Software at revision level 7.0 or higher, which must be installed before installing BGP.
- BGP requires the Graphics for BTOS software, release level 1.0 or higher which must be installed before installing BGP.

Before Using BGP

- Every time you turn on your workstation, load Graphics for BTOS software by typing **install graphics manager** (or a unique command abbreviation) in the command line.

When You Are Creating Charts

- Line Charts. BGP allows a maximum of five legends per chart. You can modify X- and Y-axis labels only in Multiplan.
- Bar Charts. BGP allows a maximum of five legends and twelve data groups per chart. You can modify Y-axis labels only in Multiplan.
- Pie Charts. BGP allows a maximum of eight segments per chart. You can modify pie chart labels only in BGP.
- Pie and Bar Charts. If you attempt to graph only one entry and it has a value of zero, BGP begins to graph the data, stops, and returns to Multiplan.

When You Are Modifying

- If all or some of the picture area appears to be deleted, redraw the picture by pressing CODE, holding it down, and pressing the letter D.
- If you try to modify a label within a chart, and BGP beeps when you press GO, return to the top-level menu. Press MODIFY. If only the first three functions appear at the bottom of the screen, press NEXT until Pattern, Axes, and Format appear. Modify the label.
- If you try to modify a label within an object (not a chart), and BGP beeps when you press GO, press NEXT until the following conditions are true:

1 A flashing box cursor surrounds the object you want to modify.

2 When you enter MODIFY from the top-level, Pattern, Axes, and Format are not displayed.

Modify the object. If BGP still beeps when you press GO, you merged or created at least one empty object. Delete each empty object by pressing f3 (Delete), the second-level function within MODIFY.

- You might want to create a picture file named *Color* for two reasons:

1 To remind you what colors the numbers on the screen represent, especially if you are using a monochrome workstation.

2 To remind you what color pens ribbon should be in your plotter printer in order to match the colors indicated on the screen.

For example, create a file with the words *Color 1, Color 2, Color 3, Color 4, Color 5, Color 6, Color 7,* and *Color 8.* Create each label as a separate object and modify it with the color it represents. Either print the file and post it where you can easily refer to it, or open the file when you need it. If you do not have a color workstation, include the name of the color that each label represents.

On a color monitor, the default screen palette does not match the default printer palette.

Default Screen Palette

Color 1: green
Color 2: dark blue
Color 3: red
Color 4: light blue
Color 5: magenta
Color 6: white
Color 7: yellow
Color 8: black (background on screen)

Default Palette for Color Printers

Color 1: green
Color 2: blue
Color 3: rose
Color 4: purple
Color 5: orange
Color 6: dark grey
Color 7: yellow
Color 8: dark brown (background on screen)

The palette file, <sys> Colorprinter.pl, contains the color configuration for these colors. In order for the colors displayed on your screen to correspond to the colors in which the printer will print your picture, you must load the ColorPrinter.pl file into your system *every time you create a new picture in BGP, or when you want to print a picture which was not previously saved with the Colorprinter.pl file.* (See PALETTE funtion for loading instructions).

When You Are Finishing

- When you end a BGP session by pressing FINISH, BGP saves the picture file into the file name displayed at the bottom of the screen.

If you do not want to overwrite an existing file, change the file name before pressing GO. If you press GO when no file name is displayed, the picture file will not be saved anywhere.

When You Are Making Hard Copies

- Make a habit of saving before printing so that you don't lose any of the work from your current session.
- If your plotter does not have enough pens to match the colors you specified, the plotter stops and BGP asks you to place the new pen in a specific position.

  If you exit BGP before receiving this message, you will not receive BGP's request for a new pen unless you enter BGP, Spooler Status, or any BTOS word processor. The plotter does not resume unless you tell it to do so.
- If you are plotting, arrange your pens either in the same order as the default colors, or as you have modified them in the palette function. The default colors are listed in this appendix, under When You Are Modifying.
- If you are printing to an AP 1311, an AP 1351,or and AP 1351-1, refer to the printer default colors listed in this appendix, under When You Are Modifying.
- If you want to cancel a direct print before it finishes, press the CANCEL key.
- If you want to cancel a spooled or direct print before it finishes, follow the instructions for your printer:

AP 1311, AP 1314, AP 1351, AP 1351-1, AP 1354, and B 9253 Printers

1 Deselect the printer (press SEL or Ready to turn off the LED).

2 For *spooled printing*, Press f3 (Cancel).

  For *direct printing*, press the CANCEL key.

