SPERRY
UTS 30
Business Graphics Utility
User Guide

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SPERRY®
UTS 30
Business Graphics
Utility

User Guide

UP–10680 Rev. 1

This library memo announces the release and availability of "SPERRY UTS 30 Business Graphics Utility User Guide," UP–10680 Revision 1. It is a Standard Library Item (SLI).

This guide contains the instructions for use of the SPERRY UTS Business Graphics Utility with a programmable SPERRY UTS 30 Single Station. This utility provides the capability of creating and presenting charts. With this utility, a user can enter specifications, via the UTS 30 keyboard, that define line, bar, text, pie, and composite graphs for use in reports or slide presentations. The utility is provided on a 5¼-inch diskette for loading from a SPERRY 8439 Double-Sided Diskette Subsystem.

This revision adds instructions for using the UTS 30 as a slide show projector and specifying the order in which slides are presented.

Destruction Notice: This release supersedes and replaces "SPERRY UTS 30 Business Graphics Utility User Guide," UP–10680, released on Library Memo dated November 1984. Destroy all copies of UP–10680 and the library memo.

Copies of this manual can be ordered from your Sperry representative.

LIBRARY MEMO ONLY	LIBRARY MEMO AND ATTACHMENTS	THIS SHEET IS
Lists MAC, MCZ, MMZ	Lists MCS, MCT, MZZ, 82 (73 pages plus library memo)	Library Memo for UP–10680 Rev. 1
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Contents

CONTENTS

5.   SPECIFIC CHART MENUS

6. ERROR MESSAGES AND RECOVERY

FIGURES

USER COMMENT SHEET

TABLES

1. Introduction

This manual contains the information required to use the SPERRY Universal Terminal System (UTS) 30 Business Graphics Utility (BGU). BGU is designed to run on the monochrome programmable graphics terminal version of the SPERRY UTS 30 Single Station. The utility provides two basic functions: the creation and presentation of charts and graphs. Using BGU, you can enter specifications via the keyboard for the purpose of defining line, bar, text, pie, and composite charts for use in reports or slide presentations. You can create storage elements containing the graphics specifications and the data. This allows you to display a graph without reentering the graphics specifications or the data. Before you begin using BGU, you should be familiar with the UTS 30 single station.

1.1. HARDWARE REQUIREMENTS AND OPTIONS

To use BGU, you must have the following SPERRY products:

- UTS 30 programmable single station

- F3987–03 memory/graphics board with 128K RAM expansion

- 8439 diskette subsystem with at least one diskette drive

In addition, BGU supports the SPERRY Model 35 Printer and the Hewlett Packard* HP7475A Plotter.

1.2. RELATED PUBLICATIONS

Consult the current versions of the following SPERRY publications for further information:

- UTS 30 Single Station Operator's Reference, UP–9798

- UTS 30 Diskette File Utility User Guide, UP–9823

- UTS 30 Single Station Verification Guide, UP–9804

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*Hewlett Packard is a registered trademark of Hewlett Packard, Inc.

1.3. MENUS AND PROMPTS

The BGU program product is an "interactive" program in that you interact with the program by responding to certain screen messages. These messages or "prompts" require your input. Other messages simply supply information and do not require your response. The utility specifies the range of acceptable answers in a series of information lines following the actual prompt. Such a multiline prompt is called a "menu." You must select a menu option to perform the corresponding operation.

Each input field is marked with underscores. In most cases a default response is supplied. You can accept the default contents of a field by pressing the TAB FORWARD key to move to the next field, or enter a new value in place of the default. However, the default values are not always displayed.

In some cases, the specification is limited to a list of values, for example, a list of line styles. In these cases, the values listed are paired with a numeric code (for example, "1 solid"). The number is entered in the input field rather than the longer word or words.

Sometimes the usefulness of a specification depends on the presence of another specification, for example, subtitle font has no meaning if a subtitle has not been defined. In these cases, the dependent fields and their prompts are not displayed.

When a set of prompts is presented, the cursor is positioned at the start of the first input field. You can move the cursor from field to field, forward and backward, to enter and correct the data within the fields.

When the XMIT key is pressed, the data is accepted and processed by BGU. If all the data is accepted, the next screen is displayed. If an error is detected, an error message is displayed on the bottom line of the screen, the cursor is positioned at the affected field, and input is enabled. Your entries are still intact, and any of them may be altered. You can then press XMIT for another try at processing the data.

Input responses are checked for validity. Numeric input is checked for valid numeric representation and range of the value. Other entries are also checked, and, when errors are found, error messages are issued and recovery is allowed.

1.4. TYPES OF CHARTS

There are four basic types of charts. Text charts display text. Bar graphs, pie charts, and line graphs display data graphically. A fifth type of chart, the composite chart, allows you to combine several charts to create one new chart.

1.4.1. Text Charts

Text charts (figure 1-1) are used to display written information. You can select the letter style (font), positioning of the text (justification), and the size of the characters for each line of text.

Because of differences in font sizes, the output from a single screen of information may not fill the output medium. Therefore, multiple screens or pages of text can be specified for a single chart.
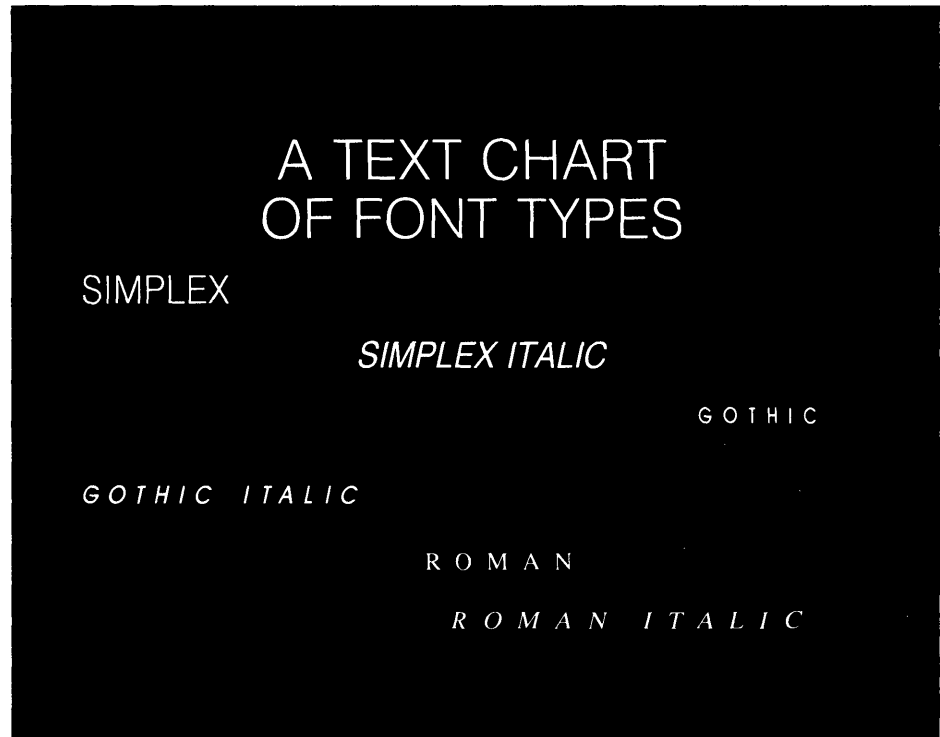
Figure 1-1. Text Chart

1.4.2. Pie Charts

Pie charts (figure 1-2) display several related data items at once as sectors (pieces) of a pie. The larger the value of an item, the larger the sector. To determine the size of a sector, all the data items are added by BGU to give the total value of the pie (circle). Each sector's percentage of the total becomes its percentage of the circle. A sector can be offset from the rest of the pie to emphasize it.

1.4.3. Bar Graphs

Bar graphs (figure 1-3) display the value of a data item as the length of a bar (rectangle). Bars start on a baseline and extend in a positive or negative direction. The bars can be horizontal or vertical. Bar charts can also be used to display multiple sets of data.
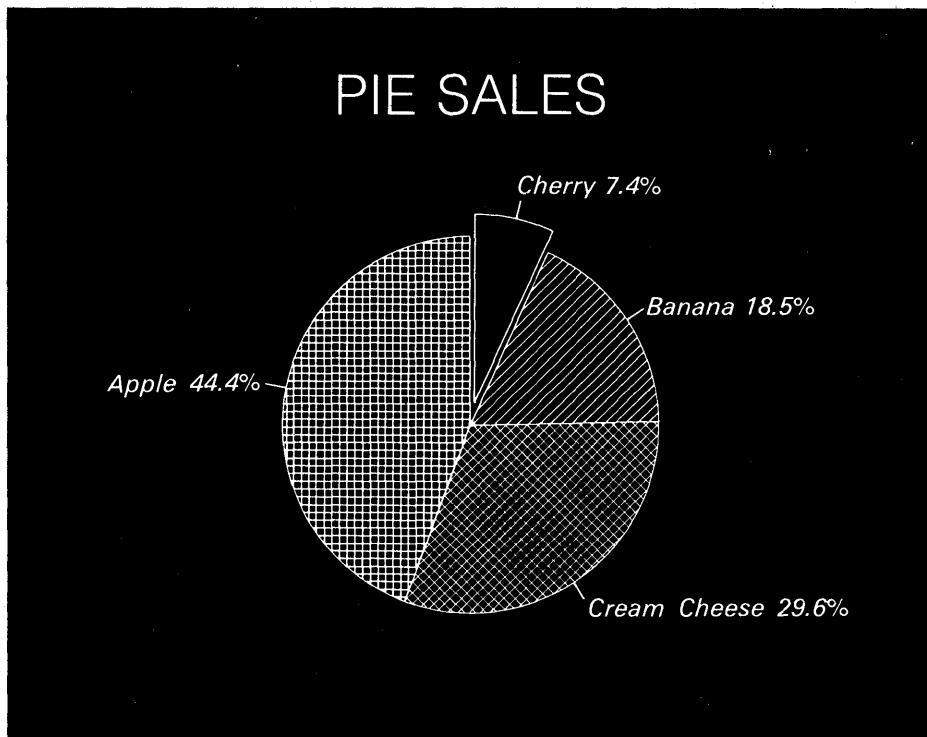
Figure 1-2. Pie Chart
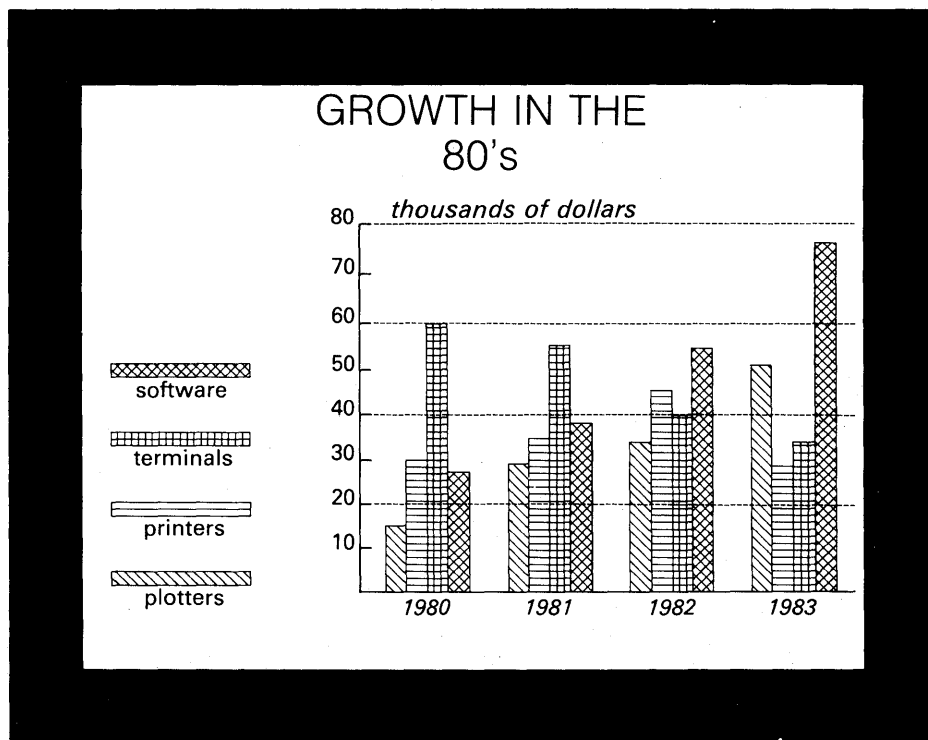
Figure 1-3. Bar Graph

1.4.4. Line Graphs

Line graphs (figure 1–4) are used to show trends and display large amounts of data. Multiple lines (data sets) can be plotted on one chart to show the relationship between measured quantities.
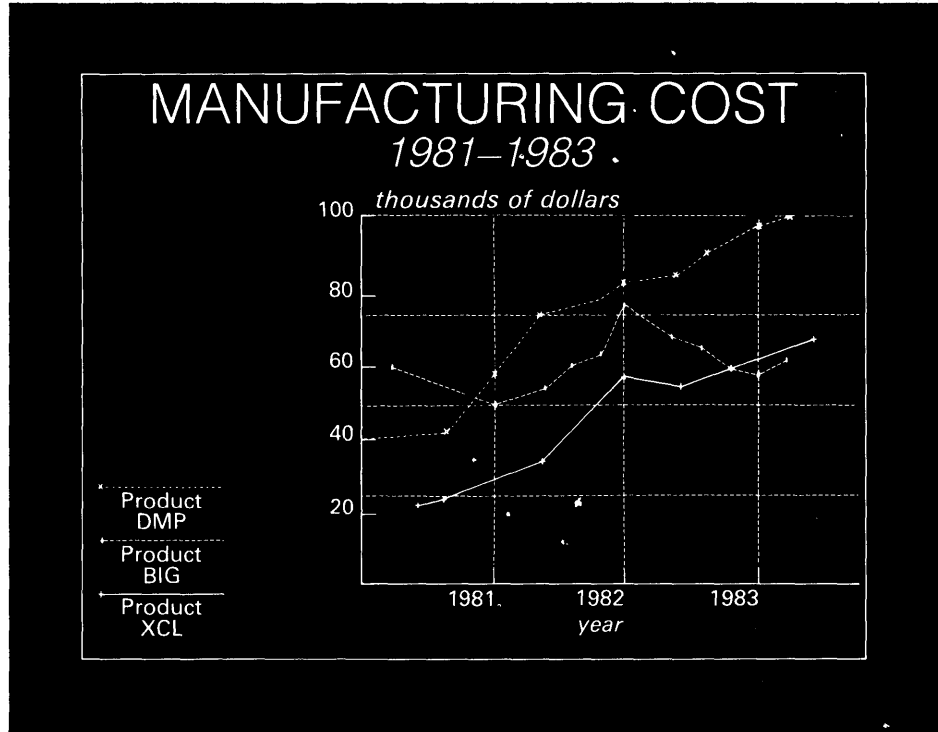
Figure 1–4. Line Graph

1.4.5. Composite Charts

A composite chart (figure 1–5) is formed when two or more charts are combined. BGU allows you to specify the size and position of each chart on the output form.

1.4.6. Slide Presentation Feature

The slide presentation feature allows you to display a series of charts and graphs on the terminal screen. This feature uses existing charts as input and displays them in the order you specify. The list of "slides" that you define can be saved for future use.

1.5. CHART STORAGE

Charts can be stored at numbered positions within files. A file can have up to 99 positions. Files can be thought of as slide trays for a projector: the positions correspond to slots for slides.

