

1. Introduction

This section introduces you to MAPPER color graphics. It also explains what color graphics is, what this manual contains, how to use this manual, and the new features available.

This section covers:

- ☐ How to Use This Manual
- ☐ Conventions Used in This Manual
- ☐ New Features and Enhancements
- ☐ What Is MAPPER Color Graphics?

How to Use This Manual

Here's what each section covers:

Section 1. Introduction

Briefly describes color graphics and explains what this manual contains, how to use this manual, and the new features available.

Section 2. Getting Started

Gives information for creating a reference chart containing the available colors and styles.

Section 3. Creating Basic Charts

Gives information for creating charts using the CHART run.

Section 4. Using Other Graphics Runs

Gives information on the other available runs used with MAPPER color graphics.

Section 5. Using Advanced Graphics

Gives information for creating an organization chart, and increasing or decreasing the size of a chart.

Appendix A. GOC Commands

Provides reference information for the GOC commands, organized alphabetically within the three types of commands: Global, Parameter, and Data. Examples are included.

Appendix B. Expanded Syntax

Provides reference information for the expanded syntax commands, organized alphabetically. Examples are included.

Appendix C. Primitive Graphics Code

Provides reference information for primitive graphics code commands, organized alphabetically by name.

Conventions Used in This Manual

This manual uses certain style conventions to make it easy for you to recognize important terms, functions, and symbols. These conventions are defined here and shown in examples.

RUN SYNTAX

Most of the charts are made by using a MAPPER run. The format of a MAPPER run has these things in common:

- ☐ Capital letters are used for run calls (for example, CHART). You can type the run call in lowercase letters when you enter it, though.
- ☐ Brackets are used around optional entries. For example:

`[CHART,]PIEG`

This shows that you are not required to type "CHART" while starting the PIEG run.

KEY NAMES

The key names used in this manual are based on the UTS 400 style keyboard. If you need definitions for other keyboards, refer to the documentation for your terminal.

TAB CHARACTERS

A special character called a quadrate (□) represents a tab character shown in this manual. You usually do not see tab characters on the screen.

To enter a tab character, press **TAB SET**. If the report is in the limited character set (LCS), you can also use the opening bracket ([) for a tab character.

You "tab" on some function request message screens and menus to move the cursor to the fields you are filling in. Press **TAB FWD** to tab from one field to the next. If you go past a field you want to fill in, press **TAB BACK**.

UPPERCASE LETTERS

These items appear in uppercase (capital) letters:

- ☐ **MAPPER** function calls; for example, **GOC** (Generate Organization Chart) and **GS** (Graphics Scaler).
- ☐ **MAPPER** runs; for example, the **CHART** and **DISPLAY** runs.
- ☐ Formats of functions or runs you enter. You can enter them in uppercase or lowercase letters. For example, you can enter:

CHART,H

or:

chart,h

Either way displays a help screen for the **CHART** run.

ITALICS

Italics are used to indicate values that you supply, depending on the circumstances. For example:

CHART[,*selection*]

This shows that you provide a specific run call, such as PIEG or LINEG, for *selection*.

Words that are in ***boldface italics*** are key words that appear in the Glossary.

COLOR

Anything that you are instructed to type is highlighted with color in the text of this manual. For example:

Enter **chart** on the control line to display the menu for the CHART run.

This means that you type the word "chart." You can enter it in lowercase or uppercase.

ENTER AND RESUME

Enter means type the necessary information and press XMIT. ***Resume*** means press F1, or enter **rsm** on the control line.

RIDS AND REPORTS

There are two ways to identify a specific report. If you use the report number, you must specify the form type separately. If you use the RID, the report number and form type are combined. For example, RID 1C is report 1 in form type C.

SCREEN ILLUSTRATIONS

Screen illustrations in this manual are identical to the screens you see on your terminal, with these exceptions:

- Line 1 information may vary (see the *MAPPER Software Level 33R1, Software Reference*, UP-9193.5).
- Report numbers may be different, depending on how many users are using the demonstration (JDOE) data base at the same time.
- Mode numbers and form types may vary, depending on which mode is used for the demonstration data base at your site.

New Features and Enhancements

If you have used earlier levels of MAPPER software, you may be interested in the new features and enhancements that have been added to color graphics for MAPPER software level 33R1.

NEW FEATURES

- Display Graphics (G) function and DSG run statement

If you have the primitive graphics code for a chart stored in a free-form report, you can display it with this function. Without this function, you had to use the **DISPLAY CODE ON SCREEN (C)** selection on the **CHART** menu. You can also use the DSG run statement in a run to display a chart during a run. Read "Overview" in Section 3 to learn how to use this function.

- Generate Organization Chart (GOC) function and GOC run statement

This function allows you to create an organization chart with multiple levels, colors, and line types. Since you store the commands in a free-form report, you can save the report and modify it as the organization changes. If you are a run designer, you can use the GOC run statement to produce your organization chart with a run. Read Section 5 to learn how to use this feature.

- **Graphics Scaler (GS) function and GS run statement**

You can use this function to rotate a chart, shift its position on the screen or plotter paper, or change its size. In addition, you can add expanded syntax commands in a free-form report or in an existing primitive graphics code report to add special details that you cannot create with the CHART runs. If you are a run designer, you can use the GS run statement for Graphics Scaler functionality within your run. Read Section 5 to learn how to use this feature.

- **MULTI run**

You can use the MULTI run to put two, three, or four charts on the same screen or plot. You make the individual charts and save each primitive graphics code result as a report, and then use MULTI to combine them. Read Section 4 to learn how to use this feature.

ENHANCEMENTS

- **Text charts**

Two parameters, F and O, have been added for text charts. You can use the F parameter to change fonts to high-quality text. The O parameter lets you delete lines from the top of the chart. You can also use it to center or left-justify small, medium, and large line types. Refer to Section 3 for a description of these parameters.

- **Mixed charts**

You can now specify a base-line parameter for mixed charts to allow a solid horizontal base line. Refer to Section 3 for a description of this parameter.

☐ **Background parameters for charts**

You can now specify a background parameter for bar, line, mixed, pareto, and scatter charts to allow a color for the inner box of the chart to be displayed. Refer to Section 3 for a description of these parameters.

☐ **GR run**

Three options have been added to the GR run. The C option allows you to make scatter charts, the M option allows mixed bar and line charts, and the X option allows pareto charts. Refer to Section 4 for a description of these options.

☐ **DISPLAY run**

You can now use several keys to control a "slide-show" presentation using DISPLAY to cycle through the charts referenced by the index list report (using DISPLAY,CYC). You use the **MSG WAIT** and **F1** through **F4** keys to stop, resume, reverse, start over, and end the cycle of an index list report. Refer to Section 4 for a description of these function keys.

What Is MAPPER Color Graphics?

MAPPER color graphics is a set of MAPPER runs that provide graphic representations of data. Using color graphics, you can create either monochrome or multicolor charts for display or for output to color plotters. You can plot charts either on paper or on transparencies for overhead projectors.

You can make charts in three ways:

- ☐ Enter data in a preformatted input report (use one of the runs listed in the CHART run menu).
- ☐ Use an existing column-formatted report as the source of data (use the GR or GRID run).
- ☐ Enter commands in a free-form report for use with the Generate Organization Chart (GOC) or Graphics Scaler (GS) functions. (These functions are covered in Section 5.) There are three types of commands: GOC, expanded syntax, and primitive graphics code.

TYPES OF CHARTS

If you use one of the CHART runs (covered in Section 3), you enter the data you want to plot, specifying the colors and styles for the particular parts of the chart. You can vary the colors of the text, foreground, background, and areas to be filled. You can also select various scales and patterns.

You can make ten kinds of charts using the CHART run:

- ☐ ***Pie*** charts can have exploded segments; each segment can have a different color and pattern.
- ☐ ***Line*** charts can have various line styles and colors.
- ☐ ***Bar*** charts can be 3-dimensional, vertical, or horizontal, and can display stacked or comparative bars with different colors and patterns.
- ☐ ***Text*** charts can have centered titles, bullet and dash lines, and numbered pages.
- ☐ ***Scatter*** charts can have various styles of markers for point indicators in different colors.
- ☐ ***Time line*** charts graph data that represents time spans.
- ☐ ***Radar*** charts contain a number of rays, each representing a different scale and data. The data is then connected by a predetermined line type for each caption.
- ☐ ***Target*** charts form a target.
- ☐ ***Mixed Bar and Line*** charts let you combine bar and line chart information on one chart.
- ☐ ***Pareto*** charts combine a bar chart with a line chart that automatically accumulates the percentage of each bar as it is plotted.

By entering data in special reports provided by the CHART runs, you can organize information in chart form. If you want to make a chart from data you already have in a field-formed MAPPER report, you can use the GR or GRID run. These runs allow you to enter options and parameters similar to a function mask for a manual function.

The GOC (Generate Organization Chart) function allows you to enter commands in a free-form report to create a chart for your organization. With the GS (Graphics Scaler) function, you can scale and rotate your charts, as well as add special details.

AVAILABLE COLORS AND STYLES

Depending on what type of display or plotter you use, you can have many different colors and patterns in your charts. (See "Required Equipment" in Section 2 for a description of the equipment you need.)

The next four tables show the colors, patterns, line styles, and marker symbols available.

Color Index Table
*colors for text charts**

COLOR	TEXT	PEN STALL†
black	0	1
red	1	3
green	2	4
yellow	3	5
blue	4	2
magenta	5	7
cyan	6	2
white	7	1
gray	8	1
tan	9	5
aqua	10	8
lime	11	6
violet	12	7
hot pink	13	3
turquoise	14	8
pink	15	3

* To specify a color for a chart other than a text chart, spell out the word. For example, enter **red** to specify the color red.

† If you have a plotter, put the indicated pen color in the numbered pen stall.

On a four-pen plotter, you can enter only black, blue, red, or green, but you can put the colors you want in the penholders. If you specify a color not available on your terminal or plotter, the system selects another color for it.

Fill Pattern Table

*hatching styles for pie and bar charts
(pattern used to fill an interior area)*

FILL PATTERN	NUMBER
none (just a border)	N
solid	0
45-degree left (\\\\\\)	1
45-degree right (////)	2
vertical lines	3
horizontal lines	4
vertical and horizontal crosshatch	5
45-degree crosshatch	6
(varies by device)	(over 6)

Line Style Table

for line charts

LINE STYLE	NUMBER
solid	1
short dashes	2
dots	3
dashes and dots	4
very short dashes	5
medium dashes	6
long dashes	7
one dash - two dots	8
widely spaced dots	9

Marker Symbol Table

symbols for marked points on scatter charts

MARKER SYMBOL	NUMBER
dot (period)	1
plus sign	2
asterisk	3
circle (capital O)	4
X (capital X)	5
(varies by device)	(over 5)

2. Getting Started

If you have never used MAPPER software to do color graphics, use this section as a tutorial. It explains basic terms, tells what equipment you need, and provides two exercises designed to show you how to use the CHART run for basic charts.

If you already know how to create charts, you won't need to complete the exercises in this section. You should review the basic terms if you intend to use any of the new features. Refer to the description of the required equipment if you are setting up a new workstation for color graphics.

This section includes:

- ☐ Basic Terms
- ☐ Required Equipment
- ☐ Exercises

Basic Terms

In order to learn how to use color graphics, you need to learn some new terms. The rest of the manual will be much easier to understand when you know what these terms mean:

- preformatted input report
- completed input report
- primitive graphics code
- expanded syntax
- index list report

WHAT IS A PREFORMATTED INPUT REPORT?

Many of the color graphics runs use a *preformatted input report* to hold the information you want to plot. The preformatted input report for a specific type of chart has fields that you tab to and complete with text or numbers for data, or with a Y or N to select an option.

You use a different preformatted input report for each of the CHART runs. For example, the next page shows the preformatted input report for PIEG (one of the CHART runs).

```

LINE# █   FMT▶  RL▶   SHFT▶   HLD CHR$▶   HLD LN▶   ▶   fcs   ▶
.DATE 01 JAN 87 12:34:56 RID  1A 01 JAN 87  JDoe
.PIE CHART FOR **JDoe**
.▶          Press F1 or enter RSM when report is updated
.TEXT COLOR --->
.SCREEN COLOR ->
.TITLE ----->
.SUBTITLE ----->
.DATE ----->
.INCLUDE LEADING '$'? ----->
.DISPLAY PERCENTAGE ONLY? ->
.DISPLAY TOTAL? ----->
.
                                FOREGROUND BACKGROUND
*NAME          VALUE          EXPLODE? COLOR      COLOR      PATTERN
*-----

```

Later in this section, you'll learn how to complete the preformatted input report and display the chart on your terminal or plot it.

WHAT IS A COMPLETED INPUT REPORT?

When you make your first chart, you get a blank preformatted input report to complete. After you fill in the fields, you save the *completed input report*.

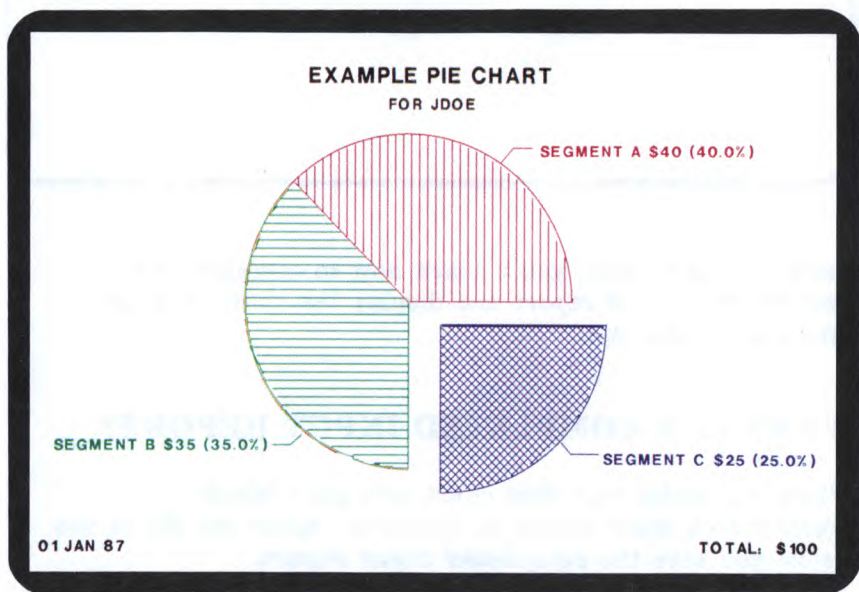
The next page shows a completed input report and the pie chart that it produces.

```

.TEXT COLOR ----> BLACK
.SCREEN COLOR -> WHITE
.TITLE -----> EXAMPLE PIE CHART
.SUBTITLE -----> FOR JOE
.DATE -----> 01 JAN 87
.INCLUDE LEADING '$'? ----> Y
.DISPLAY PERCENTAGE ONLY? -> N
.DISPLAY TOTAL? -----> Y

```

*NAME	VALUE	EXPLODE?	FOREGROUND COLOR	BACKGROUND COLOR	PATTERN
SEGMENT A	40	N	RED		4
SEGMENT B	35	N	GREEN		3
SEGMENT C	25	Y	BLUE		6



Each chart that you make by using one of the CHART runs requires a completed input report. When you make several similar charts, you can modify the completed input report and quickly produce a new chart. You can duplicate the completed input report and enter new data in the fields. You can then plot the new chart on your terminal or plotter.

WHAT IS PRIMITIVE GRAPHICS CODE?

The completed input report is processed by MAPPER software to make the finished chart. The data from the input report is translated into *primitive graphics code*. The primitive graphics code is then sent to the output device (either the terminal or the plotter). The output device interprets the primitive graphics code to create the finished chart. By translating your completed input report into primitive graphics code, the MAPPER system can support many different types of output devices.

The primitive graphics code for your chart is displayed as a result during the process of displaying your chart. For example, the primitive graphics code result for the previous pie chart looks like this:

```
line#  fmt#  r#  shft#  hid chrs#  hid ln#  ▶  ???RESULT??? ▶
.DATE 01 JAN 87 11:06:09      REPORT GENERATION      JDOER
.EXAMPLE PIE CHART - 174A
.DEVICE TYPE AQUASTAR, ASPECT RATIO .6424148607
*=====
ZIZO1                      LB3ZNLLOLTOLS1PE2A,C32767,,32767,21049,,21049,,CZ300,358C
JO,2A500,631'01 JAN 87'CJ1,2CZ410,400A32000,631'TOTAL: $100'CZ500,631CJ2,2A16384
,19997'EXAMPLE PIE CHART'CZ410,400CJ2,2A16384,19155'FOR JDOE'CJ3,3PI5PH4LF1LL1LT
1LBOA16384,9472K6000,0,144A18238,15178C18424,15749,19324,15749B410,-210'SEGMENT
A'B4100,'$40 (40.0%)'PI5PH3LF2LL2LT2LBOA16384,9472K6000,144,270A11038,6748C10503
,6476,9603,6476B-9020,-210'SEGMENT B'B4100,'$35 (35.0%)'PI5PH6LF4LL4LT4LBOA17233
,8623K6000,270,360A21476,4380C21900,3956,22800,3956B410,-210'SEGMENT C'B4100,'$2
5 (25.0%)'ZT
..... END REPORT .....
```


The primitive code shown in this result is the *packed* version. If you use the GS (Graphic Scaler) function, you can *unpack* it, putting each primitive graphics code on a separate line.

You can save a primitive graphics code result by using the XR (Duplicate Report) or REP (Replace Report) manual function.

For most types of charts, all you need to know about primitive graphics code is that it is produced from your completed input report and can be displayed as a result. However, if you want to display more than one chart at a time by using the MULTI run, or use the DISPLAY run to cycle through a series of charts, you need to save the primitive graphics code for the charts in reports. Section 4 covers this in more detail.

If you use advanced graphics, see Section 5 for a more complete discussion of primitive graphics code.

WHAT IS EXPANDED SYNTAX?

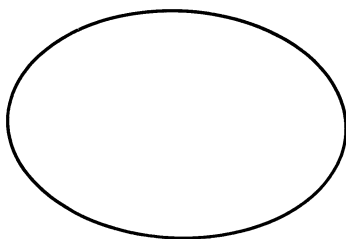
Although you can create many styles of charts by using the CHART runs and several other color graphics runs, you may want to create custom charts. You can put the appropriate primitive graphics code into a free-form report and plot it, but that requires a good understanding of primitive graphics code. To make it easier to create custom charts, MAPPER color graphics has a middle-level graphics language called *expanded syntax*.

Expanded syntax allows you to make special charts—ones that cannot be done with a preformatted input report, but are too difficult to make with primitive graphics code.

You can enter the expanded syntax instructions in a free-form report and use the GS (Graphic Scaler) function to translate it into primitive graphics code. Then you plot the primitive graphics code to get your special chart.

An example of expanded syntax and the resulting plot you get after processing it with GS is shown here:

ZI	← primitive graphics code
Z01	.
R	.
A16383,12000	.
LL1	.
LF1	.
/OV3000,2000/	← expanded syntax command
ZT	← end of primitive graphics code



"Graphics Scaler" in Section 5 has more information about expanded syntax and the GS function. After you learn how to use expanded syntax, use Appendix B as a reference.

WHAT IS AN INDEX LIST REPORT?

The *index list report* is a list of charts that you created, along with the RID for the primitive graphics code for each. You generate the index list report by using the DISPLAY run. With the DISPLAY run, you specify the primitive graphics code to index. For each primitive graphics code report (or result) that you add, the DISPLAY run adds a line of data to the index list report, describing it by title and RID.

When you learn how to use the DISPLAY run, you can also use it to cycle a set of charts on your display terminal.

Here's an example of what the index list report looks like:

LINE▶	■	FMT▶	RL▶	SHFT▶	HLD CHRS▶	HLD LN▶	▶	fcs	▶
.DATE 01 JAN 87 10:24:46 RID 25A 01 JAN 87 JDOE									
.GRAPHICS DISPLAY LIST REPORT BY: JDOE									
.@880101									
*MODE TYPE RID TITLE									
*-----									
0	a	31	example expanded syntax for GS function						BY: JDOE
0	a	34	PAGE COUNT FOR LIBRARY - 22A						
0	a	36	TEXT CHART FOR EXAMPLE PIE CHART - 37A						
0	a	61	example for GOC command						
0	a	68	MAPPER FREE FORM: primitive code sample						BY: JDOE

Now that you are familiar with these terms, you are ready to find out what type of equipment you can use for MAPPER color graphics. (If you already have a terminal that is used for color graphics, you can skip "Required Equipment" and go to "Exercises.")

Required Equipment

You can complete preformatted input reports from any supported SPERRY terminal and send them to a plotter connected as an auxiliary device. However, if you want to view the chart on your terminal or print it on a plotter attached to your terminal, you need a terminal configured for graphics.

Color graphics runs for Level 33R1 software cannot be used with previous levels of MAPPER software because of internal enhancements and options. The runs will not work correctly if you copy the run control reports from Level 33R1 into a system using an earlier level of MAPPER software.

The next few pages tell what types of terminals and plotters you can use with MAPPER color graphics. Procedures for configuring the equipment is also provided.

If your terminal (and plotter, if you have one) is already configured, you can skip the next few pages and go on to "Exercises."

TYPES OF TERMINALS

There are several types of terminals that you can use. Some require additional hardware or software.

☐ Universal Terminal System 30 (UTS 30)

The UTS 30 provides monochrome graphics if it has microcode level 3R4PC1 (or higher) and a feature board (F3987-00) installed. You also need the diskette base to load the microcode, which is supplied on a floppy diskette.

☐ Universal Terminal System 60 (UTS 60)

This terminal provides color graphics. You need microcode level 1R3C10 (or higher). As a graphics terminal, it should have the user memory expansion already installed.

☐ Universal Terminal System 400 (UTS 400) Master

You can use color graphics if you have a UTS 400 Master (not Slave), but your charts will be in monochrome. You don't need a floppy diskette for microcode for the UTS 400 because it is downloaded from the MAPPER system. You do need a monochrome graphics card installed in the UTS 400.

☐ SPERRY PC

If you have a SPERRY PC/HT, PC/IT, or PC/microIT, you can configure it as a UTS 60 or UTS 30 by installing a SPERRY Terminal Emulation Package (STEP). To use MAPPER color graphics, you need STEP IIG, version 2.1 (or higher). Order software type 7800-00 and STEP board feature 4213-01 or 4213-02. Make sure you install the P12 PROM on the STEP board to enable the graphics software to work. For installation and configuration instructions, refer to the *SPERRY Terminal Emulation Package, Enhanced Version, User's Guide*, UP-11886 Rev. 1.1.

If you have a monochrome monitor, use a HerculesTM Graphics Card for monochrome graphics and configure STEP as a UTS 30. (Hercules is a trademark of Hercules Computer Technology, Inc.)

If you want color graphics, use a high-res color monitor and the SPERRY Hi-Res color graphics card. Configure STEP as a UTS 60.

□ **Intercolor Scope™ (ISC)**

This terminal, also called an Intelligent Systems Corporation Color Terminal, does not require any additional hardware or software. (Intercolor Scope is a trademark of Intelligent Systems Corporation.)

CONFIGURING YOUR TERMINAL

When you configure your terminal, you set up the software to work with graphics to translate the primitive graphics code. Depending on the terminal, you may also need to load the microcode each time you use color graphics.

UTS 30 or UTS 60

Run the CONFIG.SYS program from the floppy diskette that holds the required microcode. Check that the update lock on your terminal is released and then follow this procedure:

1. Insert the microcode diskette into the drive.
2. Press and hold **UPPER FUNCTION** and then press **M**.
3. Type **run config.sys** and press **XMIT**.
4. Choose the fields you need to configure and follow the instructions on the screen.
5. On the last screen, you can choose to either save the changes or leave the configuration as it was. Follow the instructions on the screen.
6. If you made any changes with the CONFIG.SYS program, you must reset your terminal. When you are done with the program, press the **RESET** button. This loads the new configuration.

UTS 400

Since the UTS 400 receives the microcode downloaded from the MAPPER system, you do not need to configure it.

However, you need to load the graphics code each time you start a session using color graphics. The exercises later in this section explain how to do this.

STEP with SPERRY PC

You need to use the *SPERRY Terminal Emulation Package, Enhanced Version, User's Guide*, UP-11886 Rev. 1.1 to configure the SPERRY PC either as a UTS 30 or a UTS 60. Be sure you install the P12 PROM on the STEP board to enable the graphics feature. Before you try to use color graphics with your configured SPERRY PC, test the connection to the MAPPER system using ordinary manual functions or runs. Then test it by doing the exercises later in this section.

Intercolor Scope

The Intercolor Scope must be configured as an ISC terminal. Contact your MAPPER system coordinator to have it configured.

TYPES OF PLOTTERS

There are several types of Hewlett-PackardTM plotters that you can use, ranging from two pens to eight. (Hewlett-Packard is a trademark of Hewlett-Packard Company.)

If you have a UTS 30 or UTS 60 terminal, the only plotter you can connect directly to it is the six-pen HP 7475A plotter.

If you have configured a SPERRY PC with STEP, refer to the STEP User's Guide for the list of supported plotters.

If you have an Intercolor Scope, you can have plotters configured as auxiliary devices by the MAPPER coordinator. Here are the types of plotters you can use with this terminal:

HP 7220C	HP 7221B	HP 7221S
HP 7220T	HP 7221C	HP 7221T

CONFIGURING YOUR PLOTTER

To configure the plotter switch settings, refer to the documentation for your plotter. (You may also refer to the on-line documentation in **HELP**.)

If you have a UTS 30 or UTS 60 with a plotter attached, you must also follow this procedure:

1. Insert the microcode diskette into the drive.
2. Press and hold **UPPER FUNCTION** and then press **M**.
3. Type **run config.sys** and press **XMIT**.
4. Tab to the **PERIPHERAL ASSIGNMENT** field and press **XMIT**. Follow the instructions on your screen to supply the plotter information.
5. On the last screen, you can choose to either save the changes or leave the configuration as it was. Follow the instructions on the screen.
6. If you made any changes with the **CONFIG.SYS** program, you must reset your terminal. When you are done with the program, press the **RESET** button. This loads the new configuration.

To configure the plotter for a SPERRY PC, refer to the STEP User's Guide.

Exercises

The two exercises presented in this subsection show you how to use MAPPER color graphics. The first exercise shows you how to display an example chart. If you have a plotter, you can make a copy of the example chart. The second exercise shows you how to complete a preformatted input report for a pie chart.

LOAD GRAPHICS CODE

If you are using a UTS 60 or a SPERRY PC for graphics, you don't need to load the graphics code.

If you are using a UTS 30, UTS 400, or ISC, you must load the graphics code before using MAPPER color graphics. Enter chart,g on the control line. If your terminal is properly configured, the graphics code is loaded. An error message appears if your terminal cannot do graphics.

PREPARE PLOTTER (OPTIONAL)

If you have a plotter attached to your terminal and you want to plot charts, turn on the power and load paper into it. Refer to the manual for your plotter for paper-loading instructions, and to the Color Index Table in Section 1 for the colors of the pens to load in the pen stalls.

If you are plotting transparencies, change the plotter pens to pens made especially for transparencies. The ink used for transparencies takes about 15 minutes to dry. Do not allow anything to come in contact with the transparencies for at least that long. Also, keep the transparency masters free from grease, including fingerprints.

DISPLAY EXAMPLE STYLES CHART

For the first exercise, you display an example chart provided by the CHART run. The CHART run allows you to display many on-line examples. If you have a plotter, you can get a paper copy of the example chart.

1. Enter **chart,e** on the control line to execute the CHART run and display the menu of examples.
2. Press **TAB** to move the cursor to the first selection (**STYLES**) and press **XMIT**. The following plotting messages are displayed:

```
** If you want the chart displayed but not printed, just transmit **

If you want to plot as well as display the chart, enter the plotter
station number ----> $00 ,






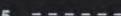


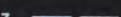
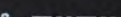

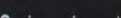







If you want the printed chart on a full sheet of paper (11" X 17")
instead of on a half sheet (8-1/2" X 11"), enter Y ----> N ,

If you're printing on overhead transparencies, enter Y ----> N ,

If you want a logo & header on your chart, enter Y ----> N ,

Transmit when done with this screen.
```

3. If you are not plotting, press **XMIT**. This chart is displayed on your terminal:

COLORS		HATCHING STYLES		LINE STYLES
0. Black		1. 45 degree left		1. 
1. Red		2. 45 degree right		2. 
2. Green		3. Vertical lines		3. 
3. Yellow		4. Horizontal lines		4. 
4. Blue		5. Crosshatch		5. 
5. Magenta		6. Diagonal Crosshatch		6. 
6. Cyan				7. 
7. White		MARKER STYLES		8. 
8. Gray		1. Dot		9. 
9. Tan		2. Plus		
10. Aqua		3. Asterisk		
11. Lime		4. Capital O		
12. Violet		5. Capital X		
13. Hot Pink				
14. Turquoise				
15. Pink				

If you are plotting, you should still view the chart on your terminal first. (You save time and plotter paper by "fine-tuning" using the terminal display—in this case, you won't change the example chart, but when you make your own charts, you probably will need to adjust colors or patterns a few times.) Repeat Steps 1 and 2. When the plotting messages are displayed, follow this procedure:

- Type the plotter station number.
- Read the rest of the options on the screen. If you need to change any, tab to the field and type **y** next to the option. When you are done, press **XMIT**.
- When the plotter is done, remove the plot.

4. To continue after you have seen the chart (and after the plot is done, if you are plotting), press and hold **SHIFT**, then press **DISP 1-2** twice. This returns you to the screen containing the plotting messages.
5. Press **F1** to resume and display a screen titled **CHART GRAPHICS DISPLAY MENU**. Use this menu for the next exercise.

CREATE YOUR OWN CHART

Now that you know how to display an example chart, you can create your own chart. You use the **CHART** run again, but this time you select the type of chart from the **CHART GRAPHICS DISPLAY MENU**.

1. If you don't have the **CHART GRAPHICS DISPLAY MENU** on your screen from the previous exercise, enter **chart** on the control line. This is the menu you see:

```

                                CHART GRAPHICS DISPLAY MENU
                                *** Tab to the selection you want and transmit ***
                                *** Or tab to a selection and enter ? for help with it ***

▶ 1. PIE CHART (PIEG)                ▶ LINE CHART (LINEG)
▶ BAR CHART (BARG)                  ▶ TEXT CHART (TEXT)
▶ SCATTER CHART (SCAT)              ▶ TIME LINE CHART (TIMEL)
▶ RADAR CHART (RADAR)               ▶ TARGET CHART (TARGET)
▶ MIXED BAR & LINE CHART (MIXED)    ▶ PARETO CHART (PARETO)

▶ LOAD GRAPHICS CODE (G)            ▶ ?HELP INFORMATION? (H)
▶ DISPLAY EXAMPLE CHARTS (E)        ▶ DETERMINE TYPE OF TERMINAL
▶ DISPLAY CODE ON SCREEN (C)        ▶ DEQUEUE PLOT FROM PLOTTER
▶ SEND CODE TO PLOTTER (P)          ▶ PLOT SPERRY HEADER ON CHARTS

```

2. Tab to **PIE CHART** if the cursor is not already there. Press **XMIT**. You get this message:

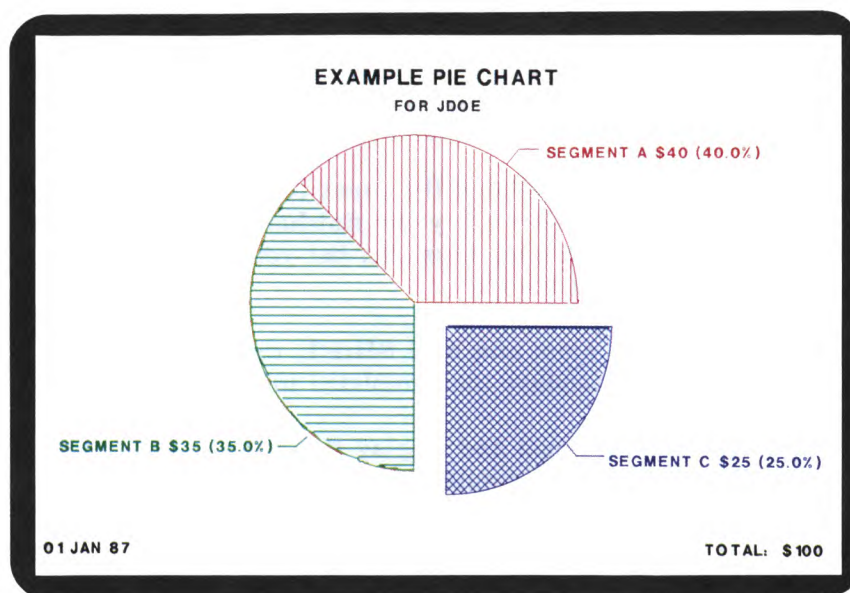
If the data already exists in a report, enter the RID number and form type. If it doesn't exist, the system adds a new report for you. Just enter the form type -->

3. Enter the letter of the form type you are using for the preformatted input reports. (Contact your **MAPPER** coordinator if you don't know which form type to use.) You get a message that tells you the mode, type, and report number where your new preformatted input report is located. Be sure to write this down.
4. Press **F1** to display the preformatted input report for the pie chart.
5. Since an **SOE** character is stored in one of the top header lines, you don't need to insert an **SOE**. Just fill in the preformatted input report like the one shown below and press **XMIT** when you finish.

```
.TEXT COLOR ---> BLACK
.SCREEN COLOR -> WHITE
.TITLE -----> EXAMPLE PIE CHART
.SUBTITLE -----> FOR JDOE
.DATE -----> 01 JAN 87
.INCLUDE LEADING '$'? -----> Y
.DISPLAY PERCENTAGE ONLY? -> N
.DISPLAY TOTAL? -----> Y
```

*NAME	VALUE	EXPLODE?	FOREGROUND BACKGROUND		PATTERN
			COLOR	COLOR	
SEGMENT A	40	N	RED		4
SEGMENT B	35	N	GREEN		3
SEGMENT C	25	Y	BLUE		6

6. Press **F1** to resume. The plotting messages are displayed. If you just want to display the chart on your terminal, press **XMIT**. (Follow the steps shown in the previous exercise if you are plotting.) This is the chart you get:



7. To continue after you have seen the chart (and after the plot is done, if you are plotting), press and hold **SHIFT**, then press **DISP 1-2** twice. This returns you to the screen containing the plotting messages.
8. Press **F1** to display the primitive code result for the chart.
9. Press **F1** to resume and display the **CHART** menu again.

