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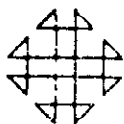


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CONTRIBUTED PROGRAM LIBRARY SUBMITTAL FORM
(for IBM S/360, 1130 and 1800)

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ROUTINE
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- ⑤ Author's Name and Address Maureen Clark
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- ⑰ Abstract (should contain sufficient information for a reader to determine the value of the program). Listed on the reverse side of this form are subjects which may serve as a guide for a descriptive abstract.

CONTRIBUTED PROGRAM LIBRARY SUBMITTAL FORM

Subject Guide

- Purpose
- Programming Language used
- Version and modification level or release number of IBM Programming System used, or program order number for non-IBM authored program used
- Field of application
- Type of routine (main program, subroutine, etc.)
- Specific description of machine requirements
- Engineering Changes (EC) level of equipment (if pertinent)

ABSTRACT

This routine will plot from one to seven dependent variables vs. an independent variable from user-supplied information. PLT360 is on the S/360 Library. All calls from FORTRAN are to PLT. Subroutines PLT1 and PLTW are called by PLT. PLT360 is the OS/360 Assembler language version of the 7040-7094 DCS routines PLT(AM01B), PLT1(AM10A), and PLTW(AM11A), which were major revisions of RW CCP and RW CCP2, written by K. G. Tomikawa and J. R. Blackmer, respectively, in August of 1962, at Space Technology Laboratories, Redondo Beach, California. Total storage required (bytes) is 236C(16) or 9046(10). This program was run on an IBM 360-IH65.

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T4SF

TABLE OF CONTENTS

Card Deck Key Sheet	4
Identification (Write-Up)	5
Contents of Write-Up	5
Acknowledgements	5
General Description	6
Tape or On-Line Plotter Output	7
Storage Requirements	7
Calling Sequence Usage	8
Extended Precision Plotting	21
EBCDIC Codes for Symbols and Special Annotation	22
Overlay Requirements	23
Errors	23
Notes on Title/Annotation Input	23
Multiple Report Plotting	24
Appendix A - Assembly Language Usage	28
Appendix B - Parameter and Work Storage Tables	30
Appendix C - Non-Standard Usage	34
Appendix D - Output Record Size Changes	36
Appendix E - Format of Plot File	37
Assembler Source Listing	39

Deck #1 Assembler Source Deck (PLT360), sequence D0440001 through D0442279 in cc 73-80; 2279 cards.

Identification

PLT360, IBM 1627 Plotting Routine
OS/360 - Assembler
M. Clarke, February 6, 1967
Aerospace Corporation, San Bernardino Operations

Contents of Write-Up

General Description	Page
Tape or On-Line Plotter Output	3
Storage Requirements (bytes)	3
Calling Sequence Usage	4
A. Setup Entrance	5
B. Data Entrance	10
C. Annotation Entrance	11
D. Aerospace Entrance	14
E. Cleanup Entrance	15
F. Terminate Entrance	16
Extended Precision Plotting	17
EBCDIC Codes for Symbols and Special Annotation	18
Overlay Requirements	19
Errors	19
Notes on Title/Annotation Input	19
Multiple Report Plotting	20
A. Calling Sequences for Multiple Report Plotting	20
B. Example for Multiple Report Plotting	22
Appendix A - Assembly Language Usage	24
Appendix B - Parameter and Work Storage Tables	26
Appendix C - Non-Standard Usage	30
Appendix D - Output Record Size Changes	32

Acknowledgment

PLT360 is the OS/360 Assembler language version of the 7040-7094 DCS routines PLT (AM001B), PLT1 (AM10A) and PLTW (AM11A), which were major revisions of RW CCP and RW CCP2, written by K. G. Tomikawa and J. R. Blackmer, respectively, in August of 1962, Space Technology Laboratories, Redondo Beach, California.

General Description

This subroutine is called from FORTRAN programs to generate plots. User's information is assembled and control is passed to PLT1, which generates plotter commands. One plotter command is generated for each 1/100th inch pen movement in vertical, horizontal or diagonal direction. One command is also generated for each pen up or down movement. The plot records are output by PLTW/360, onto a file named PLOTPLT. All plot output generated in one computer run is one file, and will be output to the same tape or on-line plotter.

A maximum of seven dependent variables are permitted as functions of one independent variable. All data must be in floating hexadecimal form in either single precision (4 bytes) or extended precision (8 bytes). Data for any variable must be stored consecutively in core. User's information controls scaling of data and printing of scales and titles. Special annotation and the Aerospace symbol may be written anywhere on the plot to the right of the plot origin at the left hand side of the plot.

Floating point data are scaled to pen deflections as determined by parameters specified in the CALL statements.

A Y data word in which bits 1-4 are all ones (approximately 16^{56}) is treated as a missing point, and a small M is printed at the vertical level of the previous point. This feature might be used to indicate telemetry dropout, etc.

A Y data word which falls off the scale (either above or below) is unconnected to any other data point. If the point is more than a small fraction of an inch off scale, a small W (for wild point) is printed at the margin in line with the wild point. A W is only printed for the first of a series of off-scale points.

The independent variable must be in tabular form in core, stored in consecutive cells. The dependent variables must be stored in a like manner; however, a block of the independent variables and blocks of the dependent variables need not be adjacent storage locations.

Tape or On-Line Plotter Output

The number 1 entry to be opened and the tape to be rewound. (OS/360 rewinds the tape when an OPEN command is given.)

The DDNAME of the plot file is PLOTPLT. The user should refer to current operating procedures for specifying on-line or off-line plotting.

The plot output tape file is written in EBCDIC in 864 character records. Larger or smaller tape records may be written by changing two cards in PLT deck and reassembling PLT. See Appendix D.

