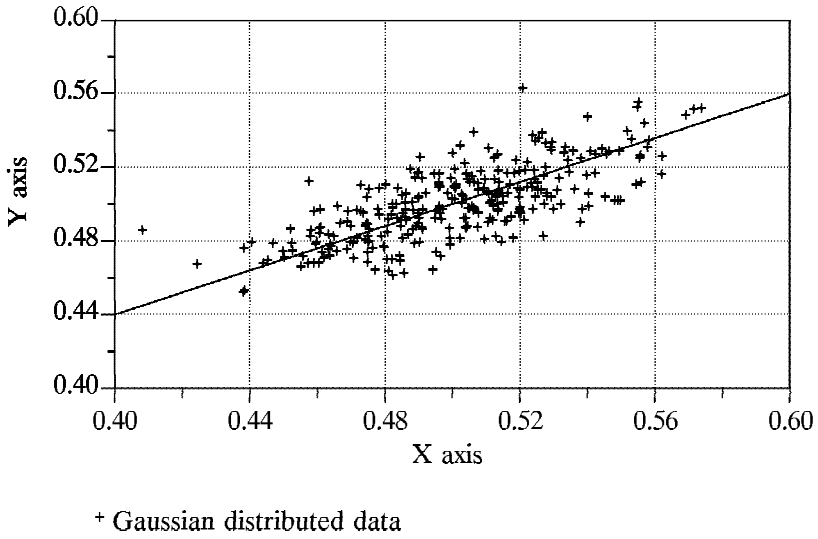

Figure 3.16: Scatter Plot

3.20 Polar Plots

Polar Plots are created using a standard data file (either a normal line data file or a scatter data file) and converting it to polar format using Rect2Pol or Scat2Pol. Figure 3.18 provides a sample polar plot.

3.21 Vector Plots

A vector plot may be produced through the use of Plot_Mat. A complex data file is generated, as described in Section 5.5, converted to the proper format using Plot_Mat, and plotted as a scatter plot. Figure 3.19 provides a sample vector plot.