MODIFY YOUR CHART

You can modify the data in your completed input report and redisplay it.

1. Display the completed input report (move the cursor to the control line and enter the RID).
2. Refer to "Pie Chart (PIEG)" in Section 3 for a description of the options and parameters you can enter.
3. When you have updated the input report, enter **pieg** on the control line to display the finished pie chart. (This bypasses the plotting messages, but you can still plot later in this procedure.)
4. To continue, press and hold **SHIFT**, then press **DISP 1-2** twice. This displays the completed input report again.
5. Press **F1** to resume and display the chart's primitive graphics code as a result. You can use this result as input to the **DISPLAY** run (refer to Section 4) by saving it as a report. Use the **XR** (Duplicate Report) function to create a report from the primitive graphics code.
6. If you want to plot the chart, enter **chart,pieg** on the control line. You see the following screen:

If the data already exists in a report, enter the RID number and form type. If it doesn't exist, the system adds a new report for you.
Just enter the form type -->

7. Enter the report number and alphabetic form type of the completed input report that you want to plot.

8. The completed input report is displayed. Press **F1** to continue.
9. The plotting messages are displayed—enter the options and press **XMIT**.
10. After the plot is done, remove it.
11. Press **SHIFT** and **DISP 1-2** twice and then press **F1**.

Now you know how to create and display a pie chart using a preformatted input report. Use Section 3 for the other types of charts listed in the **CHART** menu.

3. Creating Basic Charts

This section explains how to use the CHART runs. If you have never used MAPPER color graphics before, read Section 2, "Getting Started," first.

This section includes:

- ☐ Overview
- ☐ Pie Charts (PIEG)
- ☐ Line Charts (LINEG)
- ☐ Bar Charts (BARG)
- ☐ Text Charts (TEXT)
- ☐ Scatter Charts (SCAT)
- ☐ Time Line Charts (TIMEL)
- ☐ Radar Charts (RADAR)
- ☐ Target Charts (TARGET)
- ☐ Mixed Bar and Line Charts (MIXED)
- ☐ Pareto Charts (PARETO)

Overview

This overview describes how to create and display charts using the CHART run.

CREATING CHARTS (CHART)

If you did the exercises in Section 2, you have already created a pie chart. Use the following procedure to use the CHART run and the CHART GRAPHICS DISPLAY MENU (the CHART menu).

1. To display the CHART menu, enter **chart** on the control line. The CHART GRAPHICS DISPLAY MENU appears:

```

                                CHART GRAPHICS DISPLAY MENU
                                *** Tab to the selection you want and transmit ***
                                *** Or tab to a selection and enter ? for help with it ***

▶ 1 PIE CHART          (PIEG)          ▶ LINE CHART          (LINEG)
▶ BAR CHART           (BARG)          ▶ TEXT CHART         (TEXT)
▶ SCATTER CHART       (SCAT)          ▶ TIME LINE CHART    (TIMEL)
▶ RADAR CHART         (RADAR)         ▶ TARGET CHART       (TARGET)
▶ MIXED BAR & LINE CHART (MIXED)       ▶ PARETO CHART       (PARETO)

▶ LOAD GRAPHICS CODE   (G)            ▶ ?HELP INFORMATION? (H)
▶ DISPLAY EXAMPLE CHARTS (E)          ▶ DETERMINE TYPE OF TERMINAL
▶ DISPLAY CODE ON SCREEN (C)          ▶ DEQUEUE PLOT FROM PLOTTER
▶ SEND CODE TO PLOTTER  (P)            ▶ PLOT SPERRY HEADER ON CHARTS
```

2. If you need help with a selection, tab to it and enter ? for help.

To create a new chart or modify an existing one, tab to the chart selection in the upper half of the menu and press **XMIT**.

To select something listed on the lower half of the menu, tab to it and press **XMIT**.

For example, if you want to use the on-line help for color graphics, tab to the **HELP INFORMATION** field and press **XMIT**.

3. Respond to the message on your screen.
 - ☐ If you are creating a new chart, enter the form type you are using for preformatted input reports. You see messages that tell you the new report number and type. Be sure to write this down. Press **F1** to continue. A preformatted input report (blank) is displayed.
 - ☐ If you are modifying an existing chart, enter the report number and form type of its completed input report. That completed input report is displayed.
4. Refer to the description of the options and parameters for the specific chart in this section and type the data.

NOTE: Using apostrophes requires extra attention. In text charts, type one apostrophe for each apostrophe in your text. In all other charts, if you want an apostrophe in your text, type two apostrophes. For example, enter **John''s** for "John's" in the text.

After you type the data for the chart, press **XMIT** to complete the update. Press **F1** to continue.

5. On the screen displaying the plotting messages, enter any changes you want. The chart is displayed (and plotted, if you have a plotter).
6. To continue after viewing the chart, press and hold **SHIFT** and then press **DISP 1-2** twice. The plotting messages screen reappears. Press **F1** to display the primitive graphics code. Press **F1** again to display the CHART menu.

BYPASSING THE CHART MENU

You can bypass the CHART menu if you know the type of chart you want to work with. Enter **chart,selection** where **selection** can be either a run call or an option letter.

Using Run Call

To work on a chart, use the run call for **selection**. The run calls are shown in parentheses in the upper half of the menu.

For example, enter **chart,pieg** to work on a pie chart. You can also specify a RID to work with. For example, if you have a completed input report for a pie chart in RID 25A, enter **chart,pieg,25a** to work on it.

An even simpler way to work on a chart is to enter the run call without the CHART run call. For example, enter **pieg** to work on a pie chart (or **pieg,25a** if RID 25A is your completed input report).

Using Option Letter

To select one of the tasks listed at the bottom of the CHART menu, use the single letter in parentheses next to the task. For example, enter **chart,h** to display the on-line help for charts.

USING A RUN TO CREATE CHARTS

If you are a run designer, you can start a CHART run in one of your own MAPPER runs. Use the RUN (Run Start) run statement.

Refer to the *MAPPER Software Level 33R1, Run Designer's Reference* for a description of this run statement.

DISPLAYING GRAPHICS

If you saved the chart as a primitive graphics code report, you can display it in several ways:

- Use CHART,C
- Use G manual function
- Use DSG run statement

If the primitive graphics code report is on display, enter **chart,c** or **g** – on the control line. The chart is displayed on your terminal.

If the primitive graphics code report is not displayed when you enter **chart,c** or **g**, you get a message requesting the RID. Enter the RID you want.

If you don't have the primitive graphics code displayed, enter **chart,c,rt** where **rt** is the RID.

Run designers can use the DSG (Display Graphics) run statement to display a chart on a terminal. The chart must be saved as a primitive graphics code report to be used by the DSG run statement. Refer to the Run Designer's Reference for a description of this run statement.

Pie Charts (PIEG)

The PIEG run produces a chart that resembles a pie sliced into pieces. Each slice can be represented by different colors and patterns, and is proportional to the value given it. You can also emphasize pieces of the pie by entering **Y** in the **Explode** field. This separates the designated pieces from the pie.

Here's the preformatted input report for a pie chart:

LINE▶

■

FMT▶

RL▶

SHFT▶

HLD CHR▶

HLD LN▶

▶

fcs

▶

.DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDOE

.PIE CHART FOR **JDOE**

.▶

▶Press F1 or enter RSM when report is updated▶

.TEXT COLOR --->

.SCREEN COLOR ->

.TITLE ----->

.SUBTITLE ----->

.DATE ----->

.INCLUDE LEADING '\$'? ----->

.DISPLAY PERCENTAGE ONLY? ->

.DISPLAY TOTAL? ----->

.

FOREGROUND BACKGROUND

*NAME VALUE EXPLODE? COLOR COLOR PATTERN

*=====

PIEG SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

PIEG: Pie Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for the available colors.
SCREEN COLOR	<p>the color you want the terminal screen to be. The default color is black. See the Color Index Table in Section 1 for available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
TITLE	a title up to 40 characters.
SUBTITLE	a subtitle up to 60 characters.
DATE	a date up to 18 characters, in whatever format you want. If you enter a Y , today's date appears in the format <i>DD MMM YY</i> .
INCLUDE LEADING '\$'?	Y if you want a dollar sign (\$) in front of each value.
DISPLAY PERCENTAGE ONLY?	Y if you want to display only percentages of the parts.
DISPLAY TOTAL?	Y if you want the total of all values presented in lower right corner.
NAME	a name for each slice of the pie.
VALUE	a value for each slice (required).
EXPLODE?	Y if you want the slice to be offset from the pie's center.

(continued)

PIEG: Pie Chart Selections (continued)

In field:	Enter:
FOREGROUND COLOR/ BACKGROUND COLOR	foreground and background colors. See the Color Index Table in Section 1 for available colors. The FOREGROUND color includes the text and border for the slice, and the BACKGROUND color is the background of the pattern. If you want a solid color for a slice, specify the same color under FOREGROUND COLOR and BACKGROUND COLOR ; or specify 0 under PATTERN , which is a solid fill. If you specify a pattern but no background color, you get a black background.
PATTERN	a pattern number for each slice of the pie. See the Fill Pattern Table in Section 1 for available styles.

SOME TIPS AND SUGGESTIONS

Even though there is no absolute limit to the number of slices you may have in your pie, after a certain point the slices become so small that the text overwrites other slices, or it is just too small to be effective.

If your slices are overwriting one another, try rearranging the order of the slices: Put a large slice between small slices instead of putting all the small slices together. The order of the slices in your input report determines their order in your pie chart.

COMPLETED PIEG REPORT

The next page shows a completed input report and the pie chart it produces.

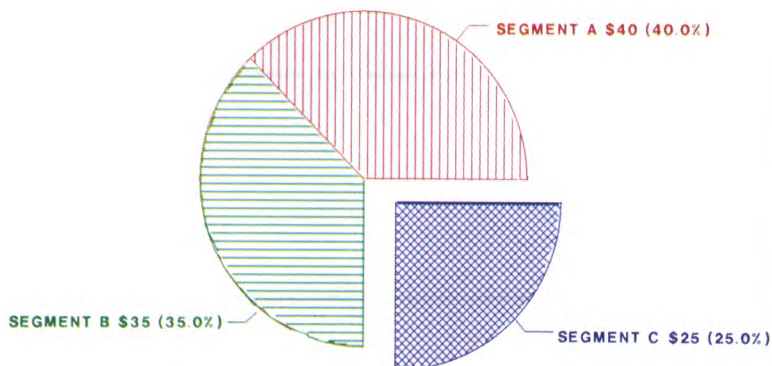

```

.TEXT COLOR ---> BLACK
.SCREEN COLOR -> WHITE
.TITLE -----> EXAMPLE PIE CHART
.SUBTITLE -----> FOR JOE
.DATE -----> 01 JAN 87
.INCLUDE LEADING '$'? -----> Y
.DISPLAY PERCENTAGE ONLY? -> N
.DISPLAY TOTAL? -----> Y

```

*NAME	VALUE	EXPLODE?	FOREGROUND COLOR	BACKGROUND COLOR	PATTERN
SEGMENT A	40	N	RED		4
SEGMENT B	35	N	GREEN		3
SEGMENT C	25	Y	BLUE		6

EXAMPLE PIE CHART FOR JOE



01 JAN 87

TOTAL: \$100

Line Charts (LINEG)

The LINEG run produces a line chart showing data with a variety of representative lines.

Here's the preformatted input report for a line chart:

LINE

FMT

RL

SHFT

HLD CHRS

HLD LN

fcs

DATE

01 JAN 87

12:34:56

RID

1A

01 JAN 87

JDOE

LINE CHART FOR JDOE

Press F1 or enter RSM when report is updated

TEXT COLOR

SCREEN COLOR

->

BACKGROUND

TITLE

X AXIS TITLE

->

Y AXIS TITLE

->

1

2

3

4

5

6

CAPTIONS

-->

*LABELS

LINEG SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

LINEG: Line Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for the available colors.
SCREEN COLOR	<p>the color you want the terminal screen to be. The default color is black. See the Color Index Table in Section 1 for the available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
BACKGROUND	color of the inner box containing the chart. Leave this field blank if you want the inner box to be the same color as the outer box (SCREEN COLOR), whose default is black. The background color displays on the screen but does not plot.
TITLE	a title up to 40 characters.
X AXIS TITLE	a title up to 60 characters centered over horizontal scale.
Y AXIS TITLE	a title up to 60 characters centered over vertical scale.
CAPTIONS	a caption for each line. The captions appear on the left side of the chart and are similar to a road map legend. (You must have at least one caption. Wherever you do not supply a caption, the system ignores all data in that particular column. You may select up to six captions. Each value in this column is a y-axis value that matches an x-axis value, thus forming a pair with a label).
LABELS	points on the x-axis (you must have at least two labels and two values).

MORE SELECTIONS?

After making your selections and pressing **XMIT**, press **F1** to resume and display the message:

If you want more parameters to customize your chart, enter Y ---> N,

If you answer **Y**, you now choose from these additional selections:

Enter as many of these extra parameters as you want, and transmit when done. For more information, see CHART,HELP.

.SUBTITLE ----->

.DATE ----->

.MINIMUM Y ----->

.MAXIMUM Y ----->

.BASE LINE ----->

.MARKER DOTS? ->

.OFFSET LINES?-----> > (Y OR N)

.CONNECT THE DOTS? ---> (Y OR N)

.DISPLAY GRID LINES? -> (Y OR N)

.NUMERIC X SCALING? --> (Y OR N)

123456

.COLOR ----->

.PATTERN ---->

.SOLID FILL->

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

LINEG: Additional Selections

In field:	Enter:
SUBTITLE	a subtitle up to 60 characters.
DATE	the date up to 18 characters, in whatever format you want. If you enter Y, today's date appears in the format <i>DD MMM YY</i> .
MINIMUM/MAXIMUM Y	<p>your own values (i.e., enter values if you do not want automatic scaling).</p> <p>NOTE: The scale along the vertical y-axis of your chart may not necessarily be your minimum and maximum, in which case the system rounds the values to a suitable interval. If you choose values for MINIMUM Y, the system truncates all values in your data that are less than the minimum. If you enter a value for MAXIMUM Y, all values in your data that are greater than the maximum value are drawn split, indicating that the maximum value exceeds the scale value. Also, the actual is placed above the split bar.</p>
BASE LINE	a base line value other than zero (default) for a solid horizontal base line (all values greater than this value appear above the base line; all values less than this value appear below it).
MARKER DOTS?	<p>Y if you want small circles around each point on the lines, or a number from 1 to 99* for a different style of marker. Refer to the Marker Symbol Table in Section 1 for available styles of markers. For this chart, marker symbol 4 (capital "O") is the default.</p> <p>* May be different at your site.</p> <p>Not available with the SOLID FILL or OFFSET LINES parameter.</p>

(continued)

LINEG: Additional Selections (continued)

In field:	Enter:
OFFSET LINES?	Y for offset filled lines: Each line is solid filled under the line, down to the bottom of the chart; each line is offset by a proportional amount, depending on how many lines you want drawn and how many selections you make. The last (sixth) line is nearest the top, the next line to the left and down some, etc. (this is a good selection for determining trends).
CONNECT THE DOTS?	Y to connect each nonblank data to the last one (even if it's not the point immediately before) with no break in the line. (Good for incomplete data, where blanks otherwise produce breaks in a line.)
DISPLAY GRID LINES?	Y if you want grid lines displayed.
NUMERIC X SCALING?	Y if you want numeric entries in the LABELS column scaled like the y-axis.
COLOR	a color for each line. See the Color Index Table in Section 1 for available colors.
PATTERN	a pattern number for each line. See the Fill Pattern Table in Section 1 for available fill patterns.
SOLID FILL	Y to solid fill any or all lines in your chart. This selection produces a solid fill, under the line in the color you specify for the line down to the bottom of the chart. Each line is drawn in order from one to six. Thus, the solid fill may overwrite the values that dip below the solid-filled lines drawn previously.

SOME TIPS AND SUGGESTIONS

You can use the same report or result for a bar chart that you use for a line chart or mixed bar and line chart. The run ignores selections unique to the other types.

Also, you can experiment by displaying the same data in your line chart in the various types of bar or mixed bar and line charts.

Default values may appear in any fields that you didn't fill in.

COMPLETED LINEG REPORT

The next page shows a completed input report and the line chart it produces. **MARKER DOTS** and **DISPLAY GRID LINES** have been selected.

```

.TEXT COLOR ---> BLACK
.SCREEN COLOR -> WHITE
.BACKGROUND ----> GRAY
.TITLE -----> EXAMPLE LINE CHART
.SUBTITLE -----> FOR JDOE
.X AXIS TITLE -> X VALUES
.Y AXIS TITLE -> Y VALUES
.DATE -----> 01 JAN 87
.MARKER DOTS? -> Y
.OFFSET PLANES? -----> N (Y OR N)
.CONNECT THE DOTS? ---> N (Y OR N)
.DISPLAY GRID LINES? -> Y (Y OR N)
.NUMERIC X SCALING? ---> N (Y OR N)

```

```

      1      2      3      4      5      6
-----
.COLOR ----> BLUE      RED      GREEN
.PATTERN ---> 1        1        1
.CAPTIONS --> CAPTION 1  CAPTION 2  CAPTION 3
*LABELS

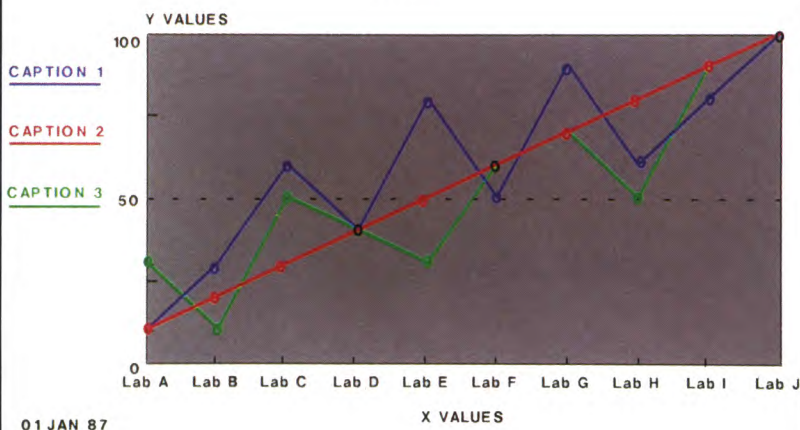
```

```

=====
Lab A      10      10      30
Lab B      30      20      10
Lab C      60      30      50
Lab D      40      40      40
Lab E      80      50      30
Lab F      50      60      60
Lab G      90      70      70
Lab H      60      80      50
Lab I      80      90      90
Lab J     100     100     100

```

EXAMPLE LINE CHART
FOR JDOE



Bar Charts (BARG)

The BARG run produces a bar chart with a variety of representative bars.

Here's the preformatted input report for a bar chart:

```
LINE# █ FMT# RL# SHFT# HLD CHR# HLD LN# fcs
. DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDOE
. BAR CHART FOR JDOE
. █ Press F1 or enter RSM when report is updated
. TEXT COLOR --->
. SCREEN COLOR ->
. BACKGROUND --->
. TITLE ----->
. X AXIS TITLE ->
. Y AXIS TITLE ->
.
. 1 . 2 . 3 . 4 . 5 . 6 .
. -----
. CAPTIONS -->
*LABELS
*=====
```

BARG SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

BARG: Bar Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for the available colors.
SCREEN COLOR	<p>the color you want the terminal screen to be. The default color is black. See the Color Index Table in Section 1 for the available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
BACKGROUND	color of the inner box containing the chart. Leave this field blank if you want the inner box to be the same color as the outer box (SCREEN COLOR), whose default is black. The background color displays on the screen but does not plot.
TITLE	a title up to 40 characters.
X AXIS TITLE	a title up to 60 characters centered over horizontal scale.
Y AXIS TITLE	a title up to 60 characters centered over vertical scale.
CAPTIONS	a caption for each bar. The captions appear on the left side of the chart and are similar to a road map legend. You must have at least one caption. Wherever you do not supply a caption, the system ignores all data in that particular column. You may select up to six captions. Each value in this column is a y-axis value that matches an x-axis value, thus forming a pair with a label.
LABELS	points on x-axis (you must have at least two labels and two values).

KINDS OF BAR CHARTS

There are five basic kinds of bar charts that you can make: Stacked horizontal, stacked vertical, comparative horizontal, comparative vertical, and three-dimensional comparative vertical.

Stacked Horizontal

The values stack one on top of another, producing one horizontal bar for each label. Answer **Y** to **DISPLAY GRID LINES** to produce solid vertical grid lines for locating points on each bar. The system ignores the answer **Y** to **3D BARS**.

Stacked Vertical

The values stack on top of the previous one, producing one vertical bar for each label. Answer **Y** to **DISPLAY GRID LINES** to produce solid grid lines behind the bars for locating points on each bar. The system ignores the answer **Y** to **3D BARS**. See also "Three-dimensional Comparative Vertical" charts in this list.

Comparative Horizontal

This chart has thin, horizontal bars, close together, with vertical grid lines (if selected). If your data is offset by a large value, enter a value for **BASE LINE** to show the detail better. The system ignores the answer **Y** to **3D BARS**.

Comparative Vertical

This chart has comparative vertical bars next to one another with optional horizontal grid lines. If your data is offset by a large value, enter a value for **BASE LINE** to show the detail better.

Three-Dimensional Comparative Vertical

This chart is like the comparative vertical chart, except that the bars are boxes rather than flat bars to give the illusion of depth. All other selections (except **BASE LINE**) apply.

MORE SELECTIONS?

After you make your selections and press **XMIT**, press **F1** to resume and display the message:



If you want more parameters to customize your chart, enter Y ---> N.

If you answer **Y**, you can now choose from these additional selections:

Enter as many of these extra parameters as you want, and transmit when done. For more information, see CHART,HELP.

```
.SUBTITLE ---->
.DATE ---->
.MINIMUM Y ---->
.MAXIMUM Y ---->
.BASE LINE ---->
.3D BARS? ----> (Y OR N)
.DISPLAY GRID LINES? - > (Y OR N)
.STACKED OR COMPARATIVE BARS? -> (S OR C)
.HORIZONTAL OR VERTICAL BARS? -> (H OR V)
.      . 1 . 2 . 3 . 4 . 5 . 6
.-----
.COLOR ---->
.PATTERN --->
.-----
```

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

BARG: Additional Selections

In field:	Enter:
SUBTITLE	a subtitle up to 60 characters.
DATE	the date up to 18 characters, in whatever format you want. If you enter Y, today's date appears in the format <i>DD MMM YY</i> .

(continued)

BARG: Additional Selections (continued)

In field:	Enter:
MINIMUM/MAXIMUM Y	<p>your own values (i.e., enter values if you do not want automatic scaling).</p> <p>NOTE: The scale along the vertical y-axis of your chart may not necessarily be your minimum and maximum, in which case the system rounds the values to a suitable interval. If you choose values for MINIMUM Y, the system truncates all values in your data that are less than the minimum. If you enter a value for MAXIMUM Y, all values in your data that are greater than the maximum value are drawn split, indicating that the maximum value exceeds the scale value. Also, the actual is placed above the split bar.</p>
BASE LINE	a base line value other than zero (default) for a solid horizontal base line (all values greater than this value appear above the base line; all values less than this value appear below it; not applicable for stacked bar charts).
3D BARS?	Y if you want 3-dimensional bars available only with comparative vertical bars.
DISPLAY GRID LINES?	Y if you want grid lines displayed.
STACKED OR COMPARATIVE BARS?	S or C (see KINDS OF BAR CHARTS).
HORIZONTAL OR VERTICAL BARS?	H or V (see KINDS OF BAR CHARTS).
COLOR	a color for each bar. See the Color Index Table in Section 1 for available colors.
PATTERN	a pattern number for each bar. See the Fill Pattern Table in Section 1 for available fill patterns.

SOME TIPS AND SUGGESTIONS

As you add more labels, your bars become thinner and thinner. There is no absolute limit to the number of labels (bars) you may have in your chart. However, if you have a large number of points, try a stacked bar chart or line chart rather than a comparative bar chart to give you more room for your data.

If your labels are very long, you might get better results with a horizontal bar chart, which gives you more room for labels.

You can use the same report or result for a bar chart that you use for a line chart or mixed bar and line chart. The run ignores selections unique to the other types.

Also, you can experiment by displaying the same data in a line chart or mixed bar and line chart, or by displaying various types of bar charts. Default values may appear in any fields that you didn't fill in.

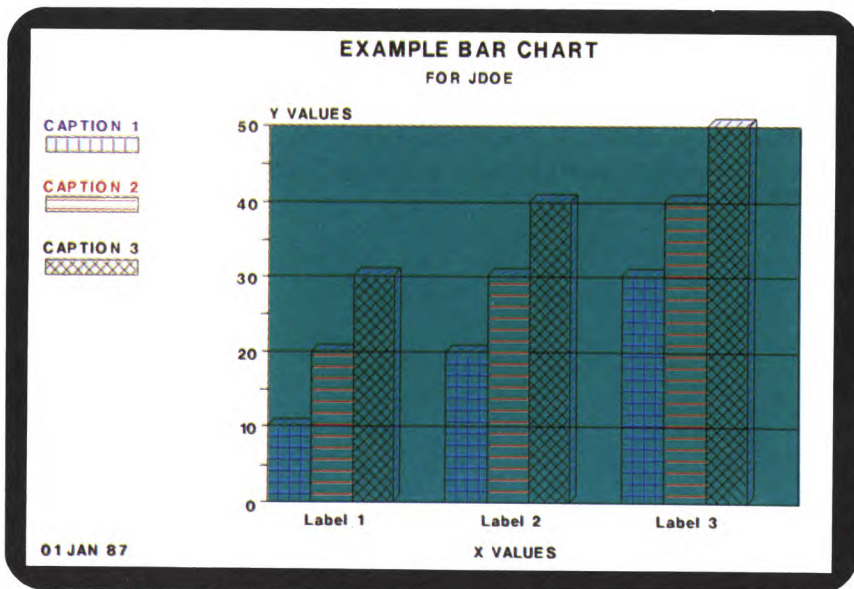
COMPLETED BARG REPORT

The next page shows a completed input report and the three-dimensional bar chart it produces. **DISPLAY GRID LINES** has been selected.

```

.TEXT COLOR ----> BLACK
.SCREEN COLOR -> WHITE
.BACKGROUND ----> AQUA
.TITLE -----> EXAMPLE BAR CHART
.SUBTITLE -----> FOR JDOE
.X AXIS TITLE -> X VALUES
.Y AXIS TITLE -> Y VALUES
.DATE -----> 01 JAN 87
.MINIMUM Y ----> 0
.MAXIMUM Y ----> 50
.3D BARS? -----> Y (Y OR N)
.DISPLAY GRID LINES? -> Y (Y OR N)
.STACKED OR COMPARATIVE BARS? -> C (S OR C)
.HORIZONTAL OR VERTICAL BARS? -> V (H OR V)
      1      2      3      4      5      6
-----
.COLOR ----> BLUE      RED      GRAY
.PATTERN ----> 5      4      6
.CAPTIONS --> CAPTION 1  CAPTION 2  CAPTION 3
*LABELS
=====
Label 1      10      20      30
Label 2      20      30      40
Label 3      30      40      50

```



Text Charts (TEXT)

The TEXT run produces a chart showing textual data. It is especially useful for creating overhead projector transparencies for presentations.

Here's the preformatted input report for a text chart:

```
LINE▶  FMT▶  RL▶  SHFT▶  HLD CHRS▶  HLD LN▶  fcs▶
DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDoe
TEXT CHART FOR JDoe
▶ Press F1 or enter RSM when report is updated
LINE TYPE: T, *, -, &, D, I, B, P, S, M, L, C, F, O
COLORS: 0-BLACK, 1-RED, 2-GREEN, 3-YELLOW, 4-BLUE, 5-MAGENTA, 6-CYAN, 7-WHITE,
8-GRAY, 9-TAN, 10-AQUA, 11-LIME, 12-VIOLET, 13-HOT PINK, 14-TURQUOISE, 15-PINK
*T.C TEXT / PARAMETERS
*=====
```

TEXT SELECTIONS

There are three fields of parameters for the text chart: line type code (T), line color (C), and the text or parameter specification (TEXT/PARAMETERS). Each row produces one line of text for the finished chart. Use the following table to fill in the fields. When you finish the whole screen, press **XMIT**.

TEXT: Text Chart Selections

In field:	Enter:
T	<p>a line type code. These codes are listed in one of the header lines of the preformatted input report. (These line types are not the same as MAPPER system line types, such as tab and asterisk lines. These are types of text lines.) See the following list of line types with their description:</p> <p>T Title. Title lines are printed in 22-point type. They are centered, underlined, and double spaced, except when they are a continuation (&) of a title line. Type up to 54 characters, including spaces, depending on the font (see F parameter).</p> <p>* Bullet. Bullet lines are printed in 18-point type. They start at the left margin and are preceded by a bullet, except when they are a continuation (&) of a bullet line. Type up to 73 characters, including spaces.</p> <p>- Dash. Dash lines are printed in 16-point type. They are indented from the left margin and are preceded by a dash, except when they are a continuation (&) of a dash line. Type up to 73 characters, including spaces.</p> <p>& Continuation. Continuation lines are in the same size type as the line type of which they are a continuation; however, they are indented somewhat more. Use continuation lines whenever the text for your line exceeds the number of characters allowed. Type up to 73 characters, including spaces.</p> <p>B Blank. Blank lines are just that—blank. Use them if you want more vertical spacing. The run ignores a color and text entry with this parameter.</p>

(continued)

TEXT: Text Chart Selections (continued)

In field:	Enter:
	<p>D Date. Date lines print the current date in 11-point type in the lower corner of the chart in the MAPPER software format <i>DD MMM YY</i>, unless you specify a different format in the first nine character positions of the text field (columns 7 through 15). You can type a date line anywhere in the report, but it always appears in the lower left corner.</p> <p>I Initials. The initials line prints up to 12 characters (usually three characters used for initials) in 11-point type at the bottom center of the chart. You can type an initials line anywhere in the report, but it always appears at the bottom center.</p> <p>P Page number. Page numbers print up to 12 characters (usually three characters for page numbers) in 11-point type in the lower right corner of the chart. Type up to three characters in the first three character positions of the text field (columns 7 through 9). You can enter a page number line anywhere in the report, but it always appears in the lower right corner of the chart.</p> <p>S Small Characters. Small character lines print in 16-point type and are left justified with no bullet or dash preceding them. Type up to 73 characters, including spaces.</p> <p>M Medium Characters. Medium character lines print in 18-point type and are left justified with no bullet or dash preceding them. Type up to 73 characters, including spaces, depending on the font (see F parameter).</p>

(continued)

TEXT: Text Chart Selections (continued)

In field:	Enter:
	<p>L Large Characters. Large character lines print in 22-point type and are left justified with no bullet or dash preceding them. Type up to 54 characters, including spaces, depending on the font (see F parameter).</p> <p>In addition to the line type codes listed above, there are three other codes you can use: color of screen (C), font (F), and option (O). Enter these in the T field.</p> <p>C Color of Screen. Change color of screen (default=0, black). Don't select the same color you selected for the text lines. Type the number of the color you want for the screen in the C field (line color). For the list of available colors, refer to the Color Index Table in Section 1 or the lines near the top of the preformatted input report.</p> <p>F Font. Change characters to high-quality text. Type the number for the font (1 to 20) or spell out the number (for example, one, two, three, etc.) in the TEXT/PARAMETERS field. Your site should have a description of fonts. Refer to the table following this one for the maximum number of characters you can use for each font.</p> <p>O Option. Spell out one of the following options in the TEXT/PARAMETERS field:</p> <p>DELETE = Delete line from top of chart.</p> <p>CENTER = Center S, M, and L line types.</p> <p>NORMAL (or blank) = Return to left justification of S, M, and L lines.</p>

(continued)

TEXT: Text Chart Selections (continued)

In field:	Enter:
C	<p>a number for the line or text color. For the list of available colors, refer to the Color Index Table in Section 1 or the lines near the top of the preformatted input report.</p> <p>The run selects colors if you leave them out. Black is not visible on a black screen, but it will plot.</p>
TEXT/PARAMETERS	<p>the text for T, *, -, &, D, I, P, S, M, and L line types up to the number of characters allowed for the line (see F parameter); or type the information for the F and O parameters as previously explained.</p> <p>You must enter at least one line type and its text.</p> <p>In text charts, type one apostrophe for each apostrophe in your text.</p>

USING HIGH-QUALITY FONTS

The following table shows how many characters, including spaces, you can type by line type with and without a high-quality font selected:

Line Type	With Font	Without Font
T	54	42
*	73	73
-	73	73
&	73	73
S	73	73
M	68	73
L	54	41

Using high-quality fonts may slow down the processing of your chart somewhat. You can change fonts as often as you wish; however, once you switch fonts, you cannot return to the default font (lower-quality text).

COMPLETED TEXT REPORT

Complete the input report and press **XMIT** to put the information in the next available report in the same type.

The next page shows a completed input report and the text chart it produces.

