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GENERAL PLOT SUBROUTINE PACKAGE FOR THE HEWLETT PACKARD
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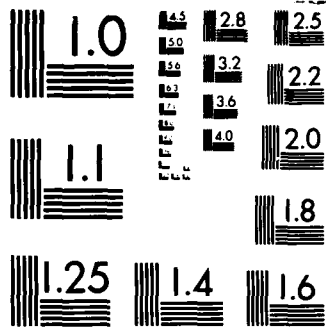
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NBDL-84R008

GENERAL PLOT SUBROUTINE PACKAGE FOR THE
HEWLETT PACKARD 5451C FOURIER ANALYZER®

Dorothy A. Francis



December, 1984

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and also provide the capability to plot to the operator's terminal. The plot package has been found to be extremely useful for graphic output on the HP-5451C® because it can run under any operating system. The plot package has been tested on the HP-5451C® system and can be recommended to users with a similar need.

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HEWLETT PACKARD 5451C FOURIER ANALYZER®

Dorothy A. Francis

December 1984

Naval Medical Research and Development Command
Work Unit No. MF5852402E0005

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SUMMARY

THE PROBLEM

The Hewlett Packard (HP) 5451C Fourier Analyzer formerly supported two plot packages: One in the Fourier environment and one in the RTE environment. Thus, programs which produced graphic output in the Fourier environment could not run in the RTE environment and conversely. Therefore, it was necessary to develop a standard package of plot subroutines that could run under any operating system. The package is comprised of several FORTRAN subroutines which interact directly with the plot devices, and also provide the capability to plot to the operator's terminal.

FINDINGS

The plot package has been found to be extremely useful for graphic output on the HP-5451C because it can run under any operating system.

RECOMMENDATIONS

The plot package has been tested on the HP-5451C system and can be recommended to users with a similar need.

ACKNOWLEDGEMENTS

Mr. William Anderson designed and implemented many of the subroutines on the EAI Pacer 100® and the PDS Nova 800® systems. He also provided valuable technical and structural suggestions. The author also is indebted to Ms. Judy Holm for typing and assembling the manuscript in an excellent manner.

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GENERAL PLOT SUBROUTINE PACKAGE FOR THE
HEWLETT PACKARD 5451C FOURIER ANALYZER

INTRODUCTION

Data plotting is an integral part of any data acquisition and/or analysis software package. Plots are very helpful in data analysis and problem solving. Furthermore, results in graphical form are usually much easier to analyze than are the results in printed tabular form.

This subroutine package is a programming tool that allows the user to conveniently use various plot devices on the HP-5451C system. The plot devices used were the HP-9872T plotter and the operator's terminal. Libraries of compatible subroutines are provided which permit the user to generate a wide variety of plotted information including the following:

1. Labelled axes.
2. Textual data.
3. Graphs from data arrays (x and y), with optional scaling of either array and centered symbols denoting the location of a data point.
4. Variables from the FORTRAN IV calling program plotted in real or integer format.
5. Individual point and vector plotting.

The user also has control of the following:

1. "Pen" selection.
2. "Pen" position (up or down).
3. Origin of plotted information.
4. Scaling of plot.
5. Rotation of text and axes.
6. Generation of multi-page plots.

FUNCTION

The following subroutines are supplied:

PLOTS - Initializes plot software package for user's hardware and software configuration.

PLOT - Moves "pen" to specified (x,y) coordinates with "pen" in up or down position; permits origin control; controls pagination.

FACTO - Scales size of subsequent plotting data.

WHERE - Returns current position and factor to user program.

SYMBO - Plots textual information (such as titles) at desired angle and size with additional capability of plotting special symbols for marking data points.

NUMBE - Plots each digit in a variable, including optional decimal point and truncation.

SCALE - Calculates parameters for axis annotation and size of plot for data array.

AXIS - Plots an axis, at desired angle, including segment markings and optional title.

LINE - Generates the plot of data in two arrays (x and y) with optional connecting lines and special symbols.

Four packages with identical subroutine calling sequences are available. The computer systems, plot peripherals, and unique characteristics of each package are summarized in Table 1.

Four interrelated coordinate systems are used, as shown in Figure 1. Embedded within the subroutines are two machine-dependent coordinate systems; one is defined in plotter machine units, the other in plotter physical inches. These are defined by PLOTS, and normally user will select the default parameters for the particular plotter selected. Users may also define their own imaginary plotting surface in which the relationship of the origin and scale relative to the plotter coordinate system are defined by PLOT and FACTOR. Finally, the relationship between "problem units" and the imaginary "user inches" is defined using SCALE.

SUBROUTINE DESCRIPTIONS

PLOTS

The routine PLOTS must be called at the start of a user program to initialize internal parameters. The call is:

CALL PLOTS (A,I)

A Resolution of plotter: inches/machine unit (0.0: defaults to hardware resolution).

I Logical unit for plot device (0: defaults to standard device address).

PLOTS initializes the scale factor to 1.0 (one user inch equals one physical inch) and sets the "pen" location and origin to (0.0, 0.0).

- NOTES:
- 1) "PLOTS" must be called before any other call to the subroutine package.
 - 2) The origin is initially at the bottom left of the page. (Top left for Printronix 300® printer).
 - 3) The X-axis runs horizontally across the page. The Y-axis runs vertically up the page. (X=down, Y=across for Printronix 300® printer.)
 - 4) Pen # 1 is selected for the HP-9872T® plotter.

PLOT

The routine PLOT causes "pen" motions to be output. PLOT controls the origin and pagination of the plot. The call is:

CALL PLOT (X, Y, I)

- X X-coordinate (user inches) relative to most recent origin.
- Y Y-coordinate (user inches) relative to most recent origin.
- I Integer of the set (-3, -2, 3, 4, 10, -10, 11, 999).
- 3 = move to (X,Y) pen up, set new origin to (X,Y).
 - 2 = move to (X,Y) pen down, set new origin to (X,Y).
 - 2 = move to (X,Y) pen down.
 - 3 = move to (X,Y) pen up.
 - 10 = advance paper one full page.

-10 = advance paper one half page.

11 = End of plots; reset the HP-2648A® graphics terminal (first press). This frees the keyboard and clears I/O operations.

999 = same as 11 (included for completeness and compatibility).

Note: All programs should be ended with the sequence:

CALL PLOT (0.,0.,10); CALL PLOT (0.,0.,-10); or CALL PLOT (0.,0.,11).

FACTOR

FACTOR allows the alteration of the overall scaling factor for plot size. The initial factor is set to 1.0 so that one (1) user inch equals one (1) physical inch. The call is:

CALL FACTOR (Z)

Z Ratio of desired plot size to current size.

1.0 = Reset overall scaling factor to 1.0.

The effects of multiple calls to FACTOR are cumulative.

WHERE

WHERE allows the user program to interrogate the plot package for the current overall scaling factor and the current (X,Y) location with respect to the current origin. The call is:

CALL WHERE (X,Y,Z)

X X-coordinate (user inches) with respect to current origin.

Y Y-coordinate (user inches) with respect to current origin.

Z Current overall scaling factor.

NUMBE

NUMBE plots floating point data in a format similar to FORTRAN IV F-format. One number is plotted for each call to NUMBE. The call is:

CALL NUMBE (X,Y,H,T,A,N)

X X-coordinate (user inches) of number relative to most recent origin.

Y Y-coordinate (user inches) of number relative to most recent origin.

H Height of number (user inches).

- T Number (floating point).
- A Angle of number to edge of paper (degrees CCW from X axis).
- N Format control integer:
- 0 T is truncated and plotted as an integer followed by ".".
- 1 T is truncated and plotted as an integer.
- +N N digits to the right of the decimal point are plotted.

SCALE

SCALE calculates the axis limits and distance between tic marks for an array to be used with AXIS and LINE to produce a properly annotated axis and a graph whose data include all points in a user specified length. SCALE does no plotting; it only provides data for AXIS and LINE. The call is:

CALL SCALE (A,S,N,I)

- A Array containing data problem units to be scaled. (Where the dimensions are A(I, N+2)).
- S Length of axis that data is to cover (user inches); number of tic marks +1.
- N Number of data values in array A. (N must be greater than 0)
- I Increment between data values in array A. (Used to allow data from 2-dimensional arrays, A(I, N+2).)

SCALE searches the data array A for minimum and maximum data values and selects convenient values (problem units) for tic marks on the axis. Tic marks are set one inch apart (user inches).

The calculated value (problem units) for the first tic mark is stored at A(N*J+1). The increment (problem units/user inch) between tic marks is stored at A(N*J+J+1), where J is the absolute value of I.

Note: If I is not equal to 1, a format incompatibility with AXIS exists.

AXIS

AXIS draws an axis with labeled tic marks at one inch intervals (user inches), with an optional title centered on the axis. The call is:

CALL AXIS (X,Y,T,N,S,A,F,D)

- X X-coordinate at start of axis (user inches).
- Y Y-coordinate at start of axis (user inches).
- T Title (packed MSB, LSB).

- N Number of characters in title:
 - on clockwise side of axis (normal for X).
 + on counterclockwise side of axis (normal for Y).
- S Length of axis (user inches).
- A Angle in degrees CCW from machine X at which axis is drawn:
 0.0 for X axis.
 90.0 for Y axis.
- F The starting value of first tic on axis (problem units).*
- D Increment between tic marks on axis (problem units).*

SYMBO

The SYMBO routine has two major uses:

1. Print a character string.
2. Print a single character by value.

The call is:

CALL SYMBO (X,Y,H,T,A,N)

- X X-coordinate (user inches) of symbol relative to most recent origin.
- Y Y-coordinate (user inches) of symbol relative to most recent origin.
- H Height of symbol (user inches).
- T Text string (packed MSB, LSB) or value of single symbol (0.0 - 127.0).
- A Angle of string or symbol CCW from machine X axis (degrees).
- N + = Number of characters in string.
 0 = No action.
 -1 = Draw symbol corresponding to value T at point X,Y.
 -2 = Draw line from previous X,Y to desired X,Y, then draw symbol.

*F and D are usually supplied by SCALE. F is available in DATA(N+1).
 D is available in A (N+2) in SCALE argument list.

LISTING OF A COMMAND FILE FOR AN
OVERLAY GENERATION USING THE PLOT PACKAGE

REFERENCE

Hewlett-Packard Company, "System Software Manual 5451C Fourier Analyzer System", Manual Part No. 05451-90519, Microfiche No. 05451-90520, Santa Clara, CA, November 1978.

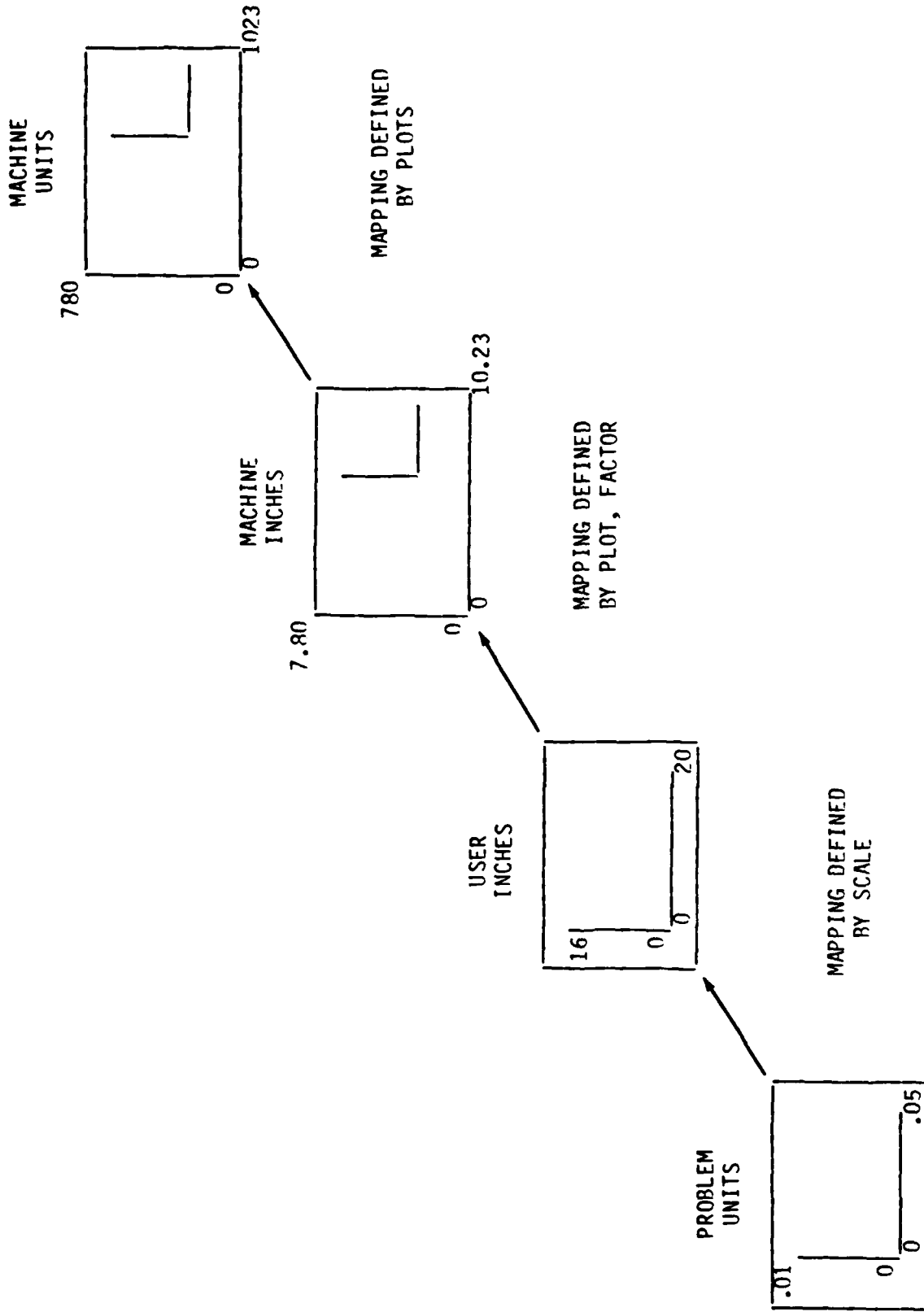


TABLE 2: SYMBOLS

2. @	16. ±	32.	48. Ø	54. G	88. P	96. ~	122. P
1. 0	17. z	33.	49. 1	65. A	91. Q	97. a	113. q
2. Δ	18.	34. "	50. 2	66. B	92. R	98. b	114. r
3. +	19.	35. #	51. 3	67. C	93. S	99. c	115. s
4. x	20.	36. \$	52. 4	68. D	94. T	100. d	116. t
5. ◊	21.	37. %	53. 5	69. E	95. U	101. e	117. u
6. †	22.	38. &	54. 6	70. F	96. V	102. f	118. v
7. x	23.	39. '	55. 7	71. G	97. W	103. g	119. w
8. z	24.	40. (56. 8	72. H	98. X	104. h	120. x
9. y	25.	41.)	57. 9	73. I	99. Y	105. i	121. y
10. x	26.	42. *	58. :	74. J	99. Z	106. j	122. z
11. x	27.	43. +	59. ;	75. K	91. [107. k	123. {
12. x	28.	44. ,	60. <	76. L	92. \	108. l	124. !
13. 1	29.	45. -	61. =	77. M	93.]	109. m	125. }
14. -	30.	46. .	62. >	78. N	94. ↑	110. n	126. ~
15. ≡	31.	47. /	63. ?	79. O	95. ↓	111. o	127. ⊞