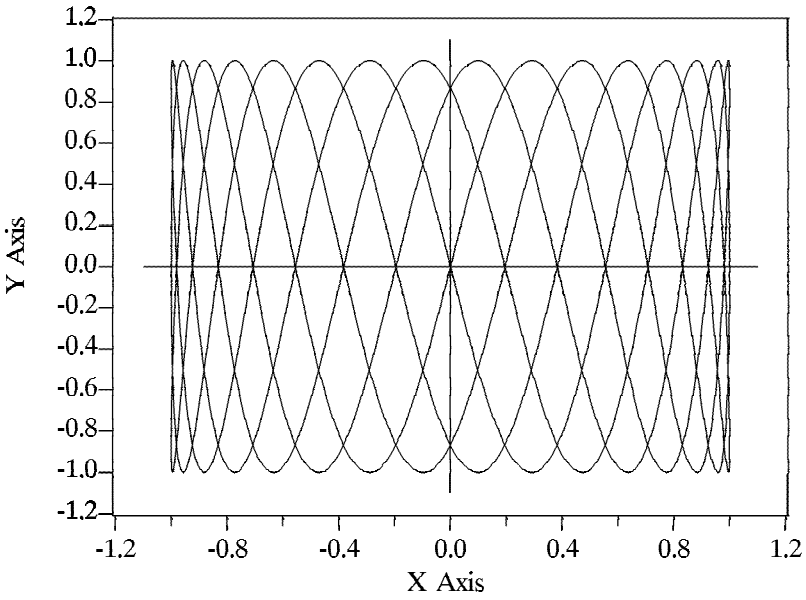

Figure 3.17: X-Y Plot

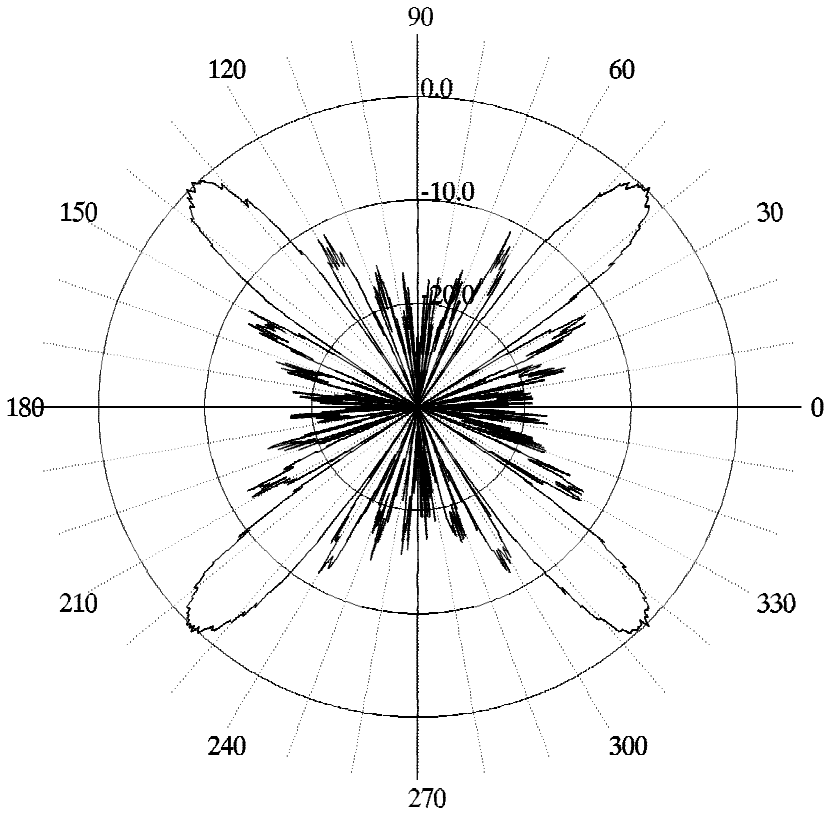

Figure 3.18: Polar Plot

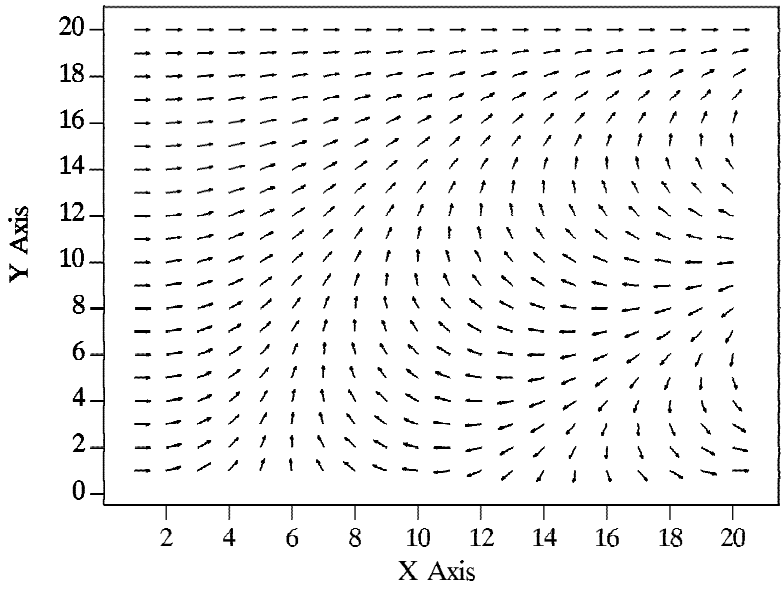

Figure 3.19: Vector Plot

Chapter 4

Header File Contents

This chapter lists the contents of a header file. This information is available by hitting F2 while in Hedit and is reprinted here for convenience. Figure 4.1 shows the first screen seen in Hedit.

4.1 Scatter Plot

If the *Scatter Plot* parameter in the header file is set to *Y* then the data file is interpreted as scatter plot data. In other words, both X and Y values are expected in the data file. If *Scatter Plot* is *N* then the data should be in the form of a 2-D or 3-D plot. For more information see Chapter 5.

4.2 Axis Numbers

Setting this parameter to *N* suppresses the axis numbers on the plot. If set to *Y* then the axes will be numbered as specified by other parameters in the header file. If set to *C*, then the axes will be numbered and centered at 0,0 on the plot, as seen in Figure 3.10.

4.3 Time

If specified, the time will be printed on the plot in the upper right hand corner. Plot labels must be specified for this option to work.

```
Scatter Plot:       N  Hidden Line Removal: N  Plot Labels:        N
Axis Numbers:       N  Box around Plot:     Y  Date:               N
Time:               N  Mark Lines:          N  Grid:               N
Transverse Lines:   N  Dotted Lines:        N  Normalize:          N
X Axis Number type: N  Y Axis Number Type:  N  Z Axis Number Type: N
Convert data to dB: N  Convert X to dB:     N  Error Bars:         N

X Offset:           0
Y Slant:            0
Z Offset:           0
Preset X (horiz.) axis values: N
  Minimum x axis value:                 0
  Maximum x axis value:                 0
Preset Y (vert.) axis values:  N
  Minimum y axis value:                 0
  Maximum y axis value:                 0
Preset Z (3-D) axis values:    N
  Minimum z axis value:                 0
  Maximum z axis value:                 0
10*Log or 20*Log:                      20
Minimum dB Value:                     -30
Accuracy:                              0
```

Figure 4.1: Hedit Main Screen

4.4 Transverse Lines

Transverse lines connect points in adjacent lines of data in a 3-D plot. This gives the plot an appearance of a "wire mesh" stretched across the plotted surface. This is difficult to describe, so you might try using it to observe its effect. The transverse lines parameter has no effect on plots other than 3-D plots. See Section 3.12.