.LINE TYPE: T, *, -, &, D, I, B, P, S, M, L, C, F, O
 .COLORS: 0-BLACK, 1-RED, 2-GREEN, 3-YELLOW, 4-BLUE, 5-MAGENTA, 6-CYAN, 7-WHITE,
 .8-GRAY, 9-TAN, 10-AQUA, 11-LIME, 12-VIOLET, 13-HOT PINK, 14-TURQUOISE, 15-PINK
 *T.C . TEXT / PARAMETERS

```

=====
F   THREE
C 7
T 0  TEXT CHART FOR EXAMPLE PIE CHART
B
* 1  SEGMENT A
- 1  COST AVERAGE $40 (FOR 40% OF TOTAL)
- 1  INCREASED COMPARED TO LAST YEAR
B
* 2  SEGMENT B
- 2  COST AVERAGE $35 (FOR 35% OF TOTAL)
- 2  INCREASED COMPARED TO LAST YEAR
B
* 4  SEGMENT C
- 4  COST AVERAGE $25 (FOR 25% OF TOTAL)
- 4  DECREASED COMPARED TO LAST YEAR
D 4  01 JAN 87
I 1  JDOE
P 2  1
  
```

TEXT CHART FOR EXAMPLE PIE CHART

● SEGMENT A

- COST AVERAGE \$40 (FOR 40% OF TOTAL)
- INCREASED COMPARED TO LAST YEAR

● SEGMENT B

- COST AVERAGE \$35 (FOR 35% OF TOTAL)
- INCREASED COMPARED TO LAST YEAR

● SEGMENT C

- COST AVERAGE \$25 (FOR 25% OF TOTAL)
- DECREASED COMPARED TO LAST YEAR

01 JAN 87

JDOE

1

Scatter Charts (SCAT)

The SCAT run produces a chart that marks points on a numeric x and y scale. This is useful for comparing pairs of related values.

Here's the preformatted input report for a scatter chart:

LINE▶

FMT▶

RL▶

SHFT▶

HLD CHR▶

HLD LN▶

fc▶

DATE 01 JAN 87

12:34:56

RID

1A

01 JAN 87

JDOE

SCATTER CHART FOR JDOE

▶ Press F1 or enter RSM when report is updated◀

TEXT COLOR --->

SCREEN COLOR ->

BACKGROUND --->

TITLE ----->

SUBTITLE ----->

DATE ----->

X AXIS TITLE ->

Y AXIS TITLE ->

X MINIMUM --->

X MAXIMUM --->

Y MINIMUM --->

Y MAXIMUM --->

MARKER SYMBOL->

LINEAR FIT --->

PARABOLIC FIT->

DISPLAY GRID LINES? ->

(Y, N, OR COLOR)

(Y, N, OR COLOR)

(Y OR N)

COLOR ----->

* X Y *

SCAT SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

SCAT: Scatter Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for the available colors.
SCREEN COLOR	<p>the color you want the screen to be. The default color is black. See the Color Index Table in Section 1 for the available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
BACKGROUND	color of the inner box containing the chart. Leave this field blank if you want the inner box the same color as the outer box (SCREEN COLOR), whose default is black. The background color displays on the screen but does not plot.
TITLE	a title up to 40 characters.
SUBTITLE	a subtitle up to 60 characters.
DATE	the date, up to 18 characters, in whatever format you want. If you enter Y, today's date appears in the format <i>DD MMM YY</i> .
X AXIS TITLE	a title up to 60 characters centered over horizontal scale.
Y AXIS TITLE	a title up to 60 characters centered over vertical scale.

(continued)

SCAT: Scatter Chart Selections (continued)

In field:	Enter:
X MINIMUM X MAXIMUM Y MINIMUM Y MAXIMUM	<p>your own values (i.e., enter values if you do not want automatic scaling).</p> <p>NOTE: The scale along the vertical y-axis of your chart may not necessarily be your minimum and maximum, in which case the system rounds the values to a suitable interval. If you choose values for MINIMUM Y, the system truncates all values in your data that are less than the minimum. If you enter a value for MAXIMUM Y, all values in your data that are greater than the maximum value are drawn split, indicating that the maximum value exceeds the scale value. Also, the actual is placed above the split bar.</p>
MARKER SYMBOL	<p>a number from 1 to 99* for the kind of marker you want to mark off the points (leave blank if you want to use the default symbol, capital "X"). Refer to the Marker Symbol Table in Section 1 for available styles of markers.</p> <p>(* Check at your site to see which markers are available.)</p>
LINEAR FIT	Y if you want the best straight line drawn through the data points.
PARABOLIC FIT	Y if you want a parabola drawn that best fits the data points.
DISPLAY GRID LINES?	Y if you want grid lines displayed.

(continued)

SCAT: Scatter Chart Selections (continued)

In field:	Enter:
COLOR	a color for the marker symbols. Default=red (see the Color Index Table in Section 1 for the available colors).
X	points on the x and y axes (you must have at least one pair of x and y points; enter as many as you wish).
Y	

COMPLETED SCAT REPORT

The next page shows a completed input report and the scatter chart it produces.

```

.TEXT COLOR ----> BLACK
.SCREEN COLOR -> TURQUOISE
.BACKGROUND ----> WHITE
.TITLE -----> EXAMPLE SCATTER CHART
.SUBTITLE -----> FOR JOE
.DATE -----> 01 JAN 87
.X AXIS TITLE -> TITLE X
.Y AXIS TITLE -> TITLE Y
.X MINIMUM ---->
.X MAXIMUM ---->
.Y MINIMUM ---->
.Y MAXIMUM ---->
.MARKER SYMBOL-> 3
.LINEAR FIT ----> (Y, N, OR COLOR)
.PARABOLIC FIT-> (Y, N, OR COLOR)
.DISPLAY GRID LINES? -> Y (Y OR N)

```

```

.COLOR -----> RED

```

```

*      X      Y

```

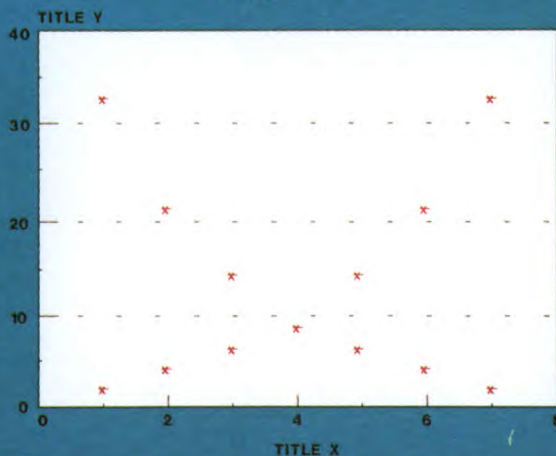
```

=====
1      2
2      4
3      6
4      9
5     14
6     21
7     33
1     33
2     21
3     14
4      9
5      6
6      4
7      2

```

SCATTER CHART

FOR JOE



01 JAN 87

Time Line Charts (TIMEL)

The TIMEL run produces a chart representing time spans. It is especially useful for work projects with a start and end date, and current or mid-cycle dates.

Here's the preformatted input report for a time line chart:

```
LINE▶ █    FMT▶  RL▶    SHFT▶    HLD CHRS▶    HLD LN▶    ▶    fcs    ▶
.DATE 01 JAN 87 12:34:56 RID  1A 01 JAN 87 JDOE
.TIMELINE CHART FOR JDOE
.▶          ▽Press F1 or enter RSM when report is updated▴
.TEXT COLOR ---> WHITE
.SCREEN COLOR -> BLACK
.TITLE ----->
.MARK1 ----->
.MARK2 ----->
.MARK3 ----->
.MARK4 ----->
.DATE LINE ---->

*      TITLE      .SDATE .CDATE .CDATE .CDATE .EDATE .MARK1 .MARK2 .MARK3 .MARK4 .
*-----*-----*-----*-----*-----*-----*-----*-----*-----*
```

TIMEL SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

TIMEL: Time Line Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for available colors.
SCREEN COLOR	<p>the color you want the screen to be. The default color is black. See the Color Index Table in Section 1 for available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
TITLE	title up to 40 characters. If left blank, no title is printed on the chart.
MARK1	a character definition (up to 10 characters) that appears at the bottom of the chart. MARK1 is a triangle. If left blank, no definition appears.
MARK2	a character definition (up to 10 characters) that appears at the bottom of the chart. MARK2 is a square. If left blank, no definition appears.
MARK3	a character definition (up to 10 characters) that appears at the bottom of the chart. MARK3 is a circle. If left blank, no definition appears.
MARK4	a character definition (up to 10 characters) that appears at the bottom of the chart. MARK4 is a diamond. If left blank, no definition appears.

(continued)

TIMEL: Time Line Chart Selections (continued)

In field:	Enter:
DATE LINE	Y if you want a vertical line that represents today's date. The default is N for no line. If today's date isn't in the date range on the chart, the date line is omitted even if you specified Y . (The line appears white on a terminal screen and black on the printer.)
TITLE	the text you want to appear on that line. For example, the work project title.
SDATE	the starting date of the project in the format YYMMDD .
CDATE (3)	three current dates (or any middle dates) in the format YYMMDD . NOTE: Times from SDATE to CDATE appear in different colors.
EDATE	the ending date of the project in the format YYMMDD . NOTE: The time from CDATE to EDATE appears in a red rectangle.
MARK1	(optional) a date that marks a milestone in the project. MARK1 is a triangle.
MARK2	(optional) a date that marks a milestone in the project. MARK2 is a square.
MARK3	(optional) a date that marks a milestone in the project. MARK3 is a circle.
MARK4	(optional) a date that marks a milestone in the project. MARK4 is a diamond.

You can type up to 50 lines of data in your report. However, the titles begin to overwrite each other at a certain point depending on the device you use. When this happens, break the data into two or more charts.

The year the time line chart starts appears just below **TITLE**. Following this is one of two things:

- ☐ If your chart spans many years, you get quarters of years across the top.
- ☐ If your chart spans months, you get months across the top.

COMPLETED TIMEL REPORT

The next page shows a completed input report and the time line chart it produces.


```

.TEXT COLOR ---> WHITE
.SCREEN COLOR -> BLACK
.TITLE -----> PRODUCT EVALUATION
.MARK1 -----> DEVELOP
.MARK2 -----> MANUF.
.MARK3 -----> BUILD
.MARK4 -----> TEST
.DATE LINE ---->

```

```

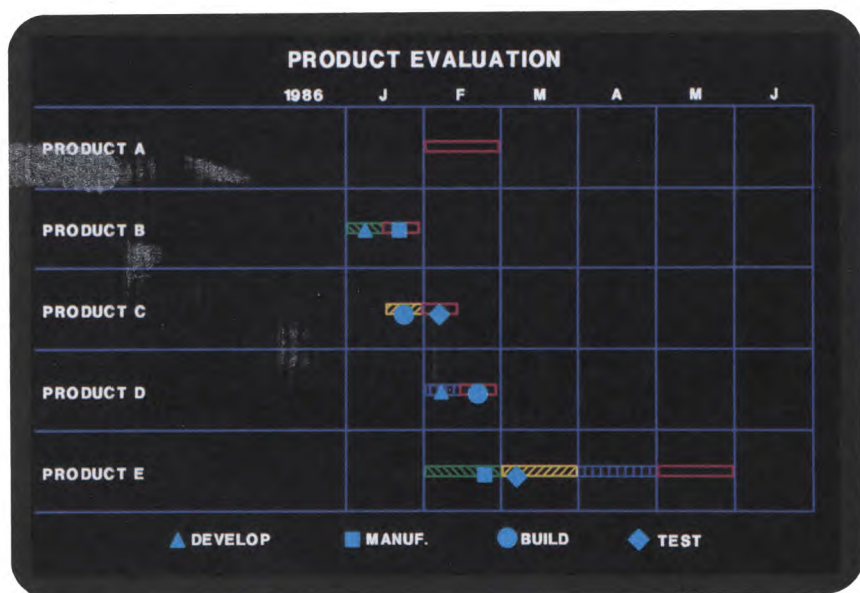
*          TITLE      .SDATE .CDATE .CDATE .CDATE .EDATE .MARK1 .MARK2 .MARK3 .MARK4
.

```

```

*----- .----- .----- .----- .----- .----- .----- .-----
PRODUCT A      860201                                860301
PRODUCT B      860101 860115                                860131 860107 860122
PRODUCT C      860115                                860131 860215                860122 860207
PRODUCT D      860201                                860215 860228 860207                860222
PRODUCT E      860201 860301 860401 860501 860601                860222                860307

```



Radar Charts (RADAR)

The RADAR run produces a chart containing a number of rays, each representing a different scale and data. The data is connected by a predetermined line type for each caption.

Here's the preformatted input report for a radar chart:

LINE▶

FMT▶

RL▶

SHFT▶

HLD CHRS▶

HLD LN▶

fcs▶

DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDOE

RADAR CHART FOR ** JDOE **

▶ Press F1 or enter RSM when report is updated

TEXT COLOR ----->

SCREEN COLOR ----->

TITLE ----->

SUBTITLE ----->

DATE ----->

PERCENTAGE MARKERS -->

1 2 3 4 5 6

CAPTIONS ----->

COLOR ----->

* RAYS SCALE

*=====

RADAR SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

RADAR: Radar Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the charts text and border. The default color is white. See the Color Index Table in Section 1 for available colors.
SCREEN COLOR	<p>the color you want the screen to be. The default color is black. See the Color Index Table in Section 1 for available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
TITLE	a title up to 40 characters.
SUBTITLE	a subtitle up to 40 characters.
DATE	the date, up to 18 characters, in whatever format you want. If you enter Y, today's date appears in the format <i>DD MMM YY</i> .
PERCENTAGE MARKERS	Y to place a mark on the 25%, 50%, and 75% (from the center) points along each ray.
CAPTIONS	a caption for each line. The captions appear on the left side of the chart and are similar to a road map legend. (You must have at least one caption. Wherever you do not supply a caption, the system ignores all data in that particular column. You may select up to six captions. Each value in this column is a y-axis value that matches an x-axis value, forming a pair with a label.)
COLOR	a color for each line. (Default=1, red.) See the Color Index Table in Section 1 for available colors.
RAYS	a name for each ray on the chart.
SCALE	a scale value for each ray on the chart.

Each line below the header represents one ray created by the chart. Each ray is made up of a scale and a series of points. All the points for a particular caption are connected by a line, and each caption has it's own line style and color. The final chart lets you compare the various captions.

COMPLETED RADAR REPORT

The next page shows a completed input report and the radar chart it produces.

```

.TEXT COLOR -----> BLACK
.SCREEN COLOR -----> WHITE
.TITLE -----> COMPARISON OF COMPANY PROFITS
.SUBTITLE -----> SCALE = DOLLARS
.DATE -----> 01 JAN 87
.PERCENTAGE MARKERS --> N
      .      1      2      3      4      5      6
.CAPTIONS -----> COMPANY A COMPANY B COMPANY C COMPANY D

```

```

.COLOR -----> RED      GREEN      VIOLET      BLUE
*RAYS      SCALE

```

```

=====
Jan      10000      7500      6000      8000      2000
Feb      10000      6000      6000      9000      3000
Mar      10000      7500      7000      9000      4000
Apr      10000      7500      7000      7000      5000
May      10000      8000      7000      6000      5000
June     10000      8000      9000      6000      6000

```

COMPARISON OF COMPANY PROFITS

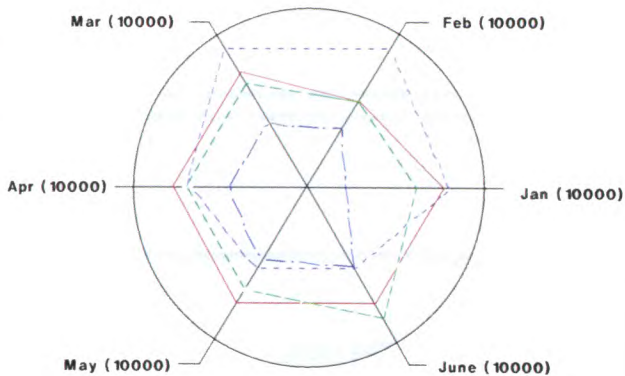
SCALE = DOLLARS

COMPANY A

COMPANY B

COMPANY C

COMPANY D



01 JAN 87

Target Charts (TARGET)

The TARGET run produces a chart in the form of a target. Each line of data in your report can have up to six different markers, each one representing a different type of data. The markers are then placed on the target according to how they relate to the MIN and MAX scale.

Here's the preformatted input report for a target chart:

LINE▶

FMT▶

RL▶

SHFT▶

HLD CHR▶

HLD LN▶

fcs

▶

DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDOE

TARGET CHART FOR JDOE

▶ Press F1 or enter RSM when report is updated

TEXT COLOR ---> black

SCREEN COLOR -> white

TITLE ----->

DATE ----->

INITIALS ----->

MIN SCALE ----->

MAX SCALE ----->

INVERT SCALE -> (Y/N)

123456

MARKER

CAPTIONS -->

*LABELS *****.*****.*****.*****.*****.*****.

*-----.-----.-----.-----.-----.-----.

TARGET SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

TARGET: Target Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is black. See the Color Index Table in Section 1 for available colors.
SCREEN COLOR	the color you want the screen to be. The default color is white. See the Color Index Table in Section 1 for available colors. NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.
TITLE	a title up to 40 characters. Places a title at the top of your chart. The title appears in the color specified in the TEXT COLOR field.
DATE	the date, up to 18 characters, in whatever format you want. If you enter Y , today's date appears in the format DD MMM YY .
INITIALS	three characters to personalize your chart, usually your initials. Your initials, for example, appear in the lower right-hand corner in the color used for the text. If left blank, nothing appears.
MIN SCALE MAX SCALE	values for the outer edge and bulls eye. They also appear in the lower right-hand side of your chart. A value must be typed for the MAX SCALE or you get an error message. If MIN SCALE is left blank, it defaults to zero.

(continued)

TARGET: Target Chart Selections (continued)

In field:	Enter:
INVERT SCALE	Y or N. This field lets you change the values for the outer edge and bulls eye. If left blank or you enter N, the bulls eye value equals the value specified in the MIN SCALE , and the outer edge value equals the value specified in the MAX SCALE . If you enter a Y, the bulls eye value equals the MAX SCALE value and the outer edge value equals the MIN SCALE value.
MARKER CAPTIONS	the title of the type of marker. There are six types of markers and each is unique to a vertical column. Column number 1 is a circle, 2 is a triangle, 3 is a square, 4 is a vertical rectangle, 5 is a horizontal rectangle, and 6 is a diamond. If left blank, no entries are made in the legend.
LABELS	points on x-axis (you must have at least two labels and two values).

Each row of data located under the header is translated into one of the six markers. All markers for one row appear in the same color. If you specify titles in the **MARKER CAPTIONS** field, a legend appears along the right-hand side of the chart. The legend contains each marker with a definition of 10 characters in length (maximum) centered above it. On the left-hand side appears another legend created from the **LABEL** field. This field contains a fill pattern (for terminals capable of doing patterns). Each pattern appears in a different color.

COMPLETED TARGET REPORT

The next page shows a completed input report and the target chart it produces.


```

.TEXT COLOR ---> WHITE
.SCREEN COLOR -> BLACK
.TITLE -----> PRICES OF BOXES
.DATE -----> 01 JAN 87
.INITIALS -----> JDO
.MIN SCALE ----> 3000
.MAX SCALE ----> 9000
.INVERT SCALE -> N (Y/N)

```

```

      1      2      3      4      5      6
-----

```

.MARKER

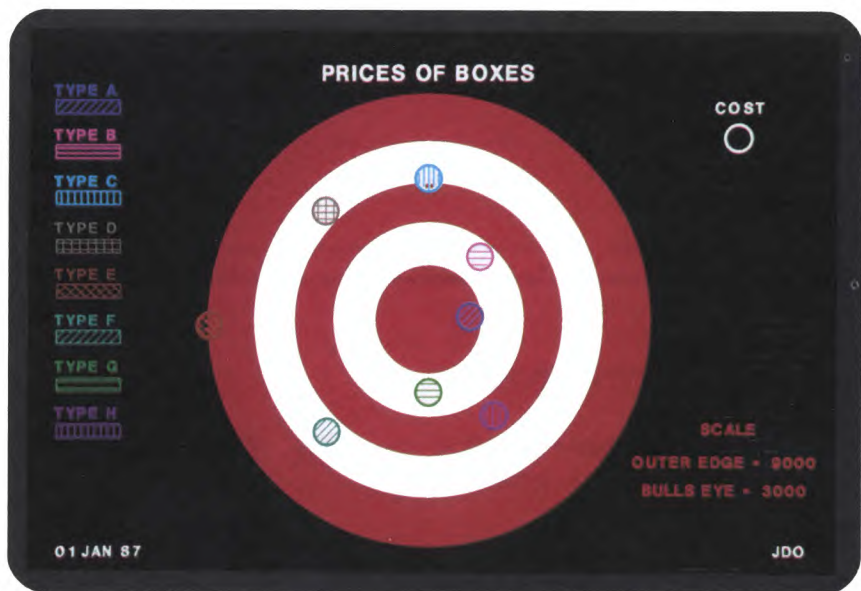
.CAPTIONS --> .COST

*LABELS *****

```

=====
TYPE A      4000
TYPE B      5125
TYPE C      6753
TYPE D      7000
TYPE E      8999
TYPE F      7000
TYPE G      4555
TYPE H      6258

```



Mixed Bar and Line Charts (MIXED)

The MIXED run produces both bar and line chart information on one chart. This chart allows one set of bars and up to three lines on a single chart.

Here's the preformatted input report for a mixed bar and line chart:

LINE▶

FMT▶

RL▶

SHFT▶

HLD CHR▶

HLD LN▶

fcs▶

DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDOE

MIXED B-L CHART FOR JDOE

▶ Press F1 or enter RSM when report is updated

TEXT COLOR --->

SCREEN COLOR ->

BACKGROUND --->

TITLE ----->

SUBTITLE ----->

DATE ----->

X AXIS TITLE ->

Y AXIS TITLE ->

BASE LINE ---->

MARKER DOTS? ->

3D BARS? -----> (Y OR N)

DISPLAY GRID LINES -> (Y OR N)

STACKED OR COMPARATIVE BARS? -> C (S OR C)

BAR LINE LINE LINE

COLOR ----->

PATTERN ---->

CAPTIONS -->

*LABELS

MIXED SELECTIONS

Use the following table to fill in the fields. When you finish with the whole screen, press **XMIT**.

MIXED: Mixed Bar and Line Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for available colors.
SCREEN COLOR	<p>the color you want the screen to be. The default color is black. See the Color Index Table in Section 1 for available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
BACKGROUND	color of the inner box containing the chart. Leave this field blank if you want the inner box to be the same color as the outer box (SCREEN COLOR), whose default is black. The background color displays on the screen but does not plot.
TITLE	a title up to 40 characters that appears at the top of your chart in the color specified in the TEXT COLOR field.
SUBTITLE	a subtitle up to 60 characters.
DATE	the date, up to 18 characters, in whatever format you want. If you enter Y, today's date appears in the format <i>DD MMM YY</i> .
X AXIS TITLE	a title up to 60 characters centered over horizontal scale.
Y AXIS TITLE	a title up to 60 characters centered over vertical scale.

(continued)

MIXED: Mixed Bar and Line Chart Selections (continued)

In field:	Enter:
BASE LINE	value for solid horizontal base line (default=0). Values exceeding this value appear above the line; lower values appear below it (good for comparing negative and positive numbers). Not applicable for stacked bar charts or for 3D bars.
MARKER DOTS?	Y if you want small circles around each point on the line, or a number from 1 to 99* for a different style of marker. Refer to the Marker Symbol Table in Section 1 for available styles of markers. For this chart, the default marker number is 4 (capital "O"). (* Check at your site to see which markers are available.)
3D BARS?	Y if you want the bars drawn to give an illusion of depth (a box appears instead of a flat bar).
DISPLAY GRID LINES?	Y if you want several solid lines behind the bars to help locate points. Lines are vertical for horizontal bar charts and horizontal for vertical bar charts.
STACKED OR COMPARATIVE BARS?	S if you want the values "stacked" on top of each other, producing one big vertical bar for each label. Enter C if you want vertical comparative bars. For a comparative bar chart, enter data in the first column for the bar values. The two unlabeled columns (between "BAR" and "LINE") are for use with stacked bar charts.
COLOR	a color for each bar and line. See the Color Index Table in Section 1 for available colors.
PATTERN	a number for the fill pattern (for bars) or line type (for lines). Refer to the Fill Pattern Table and the Line Style Table in Section 1 for these values.

(continued)

MIXED: Mixed Bar and Line Chart Selections (continued)

In field:	Enter:
CAPTIONS	a caption for each line. The captions appear on the left side of the chart and are similar to a road map legend. (You must have at least one caption.) Wherever you do not supply a caption, the system ignores all data in that particular column. You may select up to six captions. Each value in this column is a y-axis value that matches an x-axis value, thus forming a pair with a label.
LABELS	points on x-axis (you must have at least two labels and two values).

Each line of data located under the headers represents one bar and one point on each of the lines. You do not have to specify information for either the line portion or the bar portion for this chart to work—the points will still be plotted.

You can use the same report or result for a mixed bar and line chart that you use for a bar or line chart. The run ignores selections unique to the other types.

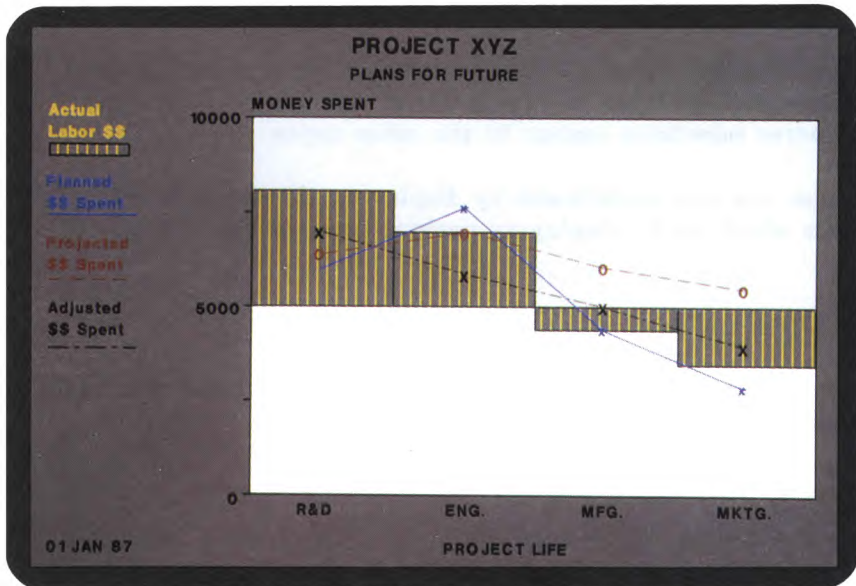
Also, you can experiment by displaying the same data in a line chart, or by displaying various types of bar charts.

COMPLETED MIXED REPORT

The next page shows a completed input report and the mixed bar and line chart it produces.

.TEXT COLOR ----> BLACK
 .SCREEN COLOR -> GRAY
 .BACKGROUND ----> WHITE
 .TITLE -----> PROJECT XYZ
 .SUBTITLE -----> PLANS FOR FUTURE
 .DATE -----> 01 JAN 87
 .X AXIS TITLE -> PROJECT LIFE
 .Y AXIS TITLE -> MONEY SPENT
 .BASE LINE ----> 5000
 .MARKER DOTS? -> Y
 .3D BARS? -----> (Y OR N)
 .DISPLAY GRID LINES -> Y (Y OR N)
 .STACKED OR COMPARATIVE BARS? -> C (S OR C)

	BAR	LINE	LINE	LINE
.COLOR ---->	YELLOW	BLUE	TAN	BLACK
.PATTERN ---->	.3	1	2	4
.CAPTIONS -->	Actual	Actual	Actual	Planned
	Labor \$\$	Material \$	Total \$\$	Projected
*LABELS				Adjusted
				Spent
				Spent
				Spent
R & D	8000	6000	7000	6000
ENG.	7000	8500	8000	7500
MFG.	4500	8500	8000	4500
MKTG.	3500	6000	6500	3000



Pareto Charts (PARETO)

The PARETO run combines bar and line charts, but in a different way than the MIXED run. This run first creates the scale of the chart by adding all the data in the report. Then it draws the bar according to where the data fits into the scale. The line portion of the chart is drawn automatically by adding the value of one bar to the previous bars and placing an asterisk to mark its location.

Here's the preformatted input report for a pareto chart:

```
LINE▶ ■   FMT▶   RL▶       SHFT▶       HLD CHRS▶   HLD LN▶   ▶       fcs ▶
.DATE 01 JAN 87 12:34:56 RID 1A 01 JAN 87 JDOE
.PARETO CHART FOR JDOE
.▶       ▸Press F1 or enter RSM when report is updated▸
.TEXT COLOR --->
.SCREEN COLOR ->
.BACKGROUND --->
.TITLE ----->
.SUBTITLE ----->
.DATE ----->
.X AXIS TITLE ->
.Y AXIS TITLE ->
.3D BARS? -----> (Y OR N)
.DISPLAY GRID LINES -> (Y OR N)
.                BAR
.                -----
*LABELS
*=====
```

PARETO SELECTIONS

Use the following table to fill in the fields. When you finish the whole screen, press **XMIT**.

PARETO: Pareto Chart Selections

In field:	Enter:
TEXT COLOR	the color you want for the chart's text and border. The default color is white. See the Color Index Table in Section 1 for available colors.
SCREEN COLOR	<p>the color you want the screen to be. The default color is black. See the Color Index Table in Section 1 for available colors.</p> <p>NOTE: Be careful when selecting color combinations. For example, if you select the same color for text and screen, your text disappears.</p>
BACKGROUND	color of the inner box containing the chart. Leave this field blank if you want the inner box to be the same color as the outer box (SCREEN COLOR), whose default is black. The background color displays on the screen but does not plot.
TITLE	a title up to 40 characters that appears at the top of your chart in the color specified in the TEXT COLOR field.
SUBTITLE	a subtitle up to 60 characters.
DATE	the date, up to 18 characters, in whatever format you want. If you enter Y, today's date appears in the format <i>DD MMM YY</i> .
X AXIS TITLE	a title up to 60 characters centered over horizontal scale.
Y AXIS TITLE	a title up to 60 characters centered over vertical scale.

(continued)

PARETO: Pareto Chart Selections (continued)

In field:	Enter:
3D BARS?	Y if you want the bars drawn to give an illusion of depth (a box appears instead of a flat bar).
DISPLAY GRID LINES?	Y if you want several solid lines behind the bars to help locate points. Lines are vertical for horizontal bar charts and horizontal for vertical bar charts.
LABELS	points on x-axis (you must have at least two labels and two values).

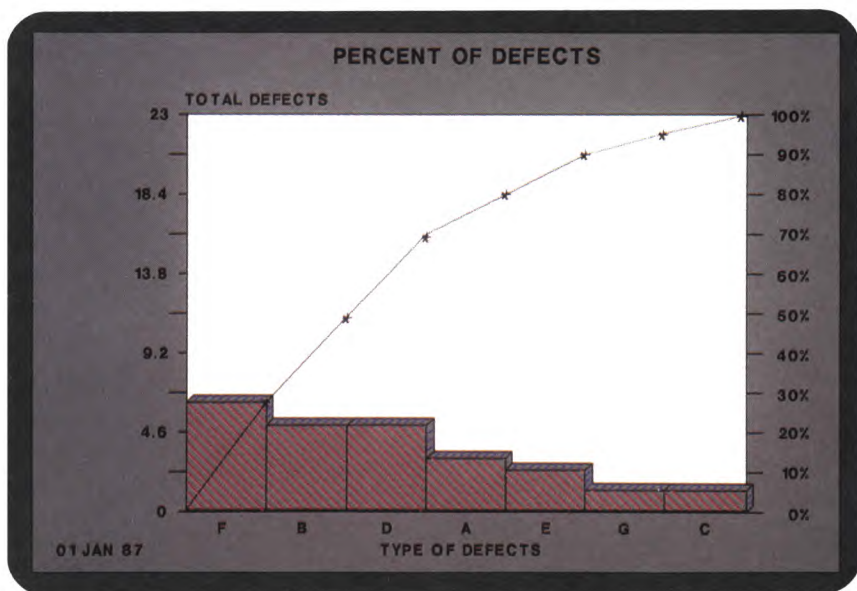
COMPLETED PARETO REPORT

The next page shows a completed input report and the pareto chart it produces.

```

.TEXT COLOR ----> BLACK
.SCREEN COLOR -> YELLOW
.BACKGROUND ----> WHITE
.TITLE -----> PERCENT OF DEFECTS
.SUBTITLE ----->
.DATE -----> 01 JAN 87
.X AXIS TITLE -> TYPE OF DEFECTS
.Y AXIS TITLE -> TOTAL DEFECTS
.3D BARS? ----> Y      (Y OR N)
.DISPLAY GRID LINES -> N (Y OR N)
      BAR
-----
*LABELS
*=====
F      6
B      5
D      5
A      3
E      2
G      1
C      1

```



4. Using Other Graphics Runs

The CHART runs provide preformatted input reports for you to complete. There are other runs, described in this section, that allow you to make charts in other ways.

For example, you can make a chart directly from data you already have in a report, instead of entering the data into a preformatted input report. Depending on whether you want to display the chart immediately or produce a completed input report, you use either the GR or GRID run.

You can use the DISPLAY run to keep track of your charts. It also allows you to display them sequentially, either by pressing a key on your keyboard or by specifying an automatic cycle.

If you want to combine different types of charts on one screen or plot, use the MULTI run. You can have two, three, or four charts combined in a number of configurations.

This section includes:

- ☐ Graph and Display Report Data (GR)
- ☐ Create Input Report from Report Data (GRID)
- ☐ Using an Index List Report (DISPLAY)
- ☐ Graphing Multiple Charts (MULTI)

Graph and Display Report Data (GR)

The GR run displays a chart on your terminal, using data directly from a column-formed report. (If you want to plot the chart, you can save the primitive graphics code or enter **chart,p** when it displays as a result.)