TABLE 1: SUMMARY OF SUBROUTINE PACKAGES

SYSTEM	PLOT DEVICE	LOGICAL UNIT	X, Y PLOT LIMITS	RESOLUTION	SUBROUTINE FILE	I/O DRIVER FILE
PACER 100	HP7220	132)8	16", 10.5"	.001"	HP PLOT	HP I/O
PACER 100	TEK4010	1)8	10.24", 7.8"	.01"	-	-
NOVA 800	TEK4051	10	10.24", 7.8"	.01"	PLOT10:PLOT1B.LB	PLOT10:TEKLIB.LB
NOVA 800	PDS Display	34)8	10.24", 10.24"	-	-	-
NOVA 800	Printronix	-	Unlimited, 15"	.01"	PLOT300:PLOT1B.LB	NONE REQUIRED
HP5451C	HP 9872T	5&30	15.75", 11.2"	.001"	PLTPK	NONE REQUIRED
HP5451C	HP 2648A	1	6.5", 4.5"	.0228"	PLTPK	NONE REQUIRED

Procedure to measure time to draw and label axes. Bits zero through five of the S-register will be on. Bits three through five will be turned off at the start of the axes operation. Bits zero through two will be the only bits on. Start timing at this point. Continue timing until all bits except zero through five are on. This signals the completion of the operation.

Plot package efficiency. The efficiency of the general plot subroutine package was measured using the procedures described earlier. A digital timer was used to time the plotting of data and the drawing and labeling of axes. The timing was also measured using the time base generator that is installed on the Fourier Analyzer. The total plot time was thirty-five seconds using the terminal as the plot device and one minute and twenty-eight seconds using the HP-9872T® plotter as the plot device. The time required to draw and label axes was thirty-one seconds using the terminal and one minute and eight seconds using the plotter.

The total plot time includes scaling the data, positioning the pen, plotting the data, and the drawing and labeling of axes. The time required to plot the data only was approximately 4.7 seconds on the terminal and 9.85 seconds on the plotter. The time required to produce a hardcopy of the plotted data is not included in any of the time measurements.

CONCLUSION

The plot package evaluation program, Y9000, was developed in the Fourier Operating System. Although relatively small in size (113 lines of coding), Y9000 required 2237 words of memory, indicating that the 5451C® utility routines for the Fourier system require a considerable amount of memory. Due to the lack of sufficient memory, only 128 words of data could be plotted. The plotting time is slow relative to data acquisition and sampling rates.

The general plot package presented herein is a valuable programming tool. Although somewhat limited in the Fourier Operating System, the package provides significant programming capabilities in the RTE operating system. As mentioned earlier, this package operates in both systems. The general plot package performance was not evaluated in the RTE Operating System because our data acquisition plans require using the Fourier Operating System. Nevertheless, the programming potential of the general plot package in the RTE Operating System are excellent.

The plot package evaluation program provides a means of determining the performance characteristics of the general plot subroutine package, thereby facilitating the estimation of throughput rates and response times for the Fourier system. The program has the following features:

1. A standard procedure to measure time to draw and label axes.
2. A standard procedure to measure time to plot data.
3. Capability to select a plot device interactively.
4. Validation of the major features of the plot package. These features include: A hardcopy from the terminal, pen selection on the HP-9872T® plotter, pagination on the plotter (which may be automatic or manual), and a user-defined scale factor.

FUNCTION:

Y9000 begins by requesting user input. The user must input the logical unit number of the plot device. The user is given the option to run the program with the standard values or with changes. The user may change the pen number and/or page size on the HP-9872T® plotter, request manual paging (if necessary) on the plotter, and/or change the scale factor.

The plot package is initialized and the 5451C utility routines are used to define 128 words of Fourier data and to store the data in X,Y arrays. The general plot subroutines are used to scale and plot the data, and to draw and label the axes. Bits zero through five of the S-register are turned on (set to 1) to signal the start of the plot operation. Some of these bits are turned off (set to 0) during the operation. Bits six through fifteen on (all bits on except 0 through 5) signals the completion of an operation. Bits zero through one of the S-register are turned on to signal the start of the drawing and labeling of axes. These bits are turned off to signal the completion of the operation. However, this action is so fast that the end of the program is signaled before the user notices it. Therefore, bits six through fifteen on signals the end of this operation also. A hardcopy of the plotted data is produced.

Procedure to measure time to plot data. Plot time and CPU utilization are the same. Bits zero through five of the S-register will be turned on at the start of the plotting operation. Start timing at this point. Some of the bits will be turned off during the operation. This is not a problem. Continue timing until bits six through fifteen (all bits except zero through five) are on. This signals the completion of plotting.

EVALUATION OF THE PLOT PACKAGE

A plot package evaluation program (Y9000) was developed in order to measure plot performance. The program was written in FORTRAN and was executed under the following machine conditions:

HP-5451C Fourier Analyzer® settings:

ADC CONTROLS

SAMPLE MODE TO KHz/ms
MULTIPLIER to TIME 100 (black 100)
EXT/INT to INT
OVERLOAD VOLTAGE SWITCH A to .8
INPUT SELECTOR to A
DISPLAY SELECTOR to A
TRIGGER SOURCE to FREE RUN
TRIGGER LEVEL to SLOPE

DISPLAY UNIT CONTROLS

CRT Portion:

MAGNIFIER to X1
DISPLAY to INT
INTENSITY as necessary
FOCUS and SCALE as desired
All level switches to center except DISPLAY TYPE to CONT

Control Portion:

GAIN to CAL
MODE to REAL/MAGNITUDE
POLAR ANG/DIV to any position
SCALE to straight up

The HP-3310A Function Generator settings:

FREQUENCY DIAL to 28
RANGE SWITCH to 10
DC OFFSET SWITCH to 0
FUNCTION SWITCH TO TRI (triangle)
OUTPUT LEVEL set with arrow pointing towards "+" sign by DC offset switch

where:

OVSFSA is the base command file for generating overlays.

OVCONA is the name of the command file for building the overlay.

N is the overlay number.

A is the revision (e.g., B would be revision 2).

N is the overlay number.

I indicates send the test output to the printer (use 0 for output to the terminal).

After the overlay is generated and stored, the program is ready for execution. In order to execute the program, the user will have to boot up the Fourier System and give the following command via the keyboard:

USER PROG	n	n	n	n	ENTER
--------------	---	---	---	---	-------

USING THE PLOT PACKAGE

All of the plot subroutines and the utility routines have been merged to create two complete files. The file &PLTPK contains the source code and the file %PLTPK contains the binary code. These files are on the RTE and Fourier operating systems. Procedures for using the plot package on both systems are given below:

The program execution procedure using the plot package on the RTE operating system is as follows:

```
:LOADR, %PROGN          (Produce executable code)
    SE, %SUBR1           (Includes user subroutines if required)
    SE, %SUBR1
    .
    .
    SE, %SUBRN
    LIBRARY, %PLTPK     (Sets up %PLTPK as a library file)
    SL                  (Search %PLTPK)
    EN                  (End of command input - exit command mode
                        and finish load)
:PROGN                 (Execute program)
```

Procedures for using the plot package on the Fourier operating system are as follows:

Write your user programs in FORTRAN IV. Your program must have a name in the format "Ynnnn", where "Y" specifies that it is a user program and "nnnn" is a four-digit positive number (e.g., 1234), excluding numbers of resident user programs. For FORTRAN IV programming, all the interfacing is handled by the compiler. Define the program as a 'SUBROUTINE' and use "CALL" statements to use the utility routines.

Use the Overlay Generation procedure in Section III of the 5451C System Software Manual® to generate an overlay. The Overlay Generation procedure requires a command file containing a list of the user programs to be included in the overlay. The command file OVC05A may be used as a pattern for creating an overlay file that utilizes the plot package. A listing of OVC05A and the output from an Overlay Generation using OVC05A are given at the end of this section.

Once the command file has been created an overlay can be generated by using the command:

```
TR, OVSFSA, OVCONA, N, 1 (return)
```

FP2AS

The routine FP2AS converts a floating point number to an ASCII character string. The call is:

CALL FP2AS (FP, NASC, ASC, I)

FP Floating point value.

NASC Number of characters to be returned in ASCII string.

ASC Array in which ASCII character string is returned.

I Number of characters to left of decimal point (output).

PXPCO

The routine PXPCO stores and retrieves the current value of variables that are common to several programs. The call is:

CALL PXPCO (JST, LU, RE, OX, OY, SF, PX, PY)

JST 0: Store values.
1: Retrieve values.

LU Logical unit for plot device.

RE(2) X,Y conversion factors to go from machine inches to machine units.

OX,OY Plot origin, in machine inches.

SF Conversion factor to go from user inches to machine inches.

PX,PY Current pen position.

The variables LU,, RE, OX, OY, SF, PX, and PY are initialized in the routine PLOTS. The only variable in the CALL statement that requires a number value is JST. If the user's program needs the variables, a call to PXPCO with JST equal to 1 has to be made. Whenever any of these variables are modified, a call to PXPCO with JST equal to 0 must be made in order to store the current values.

CALL HPCSZ (W,H)

W Width of characters in inches.

H Height of characters in inches.

HPOUT

The routine HPOUT causes plotter instructions to be output. An ASCII character string is created using one character per call and the string is output to the plotter when a terminator (;) is received. The call is:

CALL HPOUT (ICHAR)

ICHAR Character to output to plotter

HPPAG

The routine HPPAG controls pagination on the HP-9872T® plotter. Paper may be manually placed in position or advanced a full or half page. The call is:

CALL HPPAG (ISW)

ISW 1: Full page advance.
2: Half page advance.
3: Manually place sheet in position.

HPPEN

The routine HPPEN controls pen selection on the HP-9872T plotter. It provides the means to select a pen through program control. The call is:

CALL HPPEN (I)

I The pen position number; it must be an integer in the range 0 through 8.

0 Directs the pen arm to return the pen it is currently holding to its stall.

1-8 Directs the pen arm to fetch the desired pen.

UTILITY SUBROUTINES

Several utility subroutines are used in the general plot subroutine package and are included in the program file. Therefore, a brief description of each is given in this section.

PXPCG

The routine PXPCG extracts a specific character from a given character string (RHS first, LHS second). The call is:

CALL PXPCG (I0, I1, I2)

- I0 ASCII character string.
- I1 Number of the character to be extracted.
- I2 Word in which character is returned (RHS).

CGET

The routine CGET extracts a specific character from a given character string (LHS first, RHS second). The call is:

CALL CGET (I0, I1, I2)

- I0 ASCII character string.
- I1 Number of the character to be extracted.
- I2 Word in which character is returned (RHS).

HPCDR

The routine HPCDR specifies the absolute direction in which characters are lettered. HPCDR calculates run and rise values using an angle supplied and causes the character direction instruction to be output. The call is:

CALL HPCDR (TH)

- TH Angle between character base and machine X-axis in degrees.

HPCSZ

The routine HPCSZ specifies the size of characters and symbols. HPCSZ converts inches to centimeters and causes the character size instruction to be output. The call is:

Table 2 lists the available symbols. Symbols 0 to 31 are centered. Symbols 32 to 127 have their lower left corner at coordinate X,Y.

LINE

LINE combines pairs of data points in two arrays according to user-specified parameters. Points can be plotted with a special symbol (optional) and a line between points (optional). The call is:

CALL LINE (A,B,N,I,L,J)

A Name of array containing values for abscissa (problem units)

where: A(I,N+2): Array dimension.

I: Number of variables interlaced in array.

N: Number of points to be plotted.

A(1,N+1): Minimum value on axis (problem units, normally calculated by subroutine SCALE).

A(1,N+1): Problem units/user inch, normally calculated by subroutine SCALE.

B Name of array containing values for ordinate (problem units).
(Definitions are the same as A.)

N Number of points in each array to be plotted.

I Increment between points in array to be plotted (e.g., A(I,N)).

L Format control:

+L Points connected by line with symbol at point.

0 Points connected by line with no symbols.

-L Symbol at each point with no connecting line.

J Value of special symbol to be plotted.