4.5 X, Y, or Z Axis Number Type

Setting *Axis Number Type* to *N* produces normal axis numbers. Setting this parameter to *D* will cause the program to choose axis numbers that are appropriate for a scale in degrees. For example, if an axis goes from 0 to 90 degrees, and this parameter is set to *D* then the axis numbers and tic marks will be placed at 0, 30, 60, and 90, rather than at 0, 25, 50, and 75 as they would be if the angle type is set to *N* (note that the exact placement of the tic marks and numbers will depend on the output device; the above values are examples.) If the parameter is set to *B*, then the axis will be numbered using binary-type numbers (e.g. 1024)

4.6 Convert Data to Decibels

This parameter will cause the data to be converted to a decibel scale. Only the vertical axis will be changed. If this parameter is set to *Y* then two other parameters should be set. The minimum decibel value specifies the lowest value on the dB scale. This is necessary since the dB value for a data value of zero is negative infinity. Any data below the specified minimum dB value will be set to the minimum dB value. The other parameter which must be set is the *10*log or 20*log* parameter. This specifies whether the conversion to decibels is done as 10*log(data) or 20*log(data).

4.7 Hidden Line Removal

This parameter affects only 3-D plots. It causes line segments which are "behind" other segments to not be plotted. This can greatly improve the

appearance of a 3-D plot.

4.8 Box Around Data

This parameter specifies whether or not to plot a box around the data plot. It is generally recommended to specify *Y*. However, in some cases setting this parameter to *N* will save enough bit-map memory to prevent an "out of memory" error which might otherwise occur.

4.9 Mark Lines

This parameter causes the program to put "icons" at each point in the data. A table of icon labels may be printed at the bottom of the plot by setting the *Number of Line Labels* parameter in the header file to a non-zero value. This allows several lines to be placed on one plot with separate labels for each line. If too many points are included in each line, then not all points will be marked with an icon. This prevents the plot from becoming too cluttered.

If the *Dotted Lines* parameter is set to *Y*, then the *Mark Lines* specifier is ignored; that is dotted lines override marked lines.

Note that this parameter is only for 2-D and 3-D plots. Scatter diagrams provide a similar capability, only the option to mark each line with an icon is specified in the data file so that some lines may be marked and others not.

4.10 Dotted Lines

This parameter causes different lines in the plot to use different line types (solid, dotted, dashed, etc.). If *Dotted Lines* is set to *Y*, and and the number of line labels is set to a non-zero value, then a legend will be displayed providing labels for the lines.

4.11 Convert X Data to Decibels

This parameter will cause the data to be converted to a decibel scale. Only the horizontal axis will be changed. If this parameter is set to *Y*, then two

other parameters should be set. The minimum decibel value specifies the lowest value on the dB scale. This is necessary since the dB value for a data value of zero is negative infinity. Any data below the specified minimum dB value will be set to the minimum dB value. The other parameter which must be set is the *10*log or 20*log* parameter. This specifies whether the conversion to decibels is done as 10*log(data) or 20*log(data). This only works on scatter plots.

4.12 Plot Labels

Setting this parameter to *C*, *J*, or *E* causes the labels to be printed on the plot. The labels are specified on the next screen (hit PgDn). The overall plot label is always printed at the top of the plot (unless /BL is used in calling Plot), but the axis labels may be moved or deleted by setting this parameter to:

N for No labels

C for Centering the labels next to the axes

J for Justifying the label towards the end of the axes

E for putting the labels at the End of the line.

C is the standard setting. *E* and *J* are intended for centered axis plots.

4.13 Date

If specified, the date will be printed on the plot in the upper right hand corner. Plot labels must be specified for this option to work.

4.14 Grid

If specified, a grid will be placed on the plot. A grid is a set of horizontal and vertical lines placed at the same points as the axis tic marks. These grid lines allow values to be read from the plot more easily.

4.15 Normalize

If specified, the data will be normalized to a peak value of one. This is useful when the absolute values in the data are not important, but the relative values are. Normalize works only with 2-D or 3-D plots; it has no effect on scatter plots.

4.16 Error Bars

If so specified error bars will be plotted. This feature causes the data file to be interpreted in a significantly different manner than usual. The first line of data is interpreted normally. The second and third lines are interpreted as the minimum and maximum values for the error bars. For scatter plots a similar interpretation is provided. See section 3.13 for more information.

4.17 X Offset

The *X Offset*, *Y Slant*, and *Z Offset* parameters are used to specify the perspective on a 3-D plot. The *X Offset* parameter specifies the degree to which each line is shifted to the right of the previous line.