3 Press the line feed button to align the top of the paper correctly. Refer to your printer manual if necessary.

4 Turn off the printer, then turn it on.

  The SEL or Ready LED turns on automatically.

AP 9208 Printer

1 Turn off the printer.

2 For *spooled printing*, press f3 (Cancel).

For *direct printing*, press the CANCEL key.

3 Turn on the printer.

4 Wait for the printer to be ready before you resume printing.

Spooling to the AP 9208

When spooling to an AP 9208 laser printer, do not allow more than one chart to be queued. When two or more charts are queued, the second and/or subsequent charts may be corrupted upon printing.

Note: *If you are spooling to an AP 9208 laser printer, and your BTOS workstation is connected to an XE 520, you must do the following:*

- *Connect the AP 9208 laser printer to one of the RS-232 ports on your BTOS workstation.*
- *Install the spooler at your BTOS workstation by typing* ***install spooler*** *from the Executive and pressing GO.*
- Although it is possible to display pictures of great complexity, some pictures cannot be printed, depending on the amount of memory required. Note that plotters can plot pictures of greater size. The maximum picture size that BGP will *print* is approximately 80K bytes.

  If you need to determine the number of K bytes in your picture file, do the following:

  1 From the Executive, type **files** and press RETURN.

  2 Type the name of the file (including the *.pic* suffix) and press RETURN.

  3 Type **y** for *Details* and press GO.

  4 When the file is listed, divide the *length* number by 1024.

  5 If the result is approximately 80K or less, you can print your picture.

If you try to print a picture that is too large, the following message will be displayed:

Insufficient Memory. Press CANCEL to Resume. (Error 7649)

To recover from this error, press the CANCEL key (not the Cancel function key) and return to the Executive. Determine the size of your picture file (as stated above). If your picture file is less than 80K, do one of the following:

- If BGP is running in a multipartition operating system, increase the size of the partition in which BGP is running. For information on increasing partition memory, refer to the *BTOS Context Manager Operations Reference Manual* (relative to release level 2.1 or higher).
- If BGP is running in a single partition operating system, additional memory is required to print the picture.

Glossary

If the term you need to know pertains to the screen display, refer to BGP Screen Displays in Section 1, Getting Acquainted with BGP.

If the term you need to know pertains to any element of a chart, refer to How to Make Charts in Section 3, User Guide.

arrow An arrow points to a location in the current object.

arrow key One of the four arrow keys that control the arrow's movement within the picture area.

attribute A characteristic of an object, label, or data representation, such as the size, pattern, font, or color.

autosort A parameter in the Axes second-level function in MODIFY that sorts segments of a pie chart in ascending order, going clockwise.

axes specifications The specifications that define X and Y axes.

bar chart A type of chart that represents data in groups of bars. Each bar in a group represents a category.

box cursor A box that surrounds a label (text), an object, or a portion of a picture.

cell One position on a Multiplan spreadsheet where a value can be stored.

chart A graphic representation of spreadsheet data. Business Graphics Package produces bar, line, and pie charts.

color BGP provides eight numbers to chose colors for plotting or printing. Appendix A, Error Prevention Techniques, contains the default colors.

column A column is a vertical line of cells in a Multiplan spreadsheet.

command Multiplan offers several commands. The Graph command allows you to access BGP.

comparative bar chart A bar chart with separate bars for each category of data.

current object The object to which BGP applies your modifications. When several objects are present, only one of them can be the current object at any time. CODE-V indicates the current object.

data Multiplan provides the data that BGP uses to create charts. Data values are extracted from Multiplan spreadsheets and cannot be modified in BGP.

Executive The Command level that allows you to access BGP, Multiplan, and other applications.

extract Describes the process of slightly removing a segment from a pie chart.

font A typeface or style of lettering.

format The format of an object contains every attribute except Multiplan data and scale information.

format file Saves the format of an object and allows you to create more charts with a similar format.

function key Includes keys f1 through f10. BGP assigns different functions to each key every time the menu changes. The f10 key is the only key that maintains the same function (exit from current function) in all menus. The f9 key is not used in any menu.

grid Both bar and line charts contain grids. Bar chart grids consist of one horizontal line at each numbered tick on the Y axis. Line chart grids also contain a vertical line at each labeled tick on the X axis.

label An object or area within an object that contains only text.

legend A bar in a bar chart; a line in a line chart.

line chart A type of chart that represents data with lines. Each line represents a category of data. A line chart is frequently used to show trends.

menu A display at the bottom of the screen to represent the functions that correspond to the function keys.

message Prompts you to make an entry.