OV005A T=00004 IS ON CR00022 USING 00006 BLKS R=0000

```
0001 00
0002 A,OVRLYN      'OV005A' 54451-14805 REV. A 24 AUG 83
0003 T,SNP510     BASE COMMAND FILE FOR USER OVERLAY GENERATION
0004              INSERT Y COMMAND NUMBERS BEFORE '0E'. AN EXAMPLE:
0005              '0,0077' , WHERE '0077'=4-DIGIT Y COMMAND NUMBER
0006 0,7001
0007 0,8000
0008 0E
0009
0010              CSORT+
0011              INSERT PROGRAM LOADS BETWEEN 'CSORT+' AND 'CSORT-'
0012              EXAMPLE: 'F,Y77JOB' , WHERE 'Y77JOB' = FILE NAME
0013                   'Y,Y0077' , WHERE 'Y0077' = PROG NAME
0013 F,%Y7001
0014 Y,Y7001
0015 F,%Y8000
0016 Y,Y8000
0017 F,%DEM01
0018 Y,DEM01
0019 F,%DEM03
0020 Y,DEM03
0021 F,%DEM04
0022 Y,DEM04
0023 F,%PLTPK
0024 Y,PLOT
0025 F,%PLTPK
0026 Y,PLOTS
0027 F,%PLTPK
0028 Y,FACTO
0029 F,%PLTPK
0030 Y,WHERE
0031 F,%PLTPK
0032 Y,SYMB0
0033 F,%PLTPK
0034 Y,NUMBE
0035 F,%PLTPK
0036 Y,SCALE
0037 F,%PLTPK
0038 Y,AXIS
0039 F,%PLTPK
0040 Y,LINE
0041 F,%PLTPK
0042 Y,PXPCG
0043 F,%PLTPK
0044 Y,CGET
0045 F,%PLTPK
0046 Y,HPCDR
0047 F,%PLTPK
0048 Y,HPCSZ
0049 F,%PLTPK
0050 Y,HPOUT
0051 F,%PLTPK
0052 Y,HPPAG
0053 F,%PLTPK
0054 Y,HPPEN
0055 F,%PLTPK
0056 Y,PXPCO
0057 F,%PLTPK
0058 Y,FP2AS
0059
0060              CSORT-
0061 F,N3500A
0062 L,**
0063 F,N3501A
```

0064 L,**
0065 F,A3060E
0066 L,**
0067 U,**
0068 E,01
0069 ::
0070 \$\$

LISTING OF AN OVERLAY GENERATION OF THE
GENERAL PLOT PACKAGE DEMONSTRATION PROGRAM

END OF UPDAT-7K02

000042	Y7001	%Y7001	Y	0
000056	HPPEN	%PLTPK	Y	0
000057	WHERE	%PLTPK	Y	0
000074	PXPCG	%PLTPK	Y	0
000074	CGET	%PLTPK	Y	0
000111	FACTO	%PLTPK	Y	0
000163	HPCSZ	%PLTPK	Y	0
000170	HPCDR	%PLTPK	Y	0
000201	HPPAG	%PLTPK	Y	0
000256	PXPCO	%PLTPK	Y	0
000273	LINE	%PLTPK	Y	0
000313	HPOUT	%PLTPK	Y	0
000316	DEM03	%DEM03	Y	0
000327	DEM01	%DEM01	Y	0
000336	Y8000	%Y8000	Y	0
000336	PLOTS	%PLTPK	Y	0
000370	FP2AS	%PLTPK	Y	0
000377	NUMBE	%PLTPK	Y	0
000475	SCALE	%PLTPK	Y	0
000617	PLOT	%PLTPK	Y	0
000640	DEM04	%DEM04	Y	0
001265	AXIS	%PLTPK	Y	0
002012	SYMBO	%PLTPK	Y	0

ADDRESS	PGMNAM	LIBNAM	CONTROL	LENGTH
56442	AXIS	%PLTPK	Y	01265
57727	Y7001	%Y7001	Y	00042
57771	HPPEN	%PLTPK	Y	00056
60047	SYMBO	%PLTPK	Y	02012
62061	DEM04	%DEM04	Y	00640
62721	PLOT	%PLTPK	Y	00617
63540	HPPAG	%PLTPK	Y	00201
63741	WHERE	%PLTPK	Y	00057
64020	SCALE	%PLTPK	Y	00475
64515	NUMBE	%PLTPK	Y	00377
65114	FP2AS	%PLTPK	Y	00370
65504	LINE	%PLTPK	Y	00273
65777	PLOTS	%PLTPK	Y	00336
66335	Y8000	%Y8000	Y	00336
66673	DEM01	%DEM01	Y	00327
67222	DEM03	%DEM03	Y	00316
67540	HPCDR	%PLTPK	Y	00170
67730	PXPCG	%PLTPK	Y	00074
70024	HPOUT	%PLTPK	Y	00313
70337	PXPCO	%PLTPK	Y	00256
70615	HPCSZ	%PLTPK	Y	00163
71000	FACTO	%PLTPK	Y	00111
71111	CGET	%PLTPK	Y	00074
71205				

*
* F,%PLTPK
* Y,SYMB0

SYMB0 60047 62060 01021 01061

*LOAD0

*
* F,%DEM04
* Y,DEM04

DEM04 62061 62720 01016 01020

*LOAD0

*
* F,%PLTPK
* Y,FLOT

FLOT 62721 63537 01014 01015

*LOAD0

*
* F,%PLTPK
* Y,HPPAG

HPPAG 63540 63740

*LOAD0

*
* F,%PLTPK
* Y,WHERE

WHERE 63741 64017 01013 01013

*LOAD0

*
* F,%PLTPK
* Y,SCALE

SCALE 64020 64514 01010 01012

*LOAD0

SANTA CLARA DIVISION AUTO OVLAY GENERATION-6K15

* A,OVRLYN 'OVCO5A' 54451-14805 REV. A 24 AUG 83
* T,SNP51C BASE COMMAND FILE FOR USER OVERLAY GENERATION

*ENTER USERCOMMAND NUMBERS, OR TYPE "?"

* INSERT Y COMMAND NUMBERS BEFORE '<OE>'. AN EXAMPLE:
* '<O,0077>', WHERE '<0077>'=4-DIGIT Y COMMAND NUMBER
* O,7001

Y7001
Y%COM 01075 01075 00434 00435
* O,8000

Y8000
Y%COM 01074 01074 00436 00437
* OE
Y%COM 00440 00441
47440 47440

TYPE "L" TO LOAD USERCOMMAND LIBRARY

* CSORT+
* INSERT PROGRAM LOADS BETWEEN '<CSORT+>' AND '<CSORT->'
* EXAMPLE: 'F,Y77JOB', WHERE 'Y77JOB' = FILE NAME
* 'Y,Y0077', WHERE 'Y0077' = PROG NAME
* F,%PLTPK
* Y,AXIS

AXIS 56442 57726 01066 01073

*LOAD@

* F,%Y7001
* Y,Y7001

Y7001 57727 57770 01063 01065

*LOAD@

* F,%PLTPK
* Y,HPPEN

HPPEN 57771 60046 01062 01062

*LOAD@

```
*****
*
* F,%PLTPK
* Y,NUMBE
*****
```

```
NUMBE 64515 65113 01006 01007
```

```
*LOAD@
```

```
*****
*
* F,%PLTPK
* Y,FP2AS
*****
```

```
FP2AS 65114 65503
```

```
*LOAD@
```

```
*****
*
* F,%PLTPK
* Y,LINE
*****
```

```
LINE 65504 65776
```

```
*LOAD@
```

```
*****
*
* F,%PLTPK
* Y,PLOTS
*****
```

```
PLOTS 65777 66334
```

```
*LOAD@
```

```
*****
*
* F,%Y8000
* Y,Y8000
*****
```

```
Y8000 66335 66672 01002 01005
```

```
*LOAD@
```

```
*****
*
* F,%DEM01
* Y,DEM01
*****
```

```
DEM01 66673 67221 01001 01001
```

```
*LOAD@
```

*
* F,%DEM03
* Y,DEM03

DEM03 67222 67537

*LOAD@

*
* F,%PLTPK
* Y,HPCDR

HPCDR 67540 67727 00777 01000

*LOAD@

*
* F,%PLTPK
* Y,PXPCG

PXPCG 67730 70023 00767 00776

*LOAD@

*
* F,%PLTPK
* Y,HPOUT

HPOUT 70024 70336

*LOAD@

*
* F,%PLTPK
* Y,PXPCO

PXPCO 70337 70614

*LOAD@

*
* F,%PLTPK
* Y,HPCSZ

HPCSZ 70615 70777

*LOAD@

*
* F,%PLTPK
* Y,FACTO

FACTO 71000 71110

*LOAD@

*
* F,%PLTPK
* Y,CGET

CGET 71111 71204

*LOAD@

*
* CSORT-
*
* F,N3500A
* L,**

FRMTR	71205	75017	00546	00766
MOD	75020	75037		
MXMNI	75040	75153		
MXMNR				

*LX7

MINI
75154 75261
DBLE 75262 75313
SNGL 75314 75356
.XPAK 75357 75544
.XCOM 75545 75612
.XFER 75613 75650
ALOGT 75651 75657

*LOAD@

* F,N3501A
* L,**

ATAN	75660	76006		
ABS	76007	76013		
.ITOI	76014	76126		
.GOTO	76127	76150		
IABS	76151	76157		

COMPUTED GO TO

*LOAD@

* F,A3060B
* L,**

```

D.05      00062 00062
" " "    76160 76162
D.06      00060 00060
" " "    76163 76165
D.33      00063 00063
" " "    76166 76170
D.35      00061 00061
" " "    76171 76173
D.76      00055 00055
" " "    76174 76176
I.05      00046 00046
" " "    76177 76200
C.33      00045 00045
" " "    76201 76202

```

*LOAD@

```

*****
* U,**
*****

```

*UNDEFINED SYMBOLS
BLANK DTAD GKPLT

```

*AVAILABLE MEMORY
76203 76224
00442 00545

```

*LOAD@

```

*****
* E,01
*****

```

```

*USER LINKS
76225 76233
00546 01777

```

*OVERLAY SYMBOL TABLE

.BIO. 74434	.DFER 75613	.DIO. 74353 01065,I
.DTA. 74502 01063,I	.GOTO 76127 01015,I	.IAR. 74300
.IAY. 74245	.IIO. 74020 01064,I	.IOI. 74153
.IOR. 74112	.ITOI 76014 01024,I	.LDR. 75601
.LST. 70101	.RAR. 74256	.RAY. 74234
.RIO. 74032	.XAY. 74203	.XCOM 75545 00640,I
.XFER 75622 00642,I	.XIO. 74047	.XPAK 75357 00610,I
RES 76007 01007,I	ALOGT 75651 01010,I	AMAX0 75040
AMAX1 75154 01012,I	AMIN0 75052	AMIN1 75166 01011,I
ARCTA 75660	ATAN 75660 01001,I	AXIS 56456 01016,I
BCS 70526	BLANK ? ? ? 01233,I	C.33 76201 00045,I
CGET 71114 01047,I	D.05 76160 00062,I	D.06 76163 00060,I
D.33 76166 00063,I	D.35 76171 00061,I	D.76 76174 00055,I
DEBLE 75262 00574,I	DEM01 66705 01005,I	DEM03 67346 01003,I
DEM04 62401 01002,I	DTAD ? ? ? 01573,I	FACTO 71005
FP2AS 65132 01000,I	GKPLT ? ? ? 01234,I	HPCDR 67553 01060,I
HPCSZ 70631 01061,I	HPOUT 70175 01027,I	HPPAG 63545 01014,I
HPPEN 57776 01004,I	I.05 76177 00046,I	IABS 76151 01072,I
LINE 65512 01017,I	MAX0 75045	MAX1 75161
MIN0 75057 00777,I	MOD 75022 01037,I	NEWIO 74452
NUMBE 64523 01067,I	OLDIO 74457	PLOT 62742 01070,I
PLOTS 66011	PXPCG 67733 01040,I	PXPCO 70365 01073,I

SCALE 64036 01020,I SNGL 75314 00573,I SYMB0 61121 01066,I
JHEPE 63750 01006,I Y7001 57731 01075,I Y8000 66341 01074,I

*LINKS
00546 01777

*AVAILABLE MEMORY
76203 76224
00442 00545

*END

*LOAD0

::

\$" ENCOUNTERED, OVERLAY GENERATION TERMINATED

LISTINGS OF THE GENERAL PLOT PACKAGE SUBROUTINES

```

2      SUBROUTINE PLOTS(RS,IA)
3 C
4 C      RS      RESOLUTION
5 C            0.0->0.01 (DEFAULT)
6 C      IA      LOGICAL UNIT FOR OUTPUT
7 C            0->10:  TEKTRONIX DISPLAY (DEFAULT)
8 C            1:    HP-2648A GRAPHICS TERMINAL
9 C            5:    HP-9872T PLOTTER (RTE SYSTEM)
10 C           30:   HP-9872T PLOTTER (FOURIER SYSTEM)
11 C
12 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'PLOTS'
13 C      REV 22 JUN 83:  SUPPORT HP-9872T PLOTTER
14 C                    :  INITIALIZE PLOTTER & ENABLE PAPER CUTTER
15 C                    :  SELECT PEN #1
16 C      REV 01 SEP 83:  SUPPORT HP-2648A GRAPHICS TERMINAL
17 C                    :  MODIFIED TO RUN ON FOURIER SYSTEM
18 C                    :  COMMON STATEMENT REMOVED
19 C                    :  A CALL TO SUBROUTINE 'PXPCC' WAS ADDED
20 C
21 C
22 C      LU      LOGICAL UNIT FOR PLOT OUTPUT
23 C      MP      INDEX TO LAST USED WORD IN MB BUFFER
24 C      MB      BUFFER FOR OUTPUT TO PLOT DEVICE (NOT REED FOR ALL DEVICES)
25 C      RE(2):  X,Y CONVERSION FACTORS TO GO FROM MACHINE INCHES TO
26 C
27 C            MACHINE UNITS
28 C      OX,OY:  PLOT ORIGIN, IN MACHINE INCHES
29 C      SF:    CONVERSION FACTOR TO GO FROM USER INCHES TO MACHINE INCHES
30 C
31 C      REAL AR(2),RE(2)
32 C      DATA AR/1.0,1.0/
33 C      DATA IESTR/015452B/,LIDL/062141B/,ICK/041513B/
34 C      DATA IESLH/015550B/,IESCJ/015512B/
35 C
36 C      INITIALIZE PLOT ORIGIN IN MACHINE INCHES
37 C      OX=0.0
38 C      OY=0.0
39 C
40 C      INITIALIZE PEN POSITION IN USER UNITS
41 C      PX=0.0
42 C      PY=0.0
43 C
44 C      INITIALIZE SCALE FACTOR TO 1.0
45 C      SF=1.0
46 C
47 C      DEFINE OUTPUT LOGICAL UNIT
48 C      LU=IA
49 C      IF(LU.EQ.0) LU=10
50 C
51 C      DEFINE FACTOR FOR CONVERSION FROM MACHINE INCHES TO MACHINE UNITS
52 C      RT=RS
53 C      IF((RT.LE.0.0) .AND. (LU.EQ.1)) RT=.0228
54 C      IF((LU.NE.5) .AND. (LU.NE.30)) GO TO 100
55 C      IF(RT.LE.0.0) RT=1./400./2.54
56 C      IF(RT.LE.0.0) RT=.01
57 C      RE(1)=RT*AR(1)