4.18 Y Slant

The *Y Slant* parameter specifies the degree to which the plot slants from left to right.

4.19 Z Offset

The *Z Offset* parameter specified the degree to which each line is plotted above the previous line.

4.20 Set X axis

If set to *Y*, this parameter will allow the X axis range to be defined.

4.21 Minimum X Axis Value

The *Minimum X Axis Value* specifies the starting point for the X axis scale. This parameter is used only if *Preset X Axis* is *Y*.

4.22 Maximum X Axis Value

The *Maximum X Axis Value* specifies the ending point for the X axis scale. This parameter is used only if *Preset X axis* is *Y*.

4.23 Set Y axis

If set to *Y* this parameter will allow the Y axis range to be defined.

4.24 Minimum Y Axis Value

The *Minimum Y Axis Value* specifies the starting point for the Y axis scale. This parameter is used only if *Preset Y Axis* is *Y*.

4.25 Maximum Y Axis Value

The *Maximum Y Axis Value* specifies the ending point for the Y axis scale. This parameter is used only if *Set Y Axis* is *Y*.

4.26 Set Z Axis

If set to *Y* this parameter will allow the Z axis range to be defined. Remember that the Z axis is the axis that "goes into the paper"; the Y axis is the vertical axis.

4.27 Minimum Z Axis Value

The *Minimum Z Axis Value* specifies the starting point for the Z axis scale. This parameter is used only if *Set Z Axis* is *Y*.

4.28 Maximum Z Axis Value

The *Maximum Z Axis Value* specifies the ending point for the Z axis scale. This parameter is used only if *Set Z Axis* is *Y*.

4.29 10*log or 20*log

This value is used for conversion to decibels as described in Section 3.8. Either 10*log(data) or 20*log(data) will be used. This parameter is ignored unless either *Convert Data to dB* or *Convert X to dB* is set to *Y*.

4.30 Minimum dB Value

The minimum dB value specifies the minimum decibal value which will be used. This is necessary since the dB value for a data value of zero is negative infinity. Any data below the specified minimum dB value will be set to the minimum dB value.

4.31 Accuracy

The *Accuracy* parameter specifies the accuracy to which the plot perspective parameters will be applied. Too large a value will cause an increase in plotting time. A value of 100 will generally suffice.

4.32 Plot Label

The plot will be labeled with the specified labels if the *Plot Labels* parameter is set to *Y*. Two lines may be specified.

Chapter 5

Data File Format

This chapter describes the format that LASER GRAPHICS requires the data to be in. PlotHelp topic *Data Format* supplies the same information; it is reprinted here for convenience.

Two main data formats are used – one for linear (2-D or 3-D) plots and one for scatter plots. Other plot types (X-Y plots, Polar plots, and Vector plots) are generated using these formats. A third data format is used when LASER GRAPHICS is used as a graphics driver.

The most important thing to remember is that the header file must set *Scatter* to *Y* if the data file is in scatter format or to *N* if the plot is in linear format. Both file types may be in either ASCII or binary form, as specified by the /Binary option in the Plot command. (Data is in ASCII form if it may be displayed with the DOS type command; typing binary data will cause garbage to be printed to the screen.) Both formats also have optional features such the ability to specify plot labels within the file. These options are described below. ASCII data may be in integer form (e.g. 158), real form (e.g. 5.32), or in exponential form (e.g. 6.02E+23).

5.1 Linear (2-D or 3-D) Data Files

For two or three dimensional plots LASER GRAPHICS expects the ASCII data file to contain the following information:

```
Number of lines in the data
Number of data points per line
```

```
Data point for line # 1, point # 1
Data point for line # 1, point # 2
Data point for line # 1, point # 3
      ...
Data point for line # 2, point # 1
      ...
Data point for last line, last point
```

For example, the following data would generate a plot with two lines of three points each:

```
2
3
1.2
1.3
2.2
1.3
4.2
3.3
```

A linear data file such as this is specified in the header file by setting *Scatter* to *N*.

5.2 Scatter Data Files

The format for scatter diagrams is somewhat more complicated than for linear plots:

```
Number of data sets in the data
Number of data points for data set 1
Connect points in this set with lines? (y or n)
Mark points in this set with icons? (y or n)
X value for data set 1 point 1
Y value for data set 1 point 1
X value for data set 1 point 2
Y value for data set 1 point 2
  ...
X value for data set 1 last point
Y value for data set 1 last point
Number of data points for data set 2 (if more than one data set is specified)
```

```
Connect points in this set with lines? (y or n)
Mark points in this set with icons? (y or n)
X value for data set 2 point 1
Y value for data set 2 point 1
X value for data set 2 point 2
  ...
X value for data set 2 last point
Y value for data set 2 last point
  ...
```

For example, the following data file would produce a scatter plot with two data sets; the first set consisting of three points and the second set consisting of two points:

```
2
3
n
y
1.0
1.1
2.0
2.2
3.0
3.3
2
y
n
1.0
1.1
2.0
2.2
```

To specify a scatter plot, set the *Scatter* parameter in the header file to *Y*.