To use the GR run, display the report or result you want to graph and enter **gr** on the control line. You get a function mask derived from the headers of the report on display. Type the options and parameters and press **XMIT** to display the chart.

OPTIONS

If you want a vertical line chart, don't type any option above the function mask.

If you want a different type of chart, type one or more of these options above the function mask:

- B comparative bar chart
- C scatter chart*
- F filled line chart
- H horizontal bar or line chart
- M mixed bar and line chart†
- P pie chart
- S stacked bar chart
- X pareto chart

* See "For Scatter Charts Only" for parameters and examples.

† See "For Mixed Bar and Line Charts Only" for parameters and examples.

For example, type **fh** for a filled horizontal line chart.

PARAMETERS

Below the function mask, you type parameters in three rows: The first row specifies which fields are used, the second row specifies the pattern to be used, and the third row indicates the color number.

First Row—Fields Used

Specify which fields you are using by typing parameters in the first row:

L	use this field for the x-axis label
X	use data from this field

Second Row—Fill Pattern

Select the fill patterns for the fields specified with an X in the first row, and type the parameters below them in the second row. (Refer to the Fill Pattern Table in Section 1 for the numbers for these parameter values.)

Do not specify a fill pattern for the label (L) field.

With monochrome terminals, default patterns are different for each column. With color terminals, the default pattern is always solid and a different color appears in each column by default.

Third Row—Color Number

Choose the colors for the fields specified with an X in the first row, and type the color numbers below them in the third row. (Refer to the Color Index Table in Section 1 for numbers for these parameter values.)

Do not specify a color number for the label (L) field.

EXPERIMENTING WITH THE GR RUN

Try this exercise to see what the GR run can do:

- 1. Sign on as JDOE.
- 2. Display RID 1C.
- 3. Request the TOTALIZE function: Enter **tot*** on the control line.
- 4. In the function mask, type:
 - o** and **s** above the mask (TOT options)
 - s** in the **PRODUCT TYPE** field
 - +** in the **DEMO QUANTITY** field
- 5. Press **RETURN** to move the cursor to the next line.
Here's what your completed function mask should look like:

```

                                TOTALIZE
os
.@991231          CORPORATE FACTORS BASE          C000004
* PRODUCT . SUB .PRODUC. WHOLE . RETAIL . SALES .SPACE. DEMO .
* TYPE . KEY . COST . SALE$ . $$$$.COMMISS. REQ .QUANTITY. DEMO RESULTS .
*=====
s                                     +

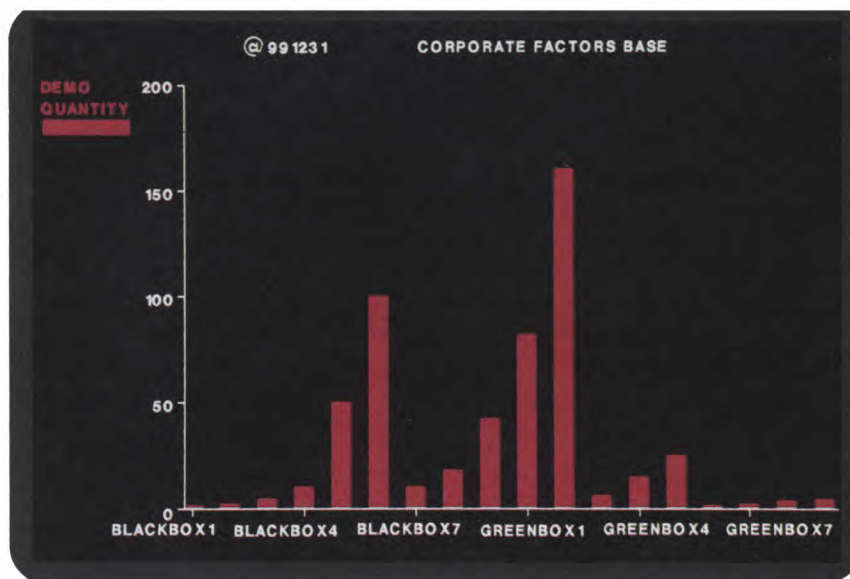
```

- 6. Press **XMIT** to create a result.
- 7. Enter **gr** in one of the control line positions to display the function mask for the GR run.

- b** above the mask
- l** in the **PRODUCT TYPE** field
- x** in the **DEMO QUANTITY** field

- ```
b
 .@991231 CORPORATE FACTORS BASE C000004
* PRODUCT . SUB .PRODUC. WHOLE . RETAIL . SALES .SPACE. DEMO .
* TYPE . KEY . COST . SALE$. $$$$.COMMISS. REQ .QUANTITY. DEMO RESULTS .
*=====,=====,=====,=====,=====,=====,=====,=====,=====,=====.
```

- 4-5



11. Press **SHIFT** and **DISP 1-2** twice to display the function mask. Press **F1** to display the original result. Then press **F1** to display the primitive graphics code.

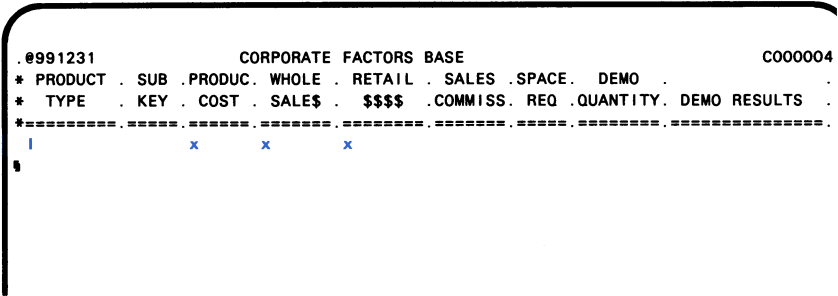
If you want to plot the chart but don't want to save the primitive graphics code, enter **chart,p** on the control line.

If you want to save the primitive graphics code for use with other runs or to plot the chart on paper, use the Duplicate Report (XR) or Replace Report (REP) function.

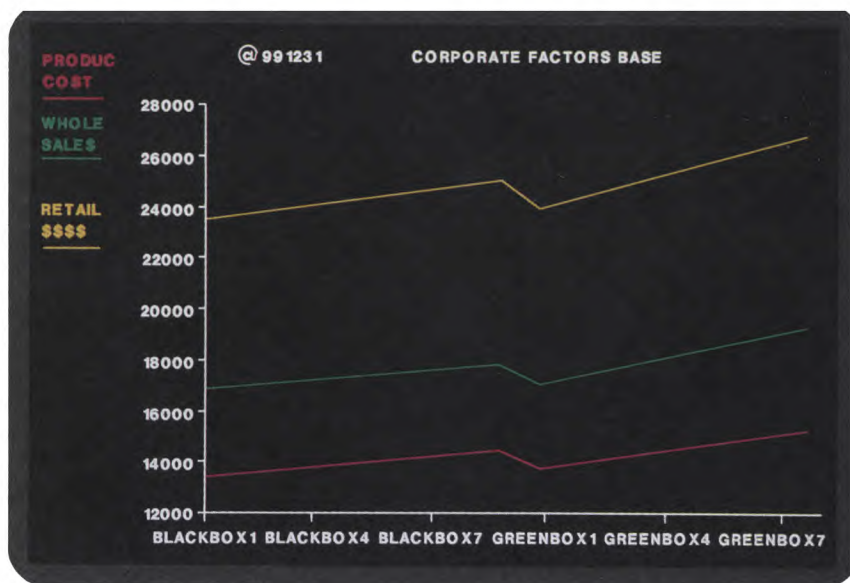


# EXAMPLE LINE CHART

The next example shows you how to make a filled line chart. Display RID 1C and enter **gr** on the control line. Fill in the function mask like the one shown below. The **PRODUCT TYPE** field has the x-axis labels (L); the fields marked with an X supply the data.



This is the chart you should get after you complete the function mask and press **XMIT**:



Press **SHIFT** and **DISP 1-2** twice to display the function mask. Press **F1** to display the original result. Then press **F1** to display the primitive graphics code.

## FOR SCATTER CHARTS ONLY

When you use the C option of GR to specify a scatter chart, you use a different set of parameters for the first and second rows below the function mask. The third row (color number) uses the same parameters.

The run draws a scatter chart from two columns of numeric data. These two columns, in any order, provide data for the x-axis and y-axis coordinates of the data points. The run draws a yellow line for the best linear fit and a cyan line for the quadratic fit calculated by the least squares method of curve fitting. If no quadratic fit line appears, it means that the calculation produced a line outside the area of the chart.

### First Row—Fields Used

You need to specify a field for the x-axis and the y-axis for a scatter chart. Type the parameters in the first row:

- X    Use this field for the x-axis label.
- Y    Use this field for the y-axis label.

### Second Row—Marker Symbol

Select the marker symbol and type it in the second row, below the field specified as the x-axis (X). (Refer to the Marker Symbol Table in Section 1 for numbers for these parameter values.) For this chart, the default marker number is 3 for an asterisk (\*).

Do not specify a marker symbol for the y-axis (Y) field.

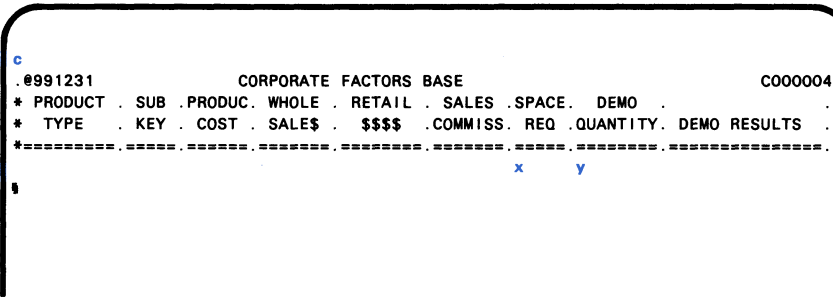
### Third Row—Color Number

The default color for the specified marker is magenta (5). If you want a different color, type it in the third row, below the value you typed for the marker symbol. (Refer to the Color Index Table in Section 1 for numbers for these parameter values.)

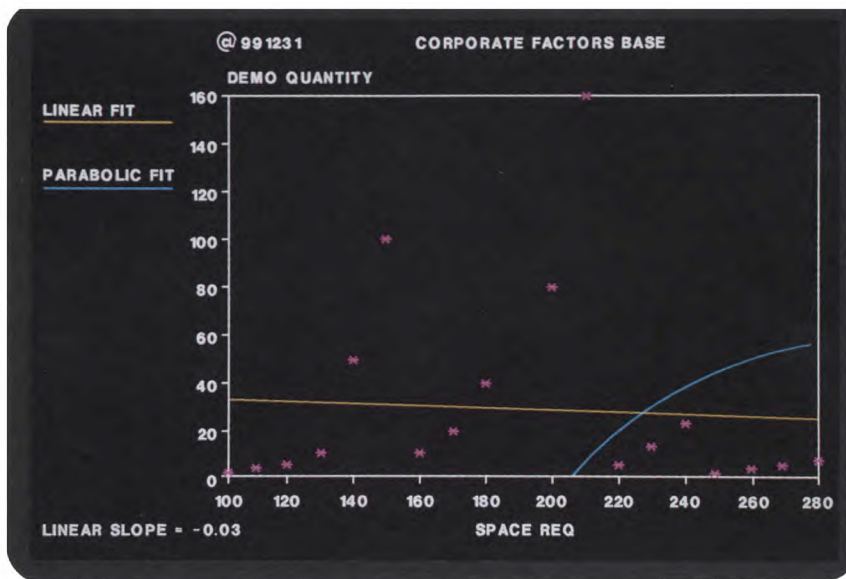
Do not specify a color number for the y-axis (Y) field.

### Example Scatter Chart

Here's an example using the C option to request a scatter chart. Display RID 1C and enter **gr** on the control line. Fill in the function mask like the one shown below:



This is the chart you should get after you complete the function mask and press **XMIT**:



Press **SHIFT** and **DISP 1-2** twice to display the function mask. Press **F1** to display the original result. Then press **F1** to display the primitive graphics code.

## FOR MIXED BAR AND LINE CHARTS ONLY

Below the function mask, you type parameters in three rows: The first row specifies which fields are used, the second row specifies the pattern to be used, and the third row indicates the color number.

When you use the **M** option of **GR** to specify a mixed bar and line chart, you use a different set of parameters for the first row below the function mask.

The second row (fill pattern) and the third row (color number) use the same parameters as the ordinary charts.

## First Row—Fields Used

Specify which fields you are using by typing parameters in the first row:

- L use this field for the x-axis label
- B use data from this field for bars
- X use data from this field for lines

There is a limit to the number of fields you can specify. The total number of B fields and X fields must be two or higher, up to a maximum of six.

## Second Row—Fill Pattern

Select the fill patterns for the fields specified with a B or an X in the first row and type the parameters below them in the second row. You cannot use a solid fill pattern (0) with the mixed bar and line chart. (Refer to the Fill Pattern Table in Section 1 for a list of the numbers for these parameters.)

Do not specify a fill pattern for the label (L) field.

With monochrome terminals, default patterns are different for each column. With color terminals, the default pattern is always solid and a different color appears in each column by default.

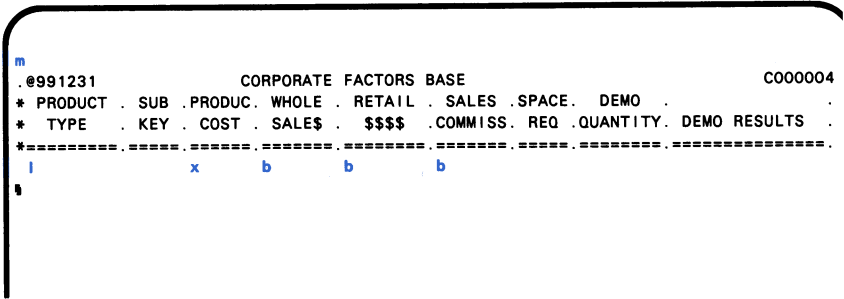
## Third Row—Color Number

Choose the colors for the fields specified with a B or an X in the first row and type the color numbers below them in the third row. (Refer to the Color Index Table in Section 1 for a list of the numbers for these parameters.)

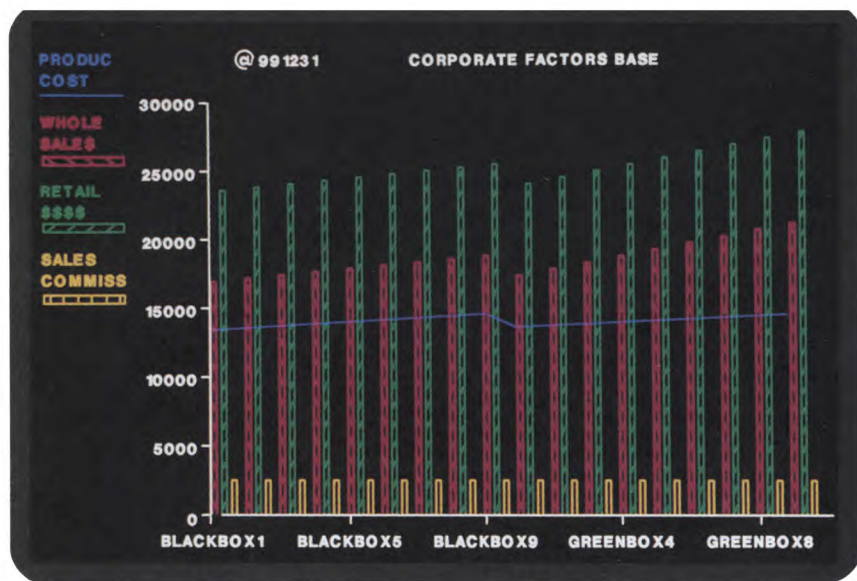
Do not specify a color number for the label (L) field.

# Example Mixed Bar and Line Chart

Here's an example using the M option to request a mixed bar and line chart. Display RID 1C and enter **gr** on the control line. Fill in the function mask like the one shown below:



This is the chart you should get after you complete the function mask and press **XMIT**:



Press **SHIFT** and **DISP 1-2** twice to display the function mask. Press **F1** to display the original result; then press **F1** to display the primitive graphics code.



# Create Input Report from Report Data (GRID)

---

Like the GR run, the GRID run lets you create charts from data in MAPPER reports. The GRID run extracts data from selected fields in your report and produces a completed input report for a line or bar chart as a result.

You can start the GRID run in two ways:

- ☐ Display the report with data and enter **grid** on the control line.
- ☐ Enter **grid,rt** where **rt** is the report number and type.

You get a function mask derived from the headers of the data report. Type the options and parameters described next and press **XMIT** to create the completed input report.

The GRID run depends on column-formatted data. If your report has no header-divider (**\*=**) line, you get an error message.

You can duplicate the result or use it to replace an existing report. Use either the LINEG or BARG run to display the chart.

## OPTIONS

If you want a line chart, don't type any option above the function mask.

If you want a different type of chart, type one of the following options above the function mask:

- B comparative bar chart
- C scatter chart
- P pie chart

For example, type **p** for a pie chart.

## PARAMETERS

Below the function mask, you type one row of parameters. Depending on the type of chart you are making, you enter different parameters.

### Pie, Bar, and Line Charts

- L Use this field for the x-axis labels for bar and line charts. If you are making a pie chart, this field is used for the slice labels. If you do not type an L, the system gives you a choice of several labels such as WEEKS, YEARS, or FISCAL MONTHS.
- 1 to 6 Use data from this field as numbers for the lines or bars or slices. Select these numbers in sequence from 1 to 6 and place them in the fields in the order you want your lines, bars, or slices to appear. The headings for these fields become the captions.

Instead of using numbers 1 through 6, you can use parameters to subtotal (like TOT) from your function mask and create the input report:

- S    Place in one field to detect up to six differences (which become the captions in the chart).
- +    Get data from the S field (which becomes the data for the captions).

When subtotalling, you can use the L parameter for labels.

## Scatter Charts

- X    Use this field for the x-axis label.
- Y    Use this field for the y-axis label.

## EXAMPLES

In order for you to try the next few examples, you need to use RID 1C again. Follow this procedure to get a result containing only BLACKBOXes and duplicate it.

1.    Display RID 1C by entering **1c** on the control line.
2.    Display the search function mask by entering **s -** on the control line.
3.    Type the option **d** above the function mask and **blackbox/** under the **PRODUCT TYPE** field. Press **RETURN** to move your cursor to the next line. This is what your completed function mask should look like:

# SEARCH

```

d
* PRODUCT . SUB . PRODUC. WHOLE . RETAIL . SALES . SPACE. DEMO .
* TYPE . KEY . COST . SALE$. $$$$. COMMISS. REQ. QUANTITY. DEMO RESULTS .
*-----
blackbox/

```

- Press **XMIT** to search RID 1C. After the result is displayed, enter **xr** on the control line. You get a copy of the result duplicated and stored as another report in type C. Here is what your new report should look like:

```

LINE# █ FMT▶ RL▶ SHFT▶ HLD CHR$▶ HLD LN▶ ▶ fcs ▶
DATE 08:28:13 RID 4C 01 JAN 87 JDOE
CORPORATE FACTORS BASE C000004
* PRODUCT . SUB . PRODUC. WHOLE . RETAIL . SALES . SPACE. DEMO .
* TYPE . KEY . COST . SALE$. $$$$. COMMISS. REQ. QUANTITY. DEMO RESULTS .
*-----
BLACKBOX1 A 13500 16875 23625 2362.50 100 1
BLACKBOX2 A 13600 17000 23800 2380.00 110 2
BLACKBOX3 A 13700 17125 23975 2397.50 120 4
BLACKBOX4 B 13800 17250 24150 2415.00 130 10
BLACKBOX5 B 13900 17375 24325 2432.50 140 50
BLACKBOX6 C 14000 17500 24500 2450.00 150 100
BLACKBOX7 C 14100 17625 24675 2467.50 160 10
BLACKBOX8 D 14200 17750 24850 2485.00 170 20
BLACKBOX9 D 14300 17875 25025 2502.50 180 40
..... END REPORT

```

Your report number will probably be different than shown here. You can do the next two examples yourself, using the report you just searched and duplicated.

Display your data report and enter **grid** on the control line.  
Fill in the function mask like the one shown below. This  
function mask specifies the **PRODUCT TYPE** field for the  
labels and the **DEMO QUANTITY** field for the pie segments.

p

CORPORATE FACTORS BASE

C000004

\* PRODUCT . SUB . PRODUC. WHOLE . RETAIL . SALES . SPACE. DEMO .

\* TYPE . KEY . COST . SALES\$ . \$\$\$ . COMMISS. REQ . QUANTITY. DEMO RESULTS .

\*-----

|

x

After you complete the function mask and press **XMIT**, you  
should see the result shown at the top of the next page.  
Press **F1** to display the chart shown at the bottom.

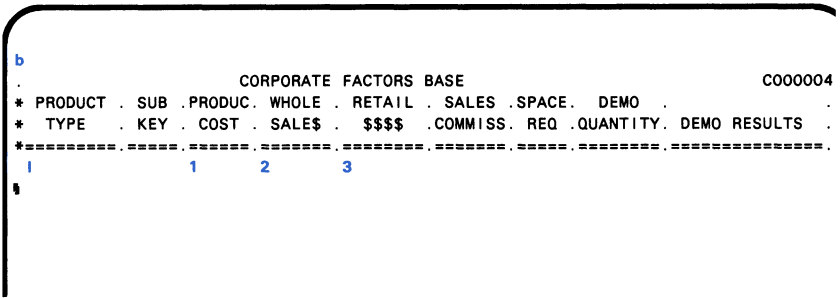


Before pressing **F1** to display the chart, you can save the result using **XR** or **REP**. You can update the completed input report with more options and parameters. To display the updated chart, type the run name (such as **PIEG** in this example).

### Example Bar Chart

This example uses **GRID** to produce a completed input report for a bar chart. Before you use this example, you need to delete three lines from the searched copy of **RID 1C** that you made earlier (the one containing only **BLACKBOXes**). Delete the lines for **BLACKBOX1**, **BLACKBOX2**, and **BLACKBOX3**. (Your report should now have only **BLACKBOX4** through **BLACKBOX9** in it.)

Display this new report and enter **grid** on the control line. Fill in the function mask like the one shown below:



After you complete the function mask and press **XMIT**, you should see the result shown at the top of the next page. Press **F1** to display the chart shown at the bottom.

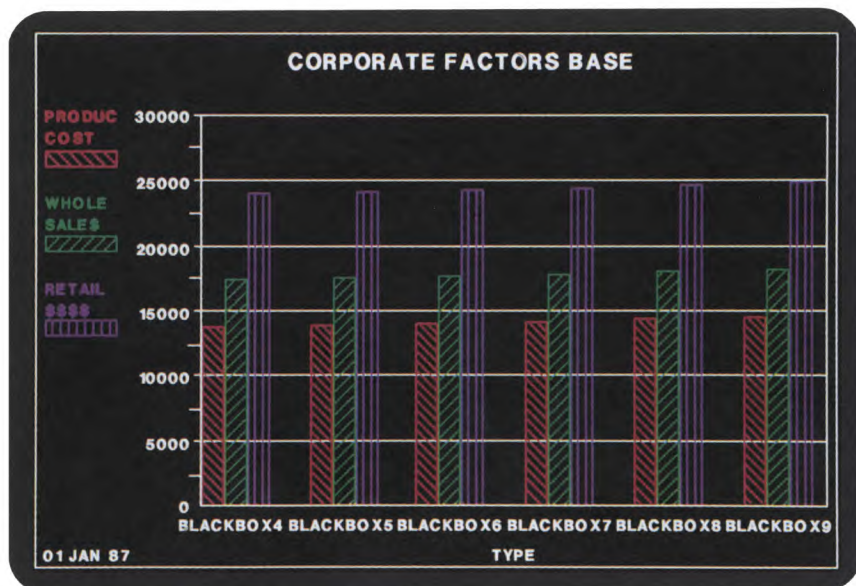
```

line▶ fmt▶ r1▶ shft▶ hld chrs▶ hld ln▶ ▶ ???RESULT??? ▶
DATE 01 JAN 87 19:18:41 REPORT GENERATION JDOE
BAR CHART FOR JDOE
▶ <Press F1 or enter RSM when report is updated>
.TITLE -----> CORPORATE FACTORS BASE
.X AXIS TITLE -> TYPE
.Y AXIS TITLE ->
.DISPLAY GRID LINES -> Y (Y OR N)

 1 2 3 4 5 6

.COLOR -----> RED GREEN MAGENTA YELLOW CYAN BLUE
.PATTERN ----> 1 2 3 4 5 6
.CAPTIONS ---> PRODUC WHOLE RETAIL
*LABELS COST SALE$ $$$
=====
BLACKBOX4 13800 17250 24150
BLACKBOX5 13900 17375 24325
BLACKBOX6 14000 17500 24500
BLACKBOX7 14100 17625 24675
BLACKBOX8 14200 17750 24850
BLACKBOX9 14300 17875 25025

```





# Using an Index List Report (DISPLAY)

---

You can use the DISPLAY run for four operations:

|     |                                                               |
|-----|---------------------------------------------------------------|
| NEW | Create an index list report                                   |
| ADD | Add a report to the list                                      |
| RUN | Cycle display of charts using index list report               |
| CYC | Automatically cycle display of charts using index list report |

## CREATING AN INDEX LIST REPORT

To create a new index list report, use the command:

**DISPLAY,NEW,*t***

where *t* is the form type where you want an index list report formatted to build a list of reports containing primitive graphics code. For example, **display.new,c** adds an index list report in form type C and displays it (note the report number for future use). Use NEW once for each index list report you want to build.

## ADDING A REPORT TO THE LIST

To add a primitive graphics code report to the index list report, use the command:

**DISPLAY,ADD,*rt***

where *rt* is the report number and form type of the index list report you created with DISPLAY,NEW. You must have a primitive graphics code result or report on display.

For example, **display,add,2c** adds the RID of the primitive graphics code to the index list report. (If it is a primitive graphics code result, using **DISPLAY,ADD** saves it and then adds the new RID to the index list report.) Usually, the results you want to add to an index list report are the results from charts you want to save. After viewing the chart, press **F1** to display the primitive graphics code result.

You can follow this step-by-step procedure when using **DISPLAY,ADD**:

1. Use any of the **CHART** runs to create a chart.
2. After the chart is done, display the primitive graphics code result by pressing **DISP 1-2** twice and then **F1** once.
3. Save the primitive graphics code result and add an entry for it in the index list report by entering **display,add,rt** on the control line (where *rt* is the RID of your index list report).

## CYCLING THE DISPLAY OF INDEXED CHARTS

To cycle through an index list report (using the **F1** key), use the command:

**DISPLAY,RUN,rt [,I]**

where:

*rt* is the RID of the index list report you created with **DISPLAY,NEW** and built with **DISPLAY,ADD**.

*I* is the line number of the chart in the index list report you wish to begin with (default=5, the first chart listed). Use this field only if you want to start with a chart further down the list.

For example, enter **display,run,2c** if RID 2C is your index list report. The first chart in your index list report is displayed. To display each subsequent chart in the list, press **F1**.

You can also cycle through an index list report, automatically pausing between displays. To do this, use the command:

**DISPLAY,CYC,*rt* [,*cyc?*,*interval*]**

where:

*rt* is the RID of the index list report. (Type two commas (,) if specifying *cyc?* and *interval*.)

*cyc?* is the number of times to cycle through the charts (Y, N, 1-99):

Y Cycles until you press  
**MSG WAIT**

N (or blank) Cycles once (default)

1-99 Cycles number of times entered

*interval* is the number of seconds between displays (default=3 seconds).

CYC automatically displays the next chart after waiting and repeats itself after finishing the list of charts. To stop the run when a chart finishes drawing, press **MSG WAIT**. To resume the cycle, press **F1**.

## CONTROLLING THE CYCLE

Press **MSG WAIT** to switch to a special screen where you can roll through your index list report or specify a line number for the next chart to display (the same function as RL and LINE on a standard MAPPER report control line).

From this special screen you can use the F1, F2, F3, and F4 keys:

- F1** Resumes the DISPLAY run at the next sequential line of the index list report.
- F2** Backs up one line in the index list report and displays it.
- F3** Starts over from the beginning of the index list report.
- F4** Terminates the DISPLAY run.

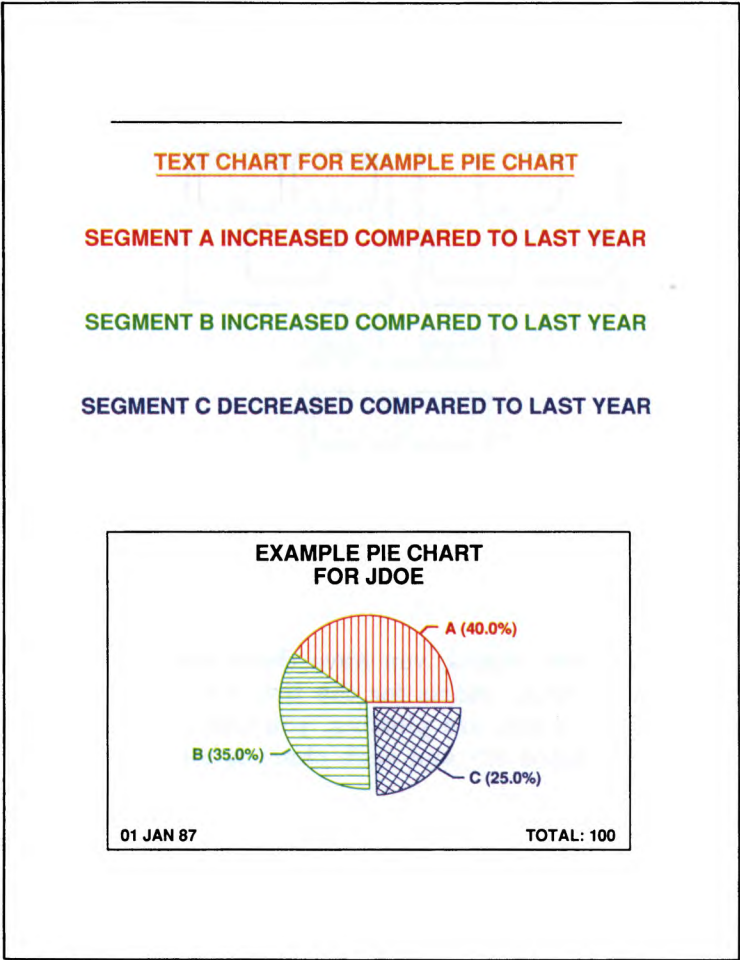
With DISPLAY,RUN, you can use any function key or screen option after each display.

With DISPLAY,CYC, press **MSG WAIT** and then use any function key or screen option.

# Graphing Multiple Charts (MULTI)

The MULTI run lets you display two, three, or four charts on the screen and plot them. You use the menus provided by the MULTI run to select the layout you want, depending on how many charts you are putting together.

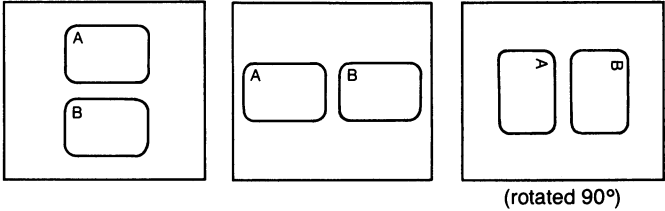
This is a plot made with two charts:



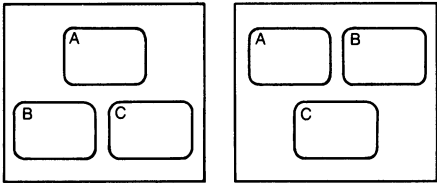
# LAYOUTS OF CHARTS

You can choose many layouts, or arrangements, of charts:

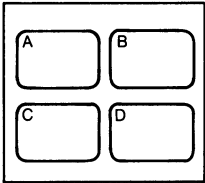
2 Charts = 3 Layouts



3 Charts = 2 Layouts



4 Charts = 1 Layout



If you combine two charts, you have three layouts to choose from. The individual charts for the first two layouts are 50% of normal size. If you are plotting, you can use the third layout. It is rotated 90° and each chart is 60% of normal size.

If you combine three charts, you have two layouts to choose from.

You can have only one layout if you combine four charts.

## CHARTS YOU CAN USE

The MULTI run processes only primitive graphics code, not completed input reports. If you use one of the CHART runs to create a chart, you must save the primitive graphics code in a report. You specify the RIDs of the charts' primitive graphics code in one of the menus for MULTI.

If you create charts using other methods, such as with expanded syntax processed with the GS (Graphic Scaler) function, you can save the primitive graphics code as a report and combine several of them with MULTI. Keep in mind that each final chart is much smaller than the original.

## RESTRICTIONS

Because of restrictions on character sizes, you should use as few characters as possible. If possible, use a five-character caption. If you can't use five characters, try manipulating the columns to keep the characters from overlapping.

A background color other than black is ignored. For best results, make your charts with a black background. (Otherwise, the colors may not have the same effect as if you had a colored background. What you created as a single chart with a colored background appears different with a black background.) If you choose to plot the charts and black text is specified, the chart plots correctly but the text does not appear on the screen.

For best efficiency, use 80-character reports for your primitive graphics code.

## HOW TO USE THE MULTI RUN

1. Enter **multi**. A menu is displayed asking if you want two, three, or four charts.
2. Tab to the number of charts you want and press **XMIT**. The plotting messages are displayed. Choose options you need and press **XMIT**.
3. The next step depends on how many charts you selected:
  - ☐ If you selected two or three charts, a screen is displayed giving you a choice of layouts. Tab to the layout you want and press **XMIT**. A screen asking for modes, types, and report numbers is displayed. Type the modes, form types, and report numbers of the reports containing the primitive graphics code for the charts. Press **XMIT** to display the finished chart.
  - ☐ If you selected four charts, a screen is displayed asking for modes, types, and report numbers. Type them and press **XMIT** to display the finished chart.
4. After the chart is displayed and you are ready to continue, press and hold **SHIFT** and then press **DISP 1-2** twice. Press **F1** to display a result containing the primitive graphics code for the chart. If you want to save this result, you can either replace it into an existing report (**REP**) or duplicate it (**XR**).