```

E 2 PLOTS OPTS: LNI 3:25 PM WED., 26 DEC., 1984

```
7 RE(2)=RT*AR(2)
8 C
9 C STORE VALUES
0 150 CALL PXP00(0,LU,RE,OX,OY,SF,PX,PY)
1 C
2 IF(LU.EQ.1) GO TO 230
3 C ADVANCE PAPER AND INITIALIZE PLOTTER
4 WRITE(LU,200)
5 200 FORMAT("AF;IN")
6 C
7 C SELECT PEN #1
8 WRITE(LU,220)
9 220 FORMAT("SP1")
0 GO TO 250
1 C
2 C CLEAR SCREEN (ALPHANUMERIC DISPLAY)
3 230 CONTINUE
4 WRITE(LU,240) IESLH,IESCJ
5 C
6 C CLEAR GRAPHIC MEMORY AND TURN ON GRAPHIC DISPLAY & CURSOR
7 WRITE(LU,240) IESTR,LDLA,ICK
8 240 FORMAT(4R2)
9 C
0 250 RETURN
1 END
```

14% COMPILER: HP92834 REV.2226 (820503)

* NO WARNINGS ** NO ERRORS ** PROGRAM: 206 COMMON: (NONE)

E 8 SYMBO OPTS: LMI 3:27 PM WED., 26 DEC., 1984

```
7 CALL HPOUT(1HE)
8 210 CALL HPOUT(IAND(JOH,377E)*2**8)
9 IF(LU.NE.30) GO TO 215
0 CALL HPOUT(177E)
1 215 CALL HPOUT(3*256)
2 CALL HPOUT(1H;)
3 X=X+W1*CO
4 Y=Y+W1*SI
5 CALL PLOT(X,Y,3)
6 GO TO 40
7 C
8 END
```

4% COMPILER: HP92834 REV.2226 (820503)

NO WARNINGS ++ NO ERRORS ++ PROGRAM: 1000 COMMON: (NONE)

```

32 20  RETURN
33 C
34 C      INITIALIZE TO START OF CHARACTER STRING
35 30  NC0=NC
36      I0=0
37 C
38 C      GET NEXT CHARACTER IN STRING
39 40  NC0=NC0-1
40      IF(NC0.LT.0) GO TO 20
41      I0=1+I0
42      CALL CGET(ASC, I0, JCH)
43 50  IF(LU.NE.1) GO TO 55
44      ICH=IAND(JCH,177B)
45      I3=SYM(JCH+1)
46      IF(JCH.GE.32) GO TO 60
47      GO TO 56
48 55  JCH=IAND(JCH,177B)
49      IF(JCH.GE.32) GO TO 200
50 56  CONTINUE
51 C
52 C      SPECIAL PLOT CHARACTER MUST BE CENTERED, MOVE PEN
53      I3=SYM(JCH+1)
54      IP=3
55      I1=0
56      X=X+H*(-2.*CO+3.*SI)
57      Y=Y+H*(-3.*CO-2.*SI)
58      XW=X
59      YW=Y
60      GO TO 110
61 60  IP=2
62      I3=1+I3
63 C
64 C      GET 8 BIT DEFINITION OF NEXT CHARACTER SEGMENT
65      CALL PXPCG (STB, I3, I1)
66 C
67 C      DECODE SEGMENT DEFINITION
68      I2=MOD(I1, 64)
69      IF(I1.GE.64) IP=3
70      IY=I2/8
71      IX=I2-8*IY
72      X1=IX
73      Y1=IY
74 C
75 C      DRAW SEGMENT
76      XW=X+H*(X1*CO-Y1*SI)
77      YW=Y+H*(Y1*CO+X1*SI)
78 110 CALL PLOT (XW, YW, IP)
79      IF(I1.LT.192) GO TO 60
80      X=XW
81      Y=YW
82      GO TO 40
83 C
84 C      WRITE A NORMAL CHARACTER
85 C
86 200 CALL HPFOUT(1HL)

```

```

277 DATA STC337/ 13171, 12486, 2156, 1114
278 1, 16838, 16899, 12594, 8390/
279 DATA STC345/ 8536, 538, 9050, 1052
280 1, 8390, 8536, 7203, -14844/
281 DATA STC353/ 6216, 8993, 3100, 259
282 1, -14840, 24624, 13106, 7212/
283 DATA STC361/ 4627, -14816, 13380, 12900
284 1, 10289, 4376, 9234, 8390/
285 DATA STC369/ 8784, -14812, 3075, 4371
286 1, 8472, -14812, 9057, 2674/
287 DATA STC377/ -14845, 2144, 769, 25612
288 1, -14844, 608, -14812, 352/
289 DATA STC385/ 786, -14812, 24612, -14844
290 1, 833, 13324, 6256, 5137/
291 DATA STC393/ 24774, 36, -14844, 2370
292 1, 6161, 10529, -15054, 4674/
293 DATA STC401/ 12898, 16838, 4618, 8731
294 1, 12586, 20677, 6937, -14812/
295 DATA STC409/ 13360, 4, 28724, -14844
296 1, 0, 0, 0, 0/
297 C MID POINT X, Y COORD & ROTATION CONSTANTS
298 X=XA
299 Y=YA
300 H=TH*0.0174532925
301 SI=SIN(H)
302 CO=COS(H)
303 H=HI/7.0
304 C
305 CALL PXPCC(1,LU,RE,OX,OY,SF,PX,PY)
306 C
307 IF(LU.EQ.1) GO TO 4
308 C
309 C SET CHARACTER SIZE
310 C
311 H0=HI*SF
312 W0=W0*2./3.
313 W1=W0*1.3333/SF
314 CALL HPCSZ(W0,H0)
315 C
316 C SET DIRECTION IN WHICH CHARACTERS ARE TO BE LETTERED
317 C
318 CALL HPCDR(TH)
319 C
320 4 CONTINUE
321 C
322 C MOVE TO NEW POINT
323 IP=3
324 IF(NC.EQ.-2) IP=2
325 CALL PLOT(XA,YA,IP)
326 IF(NC)10,20,30
327 C
328 C SINGLE CHAR IS TO BE PLOTTED
329 10 NC0=0
330 JCH=ASC(1)+0.1
331 GO TO 50

```

222 1,-14804, 833, 12886,-14807/
 223 DATA STC121 12648, 11315, 2048, 1024
 224 1, 28870, 11316, 6938, 3092/
 225 DATA STC129 259,-14840, 13123, 4120
 226 1,-14828, 328, 3075, 8988/
 227 DATA STC137 12320,-14796, 7000, 3092
 228 1, 259, 8200, 13362, 28870/
 229 DATA STC145 11316, 273, 16838, 3075
 230 1, 6932, 8217, 12584, 11315/
 231 DATA STC153 6948, 4185, 264, 710
 232 1, 11284, 12595, 8232, 7193/
 233 DATA STC161 16838, 20737,-14831, 2625
 234 1, 25106,-14814, 6211,-14797/
 235 DATA STC169 5200, 8292, 16838, 12572
 236 1, 17094, 20994, 11300, 12595/
 237 DATA STC177 -14808, 323, 10248, 13105
 238 1, 5164, 6674,-14804, 12832/
 239 DATA STC185 1060, 5200, 12486, 11315
 240 1, 6948, 23320, 3092, 3/
 241 DATA STC193 27848, 12595, 2088, 769
 242 1,-14836, 3075, 13100, 28976
 243 DATA STC201 -14847, 13360, 6235, 1088
 244 1, 12486, 23092,-14824, 13164
 245 DATA STC209 10289, 264, 5124,-14829
 246 1, 22576, 29724,-14844, 833/
 247 DATA STC217 12886, 13169, 18630, 769
 248 1, 13324, 12486, 6260,-14844/
 249 DATA STC225 16432,-14844, 6704, 1076
 250 1, 12486, 3176, 1140, 18630
 251 DATA STC233 769, 11276, 12595, 2088
 252 1, 12486, 11315, 6948,-14824/
 253 DATA STC241 328, 3075, 13100, 10289
 254 1, 21000,-14844, 13104, 9260/
 255 DATA STC249 6171, 1114, 18630, 769
 256 1, 5132, 6427, 10272, 13105/
 257 DATA STC257 -14804, 13424, 626, 28870
 258 1, 264, 3075,-14796, 624/
 259 DATA STC265 -14796, 368, 794,-14796
 260 1, 11272, 28724, 3112,-14844
 261 DATA STC273 10352, 538, 11380,-14822
 262 1, 13424, 2092, 1024, 29382
 263 DATA STC281 48,-15358, 12356, 710
 264 1, 12338, 22724, 7210, 2666/
 265 DATA STC289 19142, 10776, 7256, 28870
 266 1,-14821, 6216, 8737, 532/
 267 DATA STC297 2049, 1124, 12486, 8784
 268 1, 7203, 780, 4098, 25798/
 269 DATA STC305 6177, 264,-14844, 1140
 270 1, 8788, 6177, 264, 5122/
 271 DATA STC313 20678, 7188, 8483, 2072
 272 1, 769, 17094, 13098, 7001/
 273 DATA STC321 16838, 3075, 25652, 12594
 274 1, 6184, 4625,-14812, 24624/
 275 DATA STC329 7203,-14844, 833, 6722
 276 1, 27161,-14806, 577, 8971/

167	DATA SYN 25/	125,	125,	125,	125
168	1,	125,	125,	125/	
169	DATA SYN 33/	125,	126,	136,	141
170	1,	150,	161,	174,	186/
171	DATA SYN 41/	190,	195,	200,	207
172	1,	212,	215,	218,	221/
173	DATA SYN 49/	223,	234,	240,	249
174	1,	260,	266,	276,	287/
175	DATA SYN 57/	293,	311,	321,	326
176	1,	332,	336,	341,	345/
177	DATA SYN 65/	354,	366,	373,	385
178	1,	394,	402,	409,	414/
179	DATA SYN 73/	424,	430,	437,	443
180	1,	448,	452,	457,	463/
181	DATA SYN 81/	473,	480,	492,	501
182	1,	514,	519,	526,	530/
183	DATA SYN 89/	536,	544,	552,	559
184	1,	564,	567,	571,	577/
185	DATA SYN 97/	583,	586,	597,	607
186	1,	614,	625,	635,	641/
187	DATA SYN105/	654,	660,	668,	675
188	1,	681,	687,	697,	704/
189	DATA SYN113/	714,	724,	735,	740
190	1,	748,	754,	762,	766/
191	DATA SYN121/	772,	776,	785,	790
192	1,	798,	803,	811,	816/
193	DATA STC 1/	10842,	2088,	11276,	-9686
194	1,	10842,	8233,	2320,	5131/
195	DATA STC 9/	11044,	-9686,	10842,	3080
196	1,	-9686,	2666,	7256,	18650/
197	DATA STC 17/	26668,	-9716,	10842,	2584
198	1,	10780,	23258,	10776,	6684/
199	DATA STC 25/	-9718,	11336,	3112,	26842
200	1,	2092,	22796,	-9701,	10330/
201	DATA STC 33/	6764,	-9718,	11354,	8547
202	1,	24872,	2065,	4945,	21260/
203	DATA STC 41/	-9693,	11336,	3176,	10826
204	1,	7256,	23258,	11304,	3080/
205	DATA STC 49/	-9702,	10826,	22746,	-9700
206	1,	7256,	11368,	3144,	24794/
207	DATA STC 57/	20516,	18708,	-9685,	10842
208	1,	9057,	4945,-14630,	577/	
209	DATA STC 65/	2314,	20993,	12849,-14830	
210	1,	12641,	9075,	16838,	29489/
211	DATA STC 73/	24579,	21540,-14832,	2888	
212	1,	6932,	8217,	11305,	626/
213	DATA STC 81/	18630,	26924,	12328,	10545
214	1,	836,	3083,-14844,	596/	
215	DATA STC 89/	2049,	8976,	12843,	6441
216	1,-14844,	10849,-14798,	8563/		
217	DATA STC 97/	785,	29126,	4899,-14847	
218	1,	10826,	4196,	5216,	19142/
219	DATA STC105/	22570,-14820,	4631,	22726	
220	1,-14820,	321,	13510,	18630/	
221	DATA STC113/	12584,	11315,	780,	2049

```

112 EQUIVALENCE (STB( 25), STC 25(1))
113 EQUIVALENCE (STB( 33), STC 33(1))
114 EQUIVALENCE (STB( 41), STC 41(1))
115 EQUIVALENCE (STB( 49), STC 49(1))
116 EQUIVALENCE (STB( 57), STC 57(1))
117 EQUIVALENCE (STB( 65), STC 65(1))
118 EQUIVALENCE (STB( 73), STC 73(1))
119 EQUIVALENCE (STB( 81), STC 81(1))
120 EQUIVALENCE (STB( 89), STC 89(1))
121 EQUIVALENCE (STB( 97), STC 97(1))
122 EQUIVALENCE (STB(105), STC105(1))
123 EQUIVALENCE (STB(113), STC113(1))
124 EQUIVALENCE (STB(121), STC121(1))
125 EQUIVALENCE (STB(129), STC129(1))
126 EQUIVALENCE (STB(137), STC137(1))
127 EQUIVALENCE (STB(145), STC145(1))
128 EQUIVALENCE (STB(153), STC153(1))
129 EQUIVALENCE (STB(161), STC161(1))
130 EQUIVALENCE (STB(169), STC169(1))
131 EQUIVALENCE (STB(177), STC177(1))
132 EQUIVALENCE (STB(185), STC185(1))
133 EQUIVALENCE (STB(193), STC193(1))
134 EQUIVALENCE (STB(201), STC201(1))
135 EQUIVALENCE (STB(209), STC209(1))
136 EQUIVALENCE (STB(217), STC217(1))
137 EQUIVALENCE (STB(225), STC225(1))
138 EQUIVALENCE (STB(233), STC233(1))
139 EQUIVALENCE (STB(241), STC241(1))
140 EQUIVALENCE (STB(249), STC249(1))
141 EQUIVALENCE (STB(257), STC257(1))
142 EQUIVALENCE (STB(265), STC265(1))
143 EQUIVALENCE (STB(273), STC273(1))
144 EQUIVALENCE (STB(281), STC281(1))
145 EQUIVALENCE (STB(289), STC289(1))
146 EQUIVALENCE (STB(297), STC297(1))
147 EQUIVALENCE (STB(305), STC305(1))
148 EQUIVALENCE (STB(313), STC313(1))
149 EQUIVALENCE (STB(321), STC321(1))
150 EQUIVALENCE (STB(329), STC329(1))
151 EQUIVALENCE (STB(337), STC337(1))
152 EQUIVALENCE (STB(345), STC345(1))
153 EQUIVALENCE (STB(353), STC353(1))
154 EQUIVALENCE (STB(361), STC361(1))
155 EQUIVALENCE (STB(369), STC369(1))
156 EQUIVALENCE (STB(377), STC377(1))
157 EQUIVALENCE (STB(385), STC385(1))
158 EQUIVALENCE (STB(393), STC393(1))
159 EQUIVALENCE (STB(401), STC401(1))
160 EQUIVALENCE (STB(409), STC409(1))
161 DATA SYN 1/ 0, 8, 20, 26
162 1, 31, 36, 43, 50/
163 DATA SYN 9/ 55, 62, 68, 82
164 1, 91, 98, 101, 104/
165 DATA SYN 17/ 111, 118, 125, 125
166 1, 125, 125, 125, 125/