5.3 Graphics Driver Format

The format for a file using LASER GRAPHICS as a graphics driver should include one or more of the following commands:

```
w x1 y1 x2 y2
l x1 y1 x2 y2
p x1 y1
th x1 y1 text
tv x1 y1 text
c x1 y1 x2 y2 x3 y3
s x1 y1 x2 y2 x3 y3 shade
```

where the "w" command sets a window for subsequent lines; "l" causes a line to be drawn from x1,y1 to x2,y2; "p" plots a point at the specified location; "th" causes text to be placed horizontally at the specified location; "tv" causes text to be placed vertically, "c" causes the region of the plot inside the triangle specified by the three points to be cleared, and "s" causes the specified region to be shaded with random dots, with an average density specified by the "Shade" parameter. The shade value should be between 0 and 100, specifying the percent of pixles to be turned on.

To use such a file, use the /C option in the Plot command as describe in Section 5.3.

Note that the file format described in the preceeding three sections is all that is necessary for creating a data file in the correct format. Also note that commands Tbl2Lin and Tbl2Scat may be useful in converting data in tabular form to Plot format. Also see Section 6.16.28 for a description of how to use Plot if you have a data file which does not have the number of lines and points per line at the top of the file.

5.4 Plot File Flags

The following descriptions show how to use some additional features in the data file. These items are included as a convenience, but may seem complicated. An understanding of these items is *not* necessary for using Plot. The general form of these items is to set the number of lines or points per line in a file to a negative number. Since it does not make sense to have a negative number of lines or points, this negative value serves as a "flag" to Plot that some optional feature is to be used. Further note that almost all of these items may be selected through other means (usually in the header file), and are optionally included in the data file because sometimes it is more

convenient to have a data file contain such information as the title for the plot, the axis numbering to use, etc.

5.4.1 Specifying Labels in the Data File

If the plot labels are to be included in the data file, then the first line of the data file should be "-1". The plot labels should then follow on the next two lines in the data file. The normal file should begin at that point. For example:

```
-1
Sine wave data
Spectral density
3
4
1.17
2.33
...
```

would plot 3 lines of 4 points each, with "Sine wave data" as the first line of the label and "Spectral density" as the second line of the label.

5.4.2 Specifying Icon Labels

It is possible to put the icon labels in the data file. To do this, the number of lines should be specified as -2, then the next line should contain the number of icons labels to use, and the next lines should contain those labels. For example:

```
-2              (to indicate that data contains icon labels)
2               (number of icon labels)
icon label 1    (icon label 1)
icon label 2    (icon label 2)
2               (actual number of lines in the file)
2               (number of points per line)
1.1             (line 1 point 1)
1.2             (line 1 point 2)
2.1             (line 2 point 1)
2.2             (line 2 point 2)
```

This file would create a plot with two lines of two points, and would label the first line "icon label 1", and the second line "icon label 2".

5.4.3 Specifying Axis Ranges

It is possible to put X and Z axis information in the data file. To do this, specify -3 for the number of lines in the data file, followed by the minimum and maximum values for the X axis, and the minimum and maximum values for the Z axis (each of these values should be on separate lines). If you only want to specify one of the two axis values, specify zero for both the maximum and minimum values for the axes that you do not want to specify.

Remember that the X axis is the horizontal axis, and the Z axis is the axis that "goes into the page" on 3-D plots. The vertical axis is not set by the -3 data file option. This option was set up in this manner because the vertical axis is always specified by the values in the data file; but the X and Z values are inherent in the location of the value in the data file and are frequently changed on the plot.

5.4.4 Adding Text to a Plot

It is possible to add text to linear or scatter plots. The first method is to set the number of lines in the file to -4, then add the following lines to the data file:

```
the number of text fields,
the X position of the first text field
the Y position of the first text field
the first text field
x for text field 2,
...
text for the last text field
```

This is easy to do if you are writing a program to generate the data file, but is incovenient if the data file already exists. To add text to an existing data file, use command Add_Text as described in section 6.1.

It is possible to add text to scatter plots through a different method. To make use of this capability, the number of points in the present data set should be set to -1, then the next two lines specify the X and Y locations of

the text, and the third line specifies the text to write at that X-Y location. The file should continue as normal after the line of text (starting with the correct number of data points in the present set of data). This is a different way of doing what can be done by using -4 for the number of lines as described above, or by using Add_Text. The "points=−1" method was an early addition to the program, and has been retained for compatability, but the other two methods are now recommended.