Storage Requirements (bytes)

PLT	E24 ₁₆	3620 ₁₀	(including 1728 bytes for buffers)
PLT1	1424 ₁₆	5156 ₁₀	
PLTW	114 ₁₆	276 ₁₀	
Total	232C ₁₆	9046 ₁₀	

Calling Sequence Usage

All fixed point numbers used by the plot routine must be four-byte integers. Six calling sequences are available in PLT. They are:

1. Setup Entrance (required for every plot) which initializes tables within PLT, sets up general information about scales, titles and symbols, and outputs the title and left hand dependent variable scales if required;
2. Data Entrance (optional, but normally used) which scales user's data to his specifications and outputs plot of date;
3. Annotation Entrance (optional) which is called to add special annotation to the plot anywhere to the right of the dependent variable coordinate scales;
4. Aerospace Symbol Entrance (optional) which will add the Aerospace symbol anywhere on the plot to the right of the dependent variable coordinate scales;
5. Cleanup Entrance (required for every plot) which is called at the end of every individual plot to write the independent variable scales, additional dependent variable scales to the right of the plot, and position the plotter pen at the origin point for the next plot; and
6. Terminate Entrance (required) which is called at the end of all plots output in one computer run, to write a message to the operator on the plot file and write an end-of-file.

Calling Sequence Usage (cont)

A. Setup Entrance

CALL PLT(1,N,XO,DX,X,DDX,NF,YO1,DY1,IS1,ISF1,Y1,.....,
NT,TITLE,NTX,XTITLE,NTY1,Y1TITLE,.....)

Where:

- 1 Indicates a setup entrance.
- N Controls the output of plotter information. When $N < 0$, any partially filled buffers are output before PLT returns control to the calling program. When $N \geq 0$, any partially filled buffers are retained in PLT until the next entrance to PLT and filled with subsequent plotter commands. At the end of each plot (cleanup entrance) all information is output.
- XO Starting value of X scale in the same units as data (floating point).
- DX Delta X per inch of plot, given in the same units as data (floating point).
- X FORTRAN name of first value of independent variable (all data are floating point) when $DDX = 0$, each data entrance will plot data beginning at this point of the array and continued forward in the array for the number of points specified. When $DDX \neq 0$, the independent variable values are generated. X will be the first value of the independent variable for a data entrance and the value will be incremented by DDX for each subsequent point in this data entrance. The values plotted will be $\{X, X+DDX, X+2*DDX, X+3*DDX, \dots, X+(NP-1)*DDX\}$ (where NP = Number of points specified in data entrance). X must contain the correct value of the independent variable for the first point of each data entrance at the time the data entrance is given.

Calling Sequence Usage (cont.)

A. Setup Entrance (cont.)

- DDX = 0 when all independent variable values are stored in an array; = the increment between each value of the independent variable when they are to be generated by the routine (floating point).
- NF Number of dependent variables. Extended precision values may be plotted by adding flags to NF. See "Extended Precision Plotting" for exact specification of flags. When single precision data is to be plotted, NF = only the number of dependent variables (integer).
- YO1 Starting value of scale for first dependent variable (floating point).
- DY1 Delta per inch of plot for first dependent variable (floating point).
- IS1 Symbol code for first dependent variable (integer).
 - = 0, no symbol
 - = 1, triangle Δ
 - = 2, inverted triangle ∇
 - = 3, hour glass H
 - = 4, star *
 - = 5, spool L
 - = 6, +
 - = 7, X
- ISF1 = symbol frequency for first dependent variable. Symbol is drawn at first point and every ISF1th point thereafter (integer). A connecting line is drawn between points.
 - = 0; point plot. Data points are not connected and a symbol is drawn at every point.

Calling Sequence Usage (cont.)

A. Setup Entrance (cont.)

Y₁ FORTRAN name of first data point of first dependent variable
 (floating point)

 } Repeat last 5 parameters for each additional dependent
 } variable after first one.

NT Number of EBCDIC characters used for plot title (integer).

TITLE Plot title - may be specified by literal data with number of
 characters equal to NT or specified as an array and input by
 means of a READ statement or a DATA statement. See
 "Notes on Title/Annotation Input."

NTX Number of EBCDIC characters used for independent axis
 title. If NTX = 0, printing of X axis scale and title is sup-
 pressed (integer).

XTITLE X-axis title - may be specified in the same manner as TITLE.
 When NTX = 0, the contents of XTITLE are ignored.

NTY₁ Number (integer) of EBCDIC characters used for title of first
 dependent variable. If NTY₁ = 0, printing of Y₁ axis scale
 and title is suppressed.

Y₁ TITLE Y₁ axis title - may be specified in the same manner as TITLE.
 When NTY₁=0, the contents of Y₁ TITLE are ignored.

 } Repeat last 2 parameters for each additional dependent
 } variable after first one.

Calling Sequence Usage (cont.)

A. Setup Entrance (cont.)

e.g., CALL PLT(1.0, XO, DX, X, DDX, 3, YO1, DY1, IS1, ISF1, Y1, YO2,
 DY2, IS2, ISF2, Y2, YO3, DY3, IS3, ISF3, Y3, 10, 'PLOT
 TITLE', 24, XTITLE, 24, YITITLE, 12, 'Y-AXIS TITLE',
 0, 0)

In the above example, 3 single precision dependent variables are speci-
fied. The plot title is specified in the calling sequence and will read PLOT
TITLE. XTITLE was input by means of a READ statement from a card as
follows:

```
DIMENSION XTITLE(6)
READ(5,100)(XTITLE(I),I=1,6)
100 FORMAT(6A4)
```

YITITLE was specified by means of a Data Statement as follows:

```
DIMENSION YITITLE(6)
DATA YITITLE/'FIRST DEPENDENT VARIABLE'/
```

The title of the second dependent variable will read: Y-AXIS TITLE.

The title and scale of the third dependent variable will not be printed.