Charts can be removed using the "7 Delete Chart" command from the general menu (see 3.2).
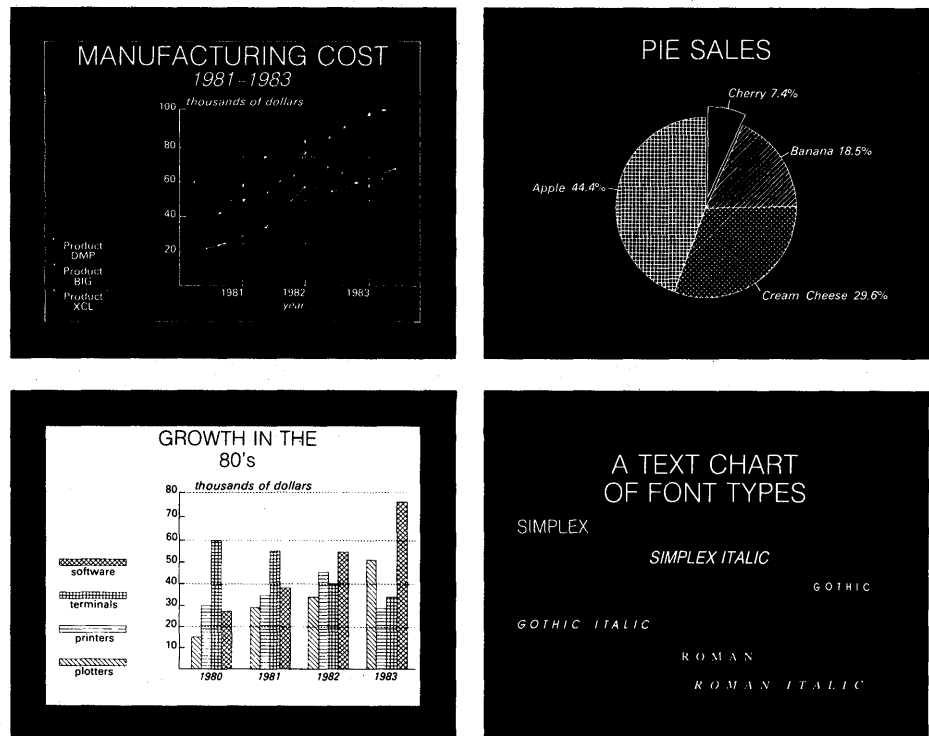
Figure 1-5. Composite Chart

The contents of a file can be listed with the "8 File Table of Contents" command from the general menu (see 3.2). This command lists the position, title, and subtitle for each chart in a file.

1.6. RESTRICTIONS

The business graphics utility must be loaded on screen 1 of the UTS 30.

2. Data and File Format

Some BGU prompts require responses in a specific format. These responses are data specification entries and file names, as explained in the following paragraphs.

2.1. DATA FORMAT

The data which defines points to be plotted, the length of bars and lines, and the size of sectors is specified by signed decimal mixed numbers in the form:

SN.nEsx

where:

S is "−" or "+" (sign) or missing.

N is a string of 0 through 9 digits.

. is "." (decimal point) or missing.

n is a string of 0 through 9 (9 − N) digits.

E is "E" or "e" (exponent) or missing

s is "+" or "−" (sign) or missing.

x is a string of 1 or 2 digits.

The sum of the number of digits represented by N + n must be greater than or equal to 1 and must not exceed 9. Leading and trailing spaces are ignored. Embedded spaces are not allowed. If "E" is missing, "s" and "x" must also be missing. The string "SN.n" is a decimal number with the usual mathematical meaning. If "Esx" is present, the value of the entry is SN.n times 10 to the sx power. A valid data value must be in the range of $-64 \leq sx \leq 63$. Nonblank characters after the data value will cause an error condition.

Examples:

0

123456789

−98765.432

−98765.43

+24.689E3 (which equals +24,689)

+369E-2 (which equals +3.69)

2.2. FILE FORMAT

A file name must be used when you create a chart you wish to save, when you create a data file, or when you wish to load an existing chart.

2.2.1. File Name and Type

The format for the file name is:

drive number:file name.type

where:

drive number is "d1" through "d4" or missing. If the drive number is not specified, the default is the last drive that was referenced, or if no prior drive has been referenced, the default is "d1."

: is ":" (colon) or missing.

file name is a string of 1 through 8 characters.

. is a "." (period) or missing.

type is a string of 1 through 3 characters or missing.

Examples:

FILE1000

File1000.

f6.G

:file

:FILE.

2:f1

d2:F6.bgu

If "drive number" is present, ":" must be present, and if "type" is present, "." must be present.

2.2.2. Graphics Files and Data Files

A graphics specifications file contains the data and graphics information needed to draw a chart. The file is created as you answer the prompts for a chart or graph and then select the "66 Save Chart" command from the chart specification menu (see 3.3). The "type" must be "BGU" or blank. If you leave "type" blank, the utility will insert "BGU." Any other type produces an error. Graphics specifications files must be created by the program. Each file can contain as many as 99 different charts.

A data file is created by another processor utility (such as UTS COBOL or UTS EDIT) and contains only the numeric data plotted for bars and lines, the file names and position numbers for slides, or the text and text format for a text chart. Data files for bar graphs, line graphs and text charts are not created by BGU. You must use another utility to create data-only files.

2.2.3. Files Created by Other Utilities

BGU will accept files built by UTS EDIT and UTS COBOL. The files must be one of the following types:

- Sequential

- Random fixed length

- Random variable length

NOTE: Random files must contain a header. A file without a header is assumed to be sequential.

See the user guide for the UTS 30 diskette file utility, UP-9823 (current version), for further information.

Paragraphs 2.3 through 2.6 describe the BGU format requirements for data files built by other utilities.

2.3. TEXT DATA FORMAT

Each record represents one line of text. The first three characters of the record are size (position 1), font (position 2), and justification (position 3). Positions 4 through 74 contain the text. Position 75 contains the number of the pen that will be used to draw the chart if the plotter is used. The text chart data menu is in 5.1.2.

2.4. BAR DATA FORMAT

The file is assumed to contain a table of strings representing numbers as described in 2.1. Each record contains one string in positions 1 through 15. The bar graph data menu is in 5.3.2.

2.5. LINE DATA FORMAT

The file is assumed to contain a table of strings representing numbers as defined in 2.1. They are ordered X(1), Y(1), X(2), Y(2), ..., and have one X,Y pair per record. In each record, positions 1 through 15 contain the X-coordinate data, and positions 16 through 30 contain the Y-coordinate data. The line graph data menu is in 5.4.2.

2.6. SLIDE DATA FORMAT

If you use a utility other than BGU to build a slide data file, the following format must be used. The list of charts that defines a slide presentation is in the form:

slide number   drive number:file name.type   position number

where:

slide number is a 2-digit number 1 through 99.

drive number is "d1" through "d4" or missing. If missing, the default is the last diskette drive that was referenced, or if no prior drive has been referenced, the default is d1.

: is ":" (colon) or missing.

file name is a string of 1 through 8 characters.

. is a "." (period) or missing.

type is a string of 1 through 3 characters or missing.

position number is a 2-digit number 1 through 99.

If "." is missing, "type" must also be missing. If ":" is missing, "drive number" must also be missing. "Slide number" is entered in positions 1 and 2, "drive number:file number.type" are entered in positions 3 through 17, and "position number" is entered in positions 18 and 19 of the record.

NOTE: In the examples below /\ denotes a space.

Examples:

25d1:slide100.bgu33

/\9File1/\/\/\/\/\/\/\/\/\5/\

99:FILE3.ss/\/\/\/\/\/\/\77

102:file2000.S/\/\/\/\25

/\51:slide100./\/\/\/\1/\

NOTE: Embedded spaces are allowed only if an item is missing or its value (number of character positions) is fewer than the maximum allowed.

3. Using BGU

3.1. LOADING AND EXITING BGU

To load the business graphics utility, place the BGU diskette into one of the diskette drives and close the door. Make sure the diskette is inserted label side up. Press and hold the FUNCTION key, while you press the "M" key. When the command menu appears on the top two lines, after the ▶ enter the following command:

load dN,bgu

N is the number of the drive containing the BGU diskette. Press XMIT. When a successful load is complete, the general menu is displayed.

To exit BGU, select option "99 Exit" from the general menu.

3.2. GENERAL MENU

The general menu (figure 3–1) presents a selection of types of graphs or charts and commands for you to choose from. When you enter the number of your selection and press XMIT, the main specification menu for the selected type of chart or graph is displayed, or the command you select (such as "7 Delete Chart") is executed. If "99 Exit" is selected, BGU returns control to the operating system.

```
                              GENERAL MENU


    Enter a selection __
        1 Text Charts
        2 Pie Charts
        3 Bar Graphs
        4 Line Graphs
        5 Composite Charts
        6 Slide Presentation
        7 Delete Chart
        8 File Table of Contents
       99 Exit


  BGU xxxxx


  Press XMIT when entry is complete.
```
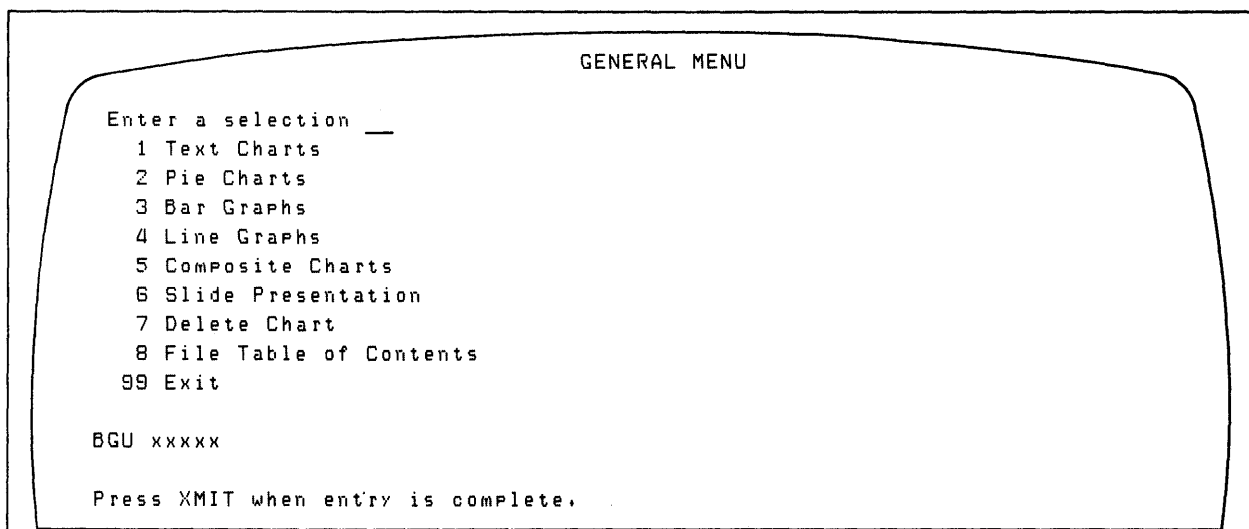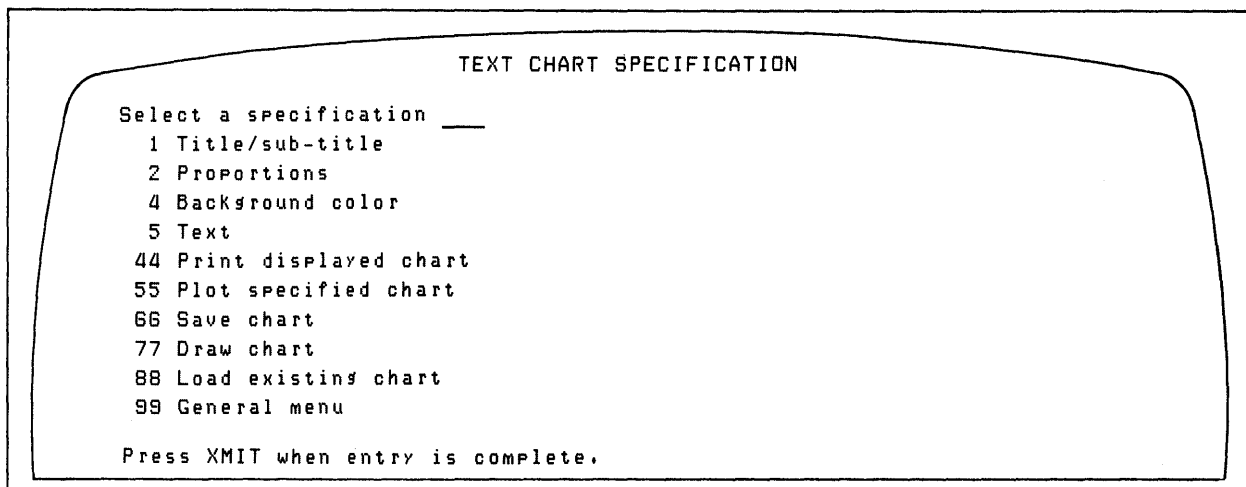
Figure 3–1. General Menu

3.3. CHART SPECIFICATION MENUS

When you select the type of chart you want to build from the general menu (see 3.2), a main specification menu for that type of chart is presented. Select the feature you want by entering the number of your selection. Press XMIT. Some feature selections present additional prompts. When you press XMIT, an additional menu (if any) appears, or the utility returns to the chart specification menu. You may repeat the same selection for inspection or change. The default values are set so you only need to input data for the selections you want to change. If you want to specify the default value, simply press XMIT.

Figures 3-2 through 3-6 are the chart specification menus for the chart types that can be selected from the general menu.
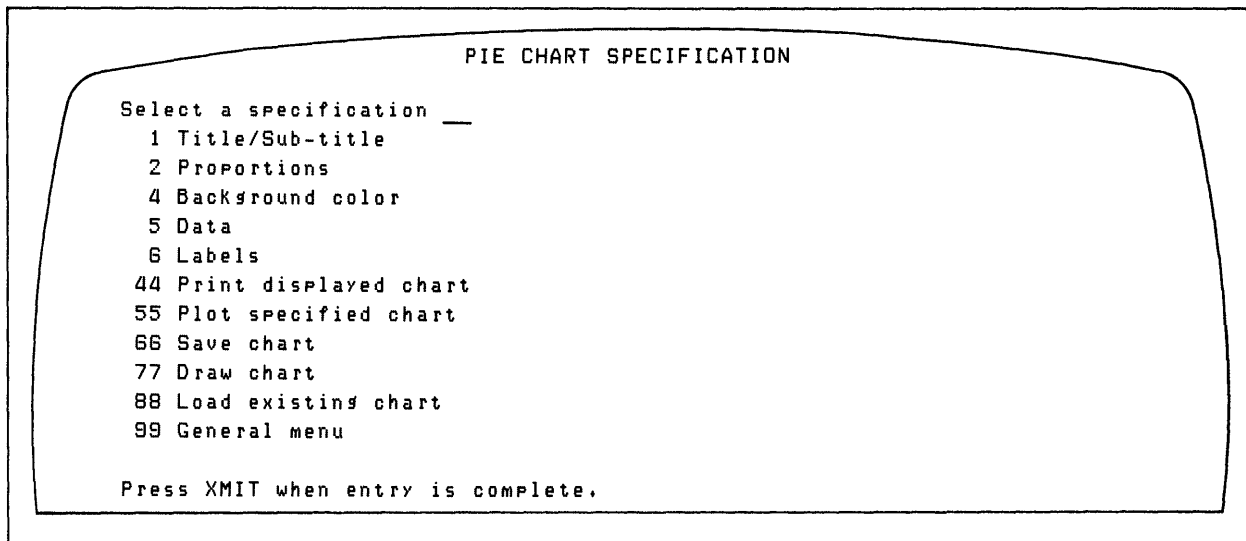
```
                        TEXT CHART SPECIFICATION

  Select a specification ___
     1 Title/sub-title
     2 Proportions
     4 Background color
     5 Text
    44 Print displayed chart
    55 Plot specified chart
    66 Save chart
    77 Draw chart
    88 Load existing chart
    99 General menu

  Press XMIT when entry is complete.
```

Figure 3-2. Text Chart Specification Menu

```
                        PIE CHART SPECIFICATION

  Select a specification ___
     1 Title/Sub-title
     2 Proportions
     4 Background color
     5 Data
     6 Labels
    44 Print displayed chart
    55 Plot specified chart
    66 Save chart
    77 Draw chart
    88 Load existing chart
    99 General menu

  Press XMIT when entry is complete.
```