5.4.5 Adding Arbitrary Lines and Text

It is possible to add arbitrary lines and text to a plot by setting the number of lines to -5, and adding any number of the graphics-driver commands described in Section 5.3. The last line of these special commands must be "END". If "END" is not included in the data file, then Plot will remain in an infinite loop until aborted by the user.

5.4.6 Dotted and Bold Lines

It is possible to make lines on a plot dotted. To do this, include within the data a line that says "dotted X", where X is a number from 0 to 255 indicating the bit pattern for the line. For example the file:

```
2               {2 lines on the plot}
2               {2 points in each line}
dotted 240      {make the first line dashed}
2.71828         {line 1, point 1}
3.14159         {line 1, point 2}
dotted 85       {make the second line dotted}
5.85877         {line 2, point 1}
8.99926         {line 2, point 2}
```

would generate a dashed line (240 = binary 11110000) and a dotted line (85 = 01010101). If a scatter plot is used, then the "dotted" command may also appear anywhere in the data for the particular line to be dotted, but the line will be solid up to the last point prior to the dotted command. This allows a line in a scatter plot to be solid for most of the line and dotted for the rest. Note that the comments shown in the above example should not be included in the actual data file.

To make lines bold, include a line that says "bold #" where # is the line weight (1=lightest, 5=darkest). In a linear data file, the "bold" command can appear anywhere in the data for the particular line that is to be made bold. For scatter files, the "bold" command may appear anywhere, but as for dotted lines, only the portion of the line following the bold command will be made bold.

5.5 Complex Data

Complex data (i.e. real, imaginary) data is supported in several ways. FFT will read and/or write complex data. Plot will plot the magnitude of a complex data file if the /Mag option is specified. And if the /Zoom option is used with Plot, then it is possible to view only the real or imaginary component of a data file. The format for a complex data file is essentially the same as for a linear file, except that the first line of data is assumed to be real, the second assumed to be imaginary, the third real, and so on. In this sense "line" means a full set of data that will specify a single line on the plot, not a single line in the data file. For example:

```
2
3
1.1
1.2
1.3
2.1
2.2
2.3
```

would indicate the complex points (1.1,2.1), (1.2,2.2), (1.3,2.3). If you have a data file in the form:

```
1.1  2.1
1.2  2.2
1.3  2.3
```

then you may convert it to the proper format using Tbl2Lin command.

The proper complex data format described above was chosen so that it will be possible to plot the real and imaginary parts of the data file individually. For example, if the command

Lines = -1	Include label in data file. May be used on any plot type.
Lines = -2	Include Icon labels in data file. May be used on any plot type.
Lines = -3	Include axis numbering information in data file. May be used on any plot type.
Lines = -4	Add text to plot. May be used on any plot type.
Lines = -5	Add arbitrary lines and text to a plot. May be used on any plot type.
Points = -1	Include text on plot. May only be used on scatter plots.
"Dotted"	Make a line dotted.
"Bold"	Make a line bold.

Table 5.1: Data File Flags

```
Plot /ZI 5 5 1 100 Header_File Complex_Data_File
```

is used, then the first through the hundredth point in the real component of the third complex line will be plotted. Lines one and two of the data file correspond to the first complex line, lines three and four correspond to the second complex line, and lines five and six correspond to the third complex line. Therefore line 5, as specified in the Plot command shown above, corresponds to the real part of the third complex line. (See Section 6.16.38 for information on the parameters of the /ZI option.) Table 5.1 provides a summary of the data file flags.

Chapter 6

Command Descriptions

This chapter describes the commands provided by LASER GRAPHICS. Most of this chapter is taken directly from the included help files, and is included here for convenience.

6.1 Add_Text

Procedure Add_Text adds the necessary information to a file so that when Plot is called, a plot will be generated which has text added at any user specified location. This is for use when particular features in the data are to be labeled. Chapter 5 describes the necessary changes to the data file for placing text on the screen. It is easy to add the text to the data file when the data file is generated, but if the file already exists, it may be inconvenient to go back and add the text to the data file. Add_Text provides an easy means of adding text to an existing data file. The calling format is:

```
Add_text inputfile outputfile
```

Add_Text will display a screen which has the fields X Position, Y Position, and Text. All these fields should be blank the first time Add_Text is run on a particular file. The X and Y position fields specify the position for the first character of the text field, and should be entered per the axis numbers. That is, if the horizontal axis is numbered 1 to 10 when the data is plotted prior to calling Add_Text, and the text is to be placed starting near the middle of the plot, then an X Position of 5.0 should be entered. Note that the up and down arrows are used to move from field to field.