Multiplan A BTOS package that allows you to create spreadsheets. You can create a chart from a file in Multiplan by using the Graph command.

object One or more charts, a label (text), or a merged file. Several objects can appear in the picture area at one time; they may or may not overlap each other.

palette You can select a palette of eight colors from 64 possible combinations. The PALETTE function allows this and is available only to workstations that include color monitors.

palette file Saves the palette colors from the current object and can be used to create more than one chart with identical colors.. parameter. One or more parameters appear in a parameter menu, which allows you to change one or more attributes at a time. Each parameter applies to a specific attribute.

parameter menu Appears on the right side of the screen in some functions. A list of parameters, position indicator, and/or size indicator might appear in this area.

pattern Used in bar and pie charts to distinguish one category of data from another. Examples of patterns include solid fills, empty fills, diagonal striping, cross-hatching, and checkered boxes.

pen In the PALETTE function, a pen is number that appears in the Pen parameter of Modify (PALETTE's second-level function). A palette color appears next to each pen.

picture All the information that appears in the picture area of the screen.

picture area The largest area on the screen where charts and text are displayed.

picture file Saves everything within the picture area, including all objects, data, and attributes.

pie chart A type of chart composed of pie segments. Each segment represents a category of data. A pie chart is frequently used to show a comparison of several groups of data as parts of a whole.

plot Describes the activity of plotting on an output device.

plotter An output device that uses pens to transfer the contents of a picture area to hard copy.

position indicator Appears on the right side of the screen. The numbers represent the location of the arrow within the picture area.

printer configuration file Contains specific information to determine what printers are available on a given installation.

row A horizontal line of cells across a Multiplan spreadsheet.

SAVE A top-level function that saves the contents of a picture area into a picture file and/or saves modifications from being lost should an error occur.

segment Pie charts are separated into segments. Each segment represents the percentage of each category of data (as compared to the sum).

Size indicator Appears on the right side of the screen. The numbers represent the size of the box cursor.

stacked bar chart A bar chart with only one bar in each group. Each bar is divided into sections that represent each category of data. The effect shows the sum of categories for each group.

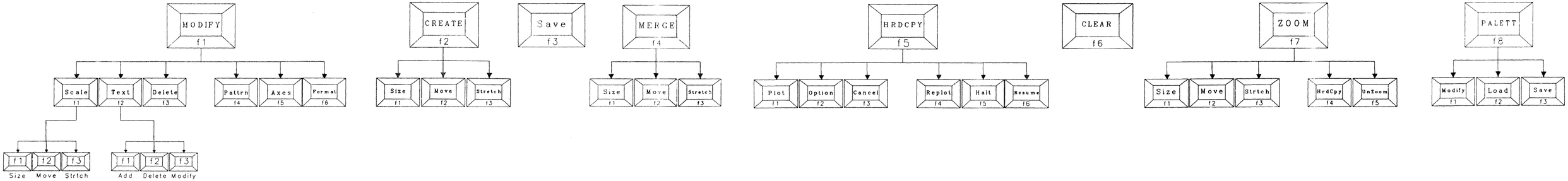
text Some text is automatically generated by BGP when charts are created. You can add text to objects and create new objects that contain only text. Text is also called a label.

tic Divide each interval in X and Y axes into smaller increments. For example, if an interval is labeled every 100 units, 4 tics divide an interval into increments of 25. (The labeled interval is included as the first tic.)

Menu Diagram

This appendix contains a diagram of the entire menu structure in Business Graphics Package (BGP). Remove this diagram and post it where you can refer to it easily. Use it to find functions and menus. Try the exercise in How to Choose the Right Function in Section 4, BGP Functions.

BGP Functions



f10

This key is in all second- and third-level menus.
Use it to return to the next highest menu.

E6671

Printer/Plotter Configuration Files

In order to print BGP graphics from your workstation, you must have BTOS Systems Graphics software and specific printer/plotter configuration files installed on your system. You need only those files that correspond to your particular printing device. If any of these files are not already present on your system, create them with the BTOS Editor.