Figure 3-3. Pie Chart Specification Menu

```
                         BAR GRAPH SPECIFICATION


     Select a specification
        1 Title/sub-title
        2 Proportions
        4 Background color
        5 Data
        6 Axes
        7 Tick labels
        8 Group labels
        9 Bars
       44 Print displayed chart
       55 Plot specified chart
       66 Save chart
       77 Draw chart
       88 Load existing chart
       99 General menu


     Press XMIT when entry is complete.
```
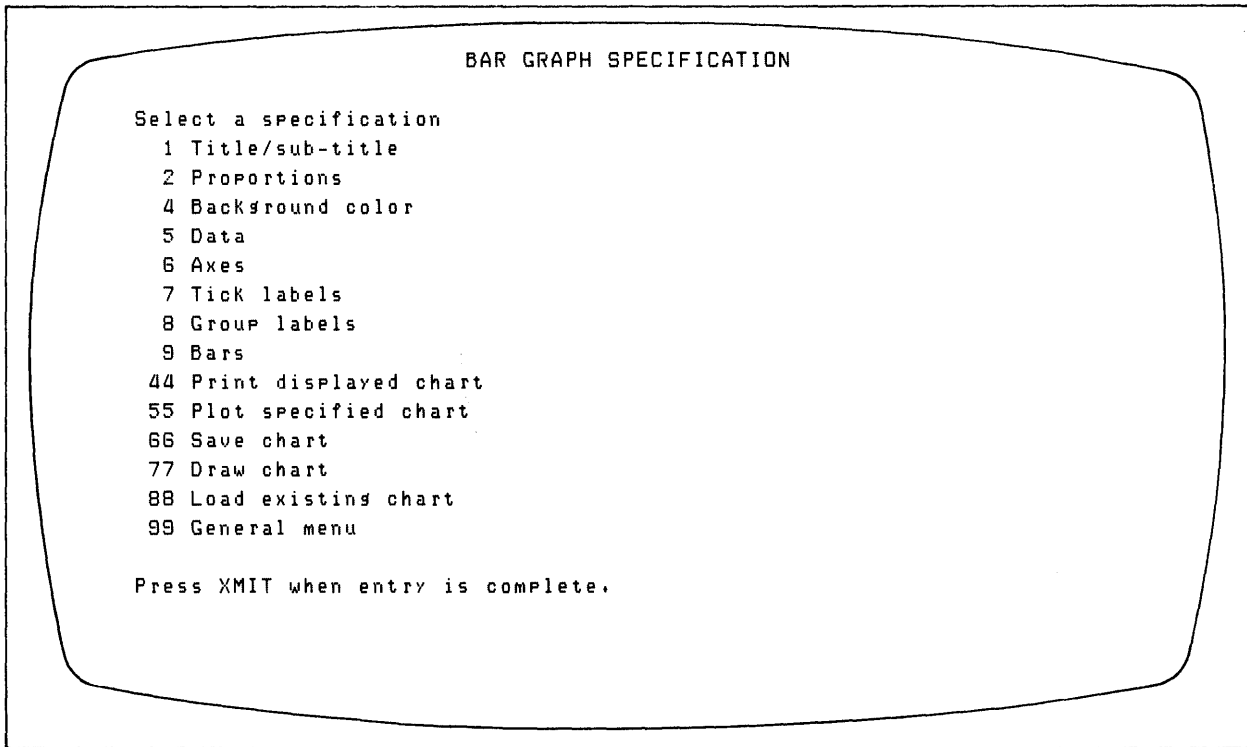
Figure 3–4. Bar Graph Specification Menu

```
                         LINE GRAPH SPECIFICATION


     Select a specification __
        1 Title/subtitle
        2 Proportions
        4 Background color
        5 Data
        6 Axes
        7 Tick labels
        8 Line
       44 Print displayed chart
       55 Plot specified chart
       66 Save chart
       77 Draw chart
       88 Load existing chart
       99 General menu


     Press XMIT when entry is complete.
```
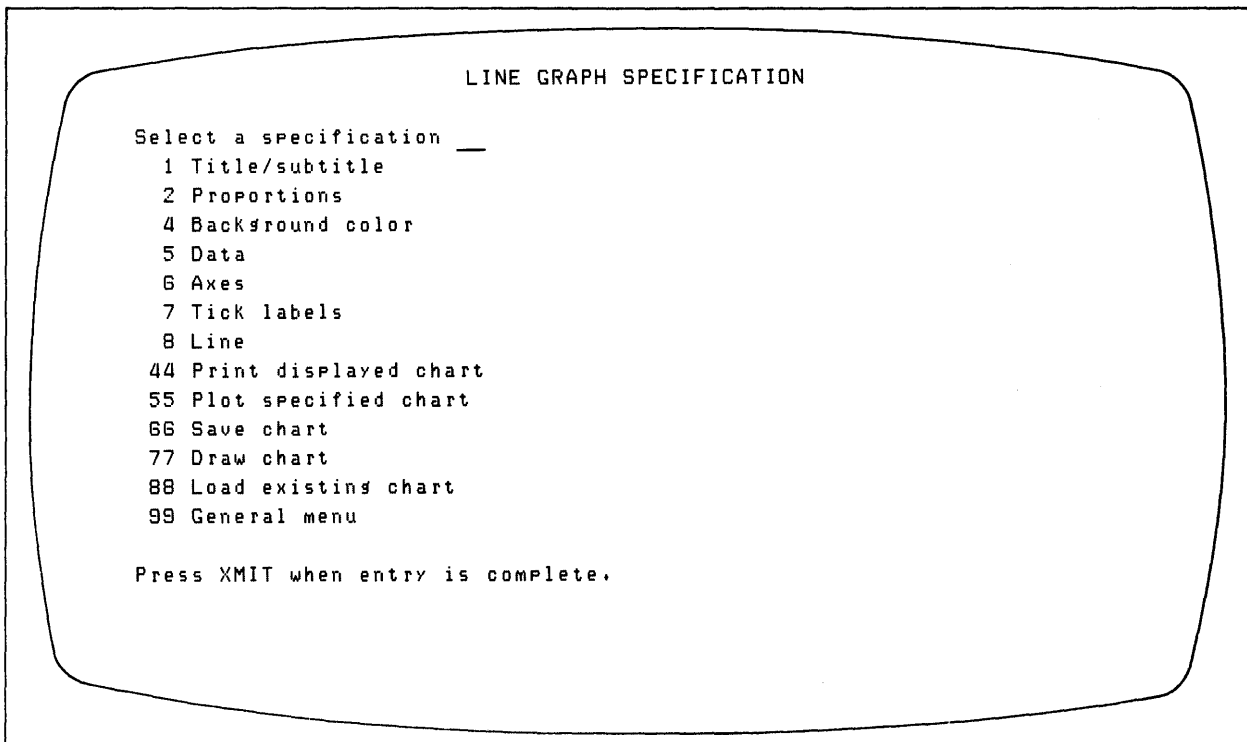
Figure 3–5. Line Graph Specification Menu

```
                    COMPOSITE GRAPH SPECIFICATION

   Select a specification __
      1 Title/sub-title
      2 Proportions
      4 Background color
      5 Define area
     44 Print displayed chart
     55 Plot specified chart
     66 Save chart
     77 Draw chart
     88 Load existing chart
     99 General menu

   Press XMIT when entry is complete,
```
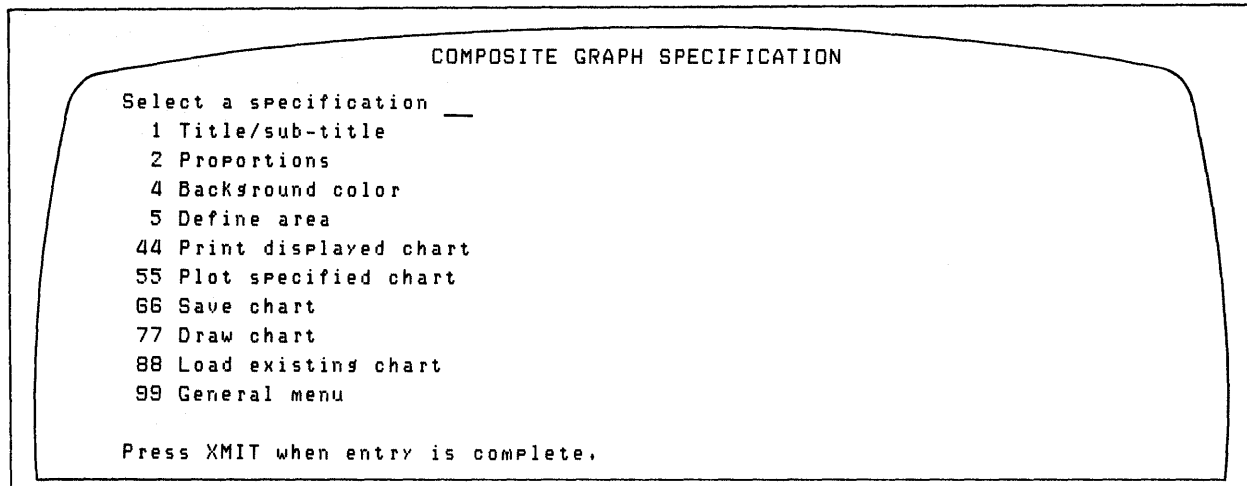
Figure 3-6. Composite Chart Specification Menu

Figure 3-7 is the specification menu for the slide presentation feature provided by BGU.

```
                    SLIDE PRESENTATION SPECIFICATION

   Select a specification __

      1 Slide show data
      2 Show slides
     44 Print list of slides
     66 Save sequence of slides
     88 Load existing slide file
     99 General menu

   Press XMIT when entry is complete,
```
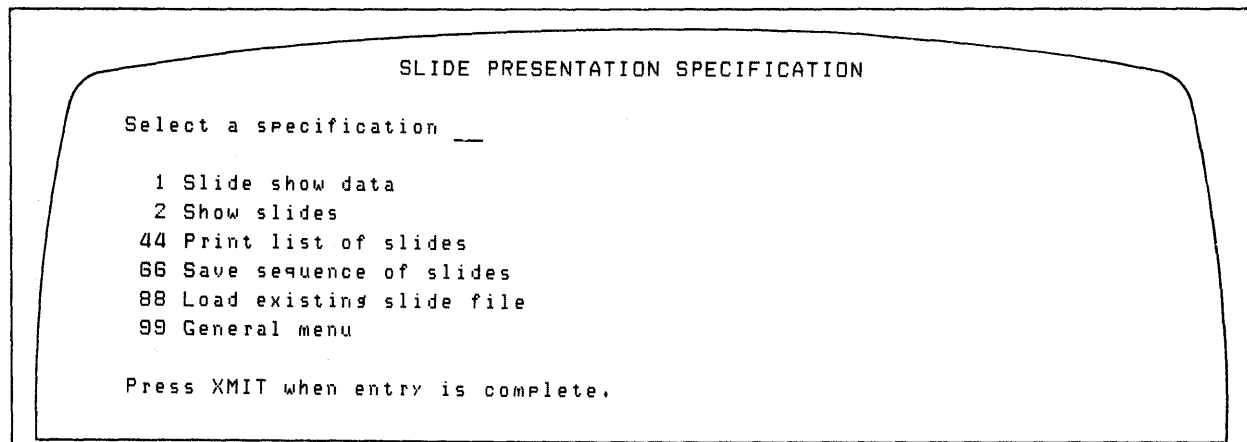
Figure 3-7. Slide Presentation Specification Menu

3.4. FINDING INFORMATION IN THIS BOOK

Section 4 describes the BGU features that are common to more than one type of chart. These include screen displays and commands that are initiated from the general and chart specification menus. Section 5 describes the selections, screen displays, and function keys that are specific to one type of chart.

To help you find reference information quickly in this book, tables 3-1 and 3-2 list the selections on the general menu and the chart specification menus along with their text references.

Table 3-1. General Menu Selections

Selection	Text Reference
1 Text Charts	5.1
2 Pie Charts	5.2
3 Bar Graphs	5.3
4 Line Graphs	5.4
5 Composite Charts	5.5
6 Slide Presentation	5.6
7 Delete Chart	4.2.7
8 File Table of Contents	4.2.8
99 Exit	3.1

Table 3-2. Chart Specification Menu Selections (Part 1 of 2)

Selections for All Chart Types	
Selection	**Text Reference**
1 Title/sub-title	4.2.1
2 Proportions	4.2.2
4 Background color	4.2.3
44 Print displayed chart	4.4.1
55 Plot specified chart	4.5.1
66 Save chart	4.2.4
77 Draw chart	4.2.5
88 Load existing chart	4.2.6
99 General menu	3.2
Additional Selections for Text Charts	
5 Text	5.1.2
Additional Selections for Pie Charts	
5 Data	5.2.2
6 Labels	5.2.3
Additional Selections for Bar Graphs	
5 Data	5.3.2
6 Axes	5.3.3
7 Tick labels	5.3.4
8 Group labels	5.3.5
9 Bars	5.3.6

Table 3–2. Chart Specification Menu Selections (Part 2 of 2)

Selection	Text Reference
Additional Selections for Line Charts	
5 Data	5.4.2
6 Axes	5.4.3
7 Tick labels	5.4.4
8 Line	5.5.5
Additional Selections for Composite Charts	
5 Define area	5.5.5
Selections for Slide Presentation	
1 Slide show data	5.6.2
2 Show slides	5.6.3
44 Print list of slides	4.4.2
66 Save sequence of slides	5.6.6
88 Load existing slide file	5.6.7

4. Common Features

4.1. SIZE, FONT, AND JUSTIFICATION

You can specify character size, style, and position for most of the text portion of a chart. The size of the text can be specified in a range of small, medium, or large. The font specification is the style of the text. BGU offers three software fonts in either straight or italic print, and one hardware font. Figure 1-1 shows examples of the available fonts.

NOTE: The hardware font is not plotted by BGU as are the other fonts. In selecting fonts for various uses in text strings, remember that the hardware font differs from other text fonts in the following ways:

Character sizes do not correspond to those of other fonts.

Text placement is less precise than with plotted fonts.

Hardware characters are not affected by proportions, for example, text specifying "3 Vertical" as the proportion will be the same as text specifying "1 CRT" as the proportion when the hardware font is used.

Justification is the horizontal positioning of a string of text. If you specify center justification, the text is centered on the chart. Left justification positions the text on the left margin of the chart, and right justification positions the text on the right margin.

The screen displays in 4.2 and section 5 show the prompts that appear for these selections on the applicable menus.

4.2. COMMON SCREEN DISPLAYS

The following paragraphs describe screen displays that are common to more than one type of chart. The title line varies according to the type of chart that is being produced (text, pie, bar, line, or composite). These displays are initiated by your selections from the general menu shown in figure 3-1 or the chart specification menus shown in Figures 3-2 through 3-6. Notice that selections 1, 2, 4, 44, 55, 66, 77, 88, and 99, are the same on all the chart specification menus.

4.2.1. Title/Subtitle

You may display a title at the top or bottom of a chart. A subtitle may also be displayed at the top or bottom of the chart.

If you select "1 Title/Sub-title" from a chart specification menu, the following title prompt is displayed:

```
                    CHART TYPE (varies) SPECIFICATION


Title  _____

Press XMIT when entry is complete.
```

Title. The title field extends to the end of the line. Leading and trailing blanks are suppressed. The default is no title (blank).

If the title field is left blank, no further prompts are displayed. The chart specification menu is again presented.

If a title is entered, the remaining title prompts are presented:

```
                    CHART TYPE (varies) SPECIFICATION

  Title font 0                    Character Size 2
    0 Hardware                      1 Small
    1 Simplex                       2 Medium
    2 Simplex Italic                3 Large
    3 Gothic
    4 Gothic Italic
    5 Roman
    6 Roman Italic


  Title position 1                Title Justification 2
    1 Top                           1 Left
    2 Bottom                        2 Center
                                    3 Right


  Pen  1
    1-6

Press XMIT when entry is complete.
```

Title Font. The default is "0 Hardware."

Character Size. The default is "2 Medium."

Title Position. If top is specified, the title is written on the top line of the graph. If bottom is selected, the title is written on the bottom line, or, if there is a subtitle, on the next-to-bottom line. The default is "1 Top."

Title Justification. The default is "2 Center."

Pen. This is the pen that will draw the title if the plotter is to be used. The default is 1.

When XMIT is pressed, the subtitle prompt is presented as follows:

```
                    CHART TYPE (varies) SPECIFICATION

Sub-title _____

Press XMIT when entry is complete.
```

Subtitle. The subtitle field extends to the end of the line. Leading and trailing spaces are suppressed. The default is no subtitle (blank).