6.2 CleanPlt

CleanPlt deletes all PLOT.PLT files from the disk. PLOT.PLT files are created whenever Plot is called. If a hard copy plot is generated, then PLOT.PLT will contain the bit map for the specified output device. If no hard copy plot is generated, then PLOT.PLT will be empty. In either case it is unlikely that there will be a future need of the PLOT.PLT file, and these files may clutter up your hard disk. CleanPlt provides an easy means of removing these files from your disk. Note that no warning is given when the files are deleted.

6.3 DataInfo

DataInfo examines a data file and displays the number of lines and points per line in the data file. It also (optionally) will return the value of a particular point within the data file. The calling format is:

```
DataInfo infile [line specification]
```

DataInfo is self-documenting; type DataInfo without any parameters for a help-screen.

6.4 FFT

FFT reads in a data file in the linear file format, and generates a new file which contains the frequency spectrum of the original data. Various pre-processing parameters are allowed, such as zero-padding and sidelobe reduction weighting. This utility is self-documenting; entering FFT at the DOS prompt without any options will generate a help screen.

FFT was not written by the authors of LASER GRAPHICS but is included because of its usefulness in many applications.

6.5 EnvEdit

Command EnvEdit provides a convenient method of editing the environment parameters such as printer type, plot size, etc., which were specified in the Install program. The same result could be achieved by re-running Install, but

EnvEdit is quicker and more convenient. EnvEdit may be called from any directory.

To get out of EnvEdit without saving any changes you have made type ctrl-Q. To exit EnvEdit saving all changes type ctrl-X.

It is possible to set up different environment files. This is generally useful for using different environment files for different plot types. For example, a different environment file might be used for polar plots than for other plot types since the aspect of a polar plot must be carefully set (by setting the number of horizontal and vertical pixels) so that circles look like circles rather than ovals. To set up different environment files, use EnvEdit, then save the changes to a new filename, e.g. `Polar.env`. Then use the /Env option when calling Plot to specify the desired environment parameters. See Section 6.16.9

6.6 Gallery

Command Gallery allows the user to view several plots which were previously generated and saved by LASER GRAPHICS or in some cases other programs. To create these disk files using LASER GRAPHICS select either the **S** or **C** options from the Plot main menu. The plots to be viewed may be listed in the Gallery command line, or they may be specified by pressing one of the ten function keys while pressing the ALT key. Plots loaded in either way may be viewed by pressing the plot's associated function key (F1-F10). Up to ten plots may be in memory at any one time (depending on system memory). Table 6.1 lists the commands recognized in the Gallery program.

6.7 Header

Command Header provides an interactive method of creating header files. The program prompts the user for various parameters which specify the type of plot to be generated. Default values are provided which may be selected by hitting return, or other values may be entered, or a more thorough description of the needed parameter may be requested by entering a question mark (?) at the prompt. The header file created by the Header command will be put in the present directory.

It is recommended that Header be called from the directory containing

F1 through F10	Display the plot associated with the given key.
Alt-F1 to Alt-F10	Load a new plot for the given key.
Ctrl-F1 to Ctrl-F10	Tag/untag a plot (for cycling).
Space bar	Display a list of the plots in memory.
D	Display a disk directory.
P	Set default Path name.
Q	Quit.
C	Cycle through tagged plots
Down arrow	Display next plot in list
Up arrow	Display previous plot in list
Page Down	Display next plot on the disk
Page Up	Display previous plot on the disk
F	Set filename for page up and page down
Home	Display first plot on the disk
M	Movie command: cycle through disk files
R	Resume Movie: use after stopping M command
N	Load next PgUp or PgDn file in next buffer

Table 6.1: Gallery Commands

the data to be plotted rather than from the graphics directory. This helps in two ways: it keeps the header files in the same directory as the data files, and it keeps the graphics program directory free from extraneous files.

Once you have created a header, modifications to that header may be made using Hedit, the DOS editor EDLIN or any other text editor. Hedit is recommended for editing header files since it does some error checking on the header file. Also, Hedit is much more convenient than Header, so if you need a header file for a 2-D plot, it may be easier to set the default header using Two_D, then use Hedit to make the changes you need.

6.8 Hedit

Command Hedit invokes the header editor. This editor provides an easy method of editing header files. After editing the header, Hedit checks for several common errors which would cause the Plot program to abort. The user is then given the chance to fix the errors before exiting the editor.

A description of the commands within Hedit may be seen by hitting F1 while in the editor. Hitting F2 will produce a description of the parameter under the cursor. The calling format is:

```
Hedit Filename
```

If the filename is omitted, then the default header file will be used. The default is set using Two_D, Three_D, Scatter, or SetHdr.

6.9 Install

Command Install is used to specify various environment parameters such as the system hardware and desired plotting bit map size for high resolution plots. Install must be run from the graphics directory. See Chapter 2 for a full explanation of how to use Install.