Direct Printing

The following describes how to configure your cluster workstation for a printer that is connected directly to your workstation:

1 Check the Sys.printers file in the <Sys> directory: Be sure an entry exists for each printer attached to your workstation.

Spooled Printing

The following describes how to configure your system for a printer that is available to several workstations. (Complete only those instructions that are marked *X* under the system you're configuring, and complete the steps in the order in which they are listed.)

Procedure	Master	Stand-alone	Cluster
1 Check the Queue.Index file in the <Sys> directory: Be sure the file contains one entry for every printer attached to this workstation.	X	X	
2 Check the SplCnfg.sys file in the <Sys> directory: Be sure the file contains one entry for every printer attached to this workstation.	X	X	X

Procedure	Master	Stand-alone	Cluster
3 If queue manager and spooler *are* installed:			
a Reboot the workstation.	X	X	X
b Type **Install Queue Manager** in the Command line of the Executive and press GO.	X	X	X
c Type **Install Spooler** in the Command line of the Executive and press GO.	X	X	X

Note: *After you reboot your workstation, be sure BTOS Systems Graphics is on your system; if it is not, type* ***Install Graphics Manager*** *in the Command line of the Executive and press GO.*

If queue manager and spooler *are not* installed:			
a Proceed with steps b and c above.	X	X	X
4 Verify queue manager and spooler installation:			
a Type **Spooler Status** in the Command line of the Executive; your printers should be listed if queue manager and spooler have been installed correctly.	X	X	X
5 Check the Sys.Printers file in the <Sys> directory: Be sure the file contains one entry for every printer you want to access from this workstation.	X	X	X

Tips

- In a cluster environment, one workstation can access any printer; however, a maximum of three printers may be physically attached to one workstation.

- If your workstation is connected to multiple printers and you want to reserve one printer for direct printing from your workstation while spooling to the other printers, do not create entries for that printer in the Queue.Index and SplCnfg.Sys files on your system. However, you must still have an entry for that printer in the Sys.Printers file.
- Whenever you change any of the Sys.Printers, Queue.Index, or SplCnfg.Sys files, you must reboot the workstation and reinstall the queue manager and the spooler.
- If your system is configured correctly for spooled printing, you will see the message, *Spooling...*, at the bottom of the BGP screen after you invoke the HRDCPY function.
- If you have followed these instructions but are unable to print a document, consult the *BTOS Hardware Installation Guide*, *BTOS Standard Software Operations Guide*, and/or the operations guide specific to your printer or plotter.

Sample Configuration Files

Following are sample configuration files for various printers. Be sure you have installed or created the correct file for your printing device, and that the different files correspond with one another: for example, if you have an entry for the AP 1314 printer in the Queue.Index file, you must also have an entry for that printer in the Sys.Printers and the SplCnfg.Sys files.

Soft copies of the Sys.Printers, Queue.Index, and SplCnfg.Sys files are also available on BTOS Systems Graphics, release 1.3. Sample entries of these files are available in <Config><Sample>Sys.Printers.

Caution: *Use these sample entries for reference only. Do not copy them to to your system.*

Sys.Printers Entries

Serial	:[Ptr]B&[SYS]<sys>PtrBConfig.sys,[SplB]	:Diablo630
Parallel	:[Lpt]&[SYS]<sys>LptConfig.sys,[Spl]	:Draft
PTRB	:[Ptr]B&[SYS]<sys>PtrBConfig.sys,[SplB]	:Diablo630
LPT	:[Lpt]&[SYS]<sys>LptConfig.sys,[Spl]	:Draft
AP1311	:[lpt]&[SYS]<sys>GraphicsPrinterConfig.sys,[AP1311]	:Draft :AP1311
AP1351	:[lpt]&[SYS]<sys>GraphicsPrinterConfig.sys,[AP1351]	:Draft :Prism
B9253	:[lpt]&[SYS]<sys>GraphicsPrinterConfig.sys,[B9253]	:Draft :Okidata
HP7475A	:[Comm]A&[SYS]<sys>HPPlotterConfig.sys,[HP7475A]	: :HP7475A
HP7470A	:[Comm]A&[SYS]<sys>HPPlotterConfig.sys,[HP7470A]	: :HP7470A
AP1314	:[lpt]&[SYS]<sys>GraphicPrinterConfig.sys,[AP1314]	:Draft :AP1314
AP1354-80	:[lpt]&[SYS]<sys>GraphicPrinterConfig.sys,[AP1354]	:Draft :AP1314
AP1354-132	:[lpt]&[SYS]<sys>GraphicPrinterConfig.sys,[AP1354]	:Draft :AP1354
AP1351-80:	[lpt]&[SYS]<sys>GraphicPrinterConfig.sys,[AP1351]	:Draft :AP1351
AP9208:	[Ptr]B&[SYS]<sys>LaserPrinterConfig.sys,[AP9208]	:Diablo630 :AP9208
AP9208L	:[Ptr]B&[SYS]<sys>LaserPrinterConfig.sys,[AP9208]	:Diablo630 :AP9208L
AP9208M	:[Ptr]B&[SYS]<sys>LaserPrinterConfig.sys,[AP9208]	:Diablo630 :AP9208M