If the subtitle field is left blank, no further prompts are displayed when you press XMIT; the chart specification menu is again presented.

If a subtitle is entered, the following subtitle prompts are presented:

```
                    CHART TYPE (varies) SPECIFICATION

Sub-title font 0                    Character Size 2
   0 Hardware                          1 Small
   1 Simplex                           2 Medium
   2 Simplex Italic                    3 Large
   3 Gothic
   4 Gothic Italic
   5 Roman
   6 Roman Italic


Sub-title position 1                Sub-title Justification 2
   1 Top                               1 Left
   2 Bottom                            2 Center
                                       3 Right


Pen 1
   1-6


Press XMIT when entry is complete.
```

Subtitle Font. The default is "0 Hardware."

Character Size. The default is "2 Medium."

Subtitle Position. The default is "1 Top."

Subtitle Justification. The default is "2 Center."

Pen. This is the pen that will draw the subtitle if the plotter is to be used. The default is 1.

When XMIT is pressed, the chart specification menu is again presented.

4.2.2. Proportions

A chart can be proportioned to different sizes. Although charts are displayed on the screen in their defined proportions, they can be reduced or enlarged to fit on the screen. The default is "1 CRT." If you select "2 Proportions" from a chart specification menu, the following menu appears:

```
                        CHART TYPE (varies) SPECIFICATION


Proportions   1
   1 CRT
   2 Horizontal (11 X 8.5)
   3 Vertical    (8.5 X 11)
   4 Viewgraph
   5 35mm (Slide size)


Press XMIT when entry is complete.
```

CRT. The chart will fill the screen.

Horizontal. The screen will display 11 X 8½ (horizontal) proportions (the way the chart would appear if printed on an 11 X 8½ inch piece of paper).

Vertical. The screen will display 8½ X 11 (vertical) proportions (the way the chart would appear if printed on an 8½ X 11-inch piece of paper).

Viewgraph. The screen will display 8 X 8 (viewgraph size) proportions.

35 MM. The screen will display 35 mm slide-proportioned charts.

When XMIT is pressed, the frame prompt is presented as follows:

```
                        CHART TYPE (varies) SPECIFICATION


Frame   2
   1 Yes
   2 No


Pen 1
   1-6


Press XMIT when entry is complete.
```

Frame. If your response is "1 Yes," a solid line will be drawn around the chart. The default is "2 No."

Pen. This is the pen that will draw the frame if the plotter is to be used. The default is 1.

When XMIT is pressed, the chart specification menu is again presented.

4.2.3. Background Color

The background color selection specifies the color of the chart background. The graph or chart is drawn in the opposite color. The default is "1 Dark." If you select "4 Background color" from a chart specification menu, the following prompt is displayed:

```
                    CHART TYPE (varies) SPECIFICATION

Background color  1
  1 Dark
  2 Light

Press XMIT when entry is complete.
```

When XMIT is pressed, the chart specification menu is again presented.

4.2.4. Saving a Chart

The "66 Save chart" command selection allows you to save a chart in a file. When you make this selection from a chart specification menu, the following display appears:

```
                    CHART TYPE (varies) SPECIFICATION

Filename  _____

Position number  ___

Press XMIT when entry is complete
```

File Name. This is the name of the file where the chart will be saved. The file must be properly formatted for the operating system (see 2.2.1). If the name is improperly structured or the file cannot be assigned, an error message is displayed.

Position Number. This is the number of the chart within the file. The number must be an integer from 1 through 99. Any other value will cause an error message to be displayed.

When XMIT is pressed, the graphics specifications and the data for the chart are saved, and the chart specification menu is again displayed. If no file name is entered, the chart is not saved and the chart specification menu is again displayed.

4.2.5. Drawing a Chart

The draw chart command generates a graph or chart from the current values and defaults. The chart is displayed on the screen and remains displayed until you press XMIT. When XMIT is pressed, the chart specification menu is again displayed.

4.2.6. Loading an Existing Chart

Selection "88 Load existing chart" on the chart specification menus allows you to load into memory a graph or chart that has been previously created and saved. The file name and position number of the saved graph or chart must be specified in order to access the file:

```
                       CHART TYPE (varies) SPECIFICATION

   Filename  _____

   Position number  ____

   Press XMIT when entry is complete.
```

File Name. This is the name of the file that contains the desired chart. The file must be properly formatted for the operating system (see 2.2.1). If the name is improperly structured, or the file cannot be assigned, an error message is displayed. The file contains the graphics specifications and the data needed to draw a chart.

Position Number. This is the number of the chart within the file.The number must be an integer from 1 through 99. Any other value will cause an error message to be displayed.

When XMIT is pressed, the graphics specifications and the data for the chart are loaded into memory, and the chart specification menu is again displayed. You can display (draw) the chart or change any of its specifications.

4.2.7. Deleting a Chart

The delete chart option allows you to erase a graph or chart that has been saved in a file. You must specify the file name and the position number of the graph or chart. When you select "7 Delete Chart" from the general menu, the following prompt appears:

```
                              DELETE CHART SPECIFICATION

   Filename  _____

   Position number  ___

   Press XMIT when entry is complete.
```

File name. Enter the name of the file containing the chart you wish to delete. If the file name is invalid or the file cannot be assigned, an error message appears.

Position number. This is the number of the chart within the file. It must be an integer from 1 through 99. Any other value will cause an error message to be displayed.

When XMIT is pressed, the graph or chart is erased leaving an empty position in the specified file. The general menu is then displayed.

4.2.8. Displaying a File Table of Contents

The file table of contents selection displays a list of the graphs and charts that have been saved in a file. Only the positions in the file that contain graphs or charts are listed. The title and subtitle of each graph and chart are listed. When you select "8 File Table of Contents" from the general menu, the following prompt appears:

```
                            TABLE OF CONTENTS SPECIFICATION

   Filename  _____

   Print table of contents?  2
     1 Yes
     2 No

   Press XMIT when entry is complete.
```

NOTE: If a table of contents listing is requested for a file which does not contain a graphics file, the results are undetermined.

File name. A file name must be entered. If the file name is not valid or the file cannot be assigned, an error message is displayed.

Print Table of Contents. See 4.4.3. The default is "2 No."

When XMIT is pressed, the table of contents is displayed, one screen at a time, on the terminal in the format shown:

```
                 TABLE OF CONTENTS -- filename: _____

  1 Title for the chart at position 1
    Subtitle for the chart at position 1
 12 Title for the chart at position 12
    Its subtitle
 21 Title for the chart at position 21
                                          (blank line indicates no subtitle)

 31 Title for the chart at position 31
    Its subtitle

 Press XMIT to continue, F6 to return to menu
```

4.3. COMMON FUNCTION KEYS

You can press F6 to return to a main chart specification menu from one of its submenus. When F6 is pressed, the data on the current screen is left in an indeterminate state. If data is being read from a file, it is ignored. If data is being entered from the keyboard, the data that is displayed is not processed. However, previously entered data is still present. You can press F6 at any time to cancel the current operation.

F12 is activated during the "77 Save chart" selection from the chart specification menus. If the chart has not been previously saved, a message appears which gives you the option to create a new file by pressing F12. F12 is also used to overwrite an existing entry in a graphics file.

4.4. PRINTING

You can print any chart you have created, print the list of slides for a slide presentation, or print a file table of contents, as explained in the following paragraphs.

Before you can print using BGU, the printer must be configured on the appropriate printer menu of the parameter/configurator utility (CONFIG.SYS) as shown. The highlighted areas show the required specifications for printing when using BGU.

Add specifications for printer: 9600/cursor return/8 bits/odd/2/duplex

```
                            PRINTER X CONFIGURATION

Current options appear in reverse video. Use tab or scan keys to move cursor
Press F4 to display next menu. Press F5 to exit.

Enter new option, then press XMIT.

PRINTER DID....................00

Move cursor to desired option, then press XMIT.

PRINTER SPEED..................9600/4800/2400/1200/600/300
CURSOR RETURN..................CURSOR RETURN/LINE FEED
WORD SIZE......................8 BITS/7 BITS
PRINTER PARITY.................ODD/EVEN/NONE
NUMBER OF STOP BITS............2/1.5/1
PRINTER TYPE...................DUPLEX/PLOTTER/SIMPLEX

Press RESET to implement new configuration.
```

Refer to the UTS 30 operator's reference, UP-9798 (current version) for information on using the parameter/configurator utility.

4.4.1. Printing the Displayed Chart

If the printer has been configured according to the specifications in 4.4, you can print the chart that is displayed on the screen. Select "44 Print displayed chart" from the chart specification menu. The following printer ID prompt will be displayed:

```
                        CHART TYPE (varies) SPECIFICATION

Printer ID P1_

Press XMIT when entry is complete.
```

Printer ID. The current printer ID is displayed in the input field. The default is 1.

To use the printer that is cabled to the J6 peripheral connector on the back of the terminal, enter P1 as the ID. The printer must also be configured on the "Printer 1" menu of the parameter/configurator utility (CONFIG.SYS). To use the printer cabled to the RS-232 expansion cartridge at the rear of the terminal, enter P2. The printer must also be configured on the "Printer 2" menu of the parameter/configurator utility.

When XMIT is pressed in response to the printer ID prompt, the ID is validated, and the printer status is checked. If the printer is ready, printing begins. Figure 4-1 shows a printed chart. If an error is detected, a message appears. You can correct the error and press XMIT again, or you can return to the chart specification menu by pressing F6.

VERTICAL OR HORIZONTAL BARS?

In the bar graph on the left, the labels overlap. This problem could be solved by shortening the labels. However, selecting horizontal bars permits use of the longer labels.
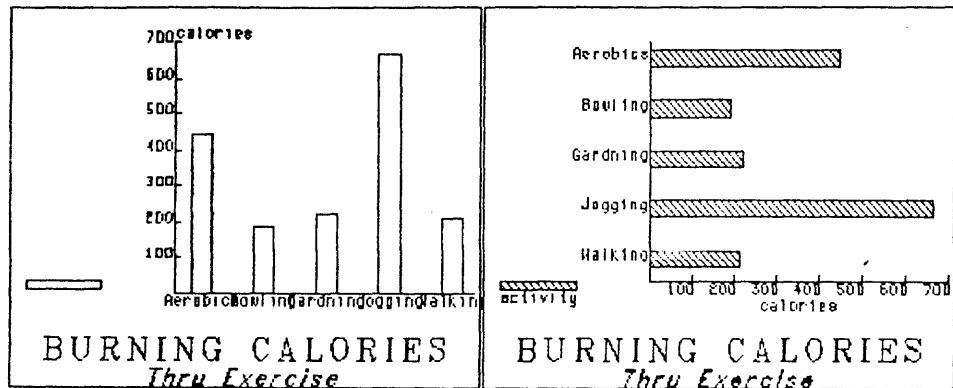
Figure 4-1. Printed Chart Example

NOTE: The current graphics screen display is what is printed. This is not necessarily the chart that is defined by the current parameters.

To print the displayed chart, the selected printer must have dot graphics printing capability. The graphics screen pixel matrix is mapped to the printer dot matrix, dot for dot.

4.4.2. Printing a Slide List

To print the list of slides for a slide presentation, select "44 Print list of slides" from the slide presentation specification menu. This does not require a printer with dot graphics capability. The file name prompt is then displayed:

```
                    SLIDE PRESENTATION SPECIFICATION


  Filename  _____


  Press XMIT when entry is complete.
```

File Name. Enter the name of the file that contains the list of slides you want to display. If the file name is invalid or the file cannot be assigned, an error message is displayed.

You can print either the list of slides that is currently specified in the slide show data array in memory, or you can print a list of slides that has been previously stored in a diskette file with the "66 Save sequence of slides" command. In the first case, the present slide list is printed but not changed. In the second case, the file is read into the slide show data array, replaces the current specification, and is then printed. The previous slide data in memory is lost.

To print the current slide list from the data array in memory, press XMIT with the "Filename" field blank. The printer ID prompt is then displayed. Follow the instructions in 4.4.1 to answer the prompt.

To print from a previously saved slide file, enter the file name to answer the prompt and press XMIT. The printer ID prompt is then displayed. Follow the instructions in 4.4.1 to answer the prompt. Figure 4–2 shows a sample printed list.

```
            Slide File:

Slide                        Position        Slide              .              Position
number    File name          number          number    File name              number

    1     file3                 1
    2     file3                 2
    3     file3                 3
    4     file3                 4
    5     fileͻ                 5
    6     file3                 ͻ
    7     fileͻ                 7
    8     file3                 ͼ
    9     file3                 9
   12     d1:12345673.bgu      12
   13     d1:12345673.ͻgu      1ͻ
   16     o1:12345ͻ7ͻ.bͻu      16
   17     o1:12345673.ͻgu      17
   2ͻ     d1:123455ͻ7ͻ.ͻgu     2ͻ
   21     file3                21
   24     fileͻ                24
   3ͻ     fileͻ                3ͻ
   41     filͻ3                ͻ1
   79     fileͻ                79
   81     fileͻ                ͻ1
```

Figure 4–2.   Slide List Print Example

4.4.3.   Printing a File Table of Contents

To print a file table of contents, select "8 File Table of Contents" from the general menu. The file name prompt is then displayed:

```
┌──────────────────────────────────────────────────────────────────────────┐
│                                                                            │
│   ╱‾‾‾‾‾‾‾‾‾‾       TABLE OF CONTENTS SPECIFICATION       ‾‾‾‾‾‾‾‾‾‾╲       │
│  ╱                                                                  ╲      │
│ ╱  Filename  _____                                 ╲     │
│                                                                           │
│    Print table of contents?   2                                           │
│      1 Yes                     ‾                                           │
│      2 No                                                                  │
│                                                                           │
│    Press XMIT when entry is complete.                                     │
└──────────────────────────────────────────────────────────────────────────┘
```

File Name. Enter the name of the file. If the file name is invalid or the file cannot be assigned, an error message is displayed.

Print Table of Contents. Enter "1" (Yes) and press XMIT. The printer ID prompt is displayed. Follow the instructions in 4.4.1 to answer the prompt. Figure 4-3 shows an example of a printed file table of contents.

```
TABLE OF CONTENTS -- Filename:  file3

 1 WELL KNOWN FACTS
   -------1--------
 2 RESIDENCE RELATIONSHIPS
   Persons over 65
 3 PEOPLE OVER 65
   in the U.S.A.
 4 SOCIAL SECURITY
   Employee Contribution
 6 OUR WORRIES
   U. of Wisconsin Study
11 SOURCES OF INCOME
   *   People over 65, living with family or alone      data in BAR1, BAR2
12 LIFE INSURANCE PREMIUMS
   Chart has ork background
20 EACH LINE STYLE
   at different angles
26 RESIDENCE RELATIONSHIPS
   data in files, LINE1, LINE2 and LINE3
```

Figure 4-3. File Table of Contents Print Example

4.5. PLOTTING

Before you can plot using BGU, the plotter must be configured on the appropriate printer menu of the parameter/configurator utility (CONFIG.SYS) as shown. The highlighted areas show the required specifications for the plotter when using BGU.

Add specifications for plotter: 9600/7 bits/odd/1/plotter

```
                    PRINTER X CONFIGURATION

Current options appear in reverse video. Use tab or scan keys to move cursor.
Press F4 to display next menu. Press F5 to exit.

Enter new option, then press XMIT.

PRINTER DID..................00

Move cursor to desired option, then press XMIT.

PRINTER SPEED..................9600/4800/2400/1200/600/300
CURSOR RETURN..................CURSOR RETURN/LINE FEED
WORD SIZE......................8 BITS/7 BITS
PRINTER PARITY.................ODD/EVEN/NONE
NUMBER OF STOP BITS...........2/1.5/1
PRINTER TYPE..................DUPLEX/PLOTTER/SIMPLEX

Press RESET to implement new configuration.
```

Refer to the UTS 30 operator's reference, UP-9798 (current version) for information on using the parameter/configurator utility.