6.10 Least

Least reads in a data file in the scatter plot file format, and generates a new file which contains the data from the original file, plus additional data for

a least-squares curve fit to the data. Various curve-fit techniques are used. Least is self-documenting; entering the command `least` at the DOS prompt without any options will generate a help screen.

6.11 MakeTabl

Program MakeTabl generates a table from an input data file. The data file must be in linear plot (i.e. not scatter plot format.) The maximum number of lines is unlimited; the number of data items per line is 4096, though more than about 20 items becomes unreasonable for a formatted table. The input data must be real. The calling format is:

```
MakeTabl InFile OutFile
```

6.12 Movie

Movie displays previously generated plots, as do Show and Gallery. However, Movie makes it easier to organize and display a large number of plots in sequence. Movie provides a menu based on a file that the user creates describing what picture files are to be displayed in sequence. The format of the file is as follows:

```
Movie file version number, for future use; presently = 1
Label 1, to be displayed at top of menu.
Label 2
Label 3
Label 4
Number of items to put in the menu.
Temporary directory, preferably a RAM disk of 2MB or more.
First menu entry.
*.cmp or *.pic filename, including wildcards, for first menu entry.
Command that will put *.cmp or *.pic files in temporary directory.
Second menu entry.
...
```

The Movie command format is simply:

```
Movie file.mov
```

where `file.mov` is a movie file formatted as shown above. An example movie file is included, `MOVIE.MOV`, which is annotated to describe the different entries in more detail. Note that the file `MOVIE.MOV` will *not* work properly. This is due to the fact that some of the entries are specific to each computer, and because all the *.cmp and *.pic files do not exist. So `MOVIE.MOV` should be considered only as a template for a functional *.mov file.

6.13 Pic_Cmp

Pic_Cmp compresses a .PIC file into a smaller .CMP file. Program Pic_Exp expands the file back to a *.PIC file. Program usage is simply:

```
Pic_Cmp File
```

where `File` is assumed to be a *.PIC file. The compressed output will be written to `File.CMP`.

6.14 Pic_Exp

Pic_Exp expands a *.CMP file back into a *.PIC file. Note that since Gallery, Show, and Movie can read a compressed file, there is normally no need to expand a compressed *.PIC file. Program usage is simply:

```
Pic_Exp File
```

where `File` is assumed to be a *.CMP file. The expanded output will be written to `File.PIC`.

6.15 PlCombin

PlCombin combines two plot files. Both input files must be valid plot data files. The output file will also be in plot format. Either linear plot data files or scatter plot data files may be combined, though types cannot be mixed. The calling format is:

```
PlCombin InFile1 InFile2 OutFile
```

6.16 Plot

Command Plot generates a plot of the given data file. The calling format is

```
PLOT [/option] [Header_filename] Data_filename
```

If the header filename is omitted, then the default header file is used (see Section 6.24 – command SetHdr). The header and data filenames will assume the extensions .hdr and .dat respectively unless otherwise specified. The option list provides additional plot control within the Plot command line. The options may be listed in any order but must precede the header and data filenames. The valid options are listed in Table 6.2, and are described in the following sections.

6.16.1 Plot /ASF

The /ASF option allows the use of axis specification files. An axis specification file allows the axes to be numbered in virtually any manner. The use of these files is described in more detail in Section 3.17. The calling format is:

```
Plot /ASF File.ASF Header Data
```

This command would plot data file `Data.dat` using header file `Header.hdr`, numbering the axes as indicated by the file `File.ASF`.

6.16.2 Plot /Binary

The /Binary option indicates that the data file is in binary form. Binary data is usually more compact than ASCII data. Not all languages use the same binary format for floating point numbers. This option will work correctly only for data that are in the Turbo-Pascal single precision real-number format used by your computer. What all this means is that you may or may not be able to plot binary data which were generated by other languages on your computer or by any language on another computer.

Other than the binary/ASCII difference, the format for binary files is the same as for ASCII files – the same items are written in the same places for the same result. But the binary/ASCII difference dictates that a binary file be written in a significantly different manner than ASCII files. Particularly

/ASF	use Axis Specification File
/Binary	binary data specification
/BL	Bottom Label: put the plot label below the plot
/C	use as graphics driver
/Comp	save compressed screen plot file
/DBI	Decibel conversion with inline parameters
/Decibels	conversion of data to decibels
/Dots	Use dotted and dashed etc. lines instead of icons
/Env	specify environment file
/FC	put a floor and ceiling on the plot
/Font	use a special font
/HS	Hi-res plot size specified inline
/IC	Number of Icon table Columns
/Ignore	Ignore specified number of lines at top of data file
/IR	Number of Icon table Rows
/IX	Define Y axis increment
/IY	Define X axis increment
/IZ	Define Z axis increment
/Label	change the plot label

Table 6.2: Plot Command Option Summary