## **5. Using Advanced Graphics**

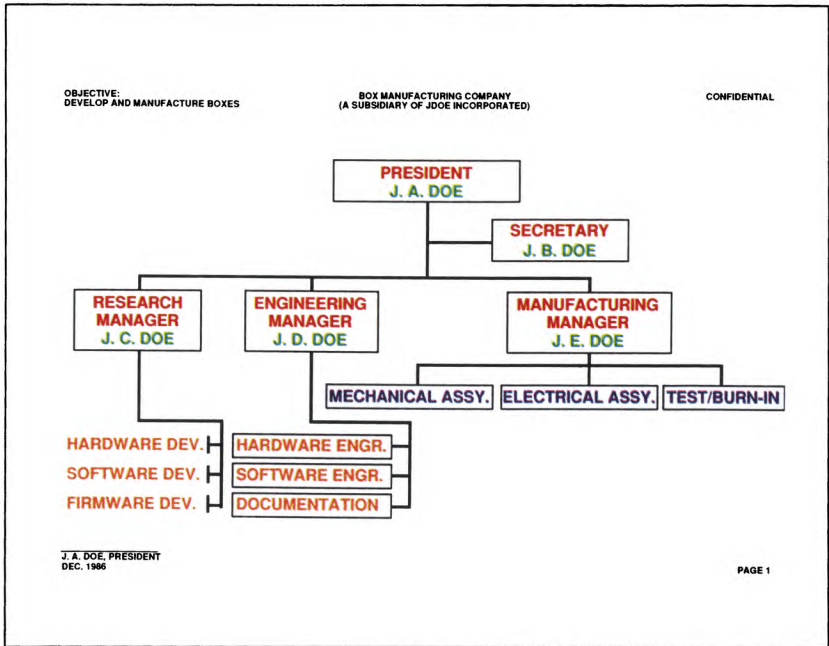
---

This section is for the advanced graphics user. It covers the following topics:

- ☐ **Generate Organization Chart (GOC)**
- ☐ **Graphics Scaler (GS)**

# Generate Organization Chart (GOC)

The Generate Organization Chart (GOC) function allows you to plot an organization chart from commands you enter in a free-form report. Here's an example of an organization chart generated with GOC:

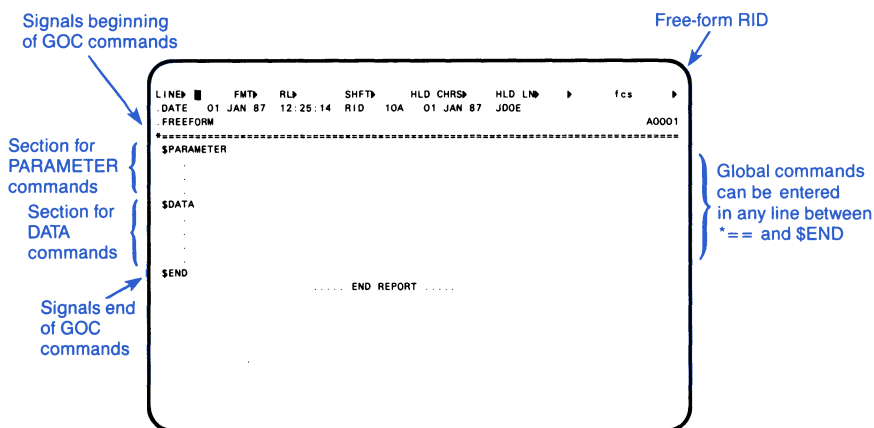


This chart shows the organization of a fictitious business that manufactures boxes, such as GREENBOXes and BLACKBOXes. You can see how the company is organized and the responsibilities of the employees by a quick glance at the chart.

You can learn how to use the GOC function by following the examples included here. (The commands that produced the previous chart are listed at the end of this subsection, if you want to make a similar chart.) You'll learn how to create a simple organization chart and then modify it to add more complex features.

## OVERVIEW

Instead of entering data in a preformatted input report, you enter commands in a free-form report to be processed by the GOC function. There are three types of commands: global, parameter, and data (refer to the accompanying figure).



### *Types of GOC Commands*

The global commands can be entered on any line between the header-divider line (\*=) and the last command, which must be \$END. (\$END is one of the data commands, signaling the end of the commands.) Global commands are used for adding comments to the commands, setting logical true and false values for assigned labels, and incorporating other types of information that applies to the entire chart.

Parameter commands must be at the top of the report, following the \$PARAMETER command and before the \$DATA command. Parameter commands specify the number of levels, the type of plotter, and other general information.

Data commands follow the \$DATA command and are ended by the \$END command. Specific information, such as the title of the chart and people's names, is put in this section.

When the GOC function processes the report holding the commands, it starts at the line following the header line (\*=). Each line is scanned until the first nonblank character is detected. A line containing only blanks is ignored.

With the exception of the global commands, the first command detected must be the \$PARAMETERS command. The GOC function scans subsequent lines for parameter information until it finds a \$DATA command. All commands other than global or parameter commands are treated as errors in this section. (Refer to the Ignore Errors Option.) Once the \$DATA command is detected, the function reads and interprets all valid commands and data until the \$END command is detected. The \$END command marks the end of the information to be interpreted by the GOC function.

## PROCEDURE TO CREATE A CHART

This is the general procedure you follow to create an organization chart:

1. Check the form types in your mode for a free-form type.
2. Use the AR (Add Report) function to get a blank free-form report.
3. Use the SOE Update function to add the GOC commands, one command per line, in the report. (If you don't remember a command, enter **help goc,command** to display a list of them. You can also use "GOC Commands" in Appendix A.)
4. After you enter the GOC commands in the report, use the GOC function to process it. The display that you get on your screen is not the same as the plot you get—the size of the letters on the screen are too large to fit in the boxes, but the finished plot is correct. (Use the screen display while you are testing to see if you have the correct number of boxes at each level.)

# USING THE GOC FUNCTION

## Generating an Organization Chart

The format for the Generate Organization Chart function is:

**GOC**

The function request message appears. Type the information and press **XMIT**.

## Fast Access

**GOC {-|rt}**

where:

- is the report or result on display

*rt* is the report number and alphabetic type.

# FUNCTION REQUEST MESSAGE

## GENERATE ORGANIZATION CHART

|                          |      |                             |
|--------------------------|------|-----------------------------|
| RID -4                   | Type | Upper Level Chart N,        |
| Eliminate All Text N,    |      | Ignore Errors N,            |
| Ignore Character Size N, |      | Use Fixed Character Size N, |
| Optimize Results N,      |      | Output Graphics N,          |
| Unpacked Result N,       |      | Output Size Information N,  |

*Entries in GOC Function Request Message*

| In field:                | Enter:                                                                                                                                                                                                                                                                                         |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RID                      | the report containing the data to produce the report from; by leaving a dash in this field, the GOC function uses the report that was displayed on the screen before you requested GOC.                                                                                                        |
| Type                     | the alphabetic type of the report being generated.                                                                                                                                                                                                                                             |
| Upper Level Chart        | <b>Y</b> if you want to prepare a special chart containing only one box at all levels other than the bottom level.                                                                                                                                                                             |
| Eliminate All Text       | <b>Y</b> if you want to eliminate all text from the result, producing a chart containing only the boxes.                                                                                                                                                                                       |
| Ignore Errors            | <b>Y</b> to ignore invalid and/or improperly used commands and parameters within the data.                                                                                                                                                                                                     |
| Ignore Character Size    | <b>Y</b> if you don't want to check to see if the resulting character size is in the correct range for the selected display device.                                                                                                                                                            |
| Use Fixed Character Size | <b>Y</b> to select a fixed character size (dependent on the selected display device).                                                                                                                                                                                                          |
| Optimize Results         | <p><b>Y</b> to produce a result and then link to the Graphics Scaler (GS) function with the optimize options selected (this may reduce the number of characters required to generate a chart).</p> <p><b>NOTE:</b> It is necessary to select this field if the FONT parameter is selected.</p> |
| Output Graphics          | <b>Y</b> to graphically display a result. If <b>Optimize Results</b> is selected, the results are optimized with the GS function and then graphically displayed.                                                                                                                               |

*(continued)*

*Entries in GOC Function Request Message (continued)*

| In field:               | Enter:                                                                                                                                                                                                                      |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unpacked Results        | <b>Y</b> to produce a result that is not packed and does not split resulting primitive commands across successive lines. This can be used to easily change the text in a result. (Ignored if <b>Optimize Results = Y</b> .) |
| Output Size Information | <b>Y</b> to append the input line count, output line count and buffer size to the end of the result.                                                                                                                        |

## GOC COMMANDS

The GOC commands are detected only when the first nonblank character on a line is a \$ character. Any other occurrence of the \$ character is treated as a parameter, data, etc. Only the command portion of this line is used; the remainder of the line is ignored.

All information on a command line is converted to uppercase.

Follow these guidelines when entering GOC commands in the report:

- ☐ Fields must be separated by spaces.
- ☐ Subfields must be separated by commas.
- ☐ Tab characters are translated to blanks.
- ☐ Free-form data lines are used as they appear, including spaces within the data.
- ☐ The function ignores subfields that are not used by commands and any leading spaces within subfields.



**NOTE:** Wherever the dash (–) character is used in a command, parameter, or color, the underline (\_\_) character may also be used.

The following tables give a brief description of the commands. For a detailed description, refer to Appendix A. For on-line information for a particular command, enter **help goc,command,xxx**, where **xxx** is the individual command. Enter **help goc,examples** for examples of the commands.

## Global Commands and Description

|                  |                                                            |
|------------------|------------------------------------------------------------|
| <b>\$COMMENT</b> | Add comment to GOC command report                          |
| <b>\$FILLER</b>  | Set character for leading/trailing spaces                  |
| <b>\$INCLUDE</b> | Start logic sequence (\$INCLUDE/\$ENDI)                    |
| <b>\$ENDI</b>    | End logic sequence of \$INCLUDE                            |
| <b>\$SET</b>     | Assign TRUE or FALSE value for logic sequence of \$INCLUDE |

## Parameter Commands and Description

|                     |                                              |
|---------------------|----------------------------------------------|
| <b>PLOTTER</b>      | Output result on graphics plotter            |
| <b>SCOPE</b>        | Display result on graphics terminal          |
| <b>HORIZONTAL</b>   | Display lowest level horizontally            |
| <b>VERTICAL</b>     | Display lowest level vertically              |
| <b>COLUMNS</b>      | Display lowest level as two vertical columns |
| <b>STAGGER</b>      | Display lowest level as two horizontal rows  |
| <b>LEVEL</b>        | Define new level                             |
| <b>SUB-LEVEL</b>    | Define sublevel                              |
| <b>FONT</b>         | Set character font                           |
| <b>PAGE</b>         | Add page number to chart                     |
| <b>CONFIDENTIAL</b> | Add "CONFIDENTIAL" to upper right corner     |

## Data Commands and Description

|                          |                                            |
|--------------------------|--------------------------------------------|
| <b>\$DATA</b>            | Mark beginning of data section             |
| <b>\$END</b>             | Mark end of GOC commands                   |
| <b>\$LOWERCASE</b>       | Preserve uppercase/lowercase of text       |
| <b>\$UPPERCASE</b>       | Convert all characters to uppercase        |
| <b>\$BLANK</b>           | Add blank line in data                     |
| <b>\$BOX</b>             | Draw a box for each item                   |
| <b>\$NO-BOX</b>          | Omit boxes for each item                   |
| <b>\$SOLID</b>           | Draw solid lines for each item             |
| <b>\$DASHED</b>          | Draw dashed lines for each item            |
| <b>\$LEVEL</b>           | Level for following data lines             |
| <b>\$SUB-LEVEL</b>       | Sublevel for following data lines          |
| <b>\$DUTIES*</b>         | Add duties lines to top of chart           |
| <b>\$MISSION*</b>        | Add mission lines to top of chart          |
| <b>\$OBJECTIVE*</b>      | Add objective lines to top of chart        |
| <b>\$RESPONSIBILITY*</b> | Add responsibilities lines to top of chart |
| <b>\$APPROVED</b>        | Add approval lines in specified position   |
| <b>\$SIGNATURE</b>       | Add signature lines to specified position  |
| <b>\$TITLE</b>           | Specify title of chart                     |

\* Only one of these can be used in each organization chart.

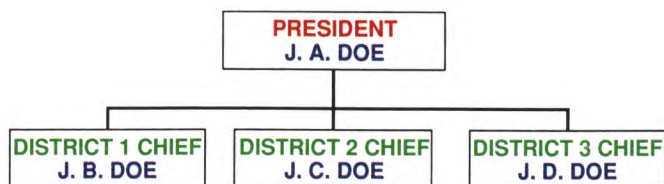
## CREATE A TWO-LEVEL CHART

Add a blank free-form report using the AR (Add Report) function. Use the SOE Update function to add the following commands in the report. (Don't add the comments shown in lowercase on the right side—they explain the command.)

If you have a plotter, turn the power on and load it with paper.

**\$PARAMETERS** beginning of the parameter commands  
**HORIZONTAL** put lowest-level boxes horizontally  
**PLOTTER,SMALL** use plotter for 8-1/2 x 11 inch paper  
**LEVEL,1,2,RED,BLUE** two lines of text for first level  
**LEVEL,2,2,GREEN,BLUE** two lines of text for second level  
**\$DATA** beginning of the data commands  
**\$LEVEL,1** use next two lines for text in first-level box  
**PRESIDENT**  
**J. A. DOE**  
**\$LEVEL,2** use next two lines for text in second-level box  
**DISTRICT 1 CHIEF**  
**J. B. DOE**  
**\$LEVEL,2**  
**DISTRICT 2 CHIEF**  
**J. C. DOE**  
**\$LEVEL,2**  
**DISTRICT 3 CHIEF**  
**J. D. DOE**  
**\$END** end of the commands

After all the commands are in the report, enter **goc** on the control line to display the function request message. Tab to the **Output Graphics** field. Type **y** and press **XMIT**. This is the plot you should get:



This example showed you how to use some basic parameter and data commands. The next example demonstrates some of the global commands.

## CREATE A THREE-LEVEL CHART

To do the next example, you can either delete the commands from your previous report or add a new free-form report.

Enter the following commands in the report. (Don't add the comments shown in lowercase on the right side—they explain the command.)

```

$PARAMETERS beginning of parameter commands
PLOTTER,SMALL
LEVEL,1,3,RED,RED,BLUE
LEVEL,2,3,BLUE,BLUE,BLUE
LEVEL,3,1
$SET,VARNAME1,T set variable "varname1" to "true"
$SET,VARNAME2,F set variable "varname2" to "false"
$FILLER,* change filler character to *
$DATA beginning of data commands
$COMMENT,= change comment character to =
= SECTION FOR THE CHIEF this is a comment line
$LEVEL,1
* add a blank line of "text" in box
CHIEF text to go inside box
* add another blank line of "text" in box
= SECTION FOR DISTRICT CHIEF 1 comment line
$LEVEL,2
*
DISTRICT*CHIEF
*
$INCLUDE,VARNAME1 varname1=T; include next lines
$LEVEL,3
CAPTAIN*1
$LEVEL,3
CAPTAIN*2
$ENDI end of lines included for varname1
= SECTION FOR DISTRICT CHIEF 2
$LEVEL,2
*
DISTRICT*CHIEF
*
$INCLUDE,VARNAME2 varname2=F; ignore next lines
$LEVEL,3
CAPTAIN*1
$LEVEL,3
CAPTAIN*2
$ENDI end of lines ignored for varname2

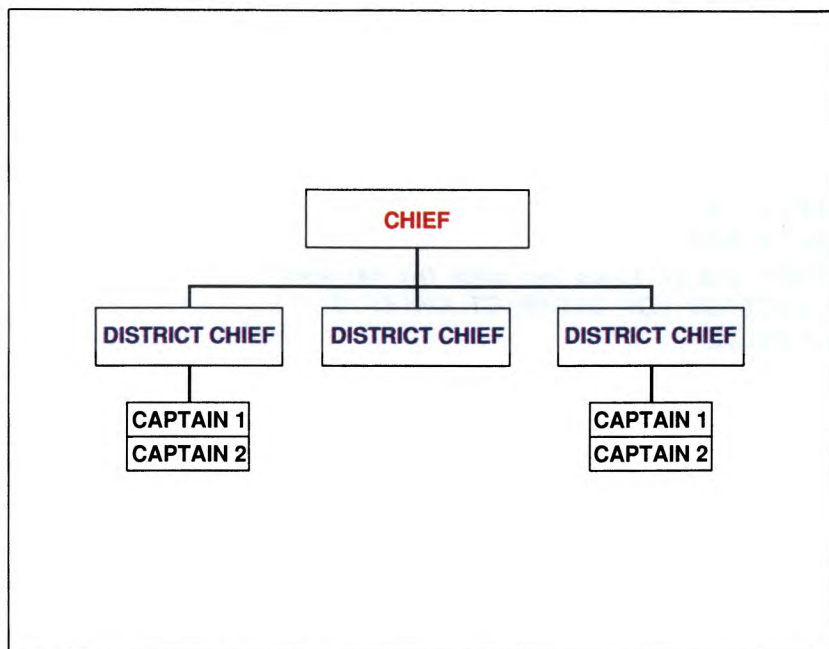
```

```

= SECTION FOR DISTRICT CHIEF 3
$LEVEL,2
*
DISTRICT*CHIEF
*
$INCLUDE,VARNAME1
$LEVEL,3
CAPTAIN*1
$LEVEL,3
CAPTAIN*2
$ENDI
$END end of commands

```

This is the plot you should get by using the GOC function to process the example:



These two examples showed you how to use some of the GOC commands. The commands used to make the first chart (BOX MANUFACTURING COMPANY) are shown next; read the descriptions of the new commands. When you are ready to create a new organization chart, refer to Appendix A for a detailed explanation of each command.

## COMMANDS USED FOR JDOE, INC. CHART

**\$PARAMETERS**

**PLOTTER,SMALL**

**LEVEL,1,2,RED,GREEN SUB,1,2,RED,GREEN** add sub-level

**LEVEL,2,3,RED,RED,GREEN**

**LEVEL,3,1,BLUE**

**LEVEL,4,1,YELLOW**

**CONFIDENTIAL** put "CONFIDENTIAL" in upper right corner

**PAGE,1,LR** put page number 1 in lower right corner

**VERT,SPREAD** lowest level vertical with space between

**\$DATA**

**\$LEVEL,1**

**PRESIDENT**

**J. A. DOE**

**\$SUB,1**

**SECRETARY**

**J. B. DOE**

**\$LEVEL,2**

**RESEARCH**

**MANAGER**

**J. C. DOE**

**\$LEVEL,3,VOID** no third level for this branch

**\$LEVEL,4**

**\$NO-BOX** no boxes around the next text

**HARDWARE DEV.**

**SOFTWARE DEV.**

**FIRMWARE DEV.**

**\$LEVEL,2**

\$BOX use boxes around the next text  
ENGINEERING  
MANAGER  
J. D. DOE  
\$LEVEL,3,VOID no third level for this branch  
\$LEVEL,4  
\$BOX  
HARDWARE ENGR.  
SOFTWARE ENGR.  
DOCUMENTATION  
\$LEVEL,2  
MANUFACTURING  
MANAGER  
J. E. DOE  
\$LEVEL,3  
MECHANICAL ASSY  
\$LEVEL,3  
ELECTRICAL ASSY  
\$LEVEL,3  
TEST/BURN-IN  
\$TITLE BOX MANUFACTURING COMPANY main title  
\$TITLE (A SUBSIDIARY OF JDOE, INCORPORATED)  
\$OBJECTIVE,L put lines of text in upper left corner  
OBJECTIVE:  
DEVELOP AND MANUFACTURE BOXES  
\$SIGNATURE,L signature line and text in lower left corner  
J. A. DOE, PRESIDENT  
DEC 1986  
\$END



# Graphics Scaler (GS)

---

The Graphics Scaler (GS) function gives you the capability of increasing or decreasing the size of your graphs by changing the primitive graphics code in the report. You can also rotate a chart and optimize the primitive graphics code. If you want to create custom charts but don't want to learn how to write primitive graphics code, you can use expanded syntax and convert it into primitive graphics code with the GS function.

## USING THE GS FUNCTION

### Using Graphics Scaler

The format for the Graphics Scaler function is:

#### GS

The GS function starts processing data after it encounters a header-divider (\*=) line in the report containing the primitive graphics code. It processes only the first 80 columns of data and the result occupies 80 columns or less. (The function always outputs an absolute move as the first move, even if a move wasn't there; or if "all relative" is selected.)

The GS function interprets primitive graphics code as well as expanded syntax (optional).

Fast Access

GS {-|rt}

where:

- is the report or result on display

rt is the report number and alphabetic type.

FUNCTION REQUEST MESSAGE

To display the GS function request message, enter **gs** on the control line.

GRAPHICS SCALER AND ENHANCER

RID → , Type , Maximum Y 23999, (0 - 32767)  
IN/OUT Format N, (A, R, O, C, S, N, or Blank)  
Ignore Errors N, Unpacked Results N, Graphics Active N,  
Expanded Syntax N, Ignore HIGH-TEXT N, Output Graphics N,  
Scaling Factor 1.0 , (0.0 - 32767.0)  
Offset Values X 0 , Y 0 ,  
Rotation Angle 0.0 X 0 , Y 0 ,  
Result Info , (L, Q, B, or Blank)

Entries in GS Function Request Message

| In field: | Enter:                                                                                                                                       |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|
| RID       | the report number; by leaving a dash in this field the GS function uses the report that was displayed on the screen before you requested GS. |
| Type      | the alphabetic type of the report being processed.                                                                                           |

(continued)

*Entries in GS Function Request Message (continued)*

| In field:        | Enter:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Maximum Y        | the maximum Y value to make a limits check on (0-32767). If 0, the value defaults to 32767. Refer to the table "Aspect Ratio of Devices" later in this subsection for the maximum Y value for your terminal or plotter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| IN/OUT Format    | <p>one of the following options:</p> <p>A for result with all absolute commands.</p> <p>R for result with all relative commands, when possible.</p> <p>O to optimize the resulting code.</p> <p>C to optimize and combine successive commands into a single command separated with commas.</p> <p>S for strict interpretation of primitive graphics code defined primitives.</p> <p><b>NOTE:</b> If the S option is selected, the <b>Ignore Errors</b>, <b>Unpack Output</b>, <b>Graphics Active</b>, and <b>Expanded Syntax</b> selections must all be answered with N. If the S option is not used, all lowercase characters that are not in a text string are interpreted as uppercase characters.</p> <p>N (or blank) Normal mode; ignore leading spaces, etc. This is the default option.</p> |
| Ignore Errors    | Y to truncate values out of range and ignore invalid commands or sequences.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Unpacked Results | Y to display the result in an unpacked format with one command per line. If you are selecting <b>Output Graphics</b> , N must be entered.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

*(continued)*

*Entries in GS Function Request Message (continued)*

| In field:        | Enter:                                                                                                                                                                                                                                                                                                                                            |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Graphics Active  | <b>Y</b> if you are assuming the graphics processor is active. This assumes that a <b>ZI</b> ( <b>INITIALIZE_GRAPHICS</b> ) command preceded the data that is being processed and no closing <b>ZT</b> ( <b>TERMINATE_GRAPHICS</b> ) command is required to end the data. If you are selecting <b>Output Graphics</b> , <b>N</b> must be entered. |
| Expanded Syntax  | <b>Y</b> to process expanded syntax. See below for additional information regarding expanded syntax.                                                                                                                                                                                                                                              |
| Ignore HIGH-TEXT | <b>Y</b> if you don't want to convert to high-quality text, even if <b>CT2</b> (high precision text command) or "rotated text" is encountered.                                                                                                                                                                                                    |
| Output Graphics  | <b>Y</b> to output the chart on the terminal. When <b>Output Graphics</b> is selected, the <b>Unpack Results</b> and <b>Graphics Active</b> selections must be answered with <b>N</b> .                                                                                                                                                           |
| Scaling Factor   | a number for the Scale Factor (0.0 through 32767.0), a floating point value that is used to scale appropriate parameters (default=1.0). If 0 is entered, 1.0 is used. A scale factor of 2.0 produces a result twice as large; a scale factor of 0.5 produces a result half as large, etc.                                                         |
| Offset Values    | <b>X</b> and <b>Y</b> values to offset the chart. An                                                                                                                                                                                                                                                                                              |
| X                | <b>X</b> -offset value (-999999999 to 999999999) is                                                                                                                                                                                                                                                                                               |
| Y                | the value that is added to all absolute <b>X</b> components. A <b>Y</b> -offset value (-999999999 to 999999999) is the value that is added to all absolute <b>Y</b> components.                                                                                                                                                                   |

*(continued)*

*Entries in GS Function Request Message (continued)*

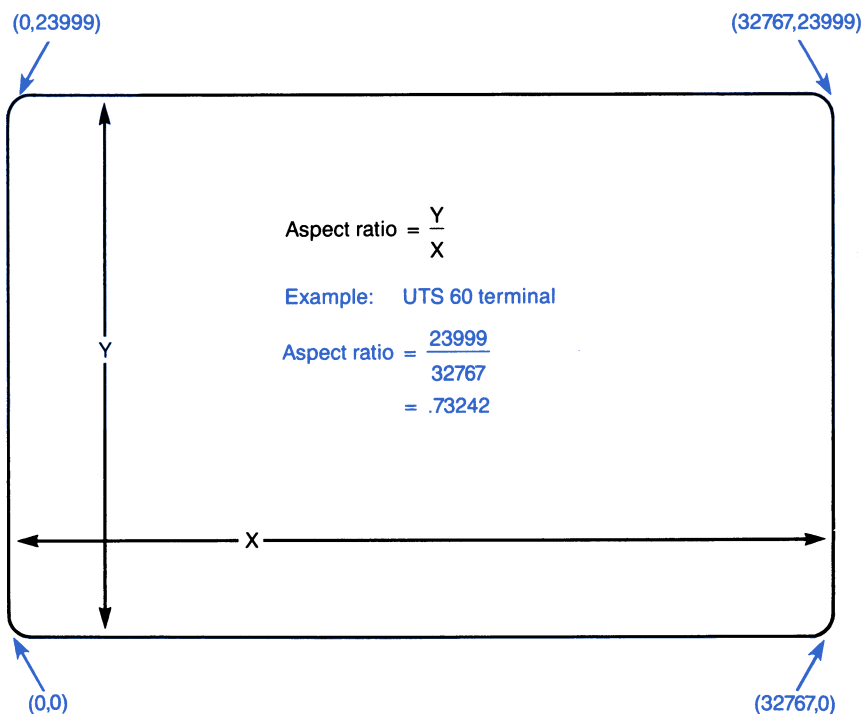
| In field:                | Enter:                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rotation Angle<br>X<br>Y | an angle (-360.0 to 360.0) to rotate the chart. The positive angles produce a counter-clockwise rotation and the negative angles produce a clockwise rotation (default=0). The X and Y values define a point about which the chart image rotates. X is an absolute X value (-999999999 to 999999999) about which to rotate all absolute X values. Y is an absolute Y value (-999999999 to 999999999) about which to rotate all absolute Y values. |
| Result Info              | an option to append information to the end of the result as the last one or two lines.<br>Options for this field are:<br><br>L X,Y limits.<br><br>Q Character in/out quantities.<br><br>B Both limits and quantities.                                                                                                                                                                                                                             |

## ASPECT RATIO OF DEVICES

The following table refers to the maximum Y (vertical) coordinate addressable on each device. The maximum X (horizontal) coordinate is 32767 for all devices. The "aspect ratio" is the percentage of 32767 units in the Y direction.

### *Aspect Ratio of Devices*

| Device Name      | Device Type Mnemonic | Maximum Y Coordinate | Aspect Ratio  |
|------------------|----------------------|----------------------|---------------|
| Intercolor Scope | ISC                  | 25197                | .769          |
| UTS400 Master    | 400                  | 21844                | .666666666666 |
| AQUASTAR         | AQUA                 | 21049                | .6424148607   |
| UTS30            | 3S                   | 23999                | .732421875    |
| UTS60            | 6S                   | 23999                | .732421875    |
| 8 1/2 x 11 Plot  | HP4 or HP8           | 24143                | .7368431052   |
| 11 x 17 Plot     | HP4 or HP8           | 22145                | .67582167263  |



*Example of UTS 60 Aspect Ratio*

## USING EXPANDED SYNTAX

Although you can create a chart with primitive graphics code by using the commands shown in Appendix C, expanded syntax provides a simpler way to add many details. Expanded syntax can be used as building blocks of complicated graphics. You add the expanded syntax commands into a free-form report or into a primitive graphics code report and process it with the GS function. The result is a series of primitive graphics code commands. This new result can then be shown on the screen or plotted by the plotter.

There are two formats for inserting comments into the RID holding the expanded syntax commands:

**/.comment string/**

Detects a comment by the presence of "/" and then scans the data until the next "/" is detected, designating the end of the comment.

**(comment string)**

Detects a comment by the presence of the leading "(" and then scans the data until the closing parenthesis ")" is detected. However, if a text string is encountered in the comment, it is disregarded and the scan for ")" resumes.

**NOTE:** Adding comments or contractions (it's, that's, etc.) causes a "text string" scan.

The next examples demonstrate how to add comments:

**(Comment without a text string)**

**(Comment 'with text and the ) character' inside it)**

The format for all other expanded syntax is:

***/expanded syntax/***

If you want to use expanded syntax, refer to Appendix B for a description of the commands.

## **EXAMPLES**

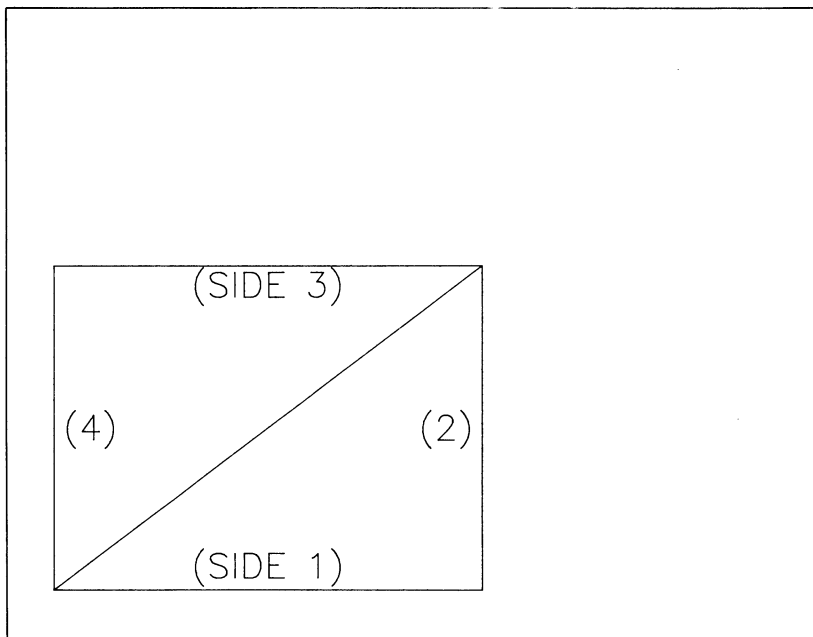
The next few pages show some ways you can use the GS function. The first diagram shows the primitive graphics code and the basic plot that it makes. Following diagrams show rotation, scaling, and offset examples. The function request message entries are shown with each diagram to show you how the function was used. (Refer to "Using the GS Function" after these examples for a description of these fields.)