4.5.1. Plotting the Specified Chart

If the plotter has been configured according to the specifications in 4.5, you can use it to draw the chart that is defined by the current parameters, select "55 Plot specified chart" from the chart specification menu. The plotter ID prompt is then displayed:

```
                    CHART TYPE (varies) SPECIFICATION

  Plotter ID P1_

  Press XMIT when entry is complete,
```

Plotter ID. The current plotter ID is displayed in the input field. The default is 1.

To use the plotter cabled to the J6 peripheral connector on the rear of the terminal, enter P1 as the ID. The plotter must also be configured on the "Printer 1" menu of the parameter/configurator utility (CONFIG.SYS). To use the plotter cabled to the RS-232 expansion cartridge at the rear of the terminal, enter P2. The plotter must also be configured on the "Printer 2" menu of the parameter/configurator utility.

Press XMIT in response to the printer ID prompt. The chart will be plotted.

NOTE: The chart that is plotted is the chart described by the current specifications. It is not necessarily the chart that is currently displayed on the graphics screen.

No background is plotted (drawn) on the plotter. The chart background will be the color of the paper you load. The elements of the chart that are specified to be the background color are not drawn on the plotter.

4.5.2. Pen Specifications

The pen specification selections that appear on various screen displays refer to a pen selection number for the plotter. This code is used only when a chart is plotted. The HP 7475A plotter has six pen positions numbered 1 through 6. The default is 1. Each position may be loaded with a pen of your choice. Color and line width are the variables. This plotter feature and its support by BGU make possible a variety in plotted charts not available in screen displays and printed charts.

5. Specific Chart Menus

The menus in this section list the features that are specific to a particular type of chart.

5.1. TEXT CHART MENUS

The input necessary to generate a text chart consists of lines of text. Other details of the graph can be specified; however, assumed defaults are provided for any or all of these. Therefore, a text chart can be produced by providing only the text.

5.1.1. Text Chart Specifications

When you select "1 Text Charts" from the general menu, the main text chart specification menu is displayed as shown. When a feature selection is made on this menu, the prompts for the feature are presented with their current values. You may accept them as they are by pressing XMIT, or enter a different value for any or all of them. Details on selections 1, 2, 4, 44, 55, 66, 77, and 88 are found in section 4.

If "99 General Menu" is selected, all input is discarded and BGU returns control the general menu.

```
                         TEXT CHART SPECIFICATION


Select a specification ___
   1 Title/sub-title
   2 Proportions
   4 Background color
   5 Text
  44 Print displayed chart
  55 Plot specified chart
  66 Save chart
  77 Draw chart
  88 Load existing chart
  99 General menu

Press XMIT when entry is complete,
```

5.1.2. Text Chart Data

If you select "5 Text" from the chart specifications menu, the following prompt is displayed to enter the text and the format information for the text. The text can be entered from the keyboard or loaded from a file.

```
                        TEXT CHART SPECIFICATION

Data file name  _____

Press XMIT when entry is complete.
```
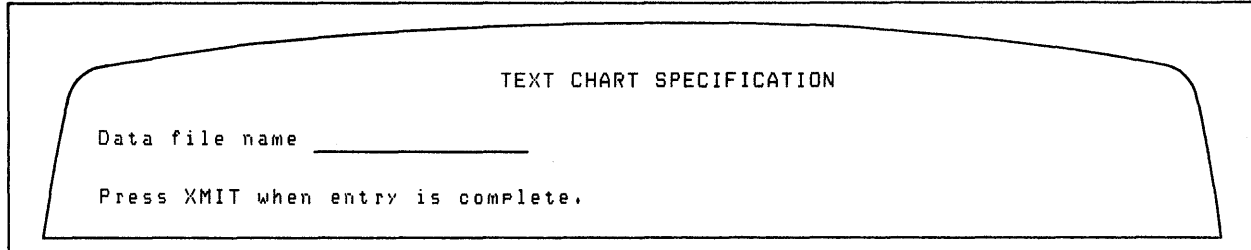
Data File Name. A valid file name can be entered. If a file name is entered and the file is inaccessible or the file name is invalid, an error message is displayed. The file format is described in 2.3. If the field is left blank and XMIT is pressed, the following menu is displayed for keyboard input of text:

```
                        TEXT CHART SPECIFICATION
              Size       Font                         Justification
              1 Small    0 Hardware      4 Gothic Italic 0 None
    SIZE      2 Medium   1 Simplex       5 Roman         1 Left
    FONT      3 Large    2 Simplex Italic 6 Roman Italic 2 Center    Pen
    JUST                 3 Gothic                        3 Right     1-6

  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -
  - - - _____ -

Press XMIT when entry is complete.
```
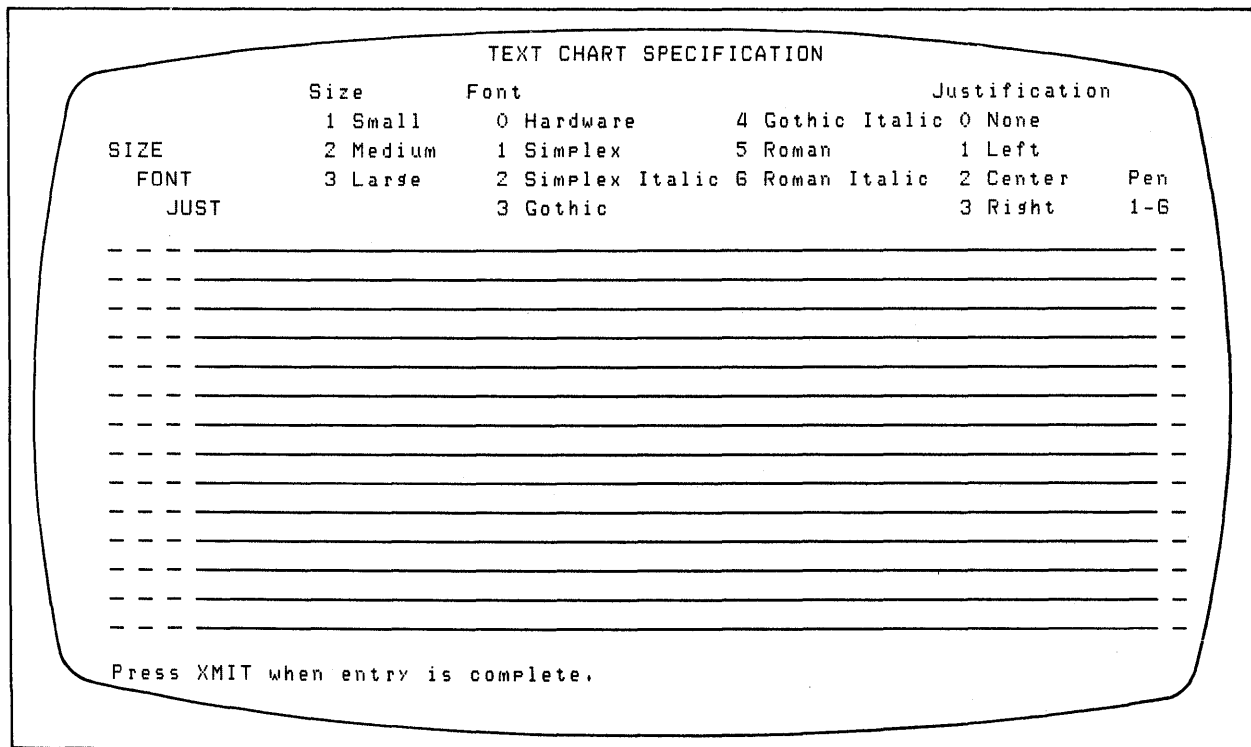
Each line of the screen, starting at line 8, represents a line of text. The first three positions of each line describe how the line will be displayed. If the text for the chart does not fit on 13 lines, it can be entered on multiple screens. After each screen is filled, press XMIT. The data is checked and saved, and the next screen is presented. If a blank line is desired, it must be specified by an entry in the size field. If all five fields of a line are left blank, the line will not appear as a blank line when the chart is displayed. This allows you to skip lines to allow for possible future insertions of additional text. You can define up to 66 lines of text.

Size. There is no default for this entry. You must provide a value. To enter a blank line that will appear blank on the chart, specify the size and leave the text field blank.

Font. There is no default for this entry. You must provide a value.

Justification. There is no default for this entry. You must provide a value.

Pen. This is the pen that will draw the text for the line if the plotter is to be used. The default is 1.

When XMIT is pressed, the text chart specification menu is again presented.

5.2. PIE CHART MENUS

The input necessary to generate a pie chart consists of data that represents the segments to be plotted. Other details of the chart may be specified; however, assumed defaults are provided for any or all of these. Therefore, a pie chart can be generated by providing the segment data only.

A pie chart is a circle divided into sectors that are proportional to the given data. The sectors are plotted in the same order in which the data is input, unless you request the data to be sorted. Plotting begins at the 12 o'clock position (straight up) and proceeds clockwise. The starting line is the first side of the first sector to be plotted.

You may specify the data in any units you wish. BGU calculates the sector angles proportional to the data. The chart will show each sector outlined, and each may be filled with a different fill style or with the background color according to what you specify.

Any sector may be emphasized by offsetting it. The sector is displayed slightly separated from the center of the whole pie.

A label may be associated with each sector. The label is displayed near the sector.

5.2.1. Pie Chart Specifications

When you select "2 Pie Chafts" from the general menu, the main pie chart specification menu is displayed as shown. When a feature selection is made on this menu, the prompts for the feature are presented with their current values. You may accept them as they are by pressing XMIT, or enter a different value for any or all of them. Details on selections 1, 2, 4, 44, 55, 66, 77, and 88 are in section 4.

If "99 General Menu" is selected, all input is discarded and BGU returns control to the general menu.

```
                              PIE CHART SPECIFICATION

   Select a specification __
      1 Title/Sub-title
      2 Proportions
      4 Background color
      5 Data
      6 Labels
     44 Print displayed chart
     55 Plot specified chart
     66 Save chart
     77 Draw chart
     88 Load existing chart
     99 General menu

   Press XMIT when entry is complete.
```

5.2.2. Pie Chart Data

When "5 Data" is selected from the preceding menu, the following menu is presented. You can create up to 10 sectors in the pie chart by specifying the data for each sector.

```
                          PIE CHART SPECIFICATION

      Data display 1                    Sort sectors 2
        1 Percent    2 Value given        1 Yes   2 No


   Sector Data Value          Label             Offset  Fill              Pen
                                               1 Yes 2 No Style           1-6
     1    _____    _____        2     _                  _
     2    _____    _____        2     _  1 Background     _
     3    _____    _____        2     _  2 \\\\\          _
     4    _____    _____        2     _  3 /////          _
     5    _____    _____        2     _  4 |||||          _
     6    _____    _____        2     _  5 -----          _
     7    _____    _____        2     _  6 +++++          _
     8    _____    _____        2     _  7 XXXXX          _
     9    _____    _____        2     _  8 Foreground     _
    10    _____    _____        2     _                  _

         Press XMIT when entry is complete.
```

Data Display. This selection allows you to specify whether the data will be displayed as a percentage or as the value specified. The default is "1 Percent."

Sort Sectors. This selection allows you to specify whether the sectors are to be sorted (smallest to largest). The default is "2 No."

Sector Data Value. Enter the data in this column in the order in which it is to be plotted, unless "Sort sectors" is answered with "1 Yes." Each entry contains a mixed decimal number in the form described in 2.1. Data less than zero is rejected with an error message.

Label. You may enter a label up to 20 characters. The label is placed adjacent to the sector with which it is associated. The default is no label (blank).

Offset. You may specify one or more sectors to be offset from the rest of the circle. The default is "2 No."

Fill Style. This is the hash pattern used to fill the segment. The default is, if possible, a pattern which is different from that of other sectors.

Pen. This is the pen that will be used to draw the sector outline, fill, and pointer if the plotter is to be used. The default is 1.

When XMIT is pressed, the pie chart specification menu is again presented.

5.2.3. Pie Chart Labels

Labels are displayed outside the circle near their corresponding sectors. Small sectors may cause the labels to overlay one another. If you select "6 Labels" from the chart specification menu, the following menu is displayed:

```
                        PIE CHART SPECIFICATION

Label font 0
   0 Hardware
   1 Simplex
   2 Simplex Italic
   3 Gothic
   4 Gothic Italic
   5 Roman
   6 Roman Italic

Character size 1
   1 Small
   2 Medium
   3 Large

Pen 1
   1-6

Press XMIT when entry is complete.
```

Label Font. Any data display is also in this font. The default is "0 Hardware."

Character Size. The size you select also applies to data displays. The default is "1 Small."

Pen. This is the pen that will draw all the sector labels if the plotter is to be used. The default is 1.

When XMIT is pressed, the pie chart specification menu is again presented.

5.3. BAR GRAPH MENUS

The input necessary to generate a bar graph consists of one or more sets of data that define the bars to be drawn. Other details of the graph may be specified; however, assumed defaults are provided for any or all of these. Therefore, a bar graph can be produced by entering only the data to define the bars.

The bars will be oriented vertically, extending upward from an unscaled baseline or horizontally extending to the right from an unscaled baseline. Perpendicular to the baseline is the length axis, which may be given tick marks and tick labels to indicate the magnitude of the bars. The baseline is located at the low value you specify or, if no value is specified, the smallest data value, if less than zero, or zero. If the data includes negative values, a "zero" line is drawn parallel to the baseline at the point along the length axis which equals zero.

If all the data is negative, a zero line is drawn, and all the bars will extend downward (or to the left) from that line. If all the data is positive, the zero line is the same as the baseline and all the bars will extend upward (or to the right) from that line. If the data contains positive and negative values, bars will extend in both directions from the zero line.

Bars that represent a given set of data all have the same fill style. The bars are all the same width and equally spaced along the baseline. Where more than one set of data is specified, the corresponding bars in each set are grouped together for comparison.

5.3.1. Bar Graph Specifications

When you select "3 Bar Graphs" from the general menu, the main bar graph specification menu is displayed as shown. When a feature selection is made on this menu, the prompts for the feature are presented with their current values. You may accept them as they are by pressing XMIT, or enter a different value for any or all of them. Details on selections 1, 2, 4, 44, 55, 66, 77, and 88 are in section 4.

If "99 General Menu" is selected, all input is discarded and BGU returns control to the general menu.

```
                              BAR GRAPH SPECIFICATION

Select a specification
   1 Title/sub-title
   2 Proportions
   4 Background color
   5 Data
   6 Axes
   7 Tick labels
   8 Group labels
   9 Bars
  44 Print displayed chart
  55 Plot specified chart
  66 Save chart
  77 Draw chart
  88 Load existing chart
  99 General menu

Press XMIT when entry is complete.
```

5.3.2. Bar Graph Data

Data may be entered for one to seven bar sets to be plotted on the same graph. When you select "5 Data" from the chart specification menu, the following prompt appears to specify which data set is being defined:

```
                              BAR GRAPH SPECIFICATION

Data Set 1

Press XMIT when entry is complete.
```

Data Set.   A number from 1 through 7 may be entered. This number matches the bar specifications (see 5.3.6) with the data that is specified. The default is 1.

When XMIT is pressed, the following screen display which requests a file name as the source of the bar graph data is displayed. If this is the first time the screen has been used with this data set, the file name field is blank. Otherwise, it contains the file name you specified last.

```
                              BAR GRAPH SPECIFICATION

Data Set 1

Data file name _____

Press XMIT when entry is complete.
```

Data file name. A data file may be named as the source of the data. If the file is inaccessible or the name is invalid, an error message is displayed. The data file format is described in 2.4. As the file is read, the data is validated. After reading is completed, if invalid data is detected, an error message is displayed.

If you replace the data file name with blanks and press XMIT, the following screen is displayed with the data that was just read as the input. You can then review and correct any errors. You can press F6 before you correct any or all of the errors. The data for the data set will be deleted, and the chart specification menu will be displayed.

If the "Data file name" field is left blank and XMIT is pressed, the following screen display is presented for keyboard input:

```
                        BAR GRAPH SPECIFICATION


  Data Set 1


        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____


  Press XMIT when entry is complete.
```

Data items are entered one per line. Each entry is in the form described in 2.1. The first blank entry marks the end of the data set. The program will accept up to 14 entries per data set.