```

57 INTEGER STC129(8)
58 INTEGER STC137(8)
59 INTEGER STC145(8)
60 INTEGER STC153(8)
61 INTEGER STC161(8)
62 INTEGER STC169(8)
63 INTEGER STC177(8)
64 INTEGER STC185(8)
65 INTEGER STC193(8)
66 INTEGER STC201(8)
67 INTEGER STC209(8)
68 INTEGER STC217(8)
69 INTEGER STC225(8)
70 INTEGER STC233(8)
71 INTEGER STC241(8)
72 INTEGER STC249(8)
73 INTEGER STC257(8)
74 INTEGER STC265(8)
75 INTEGER STC273(8)
76 INTEGER STC281(8)
77 INTEGER STC289(8)
78 INTEGER STC297(8)
79 INTEGER STC305(8)
80 INTEGER STC313(8)
81 INTEGER STC321(8)
82 INTEGER STC329(8)
83 INTEGER STC337(8)
84 INTEGER STC345(8)
85 INTEGER STC353(8)
86 INTEGER STC361(8)
87 INTEGER STC369(8)
88 INTEGER STC377(8)
89 INTEGER STC385(8)
90 INTEGER STC393(8)
91 INTEGER STC401(8)
92 INTEGER STC409(8)
93 EQUIVALENCE (SYM(1), SYN 1(1))
94 EQUIVALENCE (SYM(9), SYN 9(1))
95 EQUIVALENCE (SYM(17), SYN 17(1))
96 EQUIVALENCE (SYM(25), SYN 25(1))
97 EQUIVALENCE (SYM(33), SYN 33(1))
98 EQUIVALENCE (SYM(41), SYN 41(1))
99 EQUIVALENCE (SYM(49), SYN 49(1))
100 EQUIVALENCE (SYM(57), SYN 57(1))
101 EQUIVALENCE (SYM(65), SYN 65(1))
102 EQUIVALENCE (SYM(73), SYN 73(1))
103 EQUIVALENCE (SYM(81), SYN 81(1))
104 EQUIVALENCE (SYM(89), SYN 89(1))
105 EQUIVALENCE (SYM(97), SYN 97(1))
106 EQUIVALENCE (SYM(105), SYN105(1))
107 EQUIVALENCE (SYM(113), SYN113(1))
108 EQUIVALENCE (SYM(121), SYN121(1))
109 EQUIVALENCE (STB(1), STC 1(1))
110 EQUIVALENCE (STB(9), STC 9(1))
111 EQUIVALENCE (STB(17), STC 17(1))

```

2      SUBROUTINE SYMBO(XA,YA,HI,ASC,TH,NC)
3 C
4 C  XA  STARTING X-COORD OF LOWER LEFT OF STRING (USER INCHES)
5 C  YA  STARTING Y-COORD OF LOWER LEFT OF STRING (USER INCHES)
6 C  HI  HEIGHT OF CHARACTERS IN STRING (USER INCHES)
7 C  ASC CHARACTER STRING
8 C  TH  ANGLE OF ORIENTATION (DEGREES)
9 C  NC  +N:  NUMBER OF CHARACTERS
10 C     -1:  PLOT ONLY SINGLE CHARACTER
11 C     -2:  DRAW LINE TO POINT AND PLOT SYMBOL
12 C
13 C  REV 08 FEB 82:  CHANGE FILE NAME TO 'SYMBOL'
14 C  REV 12 MAY 83:  SUBROUTINE NAME CHANGED TO 'SYMBO'
15 C                  CHANGE CALL TO SUBROUTINE 'PXPCG'
16 C  REV 11 JUL 83:  ADDED CHARACTER SIZE & DIRECTION CALLS
17 C                  :  ADDED CODING TO WRITE A NORMAL CHARACTER
18 C  REV 01 SEP 83:  DRAW CHARACTERS FOR THE HP-2648A GRAPHICS TERMINAL
19 C                  :  MODIFIED TO RUN ON THE FOURIER SYSTEM
20 C                  :  COMMON STATEMENT REMOVED
21 C                  :  A CALL TO SUBROUTINE 'PXPCO' ADDED
22 C
23      REAL ASC(1),RE(2)
24      INTEGER SYM(128), STB(416)
25      INTEGER SYN 1(8)
26      INTEGER SYN 9(8)
27      INTEGER SYN 17(8)
28      INTEGER SYN 25(8)
29      INTEGER SYN 33(8)
30      INTEGER SYN 41(8)
31      INTEGER SYN 49(8)
32      INTEGER SYN 57(8)
33      INTEGER SYN 65(8)
34      INTEGER SYN 73(8)
35      INTEGER SYN 81(8)
36      INTEGER SYN 89(8)
37      INTEGER SYN 97(8)
38      INTEGER SYN105(8)
39      INTEGER SYN113(8)
40      INTEGER SYN121(8)
41      INTEGER STC 1(8)
42      INTEGER STC 9(8)
43      INTEGER STC 17(8)
44      INTEGER STC 25(8)
45      INTEGER STC 33(8)
46      INTEGER STC 41(8)
47      INTEGER STC 49(8)
48      INTEGER STC 57(8)
49      INTEGER STC 65(8)
50      INTEGER STC 73(8)
51      INTEGER STC 81(8)
52      INTEGER STC 89(8)
53      INTEGER STC 97(8)
54      INTEGER STC105(8)
55      INTEGER STC113(8)
56      INTEGER STC121(8)

```

```
2 SUBROUTINE WHERE(XP, YP, SC)
3 C
4 C XP PRESENT X COORDINATE (USER UNITS)
5 C YP PRESENT Y COORDINATE (USER UNITS)
6 C SC PRESENT SCALE FACTOR
7 C
8 C REV 08 FEB 82: CHANGE FILE NAME TO 'WHERE'
9 C
10 REAL RE(2)
11 C
12 C GET PRESENT VALUES OF PX, PY, & SF
13 CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
14 C
15 C GET X,Y VALUE IN USER INCHES & SCALE FACTOR
16 XP=PX
17 YP=PY
18 SC=SF
19 RETURN
20 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 46 COMMON: (NONE)

```
2 SUBROUTINE FACTO(SC)
3 C
4 C SC SCALE FACTOR
5 C
6 C REV 08 FEB 82: CHANGE FILE NAME TO 'FACTOR'
7 C REV 13 MAY 83: CHANGE SUBROUTINE NAME TO 'FACTO'
8 C
9 REAL RE(2)
10 C
11 C GET VALUE OF SF
12 CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
13 C
14 C
15 C UPDATE SCALE FACTOR. (CONVERT USER UNITS TO MACHINE INCHES)
16 IF(SC. GT. 0.)SF=SC*SF
17 IF(SC. EQ. 1.)SF=1.
18 C
19 C SAVE NEW VALUE OF SF
20 CALL PXPCO(0,LU,RE,OX,OY,SF,PX,PY)
21 RETURN
22 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 66 COMMON: (NONE)

```
2 SUBROUTINE PXPDC(JST,LU,RE,OX,OY,SF,PX,PY)
3 REAL RE(2),VARS(7)
4 C
5 C JST - 0: STORE VALUES IN ARRAY VARS
6 C - 1: RETREIVE VALUES FROM ARRAY VARS
7 C
8 C STORE VALUES
9 IF(JST.NE.0) GO TO 10
10 IUNIT=LU
11 VARS(1)=RE(1)
12 VARS(2)=RE(2)
13 VARS(3)=OX
14 VARS(4)=OY
15 VARS(5)=SF
16 VARS(6)=PX
17 VARS(7)=PY
18 RETURN
19 C
20 C UPDATE VALUES
21 C
22 10 LU=IUNIT
23 RE(1)=VARS(1)
24 RE(2)=VARS(2)
25 OX=VARS(3)
26 OY=VARS(4)
27 SF=VARS(5)
28 PX=VARS(6)
29 PY=VARS(7)
30 RETURN
31 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 104 COMMON: 'NONE'

PAGE 3 PLOT OPTS: LXI 3:26 PM WED., 26 DEC., 1984

```
112 WRITE(LU,520) IEAND,LP5,IDSF,IEAND,LP5,LU0,ICSF
113 WRITE(LU,520) IESTR,LDR
114 520 FORMAT(7R2)
115 C
116 C STORE VALUES
117 700 CALL PXPC0(0,LU,RE,OX,OY,SF,PX,PY)
118 C
119 RETURN
120 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 390 COMMON: (NONE)

```

57 C PEN DOWN, DRAW LINE
58 100 CONTINUE
59 IF<LU.EQ.1> GO TO 115
60 WRITE<LU,110> IX,IY
61 110 FORMAT("PD;PA",I6,",",",I6)
62 GO TO 120
63 115 WRITE<LU,116> IESTR,ILPLB,IX,IY,IZSP
64 116 FORMAT(2R2,I6,",",",I6,R2)
65 120 CONTINUE
66 PX=XA
67 PY=YA
68 C
69 C DEFINE NEW ORIGIN IN MACHINE INCHES IF REQUESTED
70 IF <IA. GT. 0> GO TO 700
71 PX=0.0
72 PY=0.0
73 OX=AV1
74 OY=AV2
75 GO TO 700
76 C
77 C PEN UP, MOVE TO NEXT X, Y COORDINATE
78 200 CONTINUE
79 IF<LU.EQ.1> GO TO 220
80 WRITE<LU,210> IX,IY
81 210 FORMAT("PU;PA",I6,",",",I6)
82 GO TO 120
83 220 WRITE<LU,230> IESTR,ILPLA,IX,IY,IZSP
84 230 FORMAT(2R2,I6,",",",I6,R2)
85 GO TO 120
86 C
87 C END OF PLOTS
88 C
89 600 CONTINUE
90 IF<LU.NE.1> GO TO 700
91 C
92 C RESET TERMINAL
93 WRITE<LU,520> IESCG
94 GO TO 700
95 C
96 500 CONTINUE
97 IF<LU.EQ.1> GO TO 510
98 C
99 C ADVANCE THE PAPER ON THE HP9872T PLOTTER
100 C
101 C FULL PAGE ADVANCE
102 IF<IPAGE.EQ.10> CALL HPPAG(1)
103 C
104 C HALF PAGE ADVANCE
105 IF<IPAGE.LT.0> CALL HPPAG(2)
106 GO TO 700
107 C
108 510 CONTINUE
109 C
110 C HARD COPY, CLEAR SCREEN (GRAPHIC DISPLAY)
111 C

```

```

2      SUBROUTINE PLOT(XA,YA,IA)
3 C
4 C   XA  X COORDINATE (USER UNITS)
5 C   YA  Y COORDINATE (USER UNITS)
6 C   IA  PEN CONTROL
7 C       +999 END OF PLOTS
8 C       +11 END OF PLOTS ( RESET TERMINAL - FIRST PRESS )
9 C       +10 HARD COPY, CLEAR SCREEN (TERMINAL)
10 C      +10 ADVANCE PAPER ONE FULL PAGE
11 C      -10 ADVANCE PAPER ONE HALF PAGE
12 C      +3 MOVE TO (XA, YA) PEN UP
13 C      +2 MOVE TO (XA, YA) PEN DOWN
14 C      -2 MOVE TO (XA, YA) PEN DOWN SET ORIGIN TO (XA, YA)
15 C      -3 MOVE TO (XA, YA) PEN UP   SET ORIGIN TO (XA, YA)
16 C
17 C      ANY OTHER VALUE OF IA IS TREATED AS A NOP
18 C
19 C   REV 02 FEB 82: CHANGE FILE NAME TO 'PLOT'
20 C   REV 22 JUN 83: SUPPORT HP-9872T PLOTTER
21 C   REV 01 SEP 83: SUPPORT HP-2648A GRAPHICS TERMINAL
22 C                   : MODIFIED TO RUN ON THE FOURIER SYSTEM
23 C                   :   COMMON STATEMENT REMOVED
24 C                   :   CALLS TO SUBROUTINE 'PXPCO' ADDED
25 C
26     INTEGER IA, IC0(6)
27     REAL AV(2),RE(2)
28     EQUIVALENCE (AV(1), AV1), (AV(2), AV2)
29     DATA N00/6/, IC0/2,3, -2, -3, 10, 11/
30     DATA IESTR/015452B/, ILPLA/070141B/, ILPLB/070142B/
31     DATA IXSP/055040B/, LDA/062101B/, ICSP/041440B/
32     DATA LU0/072460B/, IEAND/015446B/, LP5/070065B/
33     DATA IDSP/042040B/, IESCG/015547B/, IZSP/055040B/
34 C
35 C   RETREIVE VALUES
36     CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
37 C
38 C   CONVERT FROM USER UNITS TO MACHINE INCHES AND UNITS
39     IE=0
40     I0=IA
41     IPAGE=I0
42     IF(I0.EQ.-10) I0=10
43     IF (I0. EQ. 999) I0=11
44     AV1=SF*XA+OX
45     AV2=SF*YA+OY
46     X=AV1/RE(1)
47     IX=X+.5
48     Y=AV2/RE(2)
49     IY=Y+.5
50 C
51 C   IDENTIFY PEN CONTROL OPTION
52     DO 30 I1=1, N00
53     IF (I0. EQ. IC0(I1)) GO TO (100, 200, 100, 200, 500, 600), I1
54 30   CONTINUE
55     GO TO 700
56 C