## Basic Plot

This primitive graphics code produces the following plot:

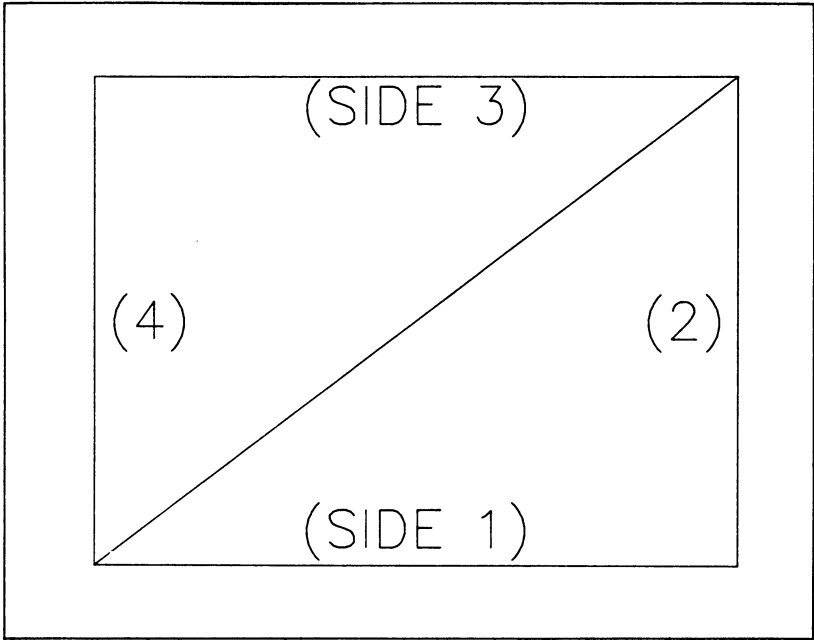
```
ZIZ01ZS1R
A0,0
D20000,0,0,15000,-20000,0,0,-15000,20000,15000
CZ1200,1200CT2CF3
A10000,500CJ2,3'(SIDE 1)'
A17000,7500CJ3,2'(2)'
A10000,13500CJ2,3'(SIDE 3)'
A400,7500CJ3,2'(4)'
ZT
```



**Scaled Plot**

With these values entered in the GS function request message, the following plot is produced:

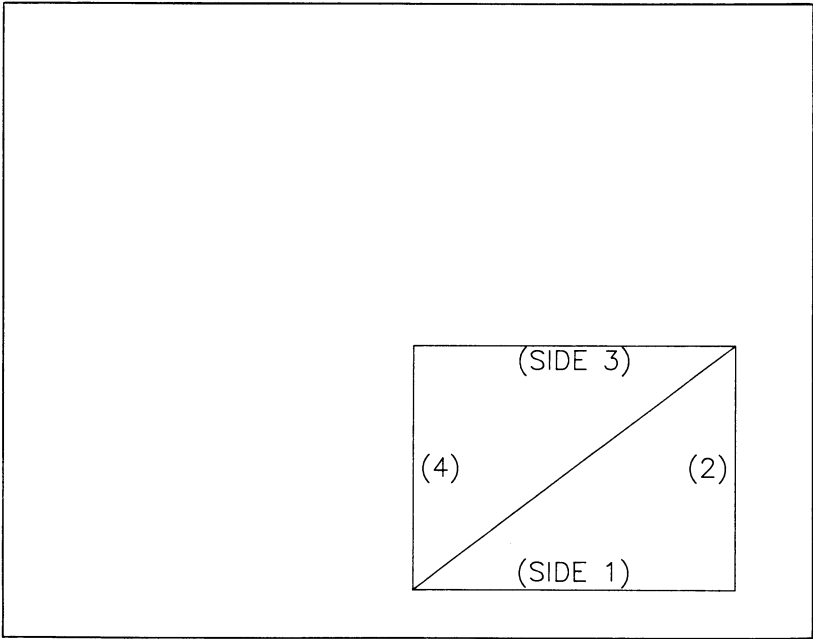
**Scaling Factor: 1.5**



# Scaled and Offset Plot

With these values entered in the GS function request message, the following plot is produced:

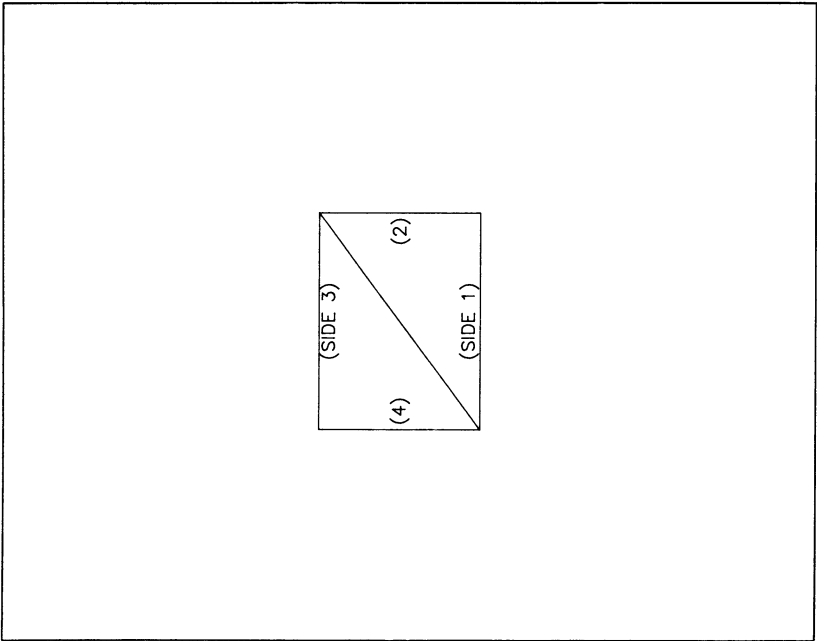
Scaling Factor: 0.75  
Offset Values: X=15000, Y=0



# Scaled, Offset, and Rotated Plot

With these values entered in the GS function request message, the following plot is produced:

Scaling Factor: 0.5  
Offset Values: X=12000, Y=9000  
Rotation Angle: 90, X=16000, Y=12000



# A. GOC Commands

---

Use this Appendix as a reference after you have learned how to use the GOC (Generate Organization Chart) function. To learn how to use the GOC function to generate organization charts, read Section 5, "Advanced Graphics."

This appendix includes:

- ☐ Global Commands
- ☐ Parameter Commands
- ☐ Data Commands

# Global Commands

---

Global commands can appear on any line in the GOC command report between the header-divider line and the \$END command. Global commands may be used more than once in the report.

## \$COMMENT

A comment line contains a period in column 1 of your chart report. You can change this period to another character using the \$COMMENT command. All comment lines in your data are ignored. These lines can be used for comments you want to keep in the report but do not wish to print on the chart.

Format: **\$COMMENT,x**

where **x** is any character other than A-Z. (If the \$ character is used for **x**, all lines are interpreted as valid lines.)

Example using the \$COMMENT command:

```
. this line is a comment line (default value)
* this line is interpreted as a valid line
$COMMENT,* changes comment character to *
. this line is now interpreted as a valid line
* this line is now interpreted as a comment line
$COMMENT,. changes comment character back to .
. this line is a comment line again
* this line is a valid line again
```

## **\$ENDI**

This command is used to end a \$INCLUDE-\$ENDI logic sequence. Refer to \$INCLUDE for more information.

Format: **\$ENDI**

Example using the \$ENDI command:

```
$INCLUDE,VAR1
 Line 1
 Line 2
 Line 3
$ENDI
```

## **\$FILLER**

The \$FILLER command is used to insert leading or trailing spaces to the data for the \$LEVEL, \$SUB-LEVEL, \$SIGNATURE, \$APPROVED, \$DUTIES, \$MISSION, \$OBJECTIVE, \$RESPONSIBILITY, and \$TITLE data commands.

Format: **\$FILLER,x**

where **x** is any character other than A-Z. (If the \$ character is used for **x**, all characters are interpreted without any changes.)

The GOC function normally ignores any leading and trailing spaces on a line. Since the number of significant characters on a line is used to determine widths, lengths, and character justification, it is sometimes useful to include additional spaces by using the filler character. The default character for filler is a backslash (\).

Example using the \$FILLER command:

```
This line contains 32 characters
\This line contains 33 characters
\This line contains 34 characters\
\ This line contains 36 characters \
$FILLER,? Change the filler character to ?
? This line displays the \ character ?
$FILLER,$ Change to no filler character
? This line displays the \ and ? characters ?
$FILLER,\ Change back to default character
```

The GOC function automatically centers data within a box. The following example shows how to override this with the use of filler characters.

```
1234567
12345
123
```

The above three lines appear within a box as follows:

```
1234567
 12345
 123
```

Using the filler character:

```
1234567
\\12345
123\\
```

The above three lines appear within a box as follows:

```
1234567
 12345
123
```

**NOTE:** A line of data containing only the filler character (one or more) can be inserted to add a blank line to the display. Refer to the \$BLANK command.



## \$INCLUDE

The **\$INCLUDE** command includes or excludes lines of information. If the condition of the name is true, the lines following the **\$INCLUDE** are included in the data until the end is designated by the **\$ENDI** command. If the condition of the name is false, the lines following the **\$INCLUDE** are ignored until the end is designated by the **\$ENDI** command.

You can embed (nest) these commands; the outermost **\$INCLUDE** having a false condition has priority.

Format: **\$INCLUDE, *name***

where *name* is the name defined in the **\$SET** command.

The following example uses these *names* and T/F conditions:

```
VAR1 = T (TRUE)
VAR2 = F (FALSE)
LAB1 = T (TRUE)
LAB2 = F (FALSE)
```

**\$INCLUDE, VAR1**

```
Line 1 Line is included
Line 2 Line is included
Line 3 Line is included
```

**\$ENDI**

**\$INCLUDE, LAB2**

```
Line 4 Line is ignored
Line 5 Line is ignored
Line 6 Line is ignored
```

**\$ENDI**

**\$INCLUDE, LAB1**

```
Line 1 Line is included
Line 2 Line is included
```

**\$INCLUDE, VAR2**

```
Line 3 Line is ignored
Line 4 Line is ignored
```

**\$ENDI**

Line 5 Line is included

Line 6 Line is included

**\$ENDI**

**\$INCLUDE, LAB2**

Line 1 Line is ignored

Line 2 Line is ignored

**\$INCLUDE, VAR1**

Line 3 Line is ignored, outermost has priority

Line 4 Line is ignored, outermost has priority

**\$ENDI**

Line 5 Line is ignored

Line 6 Line is ignored

**\$ENDI**

## **\$SET**

The **\$SET** command assigns a TRUE or FALSE value to a *name* so it can be examined by the **\$INCLUDE** command.

Format: **\$SET, *name*, *condition***

where:

*name* is 1–8 characters; commas (,) are not allowed

*condition* can be TRUE, T, FALSE, or F

Refer to the **\$INCLUDE** command for name usage.

Example using the **\$SET** command:

**\$SET, VAR1, TRUE** Set the name VAR1 to a true condition

**\$SET, VAR2, T** Set the name VAR2 to a true condition

**\$SET, LAB1, FALSE** Set the name LAB1 to a false condition

**\$SET, LAB2, F** Set the name LAB2 to a false condition

**NOTE:** If the **\$SET** command is issued again with the same name, the condition of the name changes at that point.

# Parameter Commands

---

This section describes the parameters for the entire chart. It also defines each unique level and sublevel. With the exception of command lines, the remaining data in this section is free-form and multiple information (parameters) can appear on the same line.

The **\$PARAMETER** command marks the beginning of the parameter section. The parameter commands you enter in the lines between **\$PARAMETER** and **\$DATA** do not have a **\$** symbol—just enter the command as shown in the following pages. All data contained in this section is converted to uppercase. The parameter commands can be entered in any sequence.

## COLUMNS

Display the bottom level of boxes as two vertical columns regardless of the number of boxes that are at this level.

Format: **COLUMNS**

This parameter is valid only if the Upper Level Chart option is selected.

## CONFIDENTIAL

Adds the word "CONFIDENTIAL" to the top right corner of the chart.

Format: **CONFIDENTIAL**

## FONT

Sets the character font to be used.

Format: **FONT,*nn***

where *nn* is a number (0–20) of the character font to be used to generate text.

If the FONT parameter selected is a value other than 0, you must also specify the OPTIMIZE option to generate the correct code.

## HORIZONTAL

Display the lowest level of the chart in a horizontal sequence. This parameter is not valid if the Upper Level Chart option is selected.

Format: **HORIZONTAL**

## LEVEL

Define a new level of boxes.

Format: **LEVEL,*n,qty,color1,color2,...***

where:

*n* can be 0–9 or A–Z; labels the new level. The first level detected is the highest, the second level is next, and so on. Each level must be identified by a unique *n*. A minimum of one level and a maximum of 12 levels are allowed.

*qty* is used to define how many lines are to be in each item at the level specified (0–255). A quantity equal to 0 is valid only when the display is vertical and the level is next to the bottom level when there are three or more levels. This allows you to split the bottom level into any number of columns of any length. By specifying 0 in the *qty* field, the quantity specified in the vertical parameter is overwritten.

*color* is used to define the color of the line from top to bottom within each item. Any color that is not defined defaults to white on a terminal or black on a plotter. Use the same colors as listed in the Color Index Table in Section 1. You must spell out the color name (for example, red for the color red).

## PAGE

Adds the word "PAGE" followed by a PAGEID to the chart.

Format: **PAGE**,*pageid*,*position*

where:

*pageid* is a one- to four-character page identifier.

*position* indicates where to place the page string on the chart. The following positions are available:

|    |              |
|----|--------------|
| UL | Upper Left   |
| UC | Upper Center |
| UR | Upper Right  |
| LL | Lower Left   |
| LC | Lower Center |
| LR | Lower Right  |

If no position is specified, the lower right corner of the page is used (default=LR).

## PLOTTER

Output the result on a graphics plotter.

Format: **PLOTTER**,*size,orientation*

where:

*size* is SMALL paper (8 1/2 x 11 inch) or LARGE paper (11 x 15 1/4 inch).

*orientation* is the width of the paper; WIDE (11 inches) or TALL (8 1/2 inches).

The *orientation* field is meaningful only if the *size* is equal to SMALL. The default values for PLOTTER are SMALL,WIDE.

## SCOPE

Display the result on a graphics terminal.

Format: **SCOPE**,*type*

where *type* is UTS60, AQUASTAR™, or AQUA (same as AQUASTAR). (AQUASTAR is a trademark of Electronic Systems Product, Inc.) If you do not specify *type*, the default UTS60 is used.

## STAGGER

Display the bottom level of boxes as two horizontal, staggered rows regardless of the number of boxes at this level.

Format: **STAGGER**

This parameter is valid only if the Upper Level Chart option is selected.

## SUB-LEVEL

Define a sublevel of the previous level specified. No more than one sublevel can be defined for each unique level. This parameter indicates a non-supervisory type staff position (i.e., secretary, analyst, etc.). This parameter is not meaningful at the lowest level and is ignored, if used.

The sublevel parameter must be entered after its associated level parameter.

Format: **SUB-LEVEL**,*n,qty,color1,color2,...*

where:

*n* corresponds to the level of which it is a sublevel.

*qty* field is used to define how many lines are to be in the sublevel (0-255). Quantity equal to 0 is not valid for sublevels. In addition, the quantity for a sublevel must be less than or equal to the quantity of the level it is associated with.

*color* defines the color of the line from top to bottom within the sublevel. Any color that is not defined defaults to white on a terminal or black on a plotter. Use the same color numbers as listed in the Color Index Table in Section 1. You must spell out the color name (for example, blue for the color blue).

## VERTICAL

Display the lowest level of the chart in a vertical sequence. This parameter is not valid if the Upper Level Chart option is specified.

Format: **VERTICAL,type**

where *type* specifies the arrangement of the lowest-level boxes:

- ☐ **STACK** (or **STK**) stacks the boxes, one on top of the other.
- ☐ **SPREAD** spreads the boxes out; leaving spaces between them.

If *type* is **STACK** or **STK**, you can specify another option:

Format: **VERTICAL,STACK,qty**

where *qty* is the quantity (0–99) of the maximum number of boxes to display before making two columns at this level.

If *type* is **SPREAD**, you can specify another option:

Format: **VERTICAL,SPREAD,qty,position**

where:

*qty* is the quantity (0–99) of the maximum number of boxes to display before making two columns at this level.

*position* indicates where to place the boxes for the spread. The following positions are available:

**L** or **LEFT**      position the line connecting the boxes on the left.

**R** or **RIGHT**    position the line connecting the boxes on the right.

The **STACK** type is not applicable when *position* is specified.



# Data Commands

---

The **\$DATA** command marks the beginning of the data section. The commands described next are meaningful only within the data section. Each line is treated as containing a single character string, whether it is a command or a piece of data for a command requiring multiple lines of input. Following is a list of the commands and their descriptions.

## **\$APPROVED**

The **\$APPROVED** command indicates that the data lines following (maximum of six) are to be added to the bottom of the chart with a line for a signature above them. The line is preceded by the word "APPROVED:."

The total number of **SIGNATURE** and **APPROVED** commands cannot exceed two (2–signature, 2–approved, or 1–signature and 1–approved).

Each **SIGNATURE** or **APPROVED** command can have its own position and no–line condition.

You can use the **FILLER** character with lines of data for **\$APPROVED**.

There are five formats for this command.

### Format 1: **\$APPROVED**

This default command puts a signature line at the left side of the chart.

## Format 2: **\$APPROVED,position**

where *position* specifies where to put the signature—either at the center, or on the left or right side of the chart.

The following entries are available:

|             |                                                    |
|-------------|----------------------------------------------------|
| L or LEFT   | position the signature at the left of the chart.   |
| R or RIGHT  | position the signature at the right of the chart.  |
| C or CENTER | position the signature at the center of the chart. |

## Format 3: **\$APPROVED,line-flag**

where *line-flag* allows you to indicate that you do not want a line drawn above the signature information. If *line-flag* is not specified, a line is drawn. Use the characters NL to specify the *line-flag*.

## Format 4: **\$APPROVED,position,line-flag**

## Format 5: **\$APPROVED,line-flag,position**

These are variations of formats 2 and 3 combined.

This example shows how to add four lines to the lower left corner of the chart with a line for a signature above them:

**\$APPROVED**  
**J. Q. Public**  
**Group Manager**  
**A B & C**  
**11/1/87**

The next example shows how to add three lines to the lower center of the chart with no line. Note the use of the FILLER character.

```
$APPROVED,C,NL
Filled Positions - 12
\\Open Positions - 2
\\\\\\\\\\\\\\\\\\\\Total - 14
```

## **\$BLANK**

Insert a blank line into the data for a \$LEVEL, \$SUB-LEVEL, \$SIGNATURE, \$APPROVED, \$DUTIES, \$MISSION, \$OBJECTIVE, or \$RESPONSIBILITY command.

Format: **\$BLANK**

The \$BLANK command is necessary to produce blank lines within the report. All blank lines are ignored in the data unless this command is used. Refer also to the \$FILLER command.

## **\$BOX**

Draw boxes around each item at every level or sublevel until changed by using the \$NO-BOX command.

Format: **\$BOX**

## **\$DASHED**

All lines are drawn as dashed lines until changed by using a \$SOLID command.

Format: **\$DASHED**

## \$DATA

The \$DATA command indicates the beginning of the data section.

Format: **\$DATA**

## \$DUTIES

The \$DUTIES command indicates that the data lines following (maximum of six) are to be added to the top of the chart as a block of information only, with no boxes or lines drawn around it.

You can use the FILLER character with lines of data for \$DUTIES.

Format: **\$DUTIES, *position***

where *position* allows you to indicate which side of the top of the chart to place the data lines. If no position is specified, the data lines are displayed at the right side of the chart.

L or LEFT      position the data lines at the top left side of the chart.

R or RIGHT    position the data lines at the top right side of the chart.

**NOTE:** You can use only one of the following commands for each organization chart: \$DUTIES, \$OBJECTIVE, \$MISSION, or \$RESPONSIBILITY.

## **\$END**

The **\$END** command marks the end of all useful information. Any lines after it are ignored by the GOC function.

Format: **\$END**

## **\$LEVEL**

The **\$LEVEL** command indicates that the data lines following are for boxes at a unique level.

You can use the FILLER character for any lines of data for **\$LEVEL**.

There are two formats for this command, depending on whether you want that level drawn.

Format 1: **\$LEVEL,*n***

where *n* is the unique level identifier. As defined by the *qty* value of **LEVEL,*n*,*qty*** in the parameter section, there must be *qty* lines of data following the **\$LEVEL** command (or multiples of *qty*, such as *2qty* or *3qty* ).

Multiple lines of quantity lines of data are valid only at the bottom level to indicate more than a single individual in a group at this level.

Format 2: **\$LEVEL,*n*,VOID** or **\$LEVEL,*n*,V**

where *n* is the unique identifier. This format is used to indicate a missing box at some level other than the top or bottom level. No data lines are to be supplied following this form of the **\$LEVEL** command. This format is treated as Format 1 if the Upper Level option is selected. (Refer to the example in "Create a Two-Level Chart" in Section 5 for an example of format 2.)

Example using the \$LEVEL command:

## **\$PARAMETERS**

### **PLOTTER**

**LEVEL, 1, 4, BLACK, RED, BLUE, GREEN**

**LEVEL, 2, 3, RED**

### **\$DATA**

#### **\$LEVEL, 1**

**Line 1** First line in box – displayed in BLACK

**Line 2** Second line in box – displayed in RED

**Line 3** Third line in box – displayed in BLUE

**Line 4** Fourth line in box – displayed in GREEN

#### **\$LEVEL, 2**

**Line 1** Box 1, Line 1 – displayed in RED

**Line 2** Box 1, Line 2 – displayed in BLACK

**Line 3** Box 1, Line 3 – displayed in BLACK

#### **\$LEVEL, 2**

**Line 1** Box 2, Line 1 – displayed in RED

**Line 2** Box 2, Line 2 – displayed in BLACK

**Line 3** Box 2, Line 3 – displayed in BLACK

## **\$LOWERCASE**

All alphabetic characters are displayed exactly as typed in—uppercase letters in uppercase and lowercase letters in lowercase.

Format: **\$LOWERCASE**

## **\$MISSION**

The \$MISSION command indicates that the data lines following (maximum of six) are to be added to the top of the chart as a block of information only, with no boxes or lines drawn.

You can use the FILLER character with lines of data for \$MISSION.

Format: **\$MISSION,position**

where *position* allows you to indicate which side of the top of the chart to place the data lines. If no position is specified, the data lines are displayed at the right side of the chart.

L or LEFT      position the data lines at the top left side of the chart.

R or RIGHT     position the data lines at the top right side of the chart.

**NOTE:** You can use only one of the following commands for each organization chart: **\$DUTIES**, **\$OBJECTIVE**, **\$MISSION**, or **\$RESPONSIBILITY**.

## **\$NO-BOX**

No boxes are drawn around items at any level or sublevel until changed by using the **\$BOX** command.

Format: **\$NO-BOX**

## **\$OBJECTIVE**

The **\$OBJECTIVE** command indicates that the data lines following (maximum of 6) are to be added to the top of the chart as a block of information only, with no boxes or lines drawn.

You can use the **FILLER** character with lines of data for **\$OBJECTIVE**.

Format: **\$OBJECTIVE,position**

where *position* allows you to indicate which side of the top of the chart to place the data lines. If no position is specified, the data lines are displayed at the right side of the chart.

L or LEFT      position the data lines at the top left side of the chart.

R or RIGHT     position the data lines at the top right side of the chart.

**NOTE:** You can use only one of the following commands for each organization chart: \$DUTIES, \$OBJECTIVE, \$MISSION, or \$RESPONSIBILITY.

## **\$RESPONSIBILITY**

The \$RESPONSIBILITY command indicates that the data lines following (maximum of 6) are to be added to the top of the chart as a block of information only, with no boxes or lines drawn.

You can use the FILLER character with lines of data for \$RESPONSIBILITY.

Format: **\$RESPONSIBILITY,position**

where *position* allows you to indicate which side of the top of the chart to place the data lines. If no position is specified, the data lines are displayed at the right side of the chart.

L or LEFT      position the data lines at the top left side of the chart.

R or RIGHT     position the data lines at the top right side of the chart.



**NOTE:** You can use only one of the following commands for each organization chart: **\$DUTIES**, **\$OBJECTIVE**, **\$MISSION**, or **\$RESPONSIBILITY**.

## **\$SIGNATURE**

The **\$SIGNATURE** command indicates that the data lines following (maximum of six) are added to the bottom of the chart with a line for a signature above them.

You can use the **FILLER** character with lines of data for **\$SIGNATURE**.

There are five formats for this command.

### Format 1: **\$SIGNATURE**

This default command puts a signature line at the left side of the chart.

### Format 2: **\$SIGNATURE, *position***

where *position* specifies where to put the signature—either at the center, or on the left or right side of the chart.

The following entries are available:

|             |                                                    |
|-------------|----------------------------------------------------|
| L or LEFT   | position the signature at the left of the chart.   |
| R or RIGHT  | position the signature at the right of the chart.  |
| C or CENTER | position the signature at the center of the chart. |

Format 3: **\$SIGNATURE, *line-flag***

where *line-flag* allows you to indicate that you do not want a line drawn above the signature information. If *line-flag* is not specified, a line is drawn. Use the characters NL to specify the *line-flag*.

Format 4: **\$SIGNATURE, *position*, *line-flag***

Format 5: **\$SIGNATURE, *line-flag*, *position***

These are variations of formats 2 and 3 combined.

This example shows how to add four lines to the lower left corner of the chart with a line for a signature above them:

```
$SIGNATURE
J. Q. Public
Group Manager
A B & C
11/1/87
```

The next example shows how to add three lines to the lower center of the chart with no line. Note the use of the FILLER character.

```
$SIGNATURE, C, NL
Filled Positions - 12
\\Open Positions - 2
\\\\\\\\\\\\\\\\\\\\Total - 14
```

## **\$SOLID**

All lines are drawn as solid lines until changed by using a \$DASHED command.

Format: **\$SOLID**

## **\$SUB-LEVEL**

The **\$SUB-LEVEL** command indicates that the data lines following are for a sublevel of boxes for a unique level.

You can use the **FILLER** character for any lines of data for **\$SUB-LEVEL**.

Format: **\$SUB-LEVEL**,*n,position*

where:

*n* is the unique level that this is a subset of.

*position* indicates where to place the sublevel box. The following positions are available:

L or LEFT      position the sublevel box to the left of  
the main level box.

R or RIGHT     position the sublevel box to the right  
of the main level box.

When the *position* field is not used, the sublevel box is placed below the main level box.

The format for the data is the same as for the **\$LEVEL** command except that multiple boxes are meaningful at all but the lowest level.

## **\$TITLE**

The **\$TITLE** command is used to indicate the title to be used on the chart. Use the remainder of the line for the title. You may use a maximum of two lines for titles. When two titles are used, the second title uses a character size slightly smaller than the first.

Format: **\$TITLE**

You can use the **FILLER** character with the **\$TITLE** command.

## **\$UPPERCASE**

All alphabetic characters are displayed as uppercase, whether entered as lowercase or uppercase.

Format: **\$UPPERCASE**

## B. Expanded Syntax

---

After you have used the GS (Graphic Scaler) function, you may want to modify your charts by using expanded syntax. This is a set of graphics commands you can use to modify existing primitive code reports or create custom graphics. You can add special details with expanded syntax that cannot be done with the CHART runs.

This appendix presents specifications for expanded syntax. Use it as a reference. If you have not used expanded syntax before, read "Graphics Scaler (GS)" in Section 5.

This appendix contains:

- ☐ Notation Used
- ☐ Quick Reference to Expanded Syntax
- ☐ Expanded Syntax Commands

# Notation Used

---

This appendix uses certain symbols to represent expanded syntax:

| SYMBOL | DEFINITION |
|--------|------------|
|--------|------------|

|        |                                                            |
|--------|------------------------------------------------------------|
| A to Z | Capital letters are used for the expanded syntax commands. |
|--------|------------------------------------------------------------|

|         |                                                                                                                                                                                                                                                                                              |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $(x,y)$ | A point specified by $x$ and $y$ values in an x-y coordinate system, where the origin (0,0) is at the lower left corner of the display or plotting surface. The $x$ and $y$ values are integers between -32767 and 32767 (or less, depending on the aspect ratio of the display or plotter). |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|     |                                                                                                                              |
|-----|------------------------------------------------------------------------------------------------------------------------------|
| $r$ | The radius of an arc, circle, or sector. This value can be either a floating-point number or an integer between 0 and 32767. |
|-----|------------------------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                 |
|----------|-----------------------------------------------------------------------------------------------------------------|
| $r1, r2$ | The two radii of an ellipse, where $r1$ is the radius along the x-axis and $r2$ is the radius along the y-axis. |
|----------|-----------------------------------------------------------------------------------------------------------------|

|          |                                                                                                                                                                                                                               |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $sa, ea$ | The starting angle and ending angle of an arc or sector. In the range of 0 to 360.0, these may have any number of leading 0's or spaces and are delimited by a comma or new command. These values are floating-point numbers. |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|     |                                                                                                                                           |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------|
| [ ] | Surround a part of the command that is optional. If you choose the option, do not type the brackets, just the part of the command inside. |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------|

|    |                                                                                                                                                                                                                    |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CP | The abbreviation for "current position." When the CP coordinates are described, capital letters X and Y are used. The current position is therefore labeled CP(X,Y) where used in the definitions of the commands. |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

# Quick Reference to Expanded Syntax

---

Use this list as a fast reference for expanded syntax. You must process expanded syntax using the GS (Graphic Scaler) function before it can be displayed or plotted.

| NAME                       | COMMAND                                                                                                         |
|----------------------------|-----------------------------------------------------------------------------------------------------------------|
| CALL MACRO                 | /CMnn [,qty ]/                                                                                                  |
| CLOSED ELLIPSE             | /OCr1,r2 [,sa,ea ]/                                                                                             |
| COMMENT                    | /.comment string /                                                                                              |
| COMPLEMENT ROTATION ANGLE  | /CA/                                                                                                            |
| DEFINE MACRO               | /DM[nn ][command ]\                                                                                             |
| DRAW TO MARK               | /DMKn <sub>0</sub> n <sub>1</sub> ,...,n <sub>9</sub> /                                                         |
| END OF TEXT                | /ET/                                                                                                            |
| FILLED ELLIPSE             | /OFr1,r2 [,sa,ea ]/                                                                                             |
| GENERATE POLYGON TO MARK   | /PMKn <sub>0</sub> n <sub>1</sub> ,...,n <sub>9</sub> /                                                         |
| HOLLOW ELLIPSE             | /OVr1,r2 [,sa,ea ]/                                                                                             |
| INCREMENT BACKGROUND COLOR | /ICBx /                                                                                                         |
| INCREMENT FILL COLOR       | /ICFx /                                                                                                         |
| INCREMENT LINE COLOR       | /ICLx /                                                                                                         |
| INCREMENT MARKER COLOR     | /ICMx /                                                                                                         |
| INCREMENT ROTATION ANGLE   | /IAxx.x /                                                                                                       |
| INCREMENT SCALE FACTOR     | /ISxx.x /                                                                                                       |
| INCREMENT TEXT COLOR       | /ICTx /                                                                                                         |
| LINE FEED DOWN             | /LF[D]/                                                                                                         |
| LINE FEED UP               | /LFU/                                                                                                           |
| MARK CURRENT POSITION      | /MKn /                                                                                                          |
| MULTIPLY SCALE FACTOR      | /XSxx.x /                                                                                                       |
| NEW ROTATION ANGLE         | /NAxx.x /                                                                                                       |
| NEW SCALE FACTOR           | /NSxx.x /                                                                                                       |
| POSITION TO MARK           | /PMn /                                                                                                          |
| RESET COLOR INDEX          | /RC/                                                                                                            |
| START OF TEXT              | /ST/                                                                                                            |
| TRANSLATE COLOR INDEX      | /TCox <sub>1</sub> ,nx <sub>1</sub> [,ox <sub>2</sub> ,nx <sub>2</sub> ,...,ox <sub>n</sub> ,nx <sub>n</sub> ]/ |
| UNDERLINE TEXT             | /UL/                                                                                                            |

# Expanded Syntax Commands

---

The following commands, organized alphabetically by name, include a description and an example. Each example includes primitive graphics code commands with one or more expanded syntax codes.

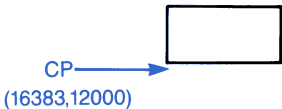
## CALL MACRO

Format: */CMnn[qty]/*

After you have defined a macro with the DEFINE MACRO command, you can call it one or more times. This command calls macro *nn*. If you want to repeat the macro a number of times, specify the *qty* number (between 1 and 32767).

Example:

```
ZI
ZO1
R
/DM1LL1PIOJ2000,1000\
A16383,12000
/CM1/
ZT
```





## CLOSED ELLIPSE

Format: `/OCr1,r2[,sa,ea]/`

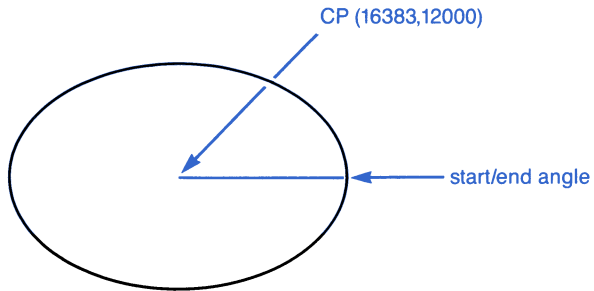
Use this command to draw a closed ellipse with radius *r1* along the x-axis and radius *r2* along the y-axis. You can draw two types of closed ellipses: full or partial.

- A full ellipse is drawn if you do not specify the start angle *sa* and end angle *ea*. A line is also drawn along the x-axis from the center point to the right edge of the ellipse.
- A partial ellipse is drawn if you specify *sa* and *ea*. A segment of the ellipse, from *sa* to *ea*, is drawn with lines connecting the ends of the segment to the center point.

The next two examples show these two types of closed ellipses.

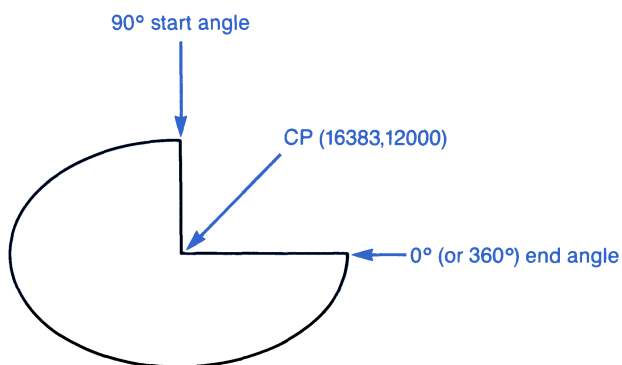
Example (of closed full ellipse):

```
ZI
Z01
R
A16383,12000
LL1
LF1
/OC3000,2000/
ZT
```



Example (of closed partial ellipse):

```
ZI
Z01
R
A16383,12000
LL1
/OC3000,2000,90,360/
ZT
```



## COMMENT

Format: */.comment string/*

Use comment commands to document the expanded syntax commands you are adding. All characters in the *comment string* are ignored until the trailing "/" is reached. (You cannot use the "/" character as part of your *comment string*.)