The plot file at the return from this setup entrance will result in the
partial plot illustrated on page 9: (YO1=0., DY1=1., IS1=1, YO2=10.,
DY2=-1., IS2=2, YO3=2000., DY3=10., IS3=3).

Calling Sequence Usage (cont.)

A. Setup Entrance (cont.)

Example of plot appearance at end of setup entrance:

PLOT TITLE

10.	0.
9.	1.
8.	2.
7.	3.
6.	4.
5.	5.
4.	6.
3.	7.
2.	8.
1.	9.
0.	10.

First Dependent Variable

Y-Axis Title

The left dependent variable axis line is not drawn if no dependent variable scales are printed on plot.

Calling Sequence Usage (cont.)

B. Data Entrance

CALL PLT(2, NP, K)

Where:

2 Indicates a data entrance.

NP = Number (integer) of points to plot at this time. NP points will be plotted for each dependent variable versus one dependent variable.

At each data entrance the first point is assumed to be at X, Y1, Y2... Ym as specified in setup entrance. Points 2 through NP are plotted from locations directly following the first.

K = 0 if curve of this data is to be connected to data previously plotted on this plot.

= 1 if curve of data from this entrance is not to be connected to curve of data from a previous data entrance.

Calling Sequence Usage (cont.)

C. Annotation Entrance

CALL PLT(3, IX, IY, S, NA, ANNOT)

Where:

- 3 Indicates an Annotation Entrance
- IX Distance in 1/100 inches from left boundary of plotting area to lower left corner of first character (integer).
- IY Distance in 1/100 inches from bottom of paper (30/100 inch below plotting area) to lower left corner of first character (integer).
- S Character height in inches. If size is negative, the print line will be rotated counter clockwise about the XY reference point by 90 degrees (floating point).
- NA Number of Hollerith characters used for annotation.
- ANNOT Characters of annotation to be written on plot. May be specified by literal data or specified as an array and input by means of a READ statement or a DATA statement. See "Notes on Title/Annotation Input."

The EBCDIC information is printed on the plot as specified. Distance between character centers is the same as character height. Several non-Hollerith characters can be printed with the hexadecimal codes shown below.

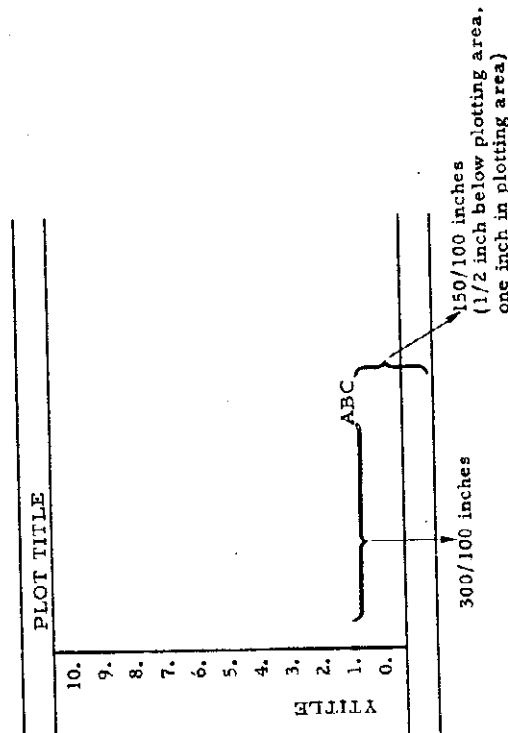
A	4F	Plot Symbols	—	5F	Suitable for drawing an axis.
V	50		—	6D	Used to extend tail of arrow.
^	4C		←	7B	
*	6F		→	7C	
□	5A				
+	6A				
X	6C				

Calling Sequence Usage (cont.)

C. Annotation Entrance (cont.)

Example of Horizontal Annotation for

CALL PLT(3, 300, 150, .5, 3, 'ABC')

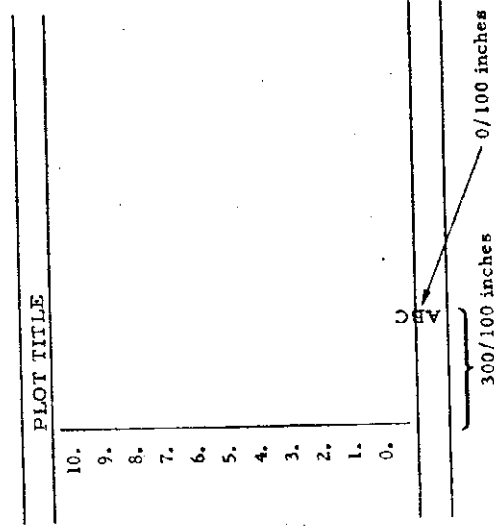


Calling Sequence Usage (cont.)

C. Annotation Entrance (cont.)

Example of Vertical Annotation for

CALL PLT(3, 300, 0, -.5, 3, 'ABC')



Calling Sequence Usage (cont.)

D. Aerospace Symbol Entrance

CALL PLT(4, MX, MY, SI)

Where:

4 Indicates Aerospace symbol entrance.

MX Distance in 1/100 inches from left boundary of plotter area to lower left corner of Aerospace symbol (integer).

MY Distance in 1/100 inches from bottom of paper (50/100 inches below plotting area) to lower left corner of Aerospace symbol (integer).

SI Is size in inches (floating point).

Calling Sequence Usage (cont.)

E. Cleanup Entrance

CALL PLT(5,IRSC,PLOTIM)

Where:

- 5 Indicates a cleanup entrance.
- IRSC Test value for right hand scale option (integer). IRSC is compared to the actual number of inches of plot. When the number of inches of plot is greater than IRSC right hand scales are also drawn.