Note: *BGP accepts only the first ten graphics printer entries in the Sys.Printers file and ignores all other entries. Each printer entry must have a unique "friendly name" and a unique graphics type (see* BTOS Systems Graphics Programming Reference Manual *for a detailed explanation of these fields). The friendly names are displayed as options in the HARD COPY function.*

Note: *Use entry AP 9208L to use the AP 9208 laser printer to print in landscape mode. Pictures printed in landscape mode may be slightly smaller than pictures printed in portrait mode.*

Queue.Index Entries

SPL/[SYS]<Spl>SPL.QUEUE/1/1

PARALLELCONTROL/[SYS]<Spl>PARALLELCONTROL.QUEUE/1/1
SERIALCONTROL/[SYS]<Spl>SERIALCONTROL.QUEUE/1/1
SPLB/[SYS]<Spl>SPLB.QUEUE/1/1
SPOOLERSTATUS/[SYS]<Spl>SPOOLERSTATUS.QUEUE/1/1

HP7475A/[SYS]<spl>HP7475A.queue/1/1
HP7475ACONTROL/[SYS]<spl>HP7475ACONTROL.queue/1/1

HP7470A/[SYS]<spl>HP7470A.queue/1/1
HP7470ACONTROL/[SYS]<spl>HP7470ACONTROL.queue/1/1

AP1311/[SYS]<spl>AP1311.queue/1/1
AP1311CONTROL/[SYS]<spl>AP1311CONTROL.queue/1/1

AP1314/[SYS]<spl>AP1314.queue/1/1
AP1314CONTROL/[SYS]<spl>AP1314CONTROL.queue/1/1

AP1351/[SYS]<spl>AP1351.queue/1/1
AP1351CONTROL/[SYS]<spl>AP1351CONTROL.queue/1/1

AP1354/[SYS]<spl>AP1354.queue/1/1
AP1354CONTROL/[SYS]<spl>AP1354CONTROL.queue/1/1

AP9208/[SYS]<spl>AP9208.queue/1/1
AP9208CONTROL/[SYS]<spl>AP9208CONTROL.queue/1/1

B9253/[SYS]<spl>B9253.queue/1/1
B9253CONTROL/[SYS]<spl>B9253CONTROL.queue/1/1

Note: *You must include the first five entries of this file and* both *Queue.Index entries that correspond to your printing device.*

Note: *Use the AP 9208 entries for each AP 9208 graphics type.*

SplCnfg.Sys Entries

0/AP1351/AP1351/[SYS]<sys>GraphicsPrinterConfig.sys/130/n
A/HP7475A/[SYS]<sys>HPPlotterConfig.sys/130/n
B/AP9208/AP9208/[SYS]<sys>LaserPrinterConfig.sys/130/n

Note: *Each of these entries corresponds to a specific output port on your printer or plotter. Use the following table to determine which entry you need for your output device.*

Port Entry	For
0	Printer connected to the parallel port
A	Printer/Plotter connected to the serial A port
B	Printer/Plotter connected to the serial B port

NOTES

Index

Title: _____

Form Number: _____ Date: _____

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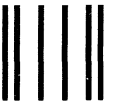
Area Code



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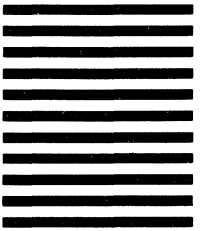

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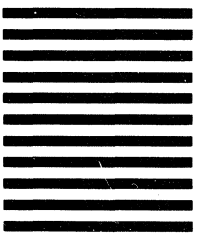

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