Example:

```
ZI
Z01
R
LL1
A10000,12000
D15000,0
/.this is a comment string/
ZT
```

(10000,12000)



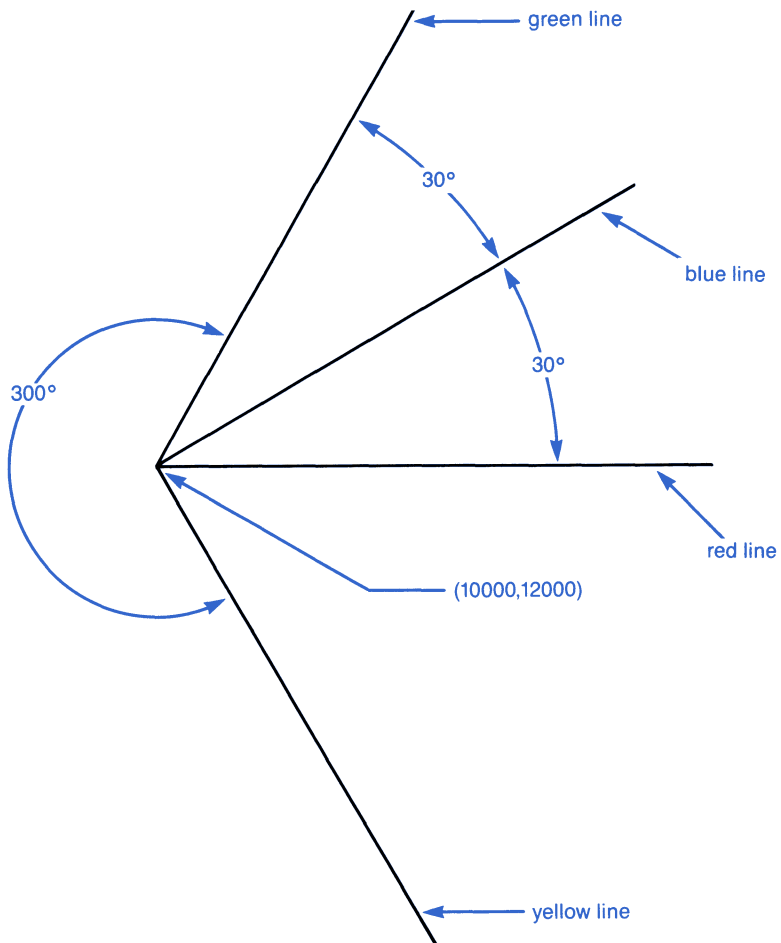
## COMPLEMENT ROTATION ANGLE

Format: **/CA/**

Use this command to set the rotation angle to the complement of the current rotation angle (CRA). The rotation angle is then  $360 - \text{CRA}$ . (See also NEW ROTATION ANGLE and INCREMENT ROTATION ANGLE.)

Example:

```
ZI
Z01
R
LL1
A10000,12000
D10000,0
B-10000,0
LL4
/NA30/
/.start of angle = 30 degrees/
D10000,0
LL2
B-10000,0
/IA30/
/.angle now = 60 degrees/
D10000,0
LL3
B-10000,0
/CA/
/.angle now = 300 degrees/
D10000,0
ZT
```



# DEFINE MACRO

Format: **/DM[nn][command]\**

Use this command to define macros, clear a specific macro, or clear all macros. A macro is a string of primitive graphics code or other expanded syntax that performs a specific operation. By defining it as a macro, you can use it with the CALL MACRO expanded syntax command. Each macro is identified by a number *nn* that you assign to it with this command. You can define macros from 0 to 99.

To define a macro, enclose *nn* and the *command* (primitive graphics code or expanded syntax) within the forward slashes. Use the format **/DMnncommand\** (no space between *nn* and *command* ).

If you want to define a different macro but use a number *nn* already defined, you can clear macro *nn*. To clear a specific macro, include the number *nn* but not the *command* string. Use the format **/DMnn\** to clear macro *nn*.

Use the command **/DM/** to clear all macros.

Example:

```
ZI
ZO1
R
/DM1LL1PIOJ2000,1000\
ZT
```

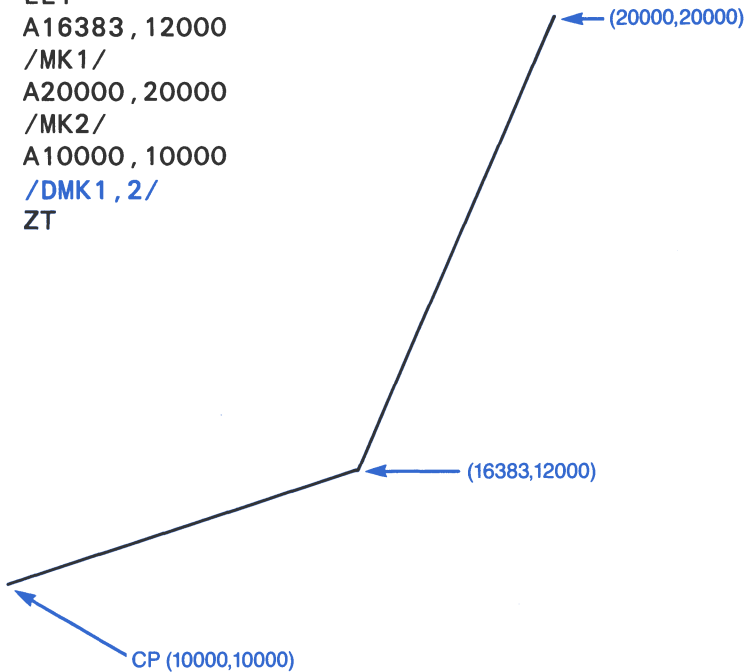
## DRAW TO MARK

Format: **/DMK** $n_0$  $n_1, \dots, n_g$ /

Draw from the CP to MARK  $n_0$  then to MARK  $n_1$ , on through as many positions marked (see MARK CURRENT POSITION) up to  $n_g$ . The last mark is not connected to the CP (see GENERATE POLYGON TO MARK to draw a closed polygon).

Example:

```
ZI
Z01
R
LL1
A16383, 12000
/MK1/
A20000, 20000
/MK2/
A10000, 10000
/DMK1, 2/
ZT
```



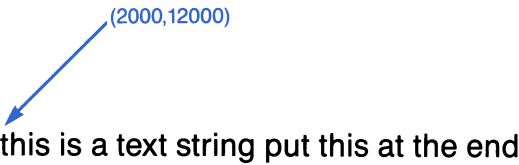
# END OF TEXT

Format: **/ET/**

This command moves the CP to the end of the last text string.

Example:

ZI  
Z01  
R  
LT1  
CZ383,383  
A2000,12000  
'this is a text string'  
**/ET/**  
' put this at the end'  
ZT





## FILLED ELLIPSE

Format: `/OFr1,r2[sa,ea]/`

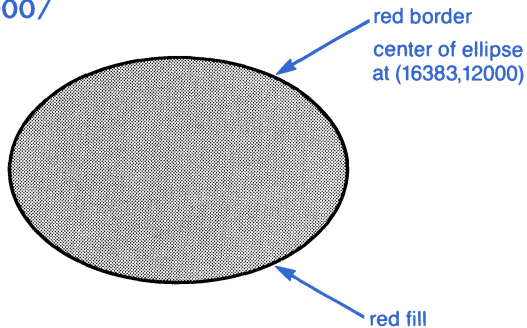
Use this command to draw a filled ellipse with radius *r1* along the x-axis and radius *r2* along the y-axis. The ellipse is filled with the current fill color (see INCREMENT FILL COLOR). You can draw two types of filled ellipses: full or partial.

- A full ellipse is drawn if you do not specify the start angle *sa* and end angle *ea*.
- A partial ellipse is drawn if you specify *sa* and *ea*. A segment of the ellipse, from *sa* to *ea*, is drawn with lines connecting the ends of the segment to the center point. As with the full ellipse, the interior is filled with the current fill color.

The next two examples show these two types of filled ellipses.

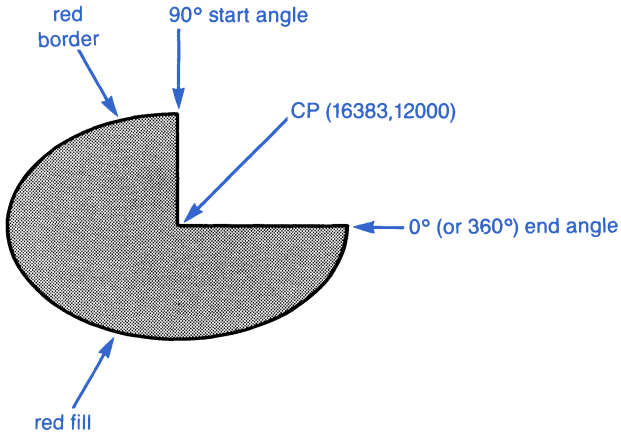
Example (of filled full ellipse):

```
ZI
Z01
R
A16383,12000
LL1
LF1
/OF3000,2000/
ZT
```



Example (of filled partial ellipse):

ZI  
Z01  
R  
A16383, 12000  
LL1  
LF1  
/OF3000, 2000, 90, 360/  
ZT



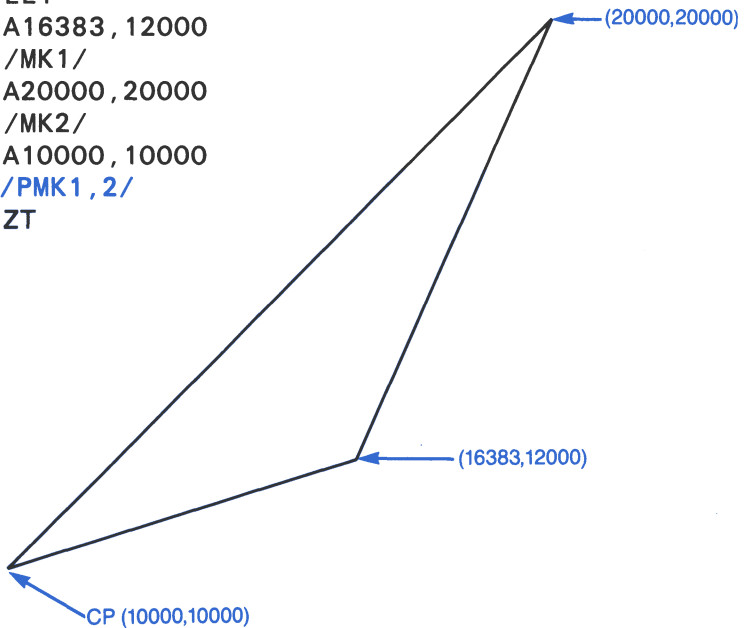
## GENERATE POLYGON TO MARK

Format: **/PMK $n_0$  $n_1$ ,..., $n_g$ /**

Generate a polygon from CP to MARK  $n_0$  then to MARK  $n_1$ , on through as many positions marked (see MARK CURRENT POSITION) up to  $n_g$ . Connect the last position to the CP to close the polygon.

Example:

```
ZI
Z01
R
P10
LL1
A16383,12000
/MK1/
A20000,20000
/MK2/
A10000,10000
/PMK1,2/
ZT
```



# HOLLOW ELLIPSE

Format: */OVr1,r2[sa,ea]/*

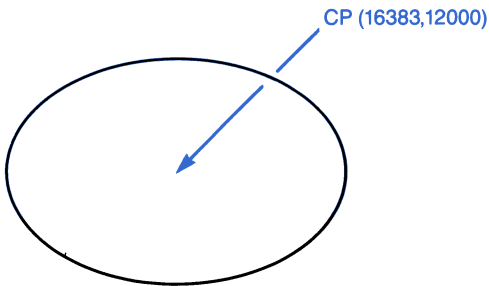
Use this command to draw a hollow ellipse with radius *r1* along the x-axis and radius *r2* along the y-axis. You can draw two types of hollow ellipses: full or partial.

- A full ellipse is drawn if you do not specify the start angle *sa* and end angle *ea*.
- A partial ellipse is drawn if you specify *sa* and *ea*. Only the segment of the ellipse, from *sa* to *ea*, is drawn.

The next two examples show these two types of hollow ellipses.

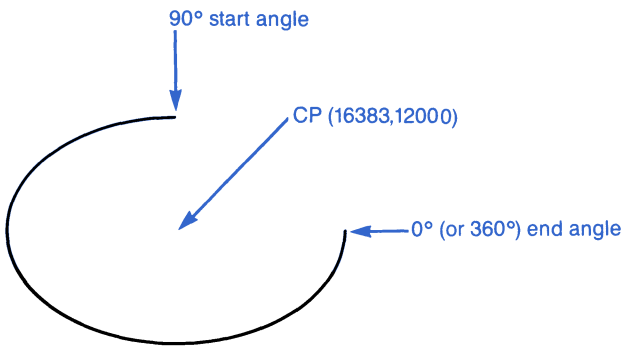
Example (hollow full ellipse):

```
ZI
ZO1
R
A16383,12000
LL1
/OV3000,2000/
ZT
```



Example (hollow partial ellipse):

```
ZI
Z01
R
A16383,12000
LL1
/OV3000,2000,90,360/
ZT
```



## INCREMENT BACKGROUND COLOR

Format: **/ICB***x***/**

You can change the background color with this command.  
Specify *x* as the number to increment (to +15) or decrement (to -15) the background color index.

Example:

ZI  
Z01  
R  
LB1  
**/ICB1/**  
ZN  
ZT

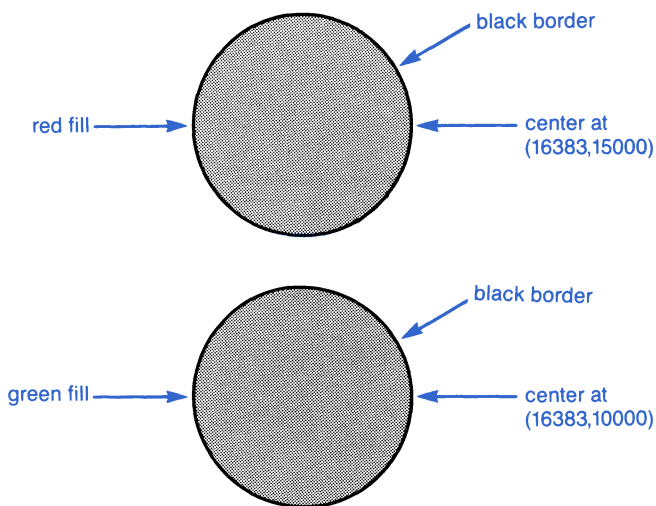
## INCREMENT FILL COLOR

Format: **/ICF $x$ /**

You can change the fill color used to fill the interior of ellipses and polygons with this command. Specify  $x$  as the number to increment (to +15) or decrement (to -15) the fill color index.

Example:

```
ZI
Z01
R
A16383,15000
PI 1
LF1
02000
/ICF1/
A16383,10000
02000
ZT
```



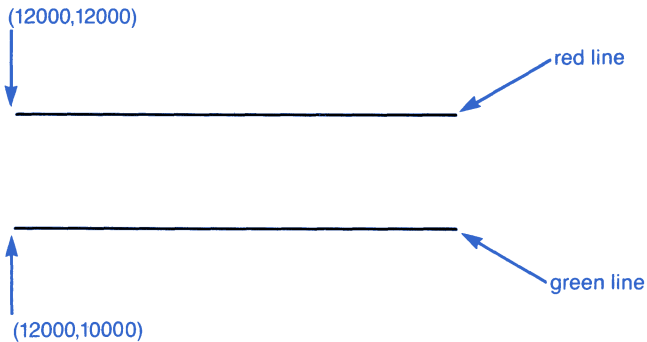
# INCREMENT LINE COLOR

Format: **/ICL $x$ /**

The color of the line being drawn is specified by the Line Color Index, which you can increment (to +15) or decrement (to -15) by specifying the value  $x$ .

Example:

```
ZI
Z01
R
A12000,12000
LL1
LS1
C20000,12000
/ICL1/
A12000,10000
C20000,10000
ZT
```





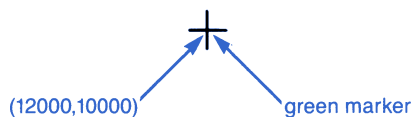
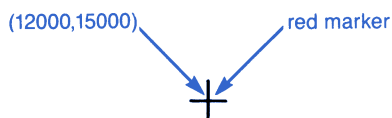
# INCREMENT MARKER COLOR

Format: **/ICM***x*/

The color of the marker being drawn is specified by the Marker Color Index, which you can increment (to +15) or decrement (to -15) by specifying the value of *x*.

Example:

```
ZI
Z01
R
A12000, 15000
S2
SI 1
F,
/ICM1/
A12000, 10000
F,
ZT
```



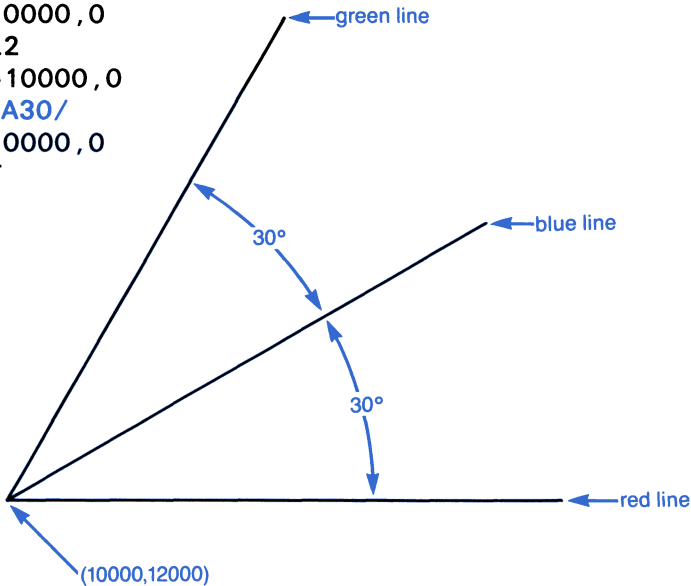
# INCREMENT ROTATION ANGLE

Format: `/IAxx.x/`

You can change the relative coordinate system by rotation in a positive (to 360.0°) or negative (to -360.0°) direction. Specify the value `xx.x` as the rotation angle to increment the Current Rotation Angle (CRA).

Example:

```
Z I
Z O1
R
LL 1
A10000,12000
D10000,0
B-10000,0
LL 4
/NA30/
D10000,0
LL 2
B-10000,0
/IA30/
D10000,0
Z T
```



## INCREMENT SCALE FACTOR

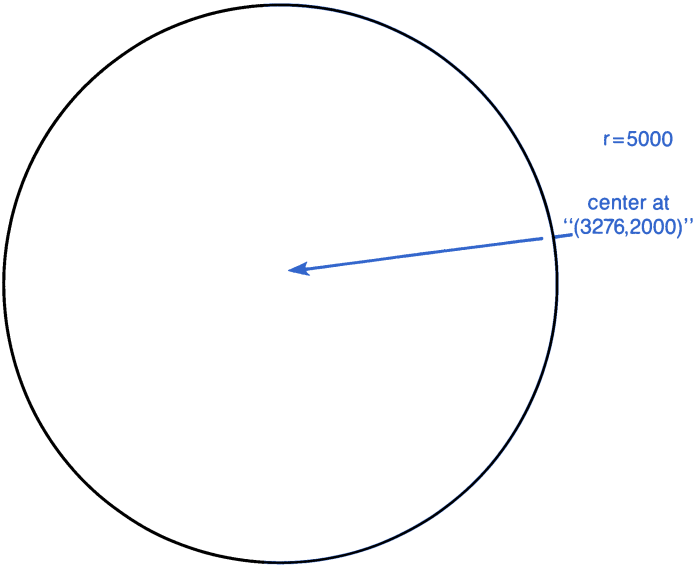
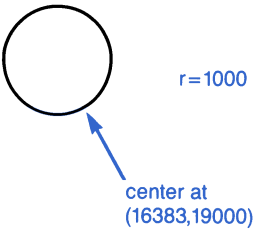
Format: **/ISxx.x/**

You can change the scale of a plot by incrementing the Scale Factor (SF). Specify the amount to increment (to 32767.0) or decrement (-32767.0) with the value **xx.x**. The new SF = SF + **xx.x**. The new SF affects commands following the INCREMENT SCALE FACTOR command.

An example using this command is shown on the next page.

Example:

ZI  
Z01  
R  
A16383,19000  
LL1  
PIO  
/NS1/  
01000  
/IS4/  
/.scale factor now = 5/  
A2000,1200  
01000  
ZT



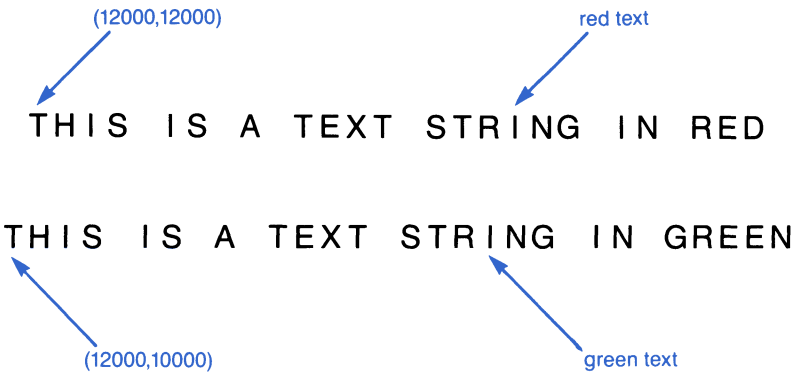
# INCREMENT TEXT COLOR

Format: **/ICT<sub>x</sub>/**

The color of the text being written is specified by the Text Color Index, which you can increment (to +15) or decrement (to -15) by specifying the value *x*.

Example:

```
ZI
Z01
R
A12000,12000
CZ500,500
CJ2,2
LT1
'THIS IS A TEXT STRING IN RED'
/ICT1/
A12000,10000
'THIS IS A TEXT STRING IN GREEN'
ZT
```



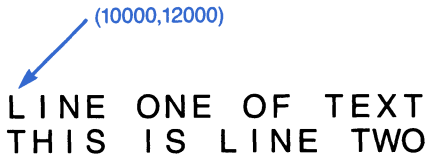
# LINE FEED DOWN

Format: **/LF[D]/**

Use this command to move the CP down a distance twice the height of the current font and to the same left margin as the previous text string.

Example:

ZI  
Z01  
R  
LT1  
CZ500,500  
A10000,12000  
'LINE ONE OF TEXT'  
**/LF/**  
'THIS IS LINE TWO'  
ZT



(10000,12000)

LINE ONE OF TEXT  
THIS IS LINE TWO

## LINE FEED UP

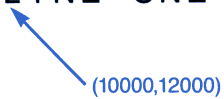
Format: **/LFU/**

Use this command to move the CP up a distance twice the height of the current font and to the same left margin as the previous text string.

Example:

```
ZI
Z01
R
LT1
CZ500,500
A10000,12000
'LINE ONE OF TEXT'
/LFU/
'THIS IS LINE TWO'
ZT
```

THIS IS LINE TWO  
LINE ONE OF TEXT



## MARK CURRENT POSITION

Format: **/MK*n*/**

This command marks the current position, saving its coordinates for use with other commands, such as DRAW TO MARK, GENERATE POLYGON TO MARK, and POSITION TO MARK. Specify *n* as the label for the mark between 0 and 9. Using this command does not place a marker at the CP; it just saves the coordinates.

Example:

```
ZI
ZO1
R
A16383,12000
/MK1/
ZT
```



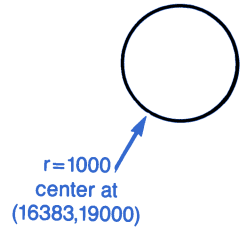
# MULTIPLY SCALE FACTOR

Format: **/XSxx.x/**

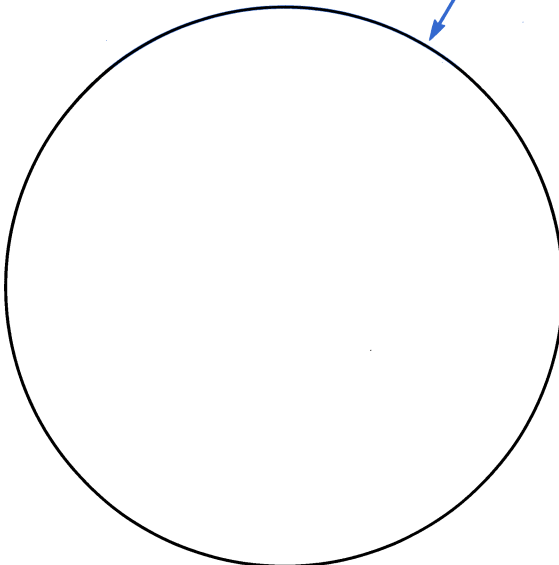
You can change the scale of a plot by multiplying the current Scale Factor (SF) by value **xx.x**. You can specify **xx.x** between 0 and 32767.0. The new  $SF = SF * xx.x$ . The new SF affects commands following the MULTIPLY SCALE FACTOR command. (If you multiply by 0, the  $SF = 1$ .)

Example:

```
ZI
ZO1
R
A16383,19000
LL1
PIO
O1000
/XS5/
A3276,2000
O1000
ZT
```



r=5000  
center at  
"(2000,1200)"



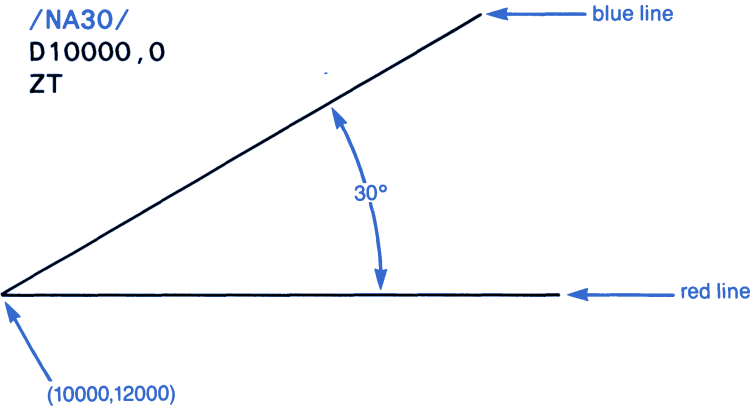
# NEW ROTATION ANGLE

Format: **/NAxx.x/**

You can change the relative coordinate system by rotation in a positive (to 360.0°) or negative (to -360.0°) direction. Specify the value **xx.x** as the rotation angle to change the Current Rotation Angle (CRA).

Example:

```
ZI
ZO1
R
LL1
A10000,12000
D10000,0
B-10000,0
LL4
/NA30/
D10000,0
ZT
```



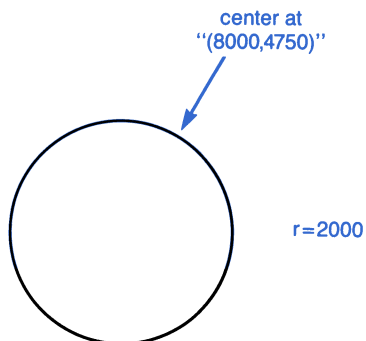
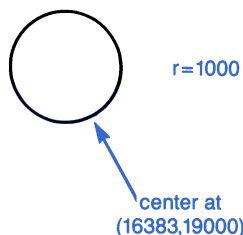
## NEW SCALE FACTOR

Format: **/NS $xx.x$ /**

Scale Factor (SF) is normally set at 1, meaning the coordinates you specify for commands are actual size. You can change the scale of a plot by setting a new SF by specifying value  $xx.x$ . Use a value of  $xx.x$  between 0.0 and 32767.0. The new SF =  $xx.x$ . The new SF affects commands following the NEW SCALE FACTOR command.

Example:

```
ZI
Z01
R
A16383,19000
LL1
PIO
01000
/NS2/
A8000,4750
01000
ZT
```



## POSITION TO MARK

Format: **/PM $n$ /**

Use this command to move the CP to a mark saved with the MARK CURRENT POSITION command. You can position to any saved mark between 0 and 9 by specifying the value  $n$ .

Example:

```
ZI
Z01
R
A16383,12000
/MK1/
A20000,20000
/PM1/
ZT
```

## RESET COLOR INDEX

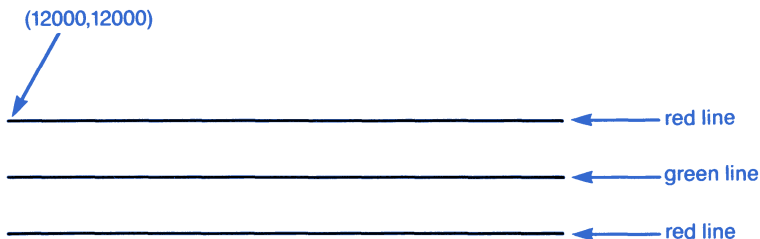
Format: **/RC/**

Use this command if you want to reset the Line Color Index values back to normal after you have used the TRANSLATE COLOR INDEX command.

**NOTE:** For all color increment commands, if the value is omitted or a 0 is entered, a value of +1 is used. If the increment value is odd, a result of 0 (normally black) is never generated.

Example:

```
ZI
ZO1
R
PIO
LL1
A12000,12000
D10000,0
B-10000,-1000
/TC1,2/
LL1
D10000,0
B-10000,-1000
/RC/
LL1
D10000,0
ZT
```



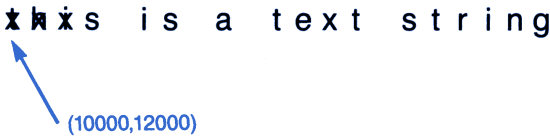
# START OF TEXT

Format: **/ST/**

To move the CP to the start of the previous text string, use this command.

Example:

```
ZI
Z01
R
LT1
CZ500,500
A10000,12000
'this is a text string'
/ST/
CZ383,383
'XXX'
ZT
```



## TRANSLATE COLOR INDEX

Format: `/TCox1,nx1[ox2nx2...,oxnnxn]/`

Use this command to translate an old Line Color Index into a new value. This interprets the old index `ox1` as the new index `nx1` for all subsequent Line Color Index values. You can translate as many Line Color Indexes as you want by specifying the pair of values (up to `oxnnxn`, where `n` is the maximum number of colors allowed).

Example:

```
ZI
Z01
R
PI0
LL1
A12000,12000
D10000,0
B-10000,-1000
/TC1,2/
LL1
D10000,0
ZT
```



## UNDERLINE TEXT


Format: **/UL/**

This command underlines the last text string, using the color specified as the Line Color Index. (The primitive graphics command CT2 may be necessary for this to work correctly.)

Example:

```
ZI
Z01
R
LT1
LL1
CZ500,500
A2000,12000
'Underline this string'
/UL/
ZT
```

Underline this string



(2000,12000)



## C. Primitive Graphics Code

---

Use this appendix to look up the format for primitive graphics code commands. You should already be familiar with the GS (Graphic Scaler) function explained in Section 5.

This appendix contains:

- ☐ Introduction
- ☐ Notation Used
- ☐ Quick Reference by Name
- ☐ Quick Reference by Format
- ☐ Quick Reference by Category
- ☐ Description of Commands

# Introduction

---

The Graphics Standards Planning Committee of SIGGRAPH-ACM has proposed a graphics standard which has become known as the "Core System." This system provides a common interface between graphics application software and graphics display/input devices. With this system, the applications package does not have to use a different protocol for each specific graphic device.

## DEVELOPMENT

The Core System was designed for graphics in the general or business environment. Since a protocol could not be defined to suit all purposes, Core/GKS compatibility was chosen for use with MAPPER color graphics. As used for MAPPER color graphics, this system is called "primitive graphics code."

Primitive graphics code is device-independent, representing a base-level user interface to a graphics device (a display or plotter).

One of the objectives of primitive graphics code is to encourage nonprogrammers to generate their own custom graphs. After experimentation, three main points emerged during development:

1. Commands that permit relative moves (such as `MOVE_REL` and `POLYGON_REL`) greatly reduce the complexity of creating custom graphs.
2. The extension commands of `RECTANGLE`, `ARC`, `SECTOR`, `CIRCLE`, and fixed fill patterns also greatly reduce complexity.
3. Commands for `LINE` and `MARKER` functions are not needed. Instead, `POLYLINE` or `POLYMARKER` commands of dimension 1 can be used.

## COMMUNICATIONS

Under the current communications protocol (standard U200 message format), the character stream may be routed either to an alpha processor or to a graphics processor. All characters following an <ESC> Z a sequence are sent to the graphics processor until either an <ETX> or <ESC> Z b sequence is received. The graphics processor interprets all primitive graphics code after it receives an INITIALIZE\_GRAPHICS command, and ignores any after a TERMINATE\_GRAPHICS command.

## RESTRICTIONS

Primitive graphics code was implemented to standardize generation of graphic images. There are limitations depending on the microcode level for the terminal, however. Each graphics device has microcode (either software or firmware) that translates the primitive graphics code into device-specific graphics commands.

Due to different devices, not all commands are handled exactly the same. However, there are few discrepancies and where they exist, they are noted with the description of the specific command.

# Notation Used

---

This appendix uses certain symbols to represent graphic values.