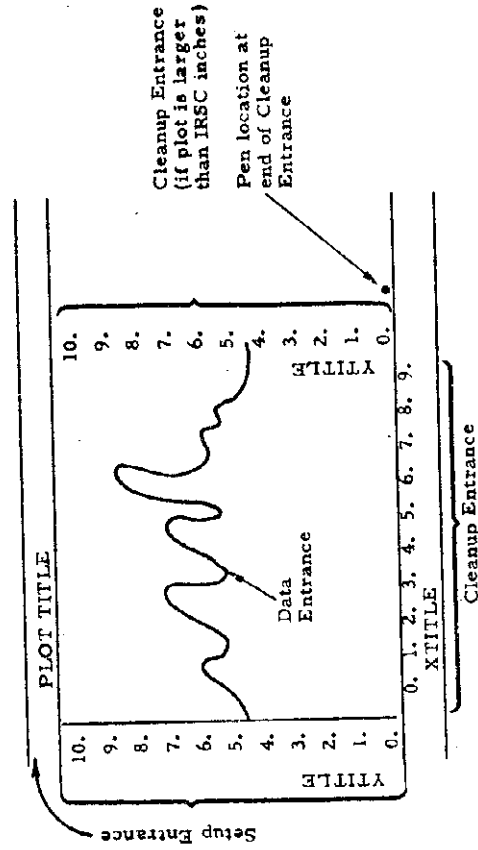
PLOTIM The routine reports the IBM 1627 plotting time in minutes through this location. This parameter should be printed off-line as a guide to estimated plot time (floating point).

If the plot occupies more than IRSC inches of paper, the independent scales and titles will be printed at the right-hand edge. The independent variable scale and title are printed in the bottom margin. The pen is moved to the home position of the next plot. The plot address is increased by one.

Calling Sequence Usage (cont.)

E. Cleanup Entrance (cont.)

Example of plot appearance at end of cleanup entrance.



F. Terminate Entrance

CALL PLT(6)

Where:

- 6 Indicates a terminate entrance.

This entrance writes a message to the plotter operator on the plot file, writes an end of file and closes the plot file. This must be the last entrance to PLT for one computer run.

Extended Precision Plotting

Extended precision data may be plotted by adding flags to NF (setup entrance). All the variables may be in extended precision, or some may be extended and some single precision. The following values must be added to NF to specify extended precision.

- Independent variable (X). Add $2^3 = 8$
- First dependent variable (Y1). Add $2^{3+1} = 16$
- Second dependent variable (Y2). Add $2^{3+2} = 32$

Seventh dependent variable (Y7). Add $2^{3+7} = 1024$

Examples

Number of Dependent Variables to Be Plotted	Single Precision Variables	Extended Precision Variables	NF
3	None	X, Y1, Y2, Y3	$3+2+3+2+4+2+5+2+6$
3	X, Y1, Y2	Y3	$3+2+6$
7	Y1, Y2, Y3, Y4, Y5	X, Y6, Y7	$7+2+3+2+9+2+10$
7	All	None	7
1	None	All	$1+2+3+2+4$

EBCDIC Codes for Symbols and Special Annotation

EBCDIC codes for all letters and numbers are normal EBCDIC codes;

i.e., A C1
B C2
etc.
1 F1
2 F2
etc.

Special Symbols

blank	40 or CO (either is acceptable)	*	6F
.	4B period	.	plot symbol
X	4C plot symbol	—	7B arrow
(4D left parenthesis	—	7C arrow
+	4E plus sign	—	7D prime (apostrophe)
Δ	4F plot symbol	=	7E equal sign
V	50 plot symbol	Ⓐ	7F Aerospace symbol
Π	5A plot symbol		
\$	5B dollar sign		
*	5C asterisk		
)	5D right parenthesis		
w	5E wild point		
—	5F axis line		
-	60 minus sign		
/	61 slash		
+	6A plot symbol		
.	6B comma		
X	6C plot symbol		
—	6D arrow tail extension		
M	6E missing data flag		

Overlay Requirements

Overlay is possible between completed plots for PLT and PLT1. PLTW must be included with the main link because of the method by which OS/360 defines DDNAMES and OPEN files.

Errors

The following errors are recognized by PLT:

1. Illegal call codes (any number other than 1, 2, 3, 4, 5, 6);
2. Error in sequence of calls (setup entrance 1 must be given before any other entrance); and
3. Number of functions less than 1 or greater than 7.

Notes on Title/Annotation Input

Titles in setup entrance and all annotation may be input in several ways.

They may be included in the calling sequence as:

.....NA, 'XX...XXX'
i.e.,10, 'ANNOTATION' , where the title is ANNOTATION

Titles may be input by means of READ statements or DATA statements.

Four EBCDIC characters will fill one full word.

```
..... NA, TITLE....
i.e., DIMENSION TITLE1(3) TITLE2(3)
      DATA TITLE2/'ANNOTATION2'/
      READ(5,1)TITLE1
      1 FORMAT(3A4)
      CALL PLT (----,10, TITLE1, ---)
      CALL PLT (----,12, TITLE2, ---)
```

Multiple Report Plotting

Multiple report plotting enables a user to generate several plots simultaneously. The resultant plots will be identical to normal sequential plots. One useful application of these routines would be where large amounts of data are generated (either read from tape or computed) and several separate plots are needed of data generated simultaneously. In this case a setup entrance must be given for each of the desired plots, then, as small amounts of data are generated, data entrances may be given for each separate plot. When all data and special annotations are complete, a cleanup entrance is given for each plot. One terminate entrance should be given at the completion of all plots. Any number of plots may be written concurrently. However, each multiple report code causes a complete pass by the output processor of the operating system over all plots written by one program. Therefore, plotting time may increase when a large number of multiple report codes are used. Codes may be re-used for subsequent plots after the cleanup entrance is given. Any combination of plot entrances may be given. However, a multiple report code must be reserved for one plot until the cleanup entrance for that plot is finished.

The first parameter in the calling sequences to PLT must be negative for multiple reports, and two additional parameters are needed.