```

```

2      SUBROUTINE NUMBE (X, Y, HGHT, Z, T, N)
3 C
4 C      X,Y      COORDINATES OF THE LOWER LEFT CORNER OF THE FIRST
5 C              DIGIT OF OUTPUT. X,Y IS IN FLT. FT. (USER INCHES)
6 C      HGHT    HEIGHT OF THE PLOTTED NUMBER IN FLT. FT. (USER INCHES)
7 C      Z       FLT. FT. NUMBER TO BE PLOTTED
8 C      T       ORIENTATION ANGLE FOR THE NUMBER
9 C      N       NUMBER OF DECIMAL DIGITS FOR OUTPUT
10 C            N=-1 WILL SUPPRESS THE DECIMAL POINT
11 C
12 C      REV 08 FEB 82:  CHANGE FILE NAME TO 'NUMBER'
13 C      REV 08 FEB 82:  FIX CALC OF FPN WHEN N. GE. 0
14 C      REV 12 MAY 83:  CHANGE SUBROUTINE NAME TO 'NUMBE'
15 C      REV 12 MAY 83:  CHANGE CALL TO SUBROUTINE 'SYMB0'
16 C      REV 26 JUL 83:  CHANGED 'ALOG10' TO 'ALOGT'
17 C
18      FPN=ABS(Z)
19      IF (N.GE.0) FPN=FPN+.5*10.**(-N)
20      XT=X
21      YT=Y
22      IF (Z) 10, 90, 20
23 C
24 C      DRAW MINUS SIGN FOR NEGATIVE NUMBER
25 10    CALL SYMB0 (XT, YT, HGHT, 1H-, T, 1)
26      CALL WHERE (XT, YT, 2T)
27 C
28 C      GET NO. OF DIGITS TO LEFT OF DECIMAL POINT
29 20    I=ALOGT(FPN)+1.0000001
30      IF (I) 50, 50, 30
31 C
32 C      DRAW DIGITS TO LEFT OF DEC. PT.
33 30    DO 40 J = 1, I
34      K = FPN*10.0**(J-I)
35      CALL SYMB0 (XT, YT, HGHT, FLOAT (K+48), T, -1)
36      FPN = FPN - FLOAT (K*10**(I-J))
37 40    CALL WHERE(XT,YT,2T)
38 C
39 C      DRAW DECIMAL POINT IF REQUESTED
40      IF (N+1) 80, 80, 50
41 50    CALL SYMB0 (XT, YT, HGHT, 1H., T, 1)
42      CALL WHERE (XT, YT, 2T)
43 C
44 C      DRAW DIGITS TO RIGHT OF DECIMAL POINT IF REQUESTED
45      IF (N) 80, 80, 60
46 60    DO 70 IJ=1, N
47      K=FPN*10.0
48      CALL SYMB0 (XT, YT, HGHT, FLOAT (K+48), T, -1)
49      CALL WHERE (XT, YT, 2T)
50 70    FPN=FPN*10.0-FLOAT(K)
51 80    RETURN
52 C
53 C      SPECIAL CASE IF NUMBER = 0.0
54 90    CALL SYMB0 (XT, YT, HGHT, 12H0.0000000000, T, 2+N)
55      RETURN
56      END

```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 241 COMMON: (NONE)

```

2 SUBROUTINE SCALE (X, S, N, K)
3
4 C
5 C X ARRAY OF DATA TO BE SCANNED FOR MAXIMUM AND MINIMUM
6 C VALUES. ADJUSTED MINIMUM VALUE STORED IN X(N*K+1).
7 C ADJUSTED DX(MAX-MIN) STORED IN X(N*K+K+1).
8 C S LENGTH OVER WHICH THIS DATA IS TO BE PLOTTED. (MACHINE INCHES)
9 C N NUMBER OF DATA POINTS IN THE ARRAY X.
10 C K REPEAT CYCLE OF MIXED ARRAY (NORMALLY 1).
11 C
12 C REV 26 JUL 83: CHANGED 'ALOG10' TO 'ALOGT'
13 C
14 REAL X(1), XM(5)
15 DATA XM/2.0, 4.0, 5.0, 8.0, 10.0/
16 C
17 C GET SIZE OF INPUT MATRIX
18 NP=N*K
19 L=NP+1
20 J=L+K
21 C
22 C GET MIN, MAX VALUES IN X ARRAY
23 XMAX=X(1)
24 XMIN=XMAX
25 DO 100 I=1, NP, K
26 XI=X(I)
27 XMAX=AMAX1(XMAX, XI)
28 100 XMIN=AMIN1(XMIN, XI)
29 IF (S.LE.0.0) GO TO 210
30 C
31 C GET RATIO OF USER RANGE/AXIS LENGTH (USER UNITS)
32 DX=(XMAX-XMIN)/S
33 IF(DX.LE.0.0) GO TO 210
34 C
35 C ROUND MINIMUM AXIS VALUE TO A CONVENIENT NUMBER
36 IDX=ALOGT(DX)
37 XI=10.0**IDX
38 IF(XMIN>110, 140, 120)
39 110 XMIN=IFIX(XMIN-1.0)
40 XI=XI-0.9999
41 120 XMIN=IFIX(XMIN-XI)
42 XMIN=XMIN*XI
43 140 X(L)=XMIN
44 C
45 C ROUND TIC DISTANCE TO A CONVENIENT NUMBER
46 T=((XMAX-XMIN)/S)
47 IF(T.LE.0.0) GO TO 210
48 DX=ALOGT(T)
49 IDX=DX
50 XMAX=1.0
51 DX=10.0**-(DX-IDX)
52 150 IF(DX-1.0) 160, 200, 170
53 160 DX=10.0*DX
54 IDX=IDX-1
55 GO TO 150
56 170 DO 180 I=1,5

```

```
57      XI=XM(I)
58      IF(DX.LE.XM(I)) GO TO 190
59 180   CONTINUE
60 190   XMAX=XI
61 200   X(J)=XMAX*10.0**IDX
62      RETURN
63 C
64 C      UNSCALABLE - SET STARTING POINT IN X(L), TIC DIST=1 IN X(J)
65 210   X(J)=1.0
66      X(L)=XMIN-0.5
67      RETURN
68      END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 285 COMMON: (NONE)

```

2      SUBROUTINE AXIS (X0, Y0, A0, N0, S0, T0, C0, D0)
3
4 C
5 C      X0  X COORDINATE OF START OF AXIS (USER INCHES)
6 C      Y0  Y COORDINATE OF START OF AXIS (USER INCHES)
7 C      A0  CHARACTER STRING TO DESCRIBE AXIS (MSB,LSB)
8 C      N0  NUMBER OF CHARACTERS IN STRING
9 C          - ON CLOCKWISE SIDE OF AXIS (NORMAL FOR X)
10 C         + ON COUNTER CLOCKWISE SIDE OF AXIS (NORMAL FOR Y)
11 C      S0  LENGTH OF AXIS (USER INCHES)
12 C      T0  ANGLE OF AXIS TO X AXIS OF PAPER (DEGREES)
13 C          0.0 FOR X-AXIS
14 C          90.0 FOR Y-AXIS
15 C      C0  COORDINATE OF MINIMUM TICK ON AXIS (PROBLEM UNITS)
16 C          NORMALLY PROVIDED BY 'SCALE', FOLLOWING THE LAST POINT
17 C          IN THE DATA ARRAY TO BE PLOTTED
18 C      D0  DISTANCE BETWEEN TICKS (PROBLEM UNITS)
19 C          NORMALLY PROVIDED BY 'SCALE', FOLLOWING C0
20 C
21 C      REV 08 FEB 82:  CHANGE NAME TO 'AXIS'
22 C      REV 13 MAY 83:  CHANGE CALLS TO SUBROUTINES NUMBE, SYMBO
23 C      REV 01 SEP 83:  CHANGE CHARACTER SIZE FOR HP-2648A GRAPHICS TERMINAL
24 C
25 C      REAL A0(1),RE(2)
26 C
27 C      RETREIVE VALUES
28 C      CALL PXP00(1,LU,RE,OX,OY,SF,PX,PY)
29 C
30 C
31 C      N1=IABS(N0)
32 C      N2=S0+0.50
33 C      B1=0.5*S0-.06*FLOAT(N1+7)
34 C      B2=0.12*FLOAT(N1+1)
35 C
36 C      CONVERT DEGREES TO RADIANS & SET UP COORD ROTATION
37 C      T1=T0*0.017453294
38 C      T3=COS(T1)
39 C      T4=SIN(T1)
40 C      IF(N0.LT.0)GO TO 10
41 C      B3=0.3675
42 C      B4=0.18
43 C      T2=T0
44 C      T5=0.1
45 C      GO TO 20
46 10  B3=-.4375
47 C      B4=-0.25
48 C      T2=T0
49 C      T5=-.1
50 C
51 C      GET X,Y COMPONENTS OF TIC MARK & START POINT
52 20  T6=T5*T3
53 C      T5=T5*T4
54 C      X1=X0
55 C      Y1=Y0
56 C

```

```

57 C    DRAW TIC MARK AND NEXT SEGMENT OF AXIS
58 C
59      DO 100 I=1,N2
60      X2=X1-T5
61      Y2=Y1+T6
62      CALL PLOT (X2, Y2, 3)
63      CALL PLOT (X1, Y1, 2)
64      X1=X1+T3
65      Y1=Y1+T4
66 100  CALL PLOT (X1, Y1, 2)
67 C
68 C    DRAW LAST TIC MARK
69      X2=X1-T5
70      Y2=Y1+T6
71      CALL PLOT (X2, Y2, 2)
72 C
73 C    GET VALUES FOR TIC LABELS:  DIFF, END, EXPONENT
74      D1=D0
75      C1=C0+N2*D1
76      E1=0.0
77      IF (D1.EQ.0.0) GO TO 140
78 C
79 C    CHANGE EXPONENT IF VALUE IS GREATER THAN 100
80 110  IF(D1.LT.100.0) GO TO 130
81      D1=D1*0.1
82      C1=C1*0.1
83      E1=E1+1.0
84      GO TO 110
85 120  D1=D1*10.0
86      C1=C1*10.0
87      E1=E1-1.0
88 C
89 C    CHANGE EXPONENT IF VALUE IS LESS THAN .01
90 130  IF(D1.LT.0.01) GO TO 120
91 C
92 C    LAST TIC + DISTANCE AWAY FROM AXIS + 1 CHAR TO LEFT
93 140  X2=X1-B4*T4-.0857*T3
94      Y2=Y1+B4*T3-.0857*T4
95      N2=N2+1
96 C
97 C
98 C    DEFINE HEIGHT OF CHARACTERS
99      HIGHT=0.10
100 C
101 C    CHANGE CHARACTER SIZE FOR THE TERMINAL
102     IF(LU.EQ.1) HIGHT=0.15
103 C
104 C    LABEL EACH TIC MARK
105 C
106     DO 150 I=1, N2
107     CALL NUMBE (X2, Y2, HIGHT, C1, T2, 2)
108     C1=C1-D1
109     X2=X2-T3
110 150  Y2=Y2-T4
111 C

```

```
112 C WRITE LABEL FOR AXIS
113 X2=X0+B1*T3-B3*T4
114 Y2=Y0+B1*T4+B3*T3
115 CALL SYMBO (X2, Y2, HIGHT, A0, T2, N1)
116 C
117 C WRITE EXPONENTIAL SCALE FACTOR IF REQUIRED
118 IF (E1.EQ.0.0) RETURN
119 X2=X2+B2*T3
120 Y2=Y2+B2*T4
121 IF(T2.EQ.0.0 .AND. LU.EQ.1) X2=X2+.10
122 IF(T2.EQ.90.0 .AND. LU.EQ.1) Y2=Y2+.10
123 CALL SYMBO (X2, Y2, HIGHT, 6H(X10) , T2, 6)
124 X2=X2+.48*T3-.07*T4
125 Y2=Y2+.48*T4+.07*T3
126 IF(T2.EQ.0.0 .AND. LU.EQ.1) X2=X2+.20
127 IF(T2.EQ.90.0 .AND. LU.EQ.1) Y2=Y2+.20
128 CALL NUMBE (X2, Y2, HIGHT, E1, T2, -1)
129 RETURN
130 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 647 COMMON: (NONE)

```

2      SUBROUTINE LINE(X, Y, N, K, J, L)
3 C
4 C      X   ARRAY OF ABSCISSA VALUES (USER UNITS)
5 C      Y   ARRAY OF ORDINATE VALUES (USER UNITS)
6 C      N   NUMBER OF POINTS IN THE ARRAY
7 C      K   REPEAT CYCLE OF A MIXED ARRAY (NORMALLY = 1)
8 C      J   >0, SYMBOL AND LINE
9 C          =0, LINE ONLY
10 C      <0, SYMBOL ONLY
11 C      L   NUMBER OF SYMBOL, SEE SYMBOL ROUTINE FOR LIST
12 C          0-17 ARE CENTERED SPECIAL SYMBOLS
13 C
14 C      REV 08 FEB 82:  FILE NAME CHANGED TO 'LINE'
15 C      REV 13 MAY 83:  CHANGE CALL TO SUBROUTINE 'SYMBOL'
16 C      THIS ROUTINE EXPECTS XMIN, DX, YMIN AND DY TO BE STORED IN
17 C      X(N*K+1), X(N*K+1+K), Y(N*K+1), AND Y(N*K+1+K) RESPECTIVELY
18 C
19      REAL X(1), Y(1)
20      IF (N.LT. 1) GO TO 110
21 C
22 C      CHECK FOR VALID SYMBOL
23      AL=L
24      IF(AL.LE.0.0 .OR. AL.GT.127.) AL=0.0
25 C
26 C      GET START POINT, SCALING, END OF DATA
27      I0=N*K+1
28      I1=I0+K
29      I2=I0-K
30      XMIN=X(I0)
31      DX=X(I1)
32      YMIN=Y(I0)
33      DY=Y(I1)
34 C
35 C      SET UP INDICES AND FLAGS
36      I2=1
37      I3=3
38      IF(J.GE.0) I3=2
39      I4=3
40      I5=N
41 C
42 C      CONVERT NEXT X,Y LOCATION TO USER INCHES & MOVE PEN
43 100  X1=(X(I2)-XMIN)/DX
44      Y1=(Y(I2)-YMIN)/DY
45      CALL PLOT (X1, Y1, I4)
46      I4=I3
47 C
48 C      PLOT SYMBOL IF REQUESTED
49      IF (J.NE.0) CALL SYMBO (X1, Y1, 0.14, AL, 0.0, -1)
50      I2=I2+K
51      I5=I5-1
52      IF (I5.GT.0) GO TO 100
53 110  RETURN
54      END