When XMIT is pressed, the bar graph specification menu is again presented.

5.3.3. Bar Graph Axes

If you select "6 Axes" from the bar graph specification menu, the following menu is displayed:

```
                              BAR GRAPH SPECIFICATION
      Axes color 2                      Pen 1
         1 background                       1-6
         2 foreground


      Base line label      _____


      Label font 0
         0 Hardware
         1 Simplex
         2 Simplex Italic
         3 Gothic
         4 Gothic Italic
         5 Roman
         6 Roman Italic


      Character Size 1               Pen 1
         1 Small                         1-6
         2 Medium
         3 Large


      Press XMIT when entry is complete.
```

Axes Color. This color is used for the baseline, length axis, and any associated tick marks and grid lines. The default is "2 Foreground."

Axes Pen. This is the pen that will draw the axes, tick marks, and grid lines if the plotter is to be used. If the "Axes color" response is "1 background," they will not be drawn. The default is 1.

Baseline Label. The label field extends to the end of the line. Leading and trailing spaces are suppressed. For vertical bars, the baseline label is centered under the baseline beneath any group labels. For horizontal bars, the baseline label is displayed just above the graph immediately to the right of the baseline. The default is no label (blank).

Baseline Label Font. The baseline label is displayed in this font. The default is "0 Hardware."

Baseline Character Size. The size of the baseline label is determined by this parameter. The default is "1 Small."

Baseline Label Pen. This is the pen that will draw the baseline label if the plotter is to be used. The default is 1.

When XMIT is pressed, the length axis prompts are presented as shown:

```
                              BAR GRAPH SPECIFICATION
 Length axis
   low value          _____
   high value         _____
   tick interval      _____
   grid interval      _____
   first tick mark    _____
   first grid line    _____

 label                _____

 Label Size 1              Label font 0              Pen 1
   1 Small                   0 Hardware              1-6
   2 Medium                  1 Simplex
   3 Large                   2 Simplex Italic
                             3 Gothic
                             4 Gothic Italic
                             5 Roman
                             6 Roman Italic

 Press XMIT when entry is complete.
```

Length Axis Low Value. The number is assumed to be in the same units as the data. The default is the lowest data value, if less than zero, or zero.

Length Axis High Value. The number is assumed to be in the same units as the data. The default is the highest data value.

Length Axis Tick Interval. The number is assumed to be in the same units as the data. The default is no ticks (blank).

Length Axis Grid Interval. The number is assumed to be in the same units as the data. Grid lines are displayed perpendicular to the length axis at the given interval and in the axes color. The default is no grid (blank).

Length Axis First Tick Mark. A numeric value in the range from low value to high value may be entered. The number is assumed to be in the same units as the data. The first tick mark is displayed at this value on the length axis. Other tick marks are placed at higher values at the specified interval. The default is the low value plus tick interval.

Length Axis First Grid Line. A numeric value in the range from low value to high value may be entered. The number is assumed to be in the same units as the data. The first grid line is displayed at this value. Other grid lines are placed at higher values at the specified interval. The default is the low value plus grid interval.

Length Axis Label. The label field extends to the end of the line. Leading and trailing spaces are suppressed. For vertical bars, the length axis label is displayed just above the graph immediately to the right of the length axis. For horizontal bars, the length axis label is centered below the length axis beneath any tick labels. The default is no label (blank).

Length Axis Label Size. The character size of the length axis label is determined by this parameter. The default is "1 Small."

Length Axis Label Font. The length axis label is displayed in this font. The default is "0 Hardware."

Length Axis Label Pen. This is the pen that will draw the length axis label if the plotter is to be used. The default is 1.

When XMIT is pressed, the bar graph specification menu is again presented.

5.3.4. Bar Graph Tick Labels

Length axis tick marks may be labeled in one of three ways:

1. A number is specified as a factor. Each tick is labeled its value divided by the specified number.

2. A data file of tick labels may be specified. The file is assumed to contain a table of 8-character entries. The first entry is the first label, the second entry is the second label, etc. The label is the 8-character entry after leading and trailing blanks are stripped off. If an entry is left blank, the corresponding tick mark is not labeled. The labels are right justified below their marks if bars are horizontal, and are right justified to the left of their marks if bars are vertical. Take care to space the tick marks so that the labels do not overlap.

   NOTE: If a specified label is too long (too large a number, for instance) to fit in the space provided, BGU will replace it with a string of asterisks (*).

3. Tick labels may be entered from the keyboard. These entries have the same format as a file data table. Up to 18 labels may be entered.

When "7 Tick labels" is selected from the chart specification menu, the following prompts appear:

```
                            BAR GRAPH SPECIFICATION

Length axis tick label source 1
   1 No tick labels
   2 Factor
   3 File
   4 Keyboard

Label font 0
   0 Hardware
   1 Simplex
   2 Simplex Italic
   3 Gothic
   4 Gothic Italic
   5 Roman
   6 Roman Italic

   Pen 1
   1-6

Press XMIT when entry is complete.
```

Length Axis Tick Label Source. If "1" is entered, no further tick label prompts are displayed. Control is returned to the bar graph specification menu. The default is "1 No tick labels."

Tick Label Font. The tick labels are displayed in the font specified. The character size is small. The default is "0 Hardware."

Tick Label Pen. This is the pen that will draw the length axis tick labels if the plotter is to be used. The default is 1.

If "2" is entered for the tick label source, the following prompt is displayed:

```
                            BAR GRAPH SPECIFICATION

Tick label factor 1

Press XMIT when entry is complete.
```

Length Axis Tick Label Factor. A numeric value may be entered. If the response is not a valid factor, an error message is displayed when XMIT is pressed, and the cursor is positioned for reentry of the tick label factor. The default is 1.

When a valid factor is received, the bar graph specification menu is again presented.

If "3" is the response to the label source prompt, the following prompt is presented:

```
                          BAR GRAPH SPECIFICATION

 Data file name  _____


 Press XMIT when entry is complete.
```

Data File Name. If a valid file name is given, the labels are read and the bar graph specification menu is again presented. Otherwise, an error message appears, and the cursor is positioned for reentry of the data file name.

If the "Data file name" field is left blank and XMIT is pressed, the tick label source prompt is again presented, allowing you to make a new selection.

If "4" is the response to the label source prompt, the following prompt is displayed for keyboard input. Up to 18 tick labels may be entered.

```
                          BAR GRAPH SPECIFICATION
       Enter labels, one per line.
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____
              _____

       Press XMIT when entry is complete.
```

When XMIT is pressed, the bar graph specification menu is again presented.

5.3.5. Bar Graph Group Labels

Groups are formed by arranging the corresponding bars of each data set together.

Each group of one or more bars may be labeled. The labels may be specified in either of two ways:

1. A data file may be specified. The data file is assumed to be a table of 8-character entries. The first entry is the label for the first group, the second entry is the label for the second group, etc. The label is the 8-character entry after leading and trailing spaces are stripped off. If an entry is blank, the corresponding group is not labeled. The labels are centered below their groups, or to the left if the bars are horizontal.

2. Group labels may be entered from the keyboard. These entries have the same format as the data file table. Up to 14 labels may be entered.

When "8 Group labels" is selected from the chart specification menu, the following prompts appear:

```
                         BAR GRAPH SPECIFICATION

Group label source 1
  1 No group labels
  2 File
  3 Keyboard

Label font 0
  0 Hardware
  1 Simplex
  2 Simplex Italic
  3 Gothic
  4 Gothic Italic
  5 Roman
  6 Roman Italic

  Pen 1
  1-6

Press XMIT when entry is complete.
```

Group Label Source. If "1" is entered, no further prompts are displayed. The bar graph specification menu is again presented. The default is "1 No group labels."

Group Label Font. The group labels are displayed in the font specified. The character size is small. The default is "0 Hardware."

Group Label Pen. This is the pen that will draw the group labels if the plotter is to be used. The default is 1.

If "2" is entered as the group label source, the following prompt is displayed:

```
                          BAR GRAPH SPECIFICATION

 Data file name  _____

 Press XMIT when entry is complete.
```

Data File Name. If a valid file name is entered, the bar graph specification menu is again presented. Otherwise, an error message is displayed, and the cursor is positioned for reentry of the data file name.

If the "Data file name" field is left blank and XMIT is pressed, the group label source menu is again presented, allowing you to make a new selection.

If "3" is the response to the group label source prompt, the following prompt is displayed for keyboard input. Up to 14 group labels may be entered.

```
                          BAR GRAPH SPECIFICATION

 Enter labels, one per line.

        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____
        _____

 Press XMIT when entry is complete.
```

When XMIT is pressed, the bar graph specification menu is again presented.

5.3.6. Bar Graph Bars

When "9 Bars" is selected from the chart specification menu, the following menu is displayed. It is used to specify the bar fill style, bar label font, and the labels for up to seven data sets. When the bars feature is first selected, the default values are displayed. Subsequent references will display the last values entered in the fields.

```
                        BAR GRAPH SPECIFICATION
   Data      Bar fill    Bar             Bar             Pen
   Set       Style       Label 1         Label 2         1-6
    1                  
    2          -         _____      _____       -
    3          -         _____      _____       -
    4          -         _____      _____       -
    5          -         _____      _____       -
    6          -         _____      _____       -
    7          -         _____      _____       -
                         _____      _____       -

   Label Font 0           Bar direction 2    Fill style
   0 Hardware             1 Horizontal        1 Background
   1 Simplex              2 Vertical          2 \\\\\
   2 Simplex Italic                           3 /////
   3 Gothic                                   4 |||||
   4 Gothic Italic                            5 -----
   5 Roman                                    6 +++++
   6 Roman Italic                             7 XXXXX
                                              8 Foreground

   Press XMIT when entry is complete.
```

Bar Fill Style. The bar and its legend are displayed in this fill style. The default is a fill that is different from the background and each other bar.

Bar Label. The label for each data set may be one or two lines of up to ten characters each. Leading and trailing spaces are suppressed. The label is displayed as part of the legend along the left-hand side of the graph in the font that is specified on this menu. The default is no label (blank).

Bar Label Pen. This is the pen that will draw the bar outline and fill if the plotter is to be used. The default is 1.

Bar Label Font. The bar labels are displayed in this font. The default is "0 Hardware."

Bar Direction. You may specify the direction in which the bars are displayed. The default is vertical (baseline at the bottom).

5.4. LINE GRAPH MENUS

The input necessary to generate a line graph consists of a set of coordinate pairs that represent the points to be plotted. Other details of the graph may be specified; however, assumed defaults are provided for any or all of these. Therefore, a line graph can be produced by providing the coordinate data only.

5.4.1. Line Graph Specifications

When you select "4 Line Graphs" from the general menu, the main line graph specification menu is displayed as shown. When a feature selection is made on this menu, the prompts for the feature are presented with their current values. You may accept them as they are by pressing XMIT, or enter a different value for any or all of them. Details on selections 1, 2, 4, 44, 55, 66, 77, and 88 are found in section 4.

If "99 General Menu" is selected, all input is discarded and BGU returns control to the general menu.

```
                          LINE GRAPH SPECIFICATION

Select a specification __
   1 Title/sub-title
   2 Proportions
   4 Background color
   5 Data
   6 Axes
   7 Tick labels
   8 Line
  44 Print displayed chart
  55 Plot specified chart
  66 Save chart
  77 Draw chart
  88 Load existing chart
  99 General menu

Press XMIT when entry is complete.
```

5.4.2. Line Graph Data

Data may be specified for one to seven lines to be plotted on the same graph. When "5 Data" is selected from the line graph specification menu, the following prompt is displayed:

```
                          LINE GRAPH SPECIFICATION

Data Set 1

Press XMIT when entry is complete.
```

Data Set. A number from 1 through 7 may be entered. This number matches the line specifications (see 5.4.5) with the specified data. Any other entry is rejected with an error message. The default is 1.

When XMIT is pressed, the following menu which requests a file name as the source of line graph data is displayed. If this is the first time the menu has been used with the current data set, the "Data file name" field is blank. Otherwise, it contains the file name you specified last.

```
                          LINE GRAPH SPECIFICATION

Data Set 1

Data file name  _____

Press XMIT when entry is complete.
```

Data File Name. A valid file name may be entered as the source of the X,Y pairs to be plotted. If the file is inaccessible or the file name is invalid, an error message is displayed. The file format is described in 2.5. The data in the file is read and replaces any data that was previously defined for the current data set. After the file is read, if invalid data is found, an error message is displayed. If you replace the data file name with blanks and press XMIT, the following screen is displayed with the data that was just read as the input. You may then review and correct any errors. You can press F6 before you correct any or all of the errors. The data for the data set will be deleted and the chart specification menu will be displayed.

If the "Data file name" field is left blank and XMIT is pressed, the following display is presented for keyboard input:

```
                          LINE GRAPH SPECIFICATION
Data Set 1

    X               Y

  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____
  _____       _____

Press XMIT when entry is complete.
```

Each entry is in the form described in 2.1. If all data positions on the screen are filled, press XMIT to enter the data pairs into memory. A new blank screen is then presented, and subsequent data pairs may be entered. If you have no more entries for the current data set, press XMIT again to return to the chart specification menu. A blank "X" entry signals the end of the current data set. The blank entry and the entries that follow it are discarded, including entries on subsequent screens. A total of 50 data pairs may be specified for all data sets combined.

5.4.3. Line Graph Axes

If you select "6 Axes" from the line graph specification menu, the following screen display appears:

```
                          LINE GRAPH SPECIFICATION
Axes color 2
   1 background
   2 foreground


Pen 1
   1-6


Press XMIT when entry is complete.
```

Axes Color. This selection specifies the color for both the X- and Y-axes and any associated tick marks or grid lines. The default is "2 foreground."

Axes Pen. This is the pen that will draw the axes, tick marks, and grid lines if the plotter is to be used. If the response is "1 background," they are not drawn. The default is 1.

When XMIT is pressed, the X-axis menu is presented as shown:

```
                          LINE GRAPH SPECIFICATION
X-axis
   low value        _____
   high value       _____
   tick interval    _____
   grid interval    _____
   first tick mark  _____
   first grid line  _____

   label _____

Label Size 2              Label font 0              Pen 1
   1 Small                   0 Hardware                1-6
   2 Medium                  1 Simplex
   3 Large                   2 Simplex Italic
                             3 Gothic
                             4 Gothic Italic
                             5 Roman
                             6 Roman Italic
Press XMIT when entry is complete.
```

X-Axis Low Value. This number is assumed to be in the same units as the data. The default is the the lowest X-coordinate value, if less than zero, or zero.

X-Axis High Value. This number is assumed to be in the same units as the data. The default is the highest X-coordinate value, if more than zero, or zero.

X-Axis Tick Interval. This number is assumed to be in the same units as the data. The default is no ticks (blank).

X-Axis First Tick Mark. A numeric value in the range from low value to high value may be entered. The number is assumed to be in the same units as the data. The first tick mark is displayed at this value on the X-axis. Other tick marks are placed at higher values at the specified interval. The default is the low value plus the tick interval.

Label Size. This selection specifies the character size of the label. The default is "2 Medium."

Label Font. The default is "0 Hardware."

X-Axis Label Pen. This is the pen that will draw the X-axis label if the plotter is to be used. The default is 1.

X-Axis Grid Interval. This number is assumed to be in the same units as the data. Grid lines are displayed perpendicular to the X-axis at the specified interval and in the axes color. The default is no grid (blank).

X-Axis First Grid Line. A numeric value in the range from low value to high value may be entered. The number is assumed to be in the same units as the data. The first grid line is displayed at this value. Other grid lines are placed at higher values at the specified interval. The default is the low value plus the grid interval.

X-Axis Label. The label field extends to the end of the line. Leading and trailing spaces are suppressed. The label is displayed centered and parallel to the X-axis. The default is no label (blank).

When XMIT is pressed, the Y-axis prompts are presented. They are the same as those for the X-axis.

When you press XMIT after making the Y-axis entries, the line graph specification menu is again presented.

5.4.4. Line Graph Tick Labels

Tick marks may be labeled in one of three ways:

1. A number is specified as a factor. Each tick is labeled as its value divided by the number. If a label so generated exceeds eight characters, a string of asterisks (*) is displayed instead of the label.