A. Calling Sequences for Multiple Report Plotting

1. Setup Entrance

```
CALL PLT(-1,A,B,n,XO,DX,DX1,DDX,nf,YO1,DY1,IS1,ISF1,
          Y1,...,YOM,DYM,ISm,ISFm,YM,NT,TITLE,NTX,
          XTITLE,NTY1,Y1TITLE,....)
```

Multiple Report Plotting (cont.)

A. Calling Sequence for Multiple Report Plotting (cont.)

- 1 Indicates a multiple report setup.
- A = location which contains multiple report characters. The first character must be a comma. The second and third characters designate the plot and distinguish it from other multiple report plots. A fourth character is not used.
- B = name of an array which is used by PLT to save plot information. This information must not be changed by the user between setup and cleanup entrances. B must be dimensioned as:
15+8*NF words (4 bytes per word)
[For one dependent variable B is dimensioned B(23); for two, B(31); for seven, B(71); etc.]

The remaining parameters remain the same as in normal usage.

2. Data Entrance

CALL PLT(-2,A,B,NP,K)

- 2 Indicates a data entrance

A Same as setup entrance for multiple report plot.

B Same as setup entrance for multiple report plot.

NP, K } Remain the same as for non-multiple report plot.

3. Annotation Entrance

CALL PLT(-3,A,B,IX,IY,S,NA,ANNOT)

4. Aerospace Symbol Entrance

CALL PLT(-4,A,B,MX,MY,SI)

Multiple Report Plotting (cont.)

A. Calling Sequence for Multiple Report Plotting (cont.)

5. Cleanup Entrance

CALL PLT(-5,A,B,IRSC,PLOTIM)

6. Terminate Entrance

CALL PLT(-6,A,B)

or

CALL PLT(6)

Multiple report designation is not necessary for the terminate entrance.

B. Example for Multiple Report Plotting

Example: Read 20000 data points from cards

Plot Y vs X, Z and Q vs X

DIMENSION B(23),D(31),X(100),Y(100),Z(100),Q(100)

DATA A,C/,'AA','BB'/

CALL PLT(-1,A,B,15,0,1,1,X,0,1,0,1,1,1,1,Y,5,'TITLE',6,
'X-AXIS',6,'Y-AXIS')

CALL PLT(-1,C,D,15,0,1,1,X,0,2,0,1,1,1,Z,0,1,1,2,1,Q,5
'TITLE',6,'X-AXIS',6,'Z-AXIS',6,'Q-AXIS')

J=0

Z DO I I=1, 100

1 READ(5,100)X(I),Y(I),Z(I),Q(I)

100 FORMAT(4F10.5)

CALL PLT(-2,A,B,100,0)

CALL PLT(-2,C,D,100,0)

J = J + 100

IF (J .LT. 20000) GO TO 2

Multiple Report Plotting (cont.)

B. Example for Multiple Report Plotting (cont.)

```
CALL PLT(-5,A,B,10,PLOTIM)
CALL PLT(-5,C,D,10,PLOTIM)
```

```
CALL PLT(6)
```

```
STOP
END
```

Appendix A - Assembly Language Usage

PLT may be called from Assembler language programs with CALL PLT(...) as in FORTRAN. Alternatively, PLT may be bypassed and PLTW and PLTI may be called directly from an Assembler language program. However, direct calls to PLTI and PLTW require:

1. Setting up a parameter table, PLTTBL, as described in Appendix B before the setup entrance to PLTI;
2. Setting up work storage table as described in Appendix B; and
3. Calling in sequence -

At beginning of all plots
PLTWSET(SETUP IO)

For each plot

PLTI(SETUP)

Any combination of data, change table, and annotation entrances to PLTI

PLTI(CLEANUP)

At end of all plots

PLTI(TERMINATE)

PLTWTERM(CLOSE IO)

4. IO Call Requirements -

PLTWSET

L 15,=V(PLTWSET)

BALR 14,15

PLTWTERM

L 15,=V(PLTWTERM)

BALR 14,15

Appendix A - Assembly Language Usage (cont)

5. PLT1 Call Requirements -

Register 13 contains the address of work storage table.

Register 1 contains the calling code;

- 1 = SETUP
- 2 = DATA
- 3 = ANNOTATION
- 5 = CLEANUP
- 6 = TERMINATE
- 7 = CHANGE TABLE

Example - Setup Entrance

```

L      15,=V(PLT1)
LH     1,H'1'
LA     13,=A(TABLE2)
BALR   14,15

```

```

TABLE2 DS 18F
DC     A(PLTTBL)
DC     CL'4',...
DS     IF
DC     H'1'
DC     H'0'
DC     F'0'
DC     A(PLOTID)
DC     4F
DS     D'0',D'0',D'0'
DC     D'0',D'0',D'0'
DC     D'0',D'0',D'0'
DC     D'0'
DC     H'864'
DC     H'0'
DC     A(TABLE2+408)
DS     26D
DS     CL1728
PLOTID DC CL20'PLOT NUMBER'

```

Appendix B - Parameter and Work Storage Tables

Parameter Table - Setup on full word boundary:

PLTTBL	+0	A	Address of plot title
	+4	H	Number of characters in plot title
	+6	C	=0 No grid =1 1" grid drawn over plotting area
	+7	C	=X'00' Floating point data =X'F0' All data is prescaled to plotter increments with origin at lower left corner of plotting area.
	+8	H	=1 Means 4 bytes between addresses of successive independent variable data points =2 Means 8 bytes between addresses =3 Means 12 bytes, etc.
	+10	H	Number of dependent variables
	+12	A	Location of XO (floating)
	+16	A	Location of DX (floating)
	+20	A	Location of DDX (floating)
	+24	A	Location of first data point in independent variable array
	+28	A	Location of X title
	+32	H	Number of characters - X title
	+34	C	=X'00' Do not print X scale =X'0F' Print X scale
	+35	CL25	Set to zero before setup entrance to PLT1
	+60	A	Location of YO (floating)
	+64	A	Location of DY ₁ (floating)
	+68	A	Location of first data point of first dependent variable
	+72	H	Symbol frequency (integer)
	+74	C	Symbol code - Hex code for symbol of first dependent variable

Appendix B - Parameter and Work Storage Tables (cont.)