```

PAGE 2 LINE OPTS: LXI 3:30 PM WED., 26 DEC., 1984

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 178 COMMON: (NONE)

```
2 SUBROUTINE PXPCG (I0, I1, I2)
3 C
4 C THIS ROUTINE EXTRACTS CHARACTER #I1 FROM STRING I0
5 C (RHS FIRST, LHS SECOND)
6
7 C
8 C REV 08 FEB 82: CHANGE FILE NAME TO 'PXPCGT'
9 C REV 12 MAY 83: SUBROUTINE NAME CHANGED TO 'PXPCG'
10 C
11 INTEGER I0 (1), I1, I2
12 C
13 C GET INDEX -1 OF WORD CONTAINING CHAR
14 JW=(I1-1)/2
15 C
16 C WITHIN WORD INDEX OF DESIRED CHAR (1 OR 2)
17 JB=I1-JW-JW
18 C
19 C PULL TWO CHARACTERS FROM STRING
20 JW=I0(JW+1)
21 C
22 C SHIFT FROM LHS IF SECOND CHARACTER IS DESIRED
23 IF (JB.NE.1) JW=JW/2**8
24 C
25 C RETURN DESIRED CHAR IN RHS OF WORD
26 I2=IAND(JW, 255)
27 RETURN
28 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 52 COMMON: (NONE)

AGE 1 FTH. OFTS: LMI 3:31 PM WED., 26 DEC., 1984

```
2 SUBROUTINE CGET(I0,I1,I2)
3 C
4 C THIS ROUTINE EXTRACTS CHARACTER #I1 FROM STRING I0
5 C (LHS FIRST, RHS SECOND)
6 C
7 C REV 08 FEB 82: CHANGE FILE NAME TO 'CGET'
8 C
9 C INTEGER I0 (1), I1, I2
10 C JW=I1-1-2
11 C JB=I1-JW-JW
12 C JW=I0-JW+1
13 C IF JB .NE. 2 JW=JW 2**8
14 C IZ=IAND(JW,255)
15 C RETURN
16 C END
```

FTH4 COMPILER: HF92834 REV.2226 (820503)

++ NO WARNINGS ++ NO ERRORS ++ PROGRAM: 52 COMMON: (NONE)

```
2 SUBROUTINE HPCDR(TH)
3 C
4 C THIS ROUTINE SPECIFIES THE ABSOLUTE DIRECTION IN
5 C WHICH CHARACTERS ARE LETTERED
6 C
7 C TH - ANGLE BETWEEN CHARACTER BASE AND MACHINE X AXIS (DEGREES)
8 C
9 C INTEGER ICHAR(10)
10 C
11 C DEFINE ABSOLUTE CHARACTER DIRECTION COMMAND
12 CALL HPOUT(1HD)
13 CALL HPOUT(1HI)
14 C
15 C SEND RUN VALUE
16 RUN=COS(TH*.0174532925)
17 CALL FP2AS(RUN,10,ICHR,N)
18 N=MIN0(N+4,10)
19 DO 100 I=1,N
20 100 CALL HPOUT(ICHR(I))
21 C
22 CALL HPOUT(1H, )
23 C
24 C SEND RISE VALUE
25 RISE=SIN(TH*.0174532925)
26 CALL FP2AS(RISE,10,ICHR,N)
27 N=MIN0(N+4,10)
28 DO 200 I=1,N
29 200 CALL HPOUT(ICHR(I))
30 C
31 CALL HPOUT(1H; )
32 C
33 RETURN
34 END
```

IN4X COMPILER: HF92834 REV.2226 (820503)

↔ NO WARNINGS ↔ NO ERRORS ↔ PROGRAM: 118 COMMON: (NONE)

```

2 SUBROUTINE HPOSZ(W,H)
3 C
4 C THIS ROUTINE SPECIFIES THE SIZE OF CHARACTERS & SYMBOLS
5 C
6 C W - WIDTH OF CHARACTER IN INCHES
7 C H - HEIGHT OF CHARACTER IN INCHES
8 C
9 INTEGER ICHAR(10)
0 C
1 C DEFINE CHARACTER SIZE COMMAND
2 CALL HPOUT(1HS)
3 CALL HPOUT(1HI)
4 C
5 C CONVERT TO CM & SEND WIDTH VALUE TO PLOTTER
6 CALL FP2AS(W*2.54,10,ICAR,N)
7 N=MING(N+4,10)
8 DO 100 I=1,N
9 100 CALL HPOUT(ICAR(I))
0 C
1 CALL HPOUT(1H.)
2 C
3 C SEND HEIGHT VALUE
4 C CONVERT TO CM & SEND HEIGHT VALUE TO PLOTTER
5 CALL FP2AS(H*2.54,10,ICAR,N)
6 N=MING(N+4,10)
7 DO 200 I=1,N
8 200 CALL HPOUT(ICAR I)
9 C
0 CALL HPOUT(1H)
1 RETURN
2 END

```

49. COMPILER: HP32004 PE 10208 1020500

* NO WARNINGS ** NO ERRORS ** PROGRAM: 110 COMMON: (NONE)

1 FTN. OPTS: LXI 3:32 PM WED., 26 DEC., 1984

SUBROUTINE HPOUT(ICHAR)

```
C
C THIS ROUTINE SENDS OUTPUT TO THE HP-9872T PLOTTER
C
C ICHAR - CHARACTER TO OUTPUT TO PLOTTER
C
C REV 01 SEP 83: MODIFIED TO RUN ON THE FOURIER SYSTEM
C : COMMON STATEMENT REMOVED
C : A CALL TO SUBROUTINE 'PXPCO' ADDED
C
REAL RE(2)
INTEGER IC(100)
DATA ITEM/'035440B'
C
C GET UNIT NUMBER
CALL PXPCO(1,LU,RE,OX,OY,SF,PI,PI)
C
C SAVE CHARACTERS FOR OUTPUT TO PLOTTER
I=I+1
N=I
IC(I)=ICHAR
C
C CHECK FOR TERMINATOR
IF(ICHAR.EQ.ITEM) I=0
IF(I.NE.0) RETURN
C
C OUTPUT CHARACTERS TO PLOTTER
C
I IEND=N-1
WRITE(LU,130) (IC(J),J=1,IEND)
: 130 FORMAT(100R1)
C
C SEND PEN UP COMMAND TO PLOTTER
WRITE(LU,150)
: 150 FORMAT("PU")
C
RETURN
END
```

*X COMPILER: HP92834 REV.2226 (820503)

NO WARNINGS ** NO ERRORS ** PROGRAM: 204 COMMON: (NONE)

DF UPDAT-7K02

1	ISSR	%4SYLB	Y	0
2	Y7001	%Y7001	Y	0
5	HPPEN	%PLTPK	Y	0
7	WHERE	%PLTPK	Y	0
4	PXPCG	%PLTPK	Y	0
4	CGET	%PLTPK	Y	0
1	FACTO	%PLTPK	Y	0
3	HPCS2	%PLTPK	Y	0
0	HPCDR	%PLTPK	Y	0
1	HPPAG	%PLTPK	Y	0
6	PXPCO	%PLTPK	Y	0
3	LINE	%PLTPK	Y	0
3	HFOUT	%PLTPK	Y	0
6	PLOTS	%PLTPK	Y	0
0	FP2AS	%PLTPK	Y	0
7	NUMBE	%PLTPK	Y	0
5	SCALE	%PLTPK	Y	0
7	PLOT	%PLTPK	Y	0
5	AXIS	%PLTPK	Y	0
2	SYMB0	%PLTPK	Y	0
7	Y9000	%Y9000	Y	0

RESS	PGMHAM	LIBHAM	CONTROL	LENGTH
42	AXIS	%PLTPK	Y	01265
27	Y7001	%Y7001	Y	00042
71	ISSR	%4SYLB	Y	00007
00	Y9000	%Y9000	Y	02237
37	PLOT	%PLTPK	Y	00617
56	SCALE	%PLTPK	Y	00475
53	HPPAG	%PLTPK	Y	00201
54	HPPEN	%PLTPK	Y	00056
32	SYMB0	%PLTPK	Y	02012
44	NUMBE	%PLTPK	Y	00377
43	FP2AS	%PLTPK	Y	00370
33	PLOTS	%PLTPK	Y	00336
71	HFOUT	%PLTPK	Y	00313
04	CGET	%PLTPK	Y	00074
00	LINE	%PLTPK	Y	00273
73	PXPCO	%PLTPK	Y	00256
51	HPCDR	%PLTPK	Y	00170
41	HPCS2	%PLTPK	Y	00163
24	FACTO	%PLTPK	Y	00111
35	PXPCG	%PLTPK	Y	00074
31	WHERE	%PLTPK	Y	00057

10

COER T=00004 IS ON CR00022 USING 00006 BLAS R=0000

```
001 @@
002 A,OVRLYN          *OVCOER* 54451-14805 REV. A 08 OCT 83
003 T,SNP510         BASE COMMAND FILE FOR USER OVERLAY GENERATION
004                 INSERT Y COMMAND NUMBERS BEFORE *OE*. AN EXAMPLE:
005                 *O,0077* , WHERE *0077*=4-DIGIT Y COMMAND NUMBER
006 O,7001
007 O,9000
008 OE
009
010                 CSORT+
011                 INSERT PROGRAM LOADS BETWEEN *CSORT+* AND *CSORT-*.
012                 EXAMPLE: *F,Y77JOB* , WHERE *Y77JOB* = FILE NAME
013                 *Y,Y0077* , WHERE *Y0077* = PROG NAME
013 F,%Y7001
014 Y,Y7001
015 F,%Y9000
016 Y,Y9000
017 F,%PLTPK
018 Y,AXIS
019 F,%PLTPK
020 Y,SCALE
021 F,%PLTPK
022 Y,LINE
023 F,%PLTPK
024 Y,PLOTS
025 F,%PLTPK
026 Y,PLOT
027 F,%PLTPK
028 Y,HPPAG
029 F,%PLTPK
030 Y,NUMBE
031 F,%PLTPK
032 Y,SYMB0
033 F,%PLTPK
034 Y,PXPC0
035 F,%PLTPK
036 Y,FACT0
037 F,%PLTPK
038 Y,HPCDF
039 F,%PLTPK
040 Y,HPOUT
041 F,%PLTPK
042 Y,HPPEN
043 F,%PLTPK
044 Y,PXPCG
045 F,%PLTPK
046 Y,WHERE
047 F,%PLTPK
048 Y,CGET
049 F,%PLTPK
050 Y,HPCSZ
051 F,%PLTPK
052 Y,FP2AS
053 F,%4SYLB
054 Y,ISSF
055
056                 CSORT-
056 F,N3500A
057 L,**
058 F,N3501A
059 L,**
060 F,A3060B
061 L,**
062 U,**
063 E,01
064 ::
```

LISTINGS OF THE COMMAND AND THE OVERLAY GENERATION
OF THE GENERAL PLOT PACKAGE EVALUATION PROGRAM Y9000

DATA AND PLOT PRODUCED BY PROGRAM Y9000



PAGE 0004 FTN. 10:58 AM THU., 27 DEC., 1984

0113 END#

0111 C
0112 END

FTN4 COMPILER: HP92060-16092 REV. 2026 (800423)

** NO WARNINGS ** NO ERRORS ** PROGRAM = 01183 COMMON = 00000

```

0056 C
0057 C   DEFINE FOURIER DATA IN BLOCK ZERO
0058     CALL KYBD(2HBS,IBS)
0059     CALL KYBD(2HCL,IBLON)
0060     CALL KYBD(2HRA)
0061 C
0062 C   GET SYSTEM BLOCK SIZE
0063     CALL GETQ(IBLOK,NQUAL)
0064     IF(NQUAL(5).NE.0) WRITE(6,30) (NQUAL(J),J=1,5)
0065 30   FORMAT("ERROR", 5(I6,4X))
0066     BS=NQUAL(1)
0067 C
0068 C   PUT FOURIER DATA INTO X,Y ARRAYS
0069     DO 5 I=1,BS
0070       I1=I-1
0071       CALL GET(IBLOK,I1,DATA1,DATA2)
0072       Y(I)=DATA1
0073       CALL KYBD(2HY ,1800,1,I1)
0074       CALL KYBD(2HY ,1828,2000,1,IBLOK,1)
0075       CALL VGETF(2000,IBUF)
0076       X(I)=XX
0077 5    CONTINUE
0078 C
0079 C   MANUALLY LOAD PAPER ON THE PLOTTER
0080     IF(IPAG.EQ.2 .AND. LU.EQ.30) CALL HPPAG(3)
0081 C
0082 C   PLOT THE DATA
0083 C
0084 C   TURN ON BITS 0-5 OF S-REG TO SIGNAL START OF OPERATION
0085 C   SOME OF THESE BITS WILL BE TURNED OFF DURING THE OPERATION.
0086 C   ALL BITS ON EXCEPT 0-5 - SIGNALS COMPLETION OF PLOT OPERATION.
0087 C
0088     CALL ISSR(77B)
0089     CALL PLOT(1.0,1.0,-3)
0090     CALL SCALE(X,10.0,BS,1)
0091     CALL SCALE(Y,2.0,BS,1)
0092     CALL LINE(X,Y,BS,1,0,0)
0093 C
0094 C   DRAW AND LABEL AXES
0095 C
0096 C   TURN ON BITS 0-1 OF S-REG TO SIGNAL START OF OPERATION
0097     CALL ISSR(7B)
0098     CALL AXIS(0.0,0.0,8HABSCISSA,-8,10.0,0.0,X(BS+1),X(BS+2))
0099     CALL AXIS(0.0,0.0,8HORDINATE,+8,6.0,90.0,Y(BS+1),Y(BS+2))
0100 C   TURN OFF BITS 0-1 OF S-REG TO SIGNAL END OF AXES OPERATION
0101     CALL ISSR(0)
0102 C
0103 C   SIGNAL END OF PLOT OPERATION
0104     CALL ISSR(17700B)
0105 C
0106 C   GET A HARDCOPY
0107     CALL PLOT(0.0,0.0,IP)
0108 C
0109 C   RESET TERMINAL
0110     CALL PLOT(0.0,0.0,11)

```