2. A data file may be specified. The file is assumed to be a table of 8-character entries. The first entry is the label for the first tick mark, the second entry is the label for the second tick mark, etc. (counting bottom to top). The label is the first eight characters of each record. If an entry is blank, the corresponding tick mark is not labeled. The labels are right justified below their marks. Take care to space the tick marks so that the labels do not overlap.

3. Tick labels may be entered from the keyboard. The entries have the same format as the data file. Up to 18 labels may be entered.

When "7 Tick labels" is selected from the chart specification menu, the following prompts appear:

```
                        LINE GRAPH SPECIFICATION

   X-axis tick label source 1
      1 No tick labels
      2 Factor
      3 File
      4 Keyboard


   Label font 0
      0 Hardware
      1 Simplex
      2 Simplex Italic
      3 Gothic
      4 Gothic Italic
      5 Roman
      6 Roman Italic


   Pen 1
      1-6


   Press XMIT when entry is complete.
```

X-Axis Tick Label Source. If "1" is entered, no further X-axis tick label prompts are displayed. The Y-axis tick label source menu is presented. The default is "1 No tick labels."

X-Axis Tick Label Font. The tick labels are displayed in the font specified. The character size is small. The default is "0 Hardware."

X-Axis Tick Label Pen. This is the pen that will draw the X-axis tick labels if the plotter is to be used. The default is "1".

If "2" is entered for the tick label source, the following prompt is displayed:

```
                        LINE GRAPH SPECIFICATION

   Tick label factor 1

   Press XMIT when entry is complete.
```

X-Axis Tick Label Factor. A numeric value in the form defined in 2.1 must be entered. If the response is not a valid factor, an error message is displayed and the cursor is positioned for reentry of the tick label factor. The default is 1.

If a valid factor is received, the prompt for Y-axis tick label source is presented. It is the same as the X-axis tick label source prompt.

If "3" is the response to the tick label source prompt, the following prompt is presented:

```
                         LINE GRAPH SPECIFICATION

 Data file name  _____

 Press XMIT when entry is complete.
```

Data File Name. If a valid name is entered, the prompt for the Y-axis tick label source is presented. Otherwise, an error message is displayed and the cursor is positioned for reentry of the "Data file name." If the data file name field is left blank and XMIT is pressed, the X-axis tick label source prompt is again presented, allowing you to make a new selection.

If "4" is the response to the tick label source prompt, the following prompt is presented for keyboard input. Up to 18 labels may be entered.

```
                         LINE GRAPH SPECIFICATION
     Enter labels, one per line.
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____
       _____

     Press XMIT when entry is complete.
```
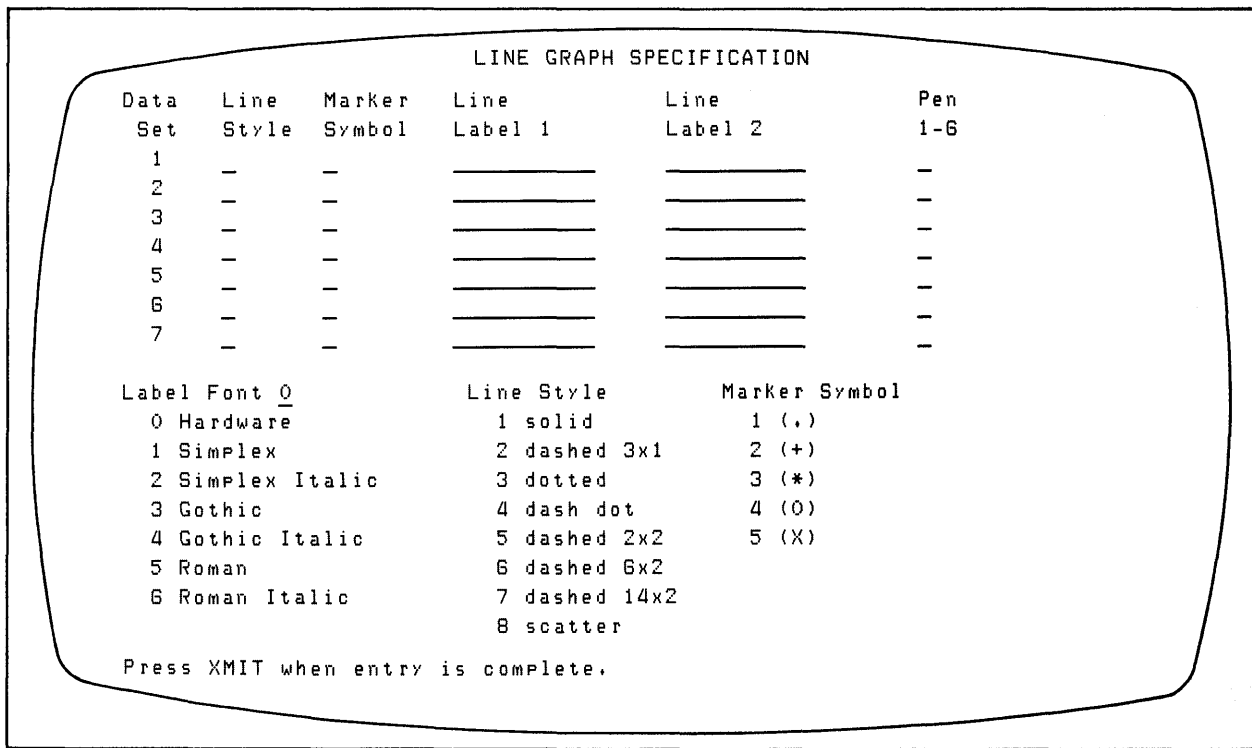
The Y-axis tick label specifications are the same as those for the X-axis.

When you press XMIT after responding to the Y-axis prompts, the line graph specification menu is again presented.

5.4.5. Line Graph Lines

Data may be input for one to seven lines to be plotted on the same graph. If you select "8 Line" from the chart specification menu, The following screen display appears. It is used to specify the line style, marker symbol, and line label for each data set. It also specifies the label font.

The marker symbol appears on the graph at each data point.

```
                        LINE GRAPH SPECIFICATION

    Data    Line    Marker    Line           Line              Pen
    Set     Style   Symbol    Label 1        Label 2           1-6
    1
    2       —       —         _____      _____         —
    3       —       —         _____      _____         —
    4       —       —         _____      _____         —
    5       —       —         _____      _____         —
    6       —       —         _____      _____         —
    7       —       —         _____      _____         —
            —       —         _____      _____         —

    Label Font 0            Line Style          Marker Symbol
       0 Hardware              1 solid             1 (.)
       1 Simplex               2 dashed 3x1        2 (+)
       2 Simplex Italic        3 dotted            3 (*)
       3 Gothic                4 dash dot          4 (O)
       4 Gothic Italic         5 dashed 2x2        5 (X)
       5 Roman                 6 dashed 6x2
       6 Roman Italic          7 dashed 14x2
                               8 scatter

    Press XMIT when entry is complete.
```

Line Style. The number beside the dashed style specifies the number of lights (pixels) on the CRT that are lit to make the dashed line. For example, the 14 x 2 means dashes 14 pixels long and 2 pixels off between dashes. If scatter is selected, no line is drawn; the line is suppressed allowing you to display only the marker symbol, if any. The default is a style that is different from the other lines.

Marker Symbol. The symbol is plotted at the point specified by each data pair. Marker symbols for different lines may match or differ. The default is no marker symbol (blank).

Line Label. The label for each data set may be one or two lines up to ten characters each. Leading and trailing spaces are suppressed. The label is displayed as part of the legend along the left-hand side of the graph. The default is no label (blank).

Line Pen. This is the pen that will draw the line and its marker symbol and legend entry if the plotter is to be used. The default is 1.

Line Label Font. This font is used for all line labels. The default is "0 Hardware."

When XMIT is pressed, the line graph specification menu is again displayed.

5.5. COMPOSITE CHART MENUS

The input required to generate a composite graph or chart consists of up to 12 files, each of which contains text (text chart) or a graph (pie chart, bar graph or line graph). The location where each text or graph is to be placed on the final output is also required.

5.5.1. Composite Chart Specifications

When you select "5 Composite Charts" from the general menu, the main composite chart specification menu is displayed as shown. When a feature selection is made on this menu, the prompts for the feature are presented with their current values. You may accept them as they are by pressing XMIT, or enter a different value for any or all of them. Details on selections 1, 2, 44, 55, and 88 are found in section 4.

If "99 General Menu" is selected, all input is discarded and BGU returns control to the general menu.

```
                        COMPOSITE GRAPH SPECIFICATION

   Select a specification __
      1 Title/sub-title
      2 Proportions
      4 Background color
      5 Define area
     44 Print displayed chart
     55 Plot specified chart
     66 Save chart
     77 Draw chart
     88 Load existing chart
     99 General menu

   Press XMIT when entry is complete.
```

5.5.2. Composite Chart Background Color

The background color for composite charts is selected in the same way as it is for other BGU charts. The background color specification menu is presented in 4.3.3. However, when drawing a composite chart, special attention should be paid to the background color chosen for the charts or graphs that you wish to combine for the composite chart:

■ If the background color of a single chart differs from that chosen for the composite chart, that chart's area is "cleared" to match the single chart's background color before the chart is drawn. This covers anything that is currently in that area.

- If the background color for a single chart is the same as that chosen for the composite chart, that chart's area is not cleared. This permits the overlaying of one chart with another.

- The composite background will "show through" spaces that are not included in the defined areas.

5.5.3. Saving a Composite Chart

As areas are defined using the file names and location feature (see 5.5.5.), the area number, file name, position number, and area coordinates are saved in a table. When "66 Save chart" is selected from the chart specfication menu, this table is saved, along with other data and parameters, such as title and background.

5.5.4. Drawing a Composite Chart

When "77 Draw chart" is selected from the chart specification menu, a composite chart is drawn using the specifications in the chart table mentioned in 5.5.3. The screen is cleared to the background color. The graphs are drawn in order for areas 1 through 12. If no chart is specified for an area, nothing is drawn.

5.5.5. Defining Composite Chart Areas

If "5 Define area" is selected from the chart specification menu, the following menu is displayed:

```
                    COMPOSITE CHART SPECIFICATION

Area number __

Press XMIT when entry is complete.
```

Area Number. A number from 1 through 12 may be entered. This number is used to match the locations with the text or the graphics file which is specified in the next menu.

When XMIT is pressed, the following prompts are displayed:

```
                    COMPOSITE CHART SPECIFICATION

Area number 1

Filename _____
Position number __

F14 deletes this area

Press XMIT when entry is complete.
```
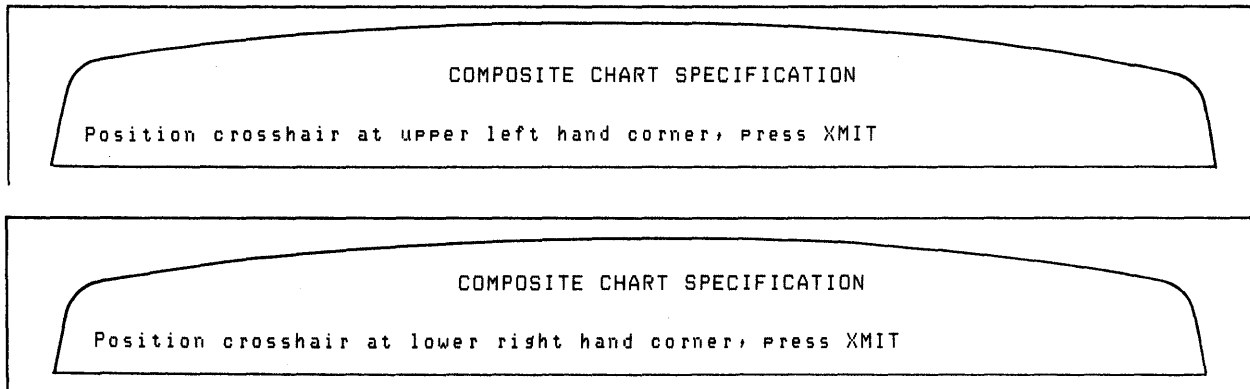
File Name. A file is named as the source of the text or graph that is to be plotted as part of the composite chart. The file is assumed to contain the graphics specifications needed to create the graph or text. (This should have been done previously using the "66 Save chart" selection from the chart specification menu.)

Position Number. This is the number within the file of the saved chart. The number must be an integer from 1 through 99. Any other value will cause an error message to be displayed.

If a chart or graph has already been specified for the area, the file name and position number are displayed. A chart may be removed from a composite chart by pressing F14. When XMIT is pressed, if the file name and position number fields are blank, the composite chart specification menu is again displayed. Otherwise, when XMIT is pressed, the following menu is presented to specify where in the composite chart the specified chart or graph is to be placed.

```
                COMPOSITE CHART SPECIFICATION

Position crosshair at upper left hand corner, press XMIT
```

```
                COMPOSITE CHART SPECIFICATION

Position crosshair at lower right hand corner, press XMIT
```

The chart or graph that is specified in the composite chart is positioned using the graphics cursor. The prompt "Position crosshair at upper left hand corner" is displayed and the graphics cursor is enabled. Position the cursor using the scan keys and press XMIT to enter the point. The prompt "Position crosshair at lower right hand corner" is displayed, and you indicate this point in the same manner. After both corners are defined, a rectangle is drawn marking the area in which the graph or chart will be placed in the composite chart. Finally, the area number is displayed in the center of the rectangle. Areas may overlap.

NOTE: Text displayed in the hardware font is not reduced to proportional size.

Other areas that are already defined are shown as rectangles on the screen. If the selected area is not defined, the crosshair is positioned at center screen. You can then move the crosshair to the desired corner and press XMIT, as explained in the preceding paragraph. If the selected area is already defined, it is not outlined, but the crosshair is positioned at the upper left-hand corner. You can then position it where you want it and press XMIT, as explained in the preceding paragraph.

5.5.6. Composite Chart Function Keys

F14 is active on the define area screen (see 5.5.5). This key allows you to delete an area that has previously been defined. When F14 is pressed, the defined area is deleted.
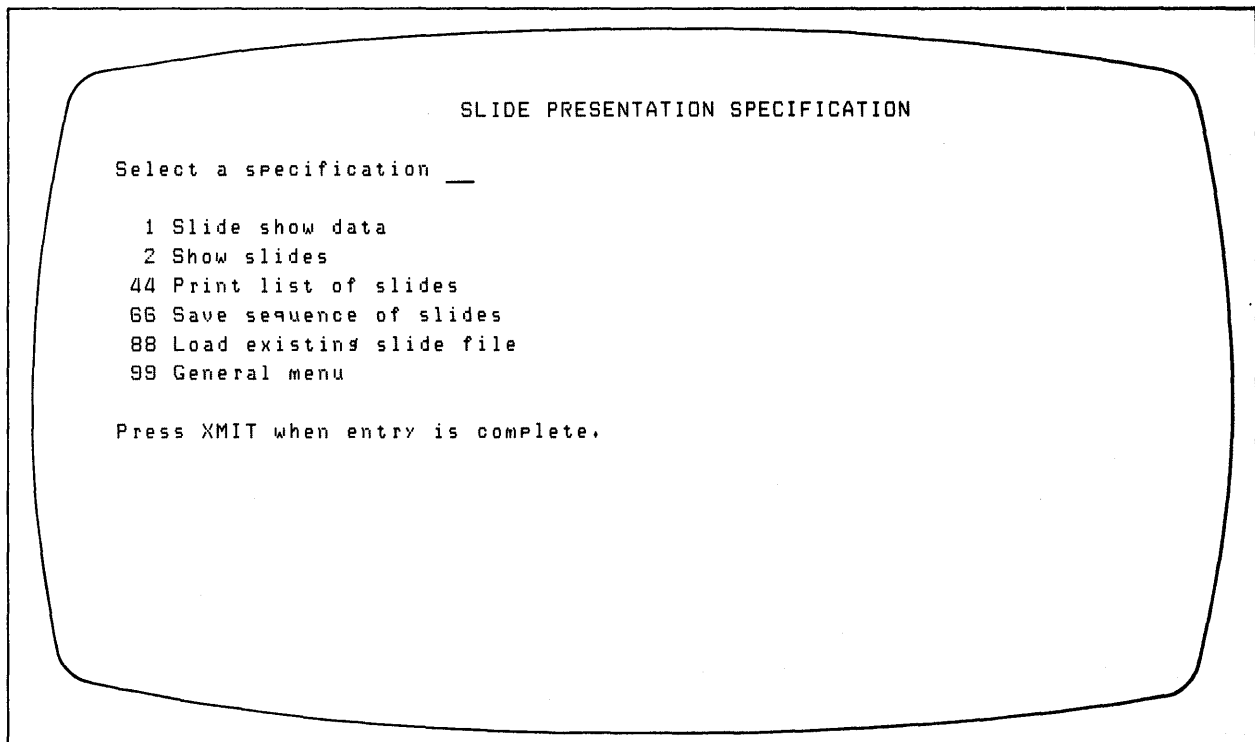
5.6. SLIDE PRESENTATION MENUS

The input required to generate a slide presentation is a list of charts and graphs (that have been saved in a file) in the order they are to be shown. They are specified by their file names and positions within the file.