Appendix B - Parameter and Work Storage Tables (cont.)

+75	C	Off scale treatment and Y_1 scale ' $X_1 X_2$ ' First HEX character (X_1) =0 Wild point =1 Mirror image of off scale data is plotted =2 Off scale data is plotted mod 10 inches
		Second HEX character =0 Do not print scale =F Print Y_1 scale
+76	A	Location of Y_1 TITLE
+80	H	Number of characters - Y_1 TITLE
+82	H	Delta Storage - Y_1
+84	CL8	Set to zero before setup entrance to PLT1
+92		Repeat data in PLTTBL+60 to PLTTBL+91 for second dependent variable
+123		
		Repeat for last dependent variable
		+60*(32*(NF-1)) to +60*(32*(NF))-1
		Maximum size - 284 bytes (71 full words)

Call parameters and Work Storage Table - 408 bytes + BUFFER

Double word boundary.

TABLE2	+0	18F	Used by PLT1 to store register contents
	+72	A	Location of PLTTBL
	+76	CL4	Multiple report characters-normally...b- however, the second and third position may be another report designator (e.g., XXb)
	+80		Unused
	+84	H	Number of this plot - Used in PLOT ID record
	+86	CL2	Initially contain zero
	+88	F	Count of words output stored by routine - Should be zero initially

PLT1 Setup Parameter

+92	A	Location of PLOT ID (20 characters)
-----	---	-------------------------------------

PLT1 Data Parameters

+92	F	Base address of data (added to address of all data locations)
+96	H	Number of points this entrance.

PLT1 Change Table Parameter

+100	F	New table address (used to suppress curve connection between data entrances)
------	---	--

PLT1 Annotation Entrance

+92	A	Location of characters
+96	E	Size (floating)
+100	H	Number of characters
+102	H	DX
+104	H	IY

Appendix B - Parameter and Work Storage Tables (cont)

PLT1 Cleanup Entrance		
+92	H	IRSC
+96	A	Location of PLOTIM
+112		General storage used by PLT1 (TABLE+112 to TABLE+204 must be set to zero before the setup entrance with the following two exceptions.)
+192	H	Size of single buffer
+196	A	Location of first byte of double buffer (Table+408)
+408		Buffer (1728 characters)

Appendix C - Non-Standard Usage

- Any usage of PLT other than that specified in the calling sequence must be implemented by changing the parameter table in PLT. (See Appendix B). An entry is available in PLT for this purpose (PLTTBL). However, with the exception of "8," these changes must be made after the setup entrance by means of an assembler language subroutine. Some of the non-standard usages which may be desired are:
- Grid (A one inch grid is drawn on the plot when the cleanup entrance is made. This grid covers the complete plotting area from the left-hand to the right-hand dependent variable scales. This may be added anytime before the cleanup entrance. See PLTTBL+6.)
 - Prescaled data (Data is given to PLT already scaled in 100th inches referenced to the lower left corner of the data field, which is 1/2 inch above the bottom of the paper and to the right of the left-hand dependent variable scales. This may be specified before any data entrance. See PLTTBL+7.)
 - Storage of data (Data is stored in non-consecutive bytes, but at a constant increment. See PLTTBL+8.)
 - Location of data arrays.
 - Symbol frequency (PLTTBL+72)
 - Symbol (The symbol code itself must be added, not the number of the symbol. PLTTBL+74.)
 - Titles (However, left-hand dependent variable titles and plot title are output by the setup entrance, so changes will have no effect.)
 - XO, DX, YO, DY may be changed in mid-plot merely by changing the number stored in these locations. Any subsequent data scaling and scale values printed will reflect the new values. No assembler language subroutine is required for these changes.

Appendix C - Non-Standard Usage (cont.)

A change to storage of data, location of data arrays, symbols and symbol frequency must be made for each variable desired before the affected data entrance is made. Changes to grid and titles may be made at any time before the cleanup entrance.

The following example changes the locations of the independent variable and the first dependent variable arrays.

```

$FORT
DIMENSION X1(100), Y1(100), X2(100), Y2(100)
REWIND9
READ(9)(X1(I), Y1(I), X2(I), Y2(I), I=1, 100)
READ(5, 100) XO, DX, YO, DY
CALL PLT(1, 0, XO, DX, X1, 0, 1, YO, DY, 1, 1, Y1, 5, 'TITLE', 1, 'X',
1, 'Y')
CALL PLT(2, 100, 1)
CALL CHANGE(X2, Y2)
CALL PLT(2, 100, 1)
CALL PLT(5, 10, PLOTIM)
CALL PLT(6)
100 FORMAT(4F10.0)
STOP
END

```

```

/*
$ASM
ENTRY
USING 2, 15
STM 2, =V(PLTTBL)
L 3, 0(1)
L 3, 24(2)
L 3, 4(1)
L 3, 68(2)
LM 2, 3, TEMPSTOR
BC 15, 14
DS 2F
END

```

Store contents of registers to used.
Address of plot table.
Address of independent variable array.
Store PLTTBL+24
Address of dependent variable array.
Store PLTTBL+68
Restore registers.
Return

Appendix D - Output Record Size Changes

The size of records on the plot file may be changed by changing two cards in PLT and re-assembling PLT.

Normal record size is 864 characters. In most cases, smaller record sizes will decrease, and larger sizes will increase efficiency. The minimum record size is 30 characters/buffer. Maximum is 864 characters/buffer for on-line plotting and 1140 characters/buffer for off-line plotting.