## SYMBOL    DEFINITION

|                |                                                                                                                                                                                                                                                                                                                  |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A to Z         | Capital letters are used for the primitive graphics code commands. Use uppercase letters for these commands—lowercase letters are reserved for future use.                                                                                                                                                       |
| ( <i>x,y</i> ) | A point specified by <i>x</i> and <i>y</i> values in an x-y coordinate system, where the origin (0,0) is at the lower left corner of the display or plotting surface. The <i>x</i> and <i>y</i> values are integers between -32767 and 32767 (or less, depending on the aspect ratio of the display or plotter). |
| <i>r</i>       | The radius of an arc, circle, or sector. This value can be either a floating-point number or an integer between 0 and 32767.                                                                                                                                                                                     |
| <i>sa, ea</i>  | The starting angle and ending angle of an arc or sector. In the range of 0 to 360.0, these may have any number of leading 0's or spaces and are delimited by a comma or new command. These values are floating-point numbers.                                                                                    |
| [ ]            | Surround a part of the command that is optional. If you choose the option, do not type the brackets, just the command inside.                                                                                                                                                                                    |
| CP             | The abbreviation for "current position." When the CP coordinates are described, capital letters X and Y are used. The current position is therefore labeled CP(X,Y) where used in the definitions of the commands.                                                                                               |

# Quick Reference by Name

---

| NAME                   | FORMAT                                  |
|------------------------|-----------------------------------------|
| ACTIVATE_WORKSTATION   | ZA $x$                                  |
| ARC                    | Mr,sa,ea                                |
| BACKGROUND_COLOR_INDEX | LB $x$                                  |
| CIRCLE                 | Or                                      |
| CLOSE_WORKSTATION      | ZC $x$                                  |
| DEACTIVATE_WORKSTATION | ZD $x$                                  |
| FILL_COLOR_INDEX       | LF $x$                                  |
| INITIALIZE_GRAPHICS    | ZL $x$                                  |
| LINE_COLOR_INDEX       | LL $x$                                  |
| MOVE_ABS               | A $x,y$                                 |
| MOVE_REL               | B $x,y$                                 |
| OPEN_WORKSTATION       | ZO $x$                                  |
| PAPER_SIZE             | R                                       |
| PEN_SPEED              | Q                                       |
| POLYGON_ABS            | G $x_p,y_1$ [ $x_2,y_2,\dots,x_n,y_n$ ] |
| POLYGON_REL            | H $x_p,y_1$ [ $x_2,y_2,\dots,x_n,y_n$ ] |
| POLYLINE_ABS           | C $x_p,y_1$ [ $x_2,y_2,\dots,x_n,y_n$ ] |
| POLYLINE_REL           | D $x_p,y_1$ [ $x_2,y_2,\dots,x_n,y_n$ ] |
| POLYMARKER_ABS         | E $x_p,y_1$ [ $x_2,y_2,\dots,x_n,y_n$ ] |
| POLYMARKER_REL         | F $x_p,y_1$ [ $x_2,y_2,\dots,x_n,y_n$ ] |
| RECTANGLE_ABS          | L $x,y$                                 |
| RECTANGLE_REL          | J $x,y$                                 |
| REDRAW_ALL_SEGMENTS    | ZN $x$                                  |
| SECTOR                 | Kr,sa,ea                                |
| SET_DEFERRAL_STATE     | ZS $x$                                  |
| SET_CHARJUST           | CJ $x,y$                                |
| SET_CHARPATH           | CP $x$                                  |
| SET_CHARSIZE           | CZ $x,y$                                |
| SET_CHARSPACE          | CS $x$                                  |
| SET_CHARTYPE           | CT $x$                                  |
| SET_FILL_AREA_INTERIOR | PL $x$                                  |
| SET_FILL_AREA_STYLE    | PH $x$                                  |
| SET_FONT               | CF $x$                                  |
| SET_LINE_STYLE         | LS $x$                                  |
| SET_MARKER_COLOR_INDEX | SL $x$                                  |
| SET_MARKER_TYPE        | S $x$                                   |
| SET_POLYGON_EDGE_STYLE | PE $x$                                  |
| SET_VIEWPORT           | VV $x1,x2,y1,y2$                        |
| TERMINATE_GRAPHICS     | ZT                                      |
| TEXT_COLOR_INDEX       | LT $x$                                  |

# Quick Reference by Format

---

## FORMAT

## NAME

|                                                                                                       |                        |
|-------------------------------------------------------------------------------------------------------|------------------------|
| Ax,y                                                                                                  | MOVE_ABS               |
| Bx,y                                                                                                  | MOVE_REL               |
| Cx <sub>p</sub> ,y <sub>1</sub> [,x <sub>2</sub> ,y <sub>2</sub> ...,x <sub>n</sub> ,y <sub>n</sub> ] | POLYLINE_ABS           |
| CFx                                                                                                   | SET_FONT               |
| CJx,y                                                                                                 | SET_CHARJUST           |
| CPx                                                                                                   | SET_CHARPATH           |
| CSx                                                                                                   | SET_CHARSPACE          |
| CTx                                                                                                   | SET_CHARTYPE           |
| CZx,y                                                                                                 | SET_CHARSIZE           |
| Dx <sub>p</sub> ,y <sub>1</sub> [,x <sub>2</sub> ,y <sub>2</sub> ...,x <sub>n</sub> ,y <sub>n</sub> ] | POLYLINE_REL           |
| Ex <sub>p</sub> ,y <sub>1</sub> [,x <sub>2</sub> ,y <sub>2</sub> ...,x <sub>n</sub> ,y <sub>n</sub> ] | POLYMARKER_ABS         |
| Fx <sub>p</sub> ,y <sub>1</sub> [,x <sub>2</sub> ,y <sub>2</sub> ...,x <sub>n</sub> ,y <sub>n</sub> ] | POLYMARKER_REL         |
| Gx <sub>p</sub> ,y <sub>1</sub> [,x <sub>2</sub> ,y <sub>2</sub> ...,x <sub>n</sub> ,y <sub>n</sub> ] | POLYGON_ABS            |
| Hx <sub>p</sub> ,y <sub>1</sub> [,x <sub>2</sub> ,y <sub>2</sub> ...,x <sub>n</sub> ,y <sub>n</sub> ] | POLYGON_REL            |
| Lx,y                                                                                                  | RECTANGLE_ABS          |
| Jx,y                                                                                                  | RECTANGLE_REL          |
| Kr,sa,ea                                                                                              | SECTOR                 |
| LBx                                                                                                   | BACKGROUND_COLOR_INDEX |
| LFx                                                                                                   | FILL_COLOR_INDEX       |
| LLx                                                                                                   | LINE_COLOR_INDEX       |
| LSx                                                                                                   | SET_LINE_STYLE         |
| LTx                                                                                                   | TEXT_COLOR_INDEX       |
| Mr,sa,ea                                                                                              | ARC                    |
| Or                                                                                                    | CIRCLE                 |
| PEx                                                                                                   | SET_POLYGON_EDGE_STYLE |
| PHx                                                                                                   | SET_FILL_AREA_STYLE    |
| PLx                                                                                                   | SET_FILL_AREA_INTERIOR |
| Q                                                                                                     | PEN_SPEED              |
| R                                                                                                     | PAPER_SIZE             |
| Sx                                                                                                    | SET_MARKER_TYPE        |
| SLx                                                                                                   | SET_MARKER_COLOR_INDEX |
| VVx1,x2,y1,y2                                                                                         | SET_VIEWPORT           |
| ZAx                                                                                                   | ACTIVATE_WORKSTATION   |
| ZCx                                                                                                   | CLOSE_WORKSTATION      |
| ZDx                                                                                                   | DEACTIVATE_WORKSTATION |
| ZLx                                                                                                   | INITIALIZE_GRAPHICS    |
| ZNx                                                                                                   | REDRAW_ALL_SEGMENTS    |
| ZOx                                                                                                   | OPEN_WORKSTATION       |
| ZSx                                                                                                   | SET_DEFERRAL STATE     |
| ZT                                                                                                    | TERMINATE_GRAPHICS     |

# Quick Reference by Category

---

If you don't know what command to use but understand the general type of operation you want, refer to this list. It categorizes the primitive graphics code commands and provides the name to simplify finding the full description in "Commands" later in this appendix.

## Control Functions

ACTIVATE\_WORKSTATION  
CLOSE\_WORKSTATION  
DEACTIVATE\_WORKSTATION  
INITIALIZE\_GRAPHICS  
OPEN\_WORKSTATION  
PAPER\_SIZE  
PEN\_SPEED  
REDRAW\_ALL\_SEGMENTS  
SET\_DEFERRAL\_STATE  
TERMINATE\_GRAPHICS

## Output Functions

ARC  
CIRCLE  
MOVE\_ABS  
MOVE\_REL  
POLYLINE\_ABS  
POLYLINE\_REL  
POLYMARKER\_ABS  
POLYMARKER\_REL  
POLYGON\_ABS  
POLYGON\_REL  
RECTANGLE\_ABS  
RECTANGLE\_REL  
SECTOR

## Line Attributes

LINE\_COLOR\_INDEX  
SET\_LINE\_STYLE

### Character Attributes

- SET\_FONT
- SET\_CHARJUST
- SET\_CHARPATH
- SET\_CHARSPACE
- SET\_CHARSIZE
- SET\_CHARTYPE
- TEXT\_COLOR\_INDEX

### Polygon Attributes

- BACKGROUND\_COLOR\_INDEX
- FILL\_COLOR\_INDEX
- SET\_FILL\_AREA\_INTERIOR
- SET\_FILL\_AREA\_STYLE
- SET\_POLYGON\_EDGE\_STYLE

### Marker Attributes

- SET\_MARKER\_COLOR\_INDEX
- SET\_MARKER\_TYPE

### View Operations

- SET\_VIEWPORT



# Description of Commands

---

These commands for primitive graphics code are in alphabetical order by command name. Use the tables earlier in this appendix for a quick reference of these commands.

## ACTIVATE\_WORKSTATION

Format: **ZA $x$**

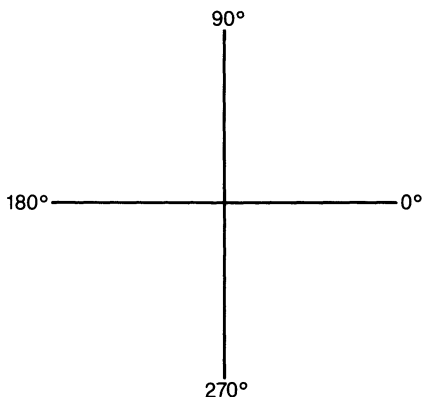
Select view surface  $x$  to receive all subsequent commands until deselected with DEACTIVATE\_WORKSTATION. On devices that have control of separate graphics and alpha display screens, this also enables the graphics display.

## ARC

Format: **Mr,sa,ea**

Draw an arc of radius  $r$  centered at CP(X,Y), starting at angle  $sa$  and ending at angle  $ea$ .

All draws are in a counter-clockwise direction. The angles are specified according to the following coordinate system:



### *Coordinate System for Primitive Graphics Commands*

If the specified start and end angles are the same, a single dot is drawn at a distance *r* from CP(X,Y).

## **BACKGROUND\_COLOR\_INDEX**

Format: **LB*x***

Sets the background index to *x*. All subsequent polygon fills using hatch patterns with a prior erase to background color will be filled with the color specified by this index. Refer to the Color Index Table in Section 1 for values.

- NOTES:**
1. The ISC model G terminal ignores this command as well as the REDRAW\_ALL\_SEGMENTS command.
  2. The UTS 60 terminal uses this command only in conjunction with the REDRAW\_ALL\_SEGMENTS command.

## CIRCLE

Format: **Or**

Draw a circle of radius **r** centered about CP(X,Y). The circle is considered a polygon and is therefore affected by all polygon attribute commands. CP(X,Y) remains unchanged. (Refer to ARC for information on draw direction and angle specification.)

## CLOSE\_\_WORKSTATION

Format: **ZCx**

Terminate all activity for view surface **x** where **x** is a surface number from 1 to 32767. This releases all retained segments and other tables associated with surface **x**. The surface may or may not be cleared—it is recommended that you do not clear it.

## DEACTIVATE\_\_WORKSTATION

Format: **ZDx**

Deselects view surface **x**. The surface does not receive any more graphics commands. The graphics image on display is not destroyed.

## FILL\_\_COLOR\_\_INDEX

Format: **LFx**

Sets the fill color index to **x**. All subsequent polygon fills using hatch patterns are filled with **x** as the foreground color. Refer to the Color Index Table in Section 1 for values.

## INITIALIZE\_\_GRAPHICS

Format: **ZIx**

Initialize graphics routines, where **x** is a positive integer referring to the revision level of the graphics code (blank or 0 is the base level). This command initializes all tables and values within the controlling device. It does not initialize a given display surface or its associated parameters. All retained segments are discarded and all devices are considered to be not initialized and not selected.

If a device was selected when ZI occurred, a deselect does not occur. The device is assumed to be deselected.

## LINE\_\_COLOR\_\_INDEX

Format: **LLx**

Sets the line color index to **x**. All subsequent lines are drawn with the color specified by this index. Refer to the Color Index Table in Section 1 for values.

## MOVE\_\_ABS

Format: **Ax,y**

Move the CP(X,Y) to location (**x,y**).

## MOVE\_REL

Format: **Bx,y**

Move the CP(X,Y) to location (**x** + X, **y** + Y). This adds the values **x** and **y** to the corresponding X and Y values for the new coordinates of the CP.

Example: B4,6 with CP(1,1)

Sets the CP to (5,7).

## OPEN\_WORKSTATION

Format: **ZOx**

Initialize view surface **x** where **x** is a surface number from 1 to 32767. Surface number 1 is assigned to the primary view surface of the graphics processor. This command initializes all tables and values associated with surface **x**. The image on display before the command is received is erased. If a plotter with a paper-advance feature is being used, a new sheet of paper is advanced.

## PAPER\_SIZE

Format: **R**

If this command is included after initialization is complete, the paper size is set to 8-1/2" by 11". If this command is not included, the paper size defaults to 11" by 17".

## PEN\_\_SPEED

Format: **Q**

If this command is included after initialization is complete, the plotter's pen speed is reduced to slow. If this command is not included, the pen speed is normal.

## POLYGON\_\_ABS

Format: **G** $x_p, y_1[, x_2, y_2, \dots, x_n, y_n]$

Draw a polygon bounded by a sequence of lines drawn from the CP(X,Y) to all vertices in the list, in order, and return to the original CP(X,Y), which does not change. The polygon edge style is determined by the SET\_POLYGON\_EDGE\_STYLE command and the polygon interior is filled with the style indicated by the SET\_FILL\_AREA\_INTERIOR command.

## POLYGON\_\_REL

Format: **H** $x_p, y_1[, x_2, y_2, \dots, x_n, y_n]$

Draw a polygon bounded by a sequence of lines drawn from the CP(X,Y) to all vertices in the list, in order, and return to the original CP(X,Y), which does not change. The first vertex is relative to CP(X,Y), and each subsequent vertex is relative to the previous vertex. The polygon edge style is determined by the SET\_POLYGON\_EDGE\_STYLE command, and the polygon interior is filled with the style indicated by the SET\_FILL\_AREA\_INTERIOR command.

## POLYLINE\_ABS

Format:  $Cx_1y_1[x_2y_2,...,x_ny_n]$

Draw a line from the CP(X,Y) to location  $(x_1,y_1)$ . Continue drawing the line to each new  $x,y$  point specified in the command from the previous point until a new command is encountered. CP is reset to the last line end point  $(x_n,y_n)$  encountered.

Example: C1,1,2,3,2,4 with CP(0,0)

The line is drawn from (0,0) to (1,1), then to (2,3), and ends at (2,4).

## POLYLINE\_REL

Format:  $Dx_1y_1[x_2y_2,...,x_ny_n]$

Draw a line from the CP(X,Y) to the location  $(x_1 + X, y_1 + Y)$ . Set the CP to this new location and repeat the line draw from this new CP to the next relative point specified  $(x_2 + X, y_2 + Y)$  until the last end point  $(x_n + X, y_n + Y)$  is encountered.

Example: D1,1,2,3,2,4 with CP(5,5)

The absolute points that the line draws to would be:

| CP(X,Y) | $(x,y)$ | location |
|---------|---------|----------|
| (5,5)   | (1,1)   | (6,6)    |
| (6,6)   | (2,3)   | (8,9)    |
| (8,9)   | (2,4)   | (10,13)  |

For this example, the line is drawn from (5,5) to (6,6), then to (8,9), and ends at (10,13).

# POLYMARKER\_ABS

Format:  $E_{x_1,y_1}[x_2,y_2,...,x_n,y_n]$

Draw the current marker (see SET\_MARKER\_TYPE) at location  $(x_1,y_1)$ . This repeats for all  $(x,y)$  points until the last location  $(x_n,y_n)$  is encountered. The CP(X,Y) is set to the last point.

# POLYMARKER\_REL

Format:  $F_{x_1,y_1}[x_2,y_2,...,x_n,y_n]$

Move the CP(X,Y) and draw the current marker (see SET\_MARKER\_TYPE) at location  $(x_1 + X,y_1 + Y)$ . Set the CP(X,Y) to this new point and repeat the marker draw at the next relative point specified  $(x_2 + X,y_2 + Y)$ , until the last end point  $(x_n + X,y_n + Y)$  is encountered.

Example: F2,3,2,4,3,4 with CP(1,1)

The absolute points for the markers are:

| CP(X,Y) | $(x,y)$ | location |
|---------|---------|----------|
| (1,1)   | (2,3)   | (3,4)    |
| (3,4)   | (2,4)   | (5,8)    |
| (5,8)   | (3,4)   | (8,12)   |

For this example, the markers are drawn at (3,4), then at (5,8) and last at (8,12). A marker is not drawn at the original CP(1,1).



## RECTANGLE\_ABS

Format: **L***x,y*

Draw a rectangle that has as its diagonal vertices CP(X,Y) and the (*x,y*) coordinate specified in the command. The boundary lines of the rectangle will be parallel to the current x-axis or y-axis. The original CP(X,Y) remains unchanged.

## RECTANGLE\_REL

Format: **J***x,y*

Draw a rectangle that has as its diagonal vertices the CP(X,Y) and a point at (*x* + X, *y* + Y). The boundary lines of the rectangle will be parallel to the current x-axis or y-axis. The original CP(X,Y) remains unchanged.

## REDRAW\_ALL\_SEGMENTS

Format: **ZN***x*

Clears the display surface of workstation *x* to the background color and redraws all retained segments associated with the selected surfaces.

- NOTES:**
1. For Hewlett-Packard pen plotters that have a paper-advance feature, this command advances a new sheet. It does not clear the display surface or redraw segments.
  2. ISC model G terminals ignore this command.

## SECTOR

Format: **Kr,sa,ea**

Draw a sector of radius **r** with a center point at CP(X,Y), starting at angle **sa** and ending at angle **ea**. CP(X,Y) remains unchanged.

A sector looks like a slice of pie. It is a polygon with one side bounded by an arc drawn from the start angle **sa** to the end angle **ea**. The other two sides are bounded by two radial lines, one drawn from the center point to the start of the arc, the other drawn from the end of the arc to the center point. The sector is considered a polygon and is therefore affected by all polygon attribute commands.

Refer to ARC for information on draw direction and angle specification.

If the specified start and end angles are the same, a single line of length **r** is drawn from CP(X,Y).

## SET\_\_CHARJUST

Format: **CJx,y**

Sets the current character string justification mode. Justification is specified in both the horizontal **x** and the vertical **y** directions. The allowable values of **x** and **y** are shown in the following tables:

| <i>x</i> -VALUE | JUSTIFICATION |
|-----------------|---------------|
| 0               | left          |
| 1               | right         |
| 2               | center        |
| 3               | off           |

| <i>y</i> -VALUE | JUSTIFICATION |
|-----------------|---------------|
| 0               | top           |
| 1               | bottom        |
| 2               | center        |
| 3               | off           |

## SET\_CHARPATH

Format: **CP***x*

Sets the direction in which a text string is placed on the display surface. The allowable values of *x* are shown in the following table:

| <i>x</i> -VALUE | DIRECTION | EXAMPLE          |
|-----------------|-----------|------------------|
| 0               | right     | RIGHT            |
| 1               | left      | TFEL             |
| 2               | up        | P<br>U           |
| 3               | down      | D<br>O<br>W<br>N |

# SET\_\_CHARSIZE

Format: CZx,y

Sets the character size, where *x* and *y* are in the range 0 to 32767. The *x* value specifies the width of the character box and the *y* value specifies the height of the character box. The placement of the character within the character box is specified by the font selected.

**NOTE:** This command is honored only by the Hewlett-Packard plotters. Other devices do not interpret this command.

# SET\_\_CHARSPACE

Format: CSx

Sets more or less character spacing between the character boxes defined by the SET\_\_CHARSIZE command. The spacing value *x* is a floating-point real number, negative or positive, in world coordinates.

**NOTE:** For the UTS 60 terminal, this command is interpreted as CSx,y where *y* is the vertical height between boxes and equals the value set for *x*.

# SET\_\_CHARTYPE

Format: CTx

Sets the character type, or precision, that is used by all following string commands. The values of *x* are shown in the following table:

| x -VALUE | PRECISION        |
|----------|------------------|
| 0        | string (default) |
| 1        | character        |
| 2        | stroke           |

# SET\_DEFERRAL\_STATE

Format: **ZSx**

Sets the deferral state to value **x** as shown in the following table:

| <b>x -VALUE</b> | <b>STATE</b>                    |
|-----------------|---------------------------------|
| 0               | ASAP (As Soon As Possible)      |
| 1               | BNIG (Before Next Input Global) |
| 2               | BNIL (Before Next Input Local)  |
| 3               | ASTI (At Some Time)             |

# SET\_FILL\_AREA\_INTERIOR

Format: **Plx**

Sets the polygon interior index to **x**. Subsequent polygons are filled according to the description listed in the following table. The default interior is 1 (solid fill).

| <b>x -VALUE</b> | <b>FILL INTERIOR</b>                                                          |
|-----------------|-------------------------------------------------------------------------------|
| 0               | hollow (no fill)                                                              |
| 1               | plain (solid fill)                                                            |
| 4               | hatch (fill according to current hatch style)                                 |
| 5               | hatch with current hatch style after solid fill with current background color |
| 6               | transparent (overlay of color planes on raster devices)                       |

- NOTES:**
1. Index values 2 and 3 are not implemented but reserved for use with pixel array shading or color.
  2. The UTS 60 terminal honors only index values 0 (no fill) and 1 (solid fill).

## SET\_\_FILL\_\_AREA\_\_STYLE

Format: **PH***x*

Sets the fill area style index to *x*. For a hatch interior style, this is the hatch index. For a pattern interior style, this is the index of the pattern table.

## SET\_\_FONT

Format: **CF***x*

Sets the current character font to *x* where *x* is in the range of 1 to 32767. Only font 1 is defined as the domestic, or hardware generated, font. Fonts 2 through 20 are reserved for future standard definition by this specification.

**NOTE:** Hewlett-Packard plotters honor fonts specified between 1 and 5 since they are hardware-generated fonts. Other devices can use only font 1.

## SET\_\_LINE\_\_STYLE

Format: **LS***x*

Sets the linestyle to *x*. Refer to the Line Style Table in Section 1 for various styles.

## SET\_\_MARKER\_\_COLOR\_\_INDEX

Format: **SL***x*

Set marker color to *x*. Refer to the Color Index Table in Section 1 for values.

## SET\_\_MARKER\_\_TYPE

Format: **S***x*

Set current marker symbol to *x*. Refer to the Marker Symbol Table in Section 1 for values.

## SET\_\_POLYGON\_\_EDGE\_\_STYLE

Format: **PE***x*

Sets the polygon edge style index to *x*. This selects the type of edge to be drawn for all subsequent polygons. The default edge style is 2.

| <i>x</i> -VALUE | EDGE STYLE                           |
|-----------------|--------------------------------------|
| 1               | same as the polygon interior         |
| 2               | solid edge in the current line color |

**NOTE:** The UTS 60 terminal ignores this command and always draws an edge.

## SET\_\_VIEWPORT

Format: **VV***x1,x2,y1,y2*

The command defines the extent, in normalized device coordinate space, of the current viewport. The viewport's sides are vertical and the top and bottom are horizontal. The default value is the entire view surface.

## **TERMINATE\_GRAPHICS**

Format: **ZT**

Terminate graphics activity. This command terminates the interpretation of the primitive graphics code. No action is taken on any additional characters received by the graphics processor until an additional INITIALIZE\_GRAPHICS command is received. This command informs the graphics processor to release all retained segments and to take any ending action deemed necessary for the orderly termination of graphics interpretation.

## **TEXT\_COLOR\_INDEX**

Format: **LT<sub>x</sub>**

Sets the text color index to **<sub>x</sub>**. All subsequent text is output with the color specified by this index. Refer to the Color Index Table in Section 1 for default values.



## A

### **asterisk line**

Line beginning with an asterisk (\*) in column 1. Asterisk lines are useful as comment lines. They are not controlled by the tab positions and edit codes of RID 0. They can be shifted and can extend to 132 characters in length. Asterisk lines can be displayed and processed in different formats.

## B

### **bar chart**

A chart with horizontal or vertical bars, used for comparing changing values over time. A stacked bar chart shows subtotals that make up a total value.

### **basic format**

The leftmost 80 characters of a report.

## C

### **call**

The abbreviation you use to request a function or run.

### **character set**

The characters allowed in a form type. *See also* FCS, LCS, *and* FCSU.

### **character string**

A series or group of connected characters.

**column**

Character position in a report; for example, the first character position on the left side of a report is column 1.

**completed input report**

A report containing the options and parameters (data) for the specific chart being made. Same as completed preformatted input report. *See also* preformatted input report.

**control line**

The top line of the screen with control positions for vertical line and horizontal positioning.

**control position**

Cursor position after the SOE on the control line. From the control position, you can make other parts of a report visible on your screen.

**coordinator**

*See* MAPPER system coordinator.

**cumulation**

Using Totalize to repeatedly add a quantity to a total and save the new total in another field.

**cursor**

The character (⏏) that shows your current location on the screen. The cursor can be moved anywhere to enter data.

## D

**data base**

The information files stored in the MAPPER system that form the basis of reports.

**date format**

A format that defines how a date will be displayed in a report; for example, *DD MMM YY* displays the date for this New Year's Day as 01 JAN 87.

**date line**

Line 1 of each report, showing the date and time of the last update, report number, report creation date, and user-id of the last person to update the report.

**default**

A preset value or condition that the system uses whenever you do not choose a specific selection.

**delimiters**

Characters placed on each side of a character string to set boundaries on what is to be found and changed; can be any character other than those in the target string.

**demonstration data base**

The practice reports stored under the JDOE user-id. You can practice manual functions and run statements with these reports, which are located in mode 0.

**display**

The terminal screen you look at while using MAPPER software. Also, to present data on the screen.

## **E**

**enter**

To transmit typed input from the terminal to the computer.

**error message**

A message the system displays on the top line of the screen, either warning you of a possible problem or telling you something is wrong.

**execute**

To perform a process to accomplish a particular instruction or task; you execute a manual function or execute a run.

**expanded syntax**

A set of graphics commands processed by the GS (Graphics Scaler) function to create charts or modify existing charts. The GS function translates the expanded syntax commands (stored in a free-form report) into primitive graphics code, which can be displayed or plotted. *See also* primitive graphics code.

## **F**

**fast access**

A form of function request that lets you bypass the function request message.

**FCS**

Full Character Set, ASCII.

**FCSU**

Full Character Set Upper, ASCII codes in uppercase only.

**field headers**

Titles for fields. These titles appear above each field at the beginning of a report, immediately preceding the header-divider line.

**form type**

A group of reports in a mode. All reports within a form type have the same headers and line length. Each form type of a mode is identified by a letter from B to I. Type A is accessible to all modes in a MAPPER system. Each form type in the MAPPER system is also identified by a unique octal number, called the form type number.

**form type number**

The octal number that identifies the type and mode within the system. Each type has a unique number, such as 0010 for type E in mode 0.

**format**

The specific variation of the form within a form type (for example, basic format, format 1, format 2, and so on), each of which displays preselected fields of data.

**free-form report**

A report without a columnar structure determined by the RID 0 of its type. Free-form reports can be used for memos, bulletins, or ad-hoc columnar reports.

**free-form type**

A form type used for free-form reports. Type A is a free-form type that can be accessed by all modes in the system.

**function**

An operation performed on a report or result, such as matching, searching, or sorting.

**function call**

The abbreviation that you use to request a function. *See also* manual function call.

**function keys**

Several keys on your terminal keyboard (for example, **F1** or **F2**) specially programmed to perform a MAPPER function.

**function mask**

A screen of report headers below which you enter items or other characters as instructions for a manual function.

**function request message**

A MAPPER system message that solicits information needed to perform a manual function.

# H

## **header-divider line**

The line of equal signs and periods that separates the headers from the data; counted as one of the header lines. Many functions rely on the header-divider line to determine where the headers end and the data begins.

## **header lines**

Lines under the date line that show the form type letter and report number, names of fields, and the header-divider line.

## **headers**

*See* field headers.

## **home position**

The upper left corner of the screen.

# I

## **index list report**

A report created by the DISPLAY run to index, or list, the charts you have created. The index list report can also be used with the DISPLAY run to present the charts sequentially.

# J

## **justify**

To position data within a field or variable. For example, left-justified means the data in a field begins in the leftmost column of that field.

# L

## LCS

Limited Character Set, also called fieldata.

## line chart

A chart that uses lines to connect points in an x-y coordinate plane. Useful for representing changing values over time or the relationship between two factors.

## line type

One of the four kinds of lines in the MAPPER system data base. Line type designators in column 1 specify the line type:

Tab (□): column-formed edited (□ represents an invisible tab character)

Asterisk (\*): column-formed nonedited.

Period (.): comment, nonedited.

Nontab (any valid character): column-formed edited (cannot start with a tab character, asterisk, or period).

## line type designator

A character used in column 1 of a report line to specify one of four line types.

## line 0

The first line of a report, never visible on the screen, containing system information about the report: the alphabetic form type, report number, write password, number of header lines, and the number of lines. This information is stored with the report and can be captured using the LZR run statement or displayed with the manual function Line Zero (LZ).

**line 1**

The first line displayed in a report (line 0 is not counted). *See* date line.

# M

**manual function call**

The abbreviation used to request a manual function (for example, TOT for Totalize).

**MAPPER system coordinator**

The person who manages the data base of the MAPPER system. This person configures the system, registers new users and new or updated runs, and coordinates the system user group.

**menu**

A list of items on a screen from which one item can be selected, either by tabbing to the selection and transmitting; or by typing in a letter, number, or character string, and then transmitting.

**mixed bar and line chart**

A chart that combines the bar chart and the line chart. *See also* bar chart *and* line chart.

**mode**

A group of eight form types (B through I). Each user signs on into a specific mode assigned by the coordinator. Users in a particular department may have one or more modes to work in.



# N

## **nontab line**

Line starting with any character except tab, asterisk, or period. Nontab lines act like tab lines except that no tab character is in column 1; they usually have an alphabetic or numeric character in column 1. Nontab lines can be manipulated separately from tab lines by keying off the left-most position.

# O

## **on-line**

Pertaining to the ability to work while the MAPPER system is active.

## **option**

Selection that you can make for special operation of a manual function or run statement. If no option is used, the default operation occurs.

## **option field**

The leftmost position of the second line of a function mask where options conditioning the function are entered.

# P

## **packed primitive graphics code**

The format of primitive graphics code stored in a MAPPER result or report. In this format, the commands are strung together, not separated by spaces or other characters. *See also* primitive graphics code *and* unpacked primitive graphics code.

## **parameter**

Identifies a value in a field below the header-divider line of the function mask.

**pareto chart**

This chart, like a mixed bar and line chart, combines a bar chart and a line chart. With this chart, the data points for the line are summed from the data points for the bar. This chart is useful for showing the cumulative effect of the data represented by a bar chart.

**period line**

Line beginning with a period in column 1. Period lines can be used as comment lines following data lines. They cannot be shifted and are limited to 80 characters in length. They cannot be displayed or processed in different formats. They are not controlled by the tab positions and edit codes of report 0, so they can be used for comments.

**pie chart**

A chart composed of a circle cut into segments representing different data values. Useful for representing parts of a whole, such as percentages.

**preformatted input report**

A report that is prepared by a specific color graphics run, such as PIEG, to accept data to be graphed. You fill in the options for the chart and the parameters (data) to make the completed input report. You can then display the chart from the completed input report.

**primitive graphics code**

A set of commands used to standardize graphics operations. The MAPPER system generates primitive graphics code for the charts and plots. The specific output device (display or plotter) translates the primitive graphics code into device-specific graphics commands. Primitive graphics code can be stored in MAPPER reports.

# R

## **radar chart**

A chart that uses rays to represent the data scale and draws lines counterclockwise through data points plotted on the rays. Each set of data can use a different line color or type. This chart is useful for comparing cyclical relationships in data.

## **report**

A set of data identified by a unique report number (for example, report 2). The report number does not identify which form type holds the report.

## **report data**

Data arranged in vertical columns, making up fields, usually with headers on top. The data in each line is related.

## **report headers**

*See* field headers.

## **report identifier (RID)**

*See* RID.

## **result**

A temporary copy of data obtained by executing a manual function or run. Held in scratch storage until released, duplicated, or replaced into a permanent report.

## **resume**

To continue with the function or run by pressing **F1** or entering **rsm** on the control line.

## **RID**

A specific report identified by a unique report number and form type letter. For example, "RID 2B" refers to report 2 in type B.

**run**

A series of instructions (run statements) stored in a run control report. The MAPPER system interprets these instructions to produce a report or to perform other tasks, such as updating files.

**run call**

An arbitrary name assigned to a run. Used to access the run and execute it; for example, HELP and FCC.

## S

**scatter chart**

A chart that uses marker points in an x-y coordinate plane to show the relationship between two sets of data.

**SOE**

Start Of Entry; the character that looks like ► on your screen. Used with the SOE Update manual function.

**station**

A place on the system where you work; a terminal.

**station number**

The unique identifier for your terminal on the system.

**station registration**

The process in which the coordinator links each station number to its RID/SID terminal identifier and specifies each connection between the local site and remote sites.

**string**

A series of characters, alphabetic or numeric, that you specify.

# T

## **tab**

To press **TAB FWD** or **TAB BACK** to move the cursor from one tab character position to another.

## **tab line**

A line (usually a data line) that begins with a tab character. Tab lines are controlled by the tab positions and edit codes of RID 0 and can extend up to 132 characters in length.

## **target chart**

A chart that uses a group of concentric circles to represent a range of values that covers the data points to be plotted. The data points are drawn on the chart in the ring corresponding to their value. Useful for comparing values of items.

## **text chart**

A form of chart containing lines of text. Useful for displaying summary ideas and other information for presentations or reports.

## **time line chart**

A form of horizontal bar chart using segments of bars to represent time spans. Markers are used to identify specific time points on the bar segment.

## **type**

*See* form type.

# U

## **unpacked primitive graphics code**

The format of primitive graphics code stored in a MAPPER result or report. In this format, each command is on a separate line. *See also* primitive graphics code *and* unpacked primitive graphics code.