```

0001 FTN4,L
0002     SUBROUTINE Y9000
0003 C
0004 C     THIS ROUTINE PROVIDES A MEANS OF EVALUATING THE
0005 C     GENERAL PLOT SUBROUTINE PACKAGE ON THE FOURIER SYSTEM.
0006 C
0007     REAL X(130),Y(130)
0008     INTEGER NQUAL(5),IBUF(2),BS
0009     EQUIVALENCE(XX,IBUF)
0010     DATA IBELL/3400B/
0011 C
0012     IBLOK=0
0013     IBS=128
0014 C
0015 C     CLEAR SCREEN AND CLEAR S-REGISTER
0016     CALL Y7001
0017     CALL ISSR(0)
0018 C
0019 C     REQUEST INFORMATION FROM USER
0020 C
0021     WRITE(1,10) IBELL
0022 10    FORMAT(R2,/"INPUT PLOT DEVICE UNIT NUMBER (I2 FORMAT)"/)
0023     READ(1,15) LU
0024 15    FORMAT(I2)
0025     WRITE(1,18) IBELL
0026 18    FORMAT(R2,/"THE PLOT PACKAGE SETS THE SCALE FACTOR TO ONE,"/
0027     *"A FULL PAGE IS ADVANCED AND PEN NUMBER ONE IS"/
0028     *"SELECTED FOR THE PLOTTER.")
0029     WRITE(1,20)
0030 20    FORMAT(/"THESE FEATURES MAY BE CHANGED PROGRAMMATICALLY"/
0031     *"INPUT THE INFORMATION REQUESTED. ")
0032     WRITE(1,26)
0033 26    FORMAT(/"ARE CHANGES DESIRED? ENTER 0 FOR NO; 1 FOR YES")
0034     READ(1,24) ICHG
0035 24    FORMAT(I1)
0036     IF(ICHG.EQ.0) GO TO 1
0037     WRITE(1,21)
0038 21    FORMAT("INPUT DESIRED SCALE FACTOR (F6.3 FORMAT)")
0039     READ(1,22) ISF
0040 22    FORMAT(F6.3)
0041     WRITE(1,23)
0042 23    FORMAT("INPUT PEN NUMBER 1 - 8 (I1 FORMAT)")
0043     READ(1,24) NPEN
0044     WRITE(1,25)
0045 25    FORMAT("INPUT PAGE INFO: 0-FULL;1-HALF;2-MANUAL (I1 FORMAT)")
0046     READ(1,24) IPAG
0047 1     CONTINUE
0048 C
0049 C
0050 C     INITIALIZE PLOT PACKAGE
0051     CALL PLOTS(0.0,LU)
0052     IF(ICHG.NE.0) CALL FACTD(ISF)
0053     IF(ICHG.NE.0) CALL HOPEN(NPEN)
0054     IP=10
0055     IF(IPAG.EQ.1 .AND. LU.EQ.30) IP=-10

```

LISTING OF THE GENERAL PLOT PACKAGE EVALUATION PROGRAM

AND A PLOT OF THE DATA PRODUCED

57 GO TO 400
58 END

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 235 COMMON: (NONE)

```

2      SUBROUTINE FP2AS(FP,NASC,ASC,I)
3 C
4 C      THIS ROUTINE CONVERTS A FLOATING POINT NUMBER TO
5 C      AN ASCII CHARACTER STRING
6 C
7 C      FP - FLOATING POINT VALUE
8 C      NASC - NO. OF CHARACTERS TO BE RETURNED IN ASCII STRING
9 C      ASC - ARRAY IN WHICH ASCII CHARACTER STRING IS RETURNED
10 C     I - NO. OF CHARACTERS TO LEFT OF DECIMAL POINT (OUTPUT)
11 C
12 C     REV 26 JUL 83:  CHANGED 'ALOG10' TO 'ALOGT'
13 C
14      INTEGER ASC(1),IDIG(10)
15      DATA IDIG/1H0,1H1,1H2,1H3,1H4,1H5,1H6,1H7,1H8,1H9/
16      DATA IMI/1H-/,IDP/1H./
17 C
18 C     CHECK FOR MINUS SIGN
19      FPX=ABS(FP)
20      I=0
21      IF(NASC.LT.1) RETURN
22      I=1
23      IF(FP.GE.0.) GO TO 100
24      ASC(I)=IMI
25      IF(I.GE.NASC) RETURN
26      I=2
27 C
28 C     CHECK FOR ABSOLUTE VALUE .GT. 1
29 100   IF(FPX.GE.1.) GO TO 200
30      ASC(I)=IDIG(1)
31      IF(I.GE.NASC) RETURN
32      I=I+1
33      GO TO 300
34 C
35 C     GET NEXT INTEGER DIGIT
36 200   IEXP=ALOGT(FPX)+1.001
37      DO 210 J=1,IEXP
38      II=FPX/10.**(IEXP-J)
39      ASC(I)=IDIG(II+1)
40      IF(I.GE.NASC) RETURN
41      I=I+1
42 210   FPX=FPX-FLOAT(II)*10.**(IEXP-J)
43 C
44 C     PUT IN DECIMAL POINT
45 300   IX=I
46      I=I-1
47      ASC(IX)=IDP
48      IF(IX.GE.NASC) RETURN
49      IX=IX+1
50 C
51 C     GET NEXT FRACTION DIGIT
52 400   II=FPX*10.
53      ASC(IX)=IDIG(II+1)
54      IF(IX.GE.NASC) RETURN
55      IX=IX+1
56      FPX=FPX*10.-FLOAT(II)

```

```
2      SUBROUTINE HPPEN(I)
3 C
4 C      THIS ROUTINE SELECTS A PEN FOR THE HP-9872T PLOTTER
5 C
6 C      I - THE PEN POSITION NUMBER. IT MUST BE AN INTEGER IN THE
7 C      RANGE 0 THROUGH 8.
8 C
9 C      0: DIRECTS THE PEN ARM TO RETURN THE PEN IT IS CURRENTLY
10 C      HOLDING TO ITS STALL
11 C
12 C      1-8: DIRECTS THE PEN ARM TO FETCH THE DESIRED PEN
13 C
14 C      REAL RE(2)
15 C
16 C      GET UNIT NUMBER
17 C      CALL PXPCO(1,LU,RE,OX,OY,SF,PX,PY)
18 C
19 C      SELECT THE DESIRED PEN
20 C      WRITE(LU,100) I
21 100  FORMAT("SP",I1)
22 C      RETURN
23 C      END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 51 COMMON: (NONE)

```
2 SUBROUTINE HPPAG(ISW)
3 C
4 C THIS ROUTINE CONTROLS PAGINATION ON THE HP-9872T PLOTTER
5 C
6 C ISW 1: FULL PAGE ADVANCE
7 C 2: HALF PAGE ADVANCE
8 C 3: MANUALLY PLACE SHEET IN POSITION
9 REAL RE(2)
10 DATA IBELL/003440B/
11 C
12 C GET UNIT NUMBER
13 CALL PXPCO(1,LU,RE,OX,OY,SF,FX,PY)
14 C
15 C CHECK FOR AUTOMATIC PAGE ADVANCE
16 IF(ISW.EQ.3) GO TO 250
17 C
18 C ADVANCE PAPER
19 C
20 C FULL PAGE ADVANCE
21 IF(ISW.EQ.2) GO TO 150
22 WRITE(LU,100)
23 100 FORMAT("AF")
24 RETURN
25 C
26 C HALF PAGE ADVANCE
27 150 WRITE(LU,200)
28 200 FORMAT("AH")
29 RETURN
30 C
31 C MANUALLY LOAD SHEET
32 250 WRITE(1,300) IBELL
33 300 FORMAT(A2,"PLACE NEW SHEET OF PAPER ON PLOTTER.",/
34 *"PRESS (SPACE)(RETURN) TO CONTINUE.")
35 READ(1,350) I
36 350 FORMAT(A1)
37 C
38 RETURN
39 END
```

FTN4X COMPILER: HP92834 REV.2226 (820503)

** NO WARNINGS ** NO ERRORS ** PROGRAM: 141 COMMON: (NONE)

SANTA CLARA DIVISION AUTO OVRLAY GENERATION-6K15

* A,OVRLYN 'OVDBER' 54451-14805 REV. A 06 OCT 83
* T,SNP51C BASE COMMAND FILE FOR USER OVERLAY GENERATION

*ENTER USERCOMMAND NUMBERS, OR TYPE "?"

* INSERT Y COMMAND NUMBERS BEFORE '@E'. AN EXAMPLE:
* '@,0077', WHERE '0077'=4-DIGIT Y COMMAND NUMBER
* @,7001

Y7001
 Y%COM 01075 01075 00434 00435
* @,9000

Y9000
 Y%COM 01074 01074 00436 00437
* @E
 Y%COM 00440 00441
 47440 47440

TYPE "L" TO LOAD USERCOMMAND LIBRARY

* CSORT+
* INSERT PROGRAM LOADS BETWEEN 'CSORT+' AND 'CSORT-'
* EXAMPLE: 'F,Y77JOB', WHERE 'Y77JOB' = FILE NAME
* 'Y,Y0077', WHERE 'Y0077' = PROG NAME
* F,%PLTAK
* Y,AXIS

 AXIS 56442 57726 01066 01073

*LOAD@

*
* F,%Y7001
* Y,Y7001

 Y7001 57727 57770 01063 01065

*LOAD@

*
* F,%4SYLE
* Y,ISSP

 ISSP 57771 57777

92068-1X019 REV.2013 750701

*LOAD@

*
* F,%Y9000
* Y,Y9000

Y9000 60000 62236 01052 01062

*LOAD@

*
* F,%PLTPK
* Y,PLOT

PLOT 62237 63055 01051 01051

*LOAD@

*
* F,%PLTPK
* Y,SCALE

SCALE 63056 63552 01045 01050

*LOAD@

*
* F,%PLTPK
* Y,HPPAG

HPPAG 63553 63753

*LOAD@

*
* F,%PLTPK
* Y,HPPEN

HPPEN 63754 64031 01043 01044

*LOAD@

*
* F,%PLTPK
* Y,SYMB0

SYMB0 64032 66043 01012 01042

*LOAD@

*
* F,%PLTPK
* Y,NUMBE

NUMBE 66044 66442 01010 01011

*LOAD@

*
* F,%PLTPK
* Y,FP2AS

FP2AS 66443 67032

*LOAD@

*
* F,%PLTPK
* Y,PLOTS

PLOTS 67033 67370

*LOAD@

*
* F,%PLTPK
* Y,HPOUT

HPOUT 67371 67703

*LOAD@

*
* F,%PLTPK
* Y,CGET

CGET 67704 67777

*LOAD@

*
* F,%PLTPK
* Y,LINE

LINE 70000 70272

*LOAD@

*
* F,%PLTPK
* Y,PXPCO

PXPCO 70273 70550

*LOAD@

*
* F,%PLTPK
* Y,HPCDF

HPCDF 70551 70740 01006 01007

*LOAD@

*
* F,%PLTFK
* Y,HPCSZ

HPCSZ 70741 71123

*LOAD@

*
* F,%PLTFK
* Y,FACTO

FACTO 71124 71234

*LOAD@

*
* F,%PLTPK
* Y,PXPCG

PXPCG 71235 71330

*LOAD@

*
* F,%PLTPK
* Y,WHERE

WHERE 71331 71407

*LOAD@

*
* CSORT-
* F,N3500A
* L,**

FRMTR 71410 75222 00565 01005
MOD 75223 75242
MXMNI 75243 75356
MXMNR

*LX7

MIN1
75357 75464
DBLE 75465 75516
SNGL 75517 75561
.XPAK 75562 75747
.XCOM 75750 76015 00556 00564
.XFER 76016 76053
ALOGT 76054 76062

*LOAD@

* F,N3501A
* L,**

ABS 76063 76067
.ITOI 76070 76202
.GOTO 76203 76224
IABS 00442 00450

COMPUTED GO TO

*LOAD@

* F,A3060E
* L,**

D.05 00062 00062
" " " 00451 00453
D.06 00060 00060
" " " 00454 00456
D.33 00063 00063
" " " 00457 00461
D.35 00061 00061
" " " 00462 00464
D.76 00055 00055
" " " 00465 00467
I.05 00046 00046
" " " 00470 00471
C.33 00045 00045
" " " 00472 00473

*LOAD@

* U,**

*UNDEFINED SYMBOLS
BLANK DTAD GKPLT

*AVAILABLE MEMORY
76225 76224
00474 00555

*LOAD@

* E,01

*USER LINKS
76225 76233
00556 01777

*OVERLAY SYMBOL TABLE

.BIO. 74637	.DFER 76016	.DIO. 74556 01065, I
.DTA. 74705 01063, I	.GOTO 76203 01051, I	.IAR. 74503
.IAY. 74450	.IIO. 74223 01064, I	.IOI. 74356
.IOR. 74315	.IT01 76070 01015, I	.LDR. 75601
.LST. 70101	.RAR. 74461	.RAY. 74437
.RIO. 74235 01061, I	.XAY. 74406	.XCOM 75750 00656, I
.XFER 76025 00660, I	.XIO. 74252	.XPAK 75562 00635, I
ABS 76063 01011, I	ALOGT 76054 01045, I	AMAX0 75243
AMAX1 75357 01047, I	AMIN0 75255	AMIN1 75371 01046, I
AXIS 56456 01052, I	BCS 70526	BLANK ? ? ? 01233, I
C.33 00472 00045, I	CGET 67707 01037, I	D.05 00451 00062, I
D.06 00454 00060, I	D.33 00457 00063, I	D.35 00462 00061, I
D.76 00465 00055, I	DELE 75465 00613, I	DTAD ? ? ? 01573, I
FACTO 71131 01057, I	FP2AS 66461 01007, I	GKPLT ? ? ? 01234, I
HPCDR 70564 01041, I	HPCSZ 70755 01042, I	HPCUT 67542 01020, I
HPPAG 63560 01055, I	HPPEN 63761 01056, I	I.05 00470 00046, I
IABS 00442 01072, I	ISSR 57771 01062, I	LINE 70006 01053, I
MAX0 75250	MAX1 75364	MIN0 75262 01006, I
MOD 75225 01027, I	NEWIO 74655	NUMBE 66052 01067, I
OLDIO 74662	PLOT 62260 01070, I	PLOTS 67045 01060, I
PXPCG 71240 01030, I	PXPCO 70321 01073, I	SCALE 63074 01054, I
SNGL 75517 00612, I	SYMB0 65104 01066, I	WHERE 71340 01010, I
Y7001 57731 01075, I	Y9000 61017 01074, I	

*LINKS
00556 01777

*AVAILABLE MEMORY
76225 76224
00474 00555

*END

*LOAD@

* : :

"\$" ENCOUNTERED, OVERLAY GENERATION TERMINATED

END

FILMED

9-85

DTIC