The cards in PLT which must be changed to alter record size are:

```

DC CL1728 (864C*2)
BUFCT EQU 864

```

These cards must be changed to the following:

```

DS 2*RECORD SIZE
BUFCT EQU RECORD SIZE

```

i.e., for 950 character records

```

DS CL1900
BUFCT EQU 950

```

These cards are sequenced, columns 73-80, D0440431 and D0440432 in the source deck that is on file in the MCC Program Library.

Appendix E - Format of Plot File

All information output by PLT360 for all plots during one computer run is contained in one physical file. The file contains two types of records; operator information records and plotter command records. All records are 864 bytes in length. When the plot information does not fill 864 bytes, the hexadecimal characters 'FF' are inserted in the byte following the plot information to designate the end of the logical record. Any information following the 'FF' is to be ignored. The initial six bytes of each physical record are control characters of the form ,XXXXGY (EBCDIC code) where:

is present as the first EBCDIC character of each record.

XXX are multiple report designator bytes. These are input to PLT360 by the calling program when multiple report plotting is used. Under nonmultiple report usage these are the EBCDIC characters: , , b or , , 1. The END OF PLOT TAPE record always contains the hexadecimal characters FFFFE1 in this field.

G is present as the fifth EBCDIC character of each record:

Y may be either T or G. T designates that the remainder of this record is operator information and is to be sent to the typewriter. G designates that the remainder of this record contains plotter commands.

An operator information record is output at the beginning of each plot and at the end of all plots. These are in EBCDIC character code.

,XXXXGTIPLOT NUMBER NNN (NNN contains the number of this plot beginning with 001 for the first plot of the computer run.)

,XXXXGTEND OF PLOT TAPE (This record is followed by an end of file mark.)

Plotter command records begin with the six bytes: ,XXXGG.

The remainder of these records contains EBCDIC plotter commands.

Appendix E - Format of Plot File (cont)

When the last buffer is not full, the hexadecimal characters 'FF' are inserted immediately following the last plotter command. The remainder of the information is to be ignored.

The following codes are output as plotter commands.

HEX	PEN DOWN	HEX	
F0	+Y	F5	-Y
F1	+X+Y	F6	-X-Y
F2	+X	F7	-X
F3	+X-Y	F8	-X+Y
F4		F9	PEN UP

+Y is pen movement toward the top of the paper.

+X is drum movement in the direction of the take-up spool.

```

* ROUTINE TO PLOT 1-7 DEPENDENT VARIABLES VS INDEPENDENT VAR
* CALL SEQUENCE - FROM FORTRAN - ALL ADDRESSES USE 4 BYTES
* SETUP CALL PLT(1,TAPE NO,XO,DX,XINCR,ROUTINE GEN X1 OR 0,NF,
*          YO1,DY1,IS1(SYMBOL CODE OR 0-NO SYMBOL),
*          ISF1(SYMBOL FREQ OR 0-POINT PLOT),Y
*          .....YON,DYN,ISN,ISFN,YN,NT(NUMBER BCD CHAR-TITLE)
*          ,TITLE,NTX,XTITLE,NTY1,YITITLE.....NTYN,YNTITLE)
*
* DATA CALL PLT(2,NO OF POINTS,KI=1,DO NOT CONNECT TO PREV DATA
*          =0,CONNECT CURVE))
*
* ANNOTATION CALL PLT(3,IX(DISTANCE FROM LEFT MARGIN,1/100 INCHES),
*          IY(DISTANCE FROM BOTTOM OF PAPER),
*          SIZE IN INCHES(1IF NEG,VERTICAL),NA(NO OF CHAR),
*          CHARACTERS)
*
* AEROSPACE CALL PLT(4,IX,IY,SIZE)
*
* CLEANUP CALL PLT(5,IRSC(1IF PLOT LENGTH IS GREATER THAN IRSC,
*          A RIGHT SCALE IS DRAWN),PLOT TIME(A LOCATION TO
*          BE FILLED BY PLT))
*
* TERMINATE CALL PLT(6) (WRITES AN END OF FILE ON PLOT TAPE,
*          REWINDS AND UNLOADS)
*
PLT START 0
ENTRY PLTTBL
EXTRN PLTWTERM,PLTWSET,PLTI
USING *,15
BC 15,**8
DC CL3'PLT'
DC X'3'
STM 14,12,12(13)
LR R12,13

```

039

```

LA 13,MISC
ST 13,8(0,R12)
ST R12,REG+4(0,13)
USING PLT,R12
DROP 15
LR R12,15
PLTS3 ST 15,0(0,R13) A(PLT)
L R2,0(0,R1)
TM 0(R2),X'80' TEST-MULTIPLE REPORT
L R2,0(0,R2)
BC 1,MPL1 YES-MPLE REPORT-TRA
L R6,MPLCHR NO-PICKUP NORMAL MPLE REPORT
LA R5,TABLE
BC 15,PLTS5
MPLE1 L R3,4(0,R1)
L R6,0(0,R3)
TM 0(R3),XCOM IS FIRST CHAR COMMA
BC 1,MPL2 YES-BRA
LR R7,R6
IC R6,COMMA
SLDL R6,24(0)
ST 1,MPL(0,R13)
LA 1,MPLMSG
BAL 14,ERROR1
L 1,MPL(0,13)
MPLE2 L R5,8(0,R1) TABLE ADDRESS
LPR R2,R2
AH R1,EIGHT
PLTS5 TM PLTTBL+SETFG,X'80' PREV SETUP-FILE OPEN
BC 7,PLTS1 YES
CH 2,ONE NO-IS THIS SETUP ENT
BC 8,PLTS1 YES
BC 15,SETERR NO-ERROR
PLTS1 CH R2,SIX
BC 2,ERCALL GT SIX, ERROR
BC 4,PLTS2 LT SIX