5.6.1. Slide Presentation Specifications

When you select "6 Slide Presentation" from the general menu, the main slide presentation specification menu is displayed as shown. When a feature selection is made on this menu, the prompts for the feature are presented with their current values. You may accept them as they are by pressing XMIT, or enter a different value for any or all of them. Details on selections 44 and 66 are found in section 4.

If "99 General Menu" is selected, all input is discarded and BGU returns control to the general menu.

```
                      SLIDE PRESENTATION SPECIFICATION

Select a specification __

    1 Slide show data
    2 Show slides
   44 Print list of slides
   66 Save sequence of slides
   88 Load existing slide file
   99 General menu

Press XMIT when entry is complete.
```

5.6.2. Slide Show Data

When "1 Slide show data" is selected, the slide data screen is presented:

```
                          SLIDE PRESENTATION SPECIFICATION

      Slide number        File name              Position number
          1               _____            __
          2               _____            __
          3               _____            __
          4               _____            __
          5               _____            __
          6               _____            __
          7               _____            __
          8               _____            __
          9               _____            __
         10               _____            __
         11               _____            __
         12               _____            __
         13               _____            __
         14               _____            __
         15               _____            __
         16               _____            __

      Press F7 for next screen, F8 for previous screen.
      Press XMIT when entry is complete.
```

If the file name and position number for a line are left blank, the position is skipped in the presentation. A slide can be deleted from the slide presentation by replacing its file name and position number with blanks.

Slide Number. This number is used to identify the order in which the slides will be shown (1 being first, 2 second, etc.). Sixteen slides are defined per page. The first page starts with slide 1, the second page with slide 17, etc. This field is for information only and not for your entry. There can be up to 99 slides in a file.

File Name. A file may be named as the source of the text or graph that is to be included in the slide presentation. The file is assumed to contain the graphics specifications needed to create the graph or text.

Position Number. This is the number of a specified chart within the name file. You may enter a number from 1 through 99. Any other value will cause an error message to be displayed.

5.6.3. Showing Slides

When you select "2 Show slides" from the slide presentation specification menu, the following menu is displayed:

```
                          SLIDE PRESENTATION SPECIFICATION
  Select a specification _
    1 Display slide cycle as defined
    2 Display a single slide
    3 Return Slide Presentation menu
    4 Terminate BGU

  Press XMIT when entry is complete.
```

Display Slide Cycle as Defined. This selection presents the slides in the order you specify on the menu described in 5.6.4.

Display Single Slide. This selection presents the slide that you specify by number on the menu described in 5.6.5.

Return Slide Presentation Menu. This selection returns the slide presentation specification menu.

Terminate. This selection exits BGU and returns control to the operating system.

5.6.4. Display Cycle

When "1 Display slide cycle as defined" is selected from the menu described in 5.6.3, the following menu is displayed:

```
                          SLIDE PRESENTATION SPECIFICATION

  0
  _
  Scan up        : Next slide
  Scan down      : Display previous slide
  number,XMIT    : Display this slide next
  F9             : Display this menu
  F10            : End slide show
  F11            : Display current slide number
  F17            : Start timed display 00 min.
                                       00 sec.

  Press the FUNCTION KEY of your choice.
```

Scan Up. This selection displays the next slide of the cycle. This is also known as the up arrow key: it moves the cursor up.

Scan Down. This selection displays the previous slide of the cycle. This is also known as the down arrow key: it moves the cursor down.

Number. A number from 1 through 99 may be entered. If the F11 toggle is on, the number appears in the upper left-hand corner of the screen or you can enter the number without the F11 display. This becomes the current slide number. The slide show continues forward or backward from this number. When XMIT is pressed, the selected slide is displayed. The typed number is the slide position in the slide presentation, not its position in a file.

F9. This selection returns to the display slide cycle menu (see 5.6.4).

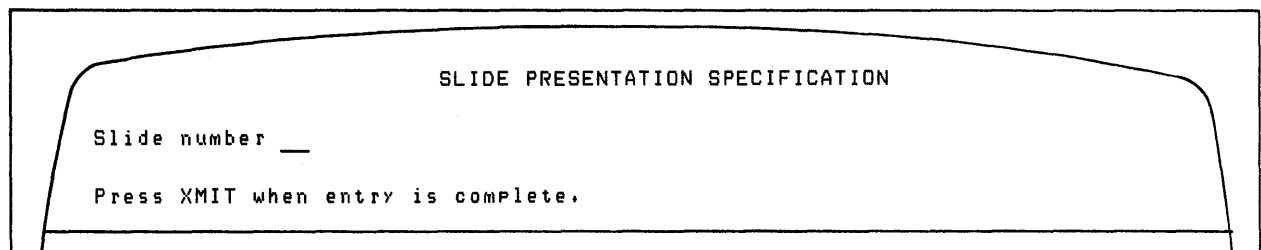**F10.** This selection returns to the show slides menu (see 5.6.3).

F11. This selection displays the number of the current slide on the upper left-hand corner of the screen. If the number is already displayed, pressing F11 causes the number to be erased.

F17. This selection starts the slide show. The time you specify is the interval between each slide display change. The show continues until the last slide is shown. Pressing F17 always starts the slide show at the current slide, allowing you to begin or interrupt at any time. Any of the function keys will shut off the timer. The maximum timer interval is 21 minutes, 50 seconds. The default is 0 minutes, 0 seconds.

After either the scan up or scan down key has been pressed, or a number has been entered and XMIT is pressed, the designated slide is displayed until a function key is again pressed. If you forget what the function keys do, press F9 to redisplay the display slide cycle menu (see 5.6.4).

5.6.5. Displaying a Single Slide

When "2 Display single slide" is selected from the menu described in 5.6.3, the following menu is displayed:

```
                    SLIDE PRESENTATION SPECIFICATION

  Slide number __

  Press XMIT when entry is complete.
```

Slide Number. A number from 1 through 99 must be entered. Any other entry causes an error message to be displayed.

When XMIT is pressed, the slide is displayed. The slide remains on the screen until XMIT is pressed again. Then the slide presentation menu is displayed.

5.6.6. Saving a Sequence of Slides

When "66 Save sequence of slides" is selected from the slide presentation specification menu, the following prompt is presented. Your response to this prompt will save the list of graphs and charts that make up the slide presentation.

```
                        SLIDE PRESENTATION SPECIFICATION


    Filename _____


    Press XMIT when entry is complete.
```

File Name. Enter the name of the file in which the sequence of the slide presentation is to be saved. If the file name is not valid or the file cannot be assigned, an error message will appear.

5.6.7. Loading an Existing Slide File

When you select "88 Load existing slide file" from the slide presentation specification menu, the following prompt appears to allow you to load a file that contians the sequence in which slides (graphs or charts) are to be displayed in a slide presentation. This file is created by BGU when it saves a slide presentation, or by any other processor that generates a file of like format (see 2.6).

```
                        SLIDE PRESENTATION SPECIFICATION

    Filename _____

    Press XMIT when entry is complete.
```

File Name. Enter the name of the file in which the sequence of the slide presentation is to be saved. If the file name is not valid or the file cannot be assigned, an error message will appear.

5.6.8. Slide Presentation Function Keys

F7 is active on the slide show data screen (see 5.6.2). This key allows you to continue to the next slide data screen. When F7 is pressed, the current screen data is validated and the next screen is displayed.

F8 is active on the slide show data screen (see 5.6.2.). This key allows you to review a previous slide data screen. When F8 is pressed, the current screen data is validated and the previous screen is displayed.

F9 is active on the display slide cycle screen (see 5.6.4) and during slide display. When F9 is pressed, the menu is displayed.

F10 is active on the display slide cycle screen (see 5.6.4) and during slide display. When F10 is pressed, the presentation is ended and BGU returns to the show slides menu (see 5.6.3).

F11 is active on the display slide cycle screen (see 5.6.4) and during slide display. This is a toggle key (on/off) for the current slide number. When F11 is pressed, the slide number is displayed on or erased from the upper left-hand corner of the screen.

F12 is activated when you save a slide file. A message appears during the save function allowing you to create a new file or to overwrite an existing slide file. If the file specified for a save already exists, pressing F12 deletes the old file and then performs the save. If the file does not exist, pressing F12 creates a new file before the save.

F17 is active on the display slide cycle screen (see 5.6.4.) and during slide display. This key allows you to present an automatic slide show. Pressing F17 starts a slide show at the current slide and displays each slide for the time interval you specify.

6. Error Messages and Recovery

You can correct errors as specified in the following explanations, or press F6 to cancel the current operation and return to the main chart specification menu.

ADDRESS ERROR ON DISK

The address accessed on the disk is bad. Retry the operation.

BAD CHART TYPE

The data for the chart to be displayed contains a chart-type code that is not recognized. Display a different chart.

BAD SLIDE DATA IN FILE; 2 AND 66 ARE NOT ALLOWED TIL DATA CORRECTED

Selections 2 (Show slides) and 66 (Save sequence of slides) are not allowed until the slide data is in the format described in 2.6. Select "1 Slide show data" to review and correct the slide data, or load another file.

BAD SLIDE DATA IN FILE; LOAD ANOTHER FILE OR SELECT 1 TO CORRECT DATA

The slide data file is not in the format described in 2.6. Select "1 Slide show data" and correct the data, or load another file.

BAD SLIDE NUMBER; PROCESSING STOPPED—CORRECT FILENAME OR PRESS F6

The slide number is not correct (see 2.6). Correct the file name.

CRC ERROR

A disk access error has occurred and the disk cannot be read. This could be caused by a bad head or disk. Retry the operation.

DATA OUT OF RANGE

The data is not in the range specified in 2.1. Correct the bad data value.

DEVICE NOT CONFIGURED

The device you are trying to access is not configured. Configure the device or enter another device number.

DEVICE NOT READY

The disk drive cannot be accessed. Close the door to the disk drive, or check to see if the diskette is inserted properly.

DOES NOT DEFINE RECTANGULAR AREA

The two points given are not opposite corners of a rectangle. The screen is ready for the area to be defined again.

END OF FILE

An end-of-file status has been detected by the firmware. Retry the operation or correct the diskette.

ERROR IN FILE DATA. BLANK OUT FILENAME AND PRESS XMIT TO VIEW AND CORRECT DATA

The data file that is being loaded contains data that is not in the format described in 2.1. Blank out the file name, and then press XMIT. Correct the bad data.

ERROR IN FILE DATA. PRESS XMIT TO PRINT AS IS, F6 TO RETURN TO MENU

The file that is being printed contains one or more invalid file names or position numbers. Press XMIT to list the file as it is. Press F6 to return to the slide presentation menu.

FILE ALREADY EXISTS

The file that is being created already exists. Correct the file name.

FILE ALREADY EXISTS. PRESS F12 TO OVERWRITE

The slide file specified already exists. Press F12 to overwrite the current data, or correct the file name.

FILE DEFINED NOT SUPPORTED BY BGU

The file is not in one of the formats supported by BGU, or the graphics specifications file is not of the type extension "BGU." Correct the file or enter another file name.

FILE IS EMPTY

The file you are attempting to read is empty. Correct the file name.

FILE NOT FOUND

The file name that is being referenced by the " 88 Load existing chart" selection cannot be found. Correct the file name or insert a diskette containing the specified file.

FILE NOT FOUND; TO CREATE IT PRESS F12. OTHERWISE, CORRECT FILENAME ABOVE

The file specified for the "66 Save chart" selection is a new file. Press F12 to create the file, or change the file name.

I/O CANCELLED BY KEYBOARD UNLOCK

The firmware has detected the unlock key. Retry the operation.

INTERNAL ERROR

A nonrecoverable error has occurred during a disk access. The disk could have a bad record, track, or sector. Retry the operation, correct the diskette, or enter another file name.

INTERVAL MUST NOT EXCEED 21:50

The interval given for a timed slide show is too large. Correct the time interval.

INVALID DEVICE

The disk drive specified is not valid. Input a valid drive number.

INVALID FILE TYPE

The file name type extension is not in the form described in 2.2. Correct the file name.

INVALID FILENAME

The file name is not in the form described in 2.2. Correct the file name.

INVALID INPUT

You have made an incorrect menu selection, or the data is not in the correct format. Correct the invalid entry.

LENGTH AXIS HIGH VALUE ≤ LOW VALUE

The high value specified is less than the low value. Select "6 Axes" and correct the high or low length axis value.

NO SIGNIFICANT DATA

A chart cannot be drawn without data. Select the data feature from the chart specification menu and input the data.

OUT OF PAPER/RIBBON

The printer has signaled that it has run out of paper or ribbon. Check the printer and correct the problem.

OUT OF ROOM ON DISKETTE

The diskette specified is full. Insert another diskette and resave the file.

PARITY ERROR

A diskette access error has occurred and the diskette cannot be read. This could be caused by a bad head or diskette. Retry the operation.

POSITION IS ALREADY OCCUPIED. TO REPLACE, PRESS F12

The position number entered for the specified file contains information. Press F12 to overwrite the existing information or correct the file name or position number.

READ ONLY FILE.

You are trying to write to a file defined as read only. Redefine the file.

SLIDE NOT FOUND — PRESS XMIT TO RETRY

BGU cannot access the slide you are requesting. Insert the correct diskette containing the chart requested, and then press XMIT to retry, or continue with the rest of the slide show.

SLIDES OUT OF ORDER; PROCESSING STOPPED — CORRECT FILENAME OR PRESS F6

The slides in the file that is being loaded are not ordered smallest slide number to largest slide number. Correct the file name or the data in the file.

SPECIFIED CHART IS NOT A BAR GRAPH

You are attempting to load a nonbar graph from bar graph mode. Correct the file name or position number, or select the correct chart type.

SPECIFIED CHART IS NOT A COMPOSITE CHART

You are attempting to load a noncomposite chart from composite chart mode. Correct the file name or position number, or select the correct chart type.

SPECIFIED CHART IS NOT A LINE GRAPH

You are attempting to load a nonline graph from line graph mode. Correct the file name or position number, or select the correct chart type.

SPECIFIED CHART IS NOT A PIE CHART

You are attempting to load a nonpie chart from pie chart mode. Correct the file name or position number, or select the correct chart type.

SPECIFIED CHART IS NOT A TEXT CHART

You are attempting to load a nontext chart from text chart mode. Correct the file name or position number, or select the correct chart type.

SPECIFIED POSITION IS EMPTY

You are attempting to read from a file position that is empty. Correct the file name or position number.

TOO MANY DATA

A maximum of 50 points is allowed for all data sets combined. Correct the data.

WRITE PROTECT

The diskette you are trying to write to has a write-protect label. Remove the write-protect label or insert another diskette.

X AXIS HIGH VALUE < LOW VALUE

The X-axis high value specified is less than the low value. Select "6 Axes" and correct the high or low X-axis value.

Y AXIS HIGH VALUE < LOW VALUE

The Y-axis high value specified is less than the low value. Select "6 Axes" and correct the high or low Y-axis value.

READER'S COMMENT SHEET

Your comments on this manual will help us improve it. Please fill in the requested information.

Name of manual: _____

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Thank you for your cooperation.

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