```

040

	L	R6,ZZ		D0440073
PLTS2	ST	R5,TBL(0,R13)		D0440074
	ST	R6,MPL(0,R13)		D0440075
	MM	R2,FOUR		D0440076
	BC	15,#+4(R2)		D0440077
	BC	15,ERCALL		D0440078
	BC	15,SETUP		D0440079
	BC	15,DATA		D0440080
	BC	15,ANNO		D0440081
	BC	15,AERO		D0440082
	BC	15,CLEAN		D0440083
	LH	R1,SIX		D0440084
	L	15,LPLT1	TERM	D0440085
	BALR	14,15	PLT1 TERM R2,SIX	D0440086
	USING	*,14		D0440087
	L	15,L10TERM		D0440088
TERM1	BALR	14,15		D0440089
	USING	*,R14		D0440090
	L	R12,LPLT		D0440091
	USING	PLT,R12		D0440092
	DROP	14		D0440093
	MVI	PLTTBL+SETFG,X'00'	CLEAR SETUP FLAG,FILE CLOSED	D0440094
	BC	15,PLTRTN		D0440095
SETUP	L	R15,L10SET		D0440096
	BALR	R14,R15		D0440097
	USING	*,R14		D0440098
	L	R12,LPLT		D0440099
	USING	PLT,R12		D0440100
	DROP	14		D0440101
	STC	11,SETFG(R5)		D0440102
	STC	11,PLTTBL+SETFG	SET FLAG	D0440103
	TH	SETFG(R5),X'80'		D0440104
	BC	1,SET1		D0440105
	LA	2,TABLE		D0440106
	LA	3,MISC		D0440107
	LH	4,ONE		D0440108

041

PLTS4	MVI	0(2),X'00'		D0440109
	AR	2,4		D0440110
	CLR	2,3		D0440111
	BC	4,PLTS4		D0440112
	LA	3,ENDMISC		D0440113
	AM	2,EIGHTY		D0440114
	CLR	2,3		D0440115
	BC	4,PLTS4		D0440116
SET10	ST	R5,TBL(0,R13)		D0440117
	ST	R6,MPL(0,R13)		D0440118
	OI	PLTTBL+SETFG,X'80'	SET FLAG	D0440119
	OI	SETFG(R5),X'80'	SET FLAG	D0440120
	SR	R6,R6		D0440121
	STH	R6,PLOTND(0,R13)		D0440122
SET1	LA	R6,PLOTID		D0440123
	ST	R6,PADR(0,R13)	PLOT ID	D0440124
	LA	R2,PLTTBL		D0440125
	CR	R2,R5		D0440126
	BC	7,SET11		D0440127
	L	R2,4(0,R1)	FLAG CLEAR BUF	D0440128
	TH	0(R2),X'80'		D0440129
	BC	1,SET11	YES	D0440130
	MVI	CLNBUF(R5),X'00'	NO-DO NOT CLEAR BUF BEFORE RETURN	D0440131
	BC	15,SET12		D0440132
SET11	MVI	CLNBUF(R5),X'80'	CLEAR BUF	D0440133
SET12	L	R2,8(0,R1)	XD LOC	D0440134
	ST	R2,X0(0,R5)		D0440135
	L	R2,12(0,R1)	DX LOC	D0440136
	ST	R2,DX(0,R5)		D0440137
	L	R2,20(0,R1)	DDX LOC	D0440138
	ST	R2,DDX(0,R5)		D0440139
	L	R4,16(0,R1)	X LOC	D0440140
SET2	ST	R4,X(0,R5)	STORE X	D0440141
	NI	GRID(R5),X'0'	NO GRID	D0440142
	NI	PRESCL(R5),X'00'		D0440143
	L	R2,24(0,R1)	NF LOC	D0440144

042

	L	R3,0(0,R2)	NF	D0440145
	ST	R3,PLTTMP(0,R13)		D0440146
	N	R3,X07		D0440147
	ST	R3,DELTX(0,R5)	SH 0 IN DEKT,SH NF IN NF	D0440148
	AH	R1,TWNEG	LDC Y01,PARAM	D0440149
	SR	R4,R4		D0440150
SET3	L	R2,0(0,R1)	Y0 LOC	D0440151
	ST	R2,YU(R4,R5)		D0440152
	L	R2,4(0,R1)		D0440153
	ST	R2,DY(R4,R5)	DY LOC	D0440154
	L	R2,8(0,R1)		D0440155
	L	R6,0(0,R2)	SYMBOL	D0440156
	IC	R6,SYMGDD(R6)		D0440157
	STC	R6,YSYM(R4,R5)		D0440158
	L	R2,12(0,R1)		D0440159
	L	R6,0(0,R2)	SYM FREQ	D0440160
	STH	R6,SYMFREQ(R4,R5)		D0440161
	L	R2,16(0,R1)		D0440162
	ST	R2,Y(R4,R5)		D0440163
	AH	R1,TWNTY		D0440164
	AH	R4,YSTOR		D0440165
	BCT	R3,SET3	ALL FUNC FINISHED	D0440166
	L	R2,0(0,R1)	YES	D0440167
	L	R3,0(0,R2)	NI	D0440168
	STH	R3,NT(0,R5)		D0440169
	L	R2,4(0,R1)	TITLE LOC	D0440170
	ST	R2,TITLE(0,R5)		D0440171
	L	R2,8(0,R1)		D0440172
	L	R3,0(0,R2)	NTX	D0440173
	N	3,X7FFF		D0440174
	BC	7,SET4	NO-TRA	D0440175
	STH	R3,NTX(0,R5)	YES	D0440176
	ST	R3,XTITLE(0,R5)		D0440177
	STC	R3,SUPXSC(0,R5)		D0440178
	BC	15,SET5		D0440179
SET4	STH	R3,NTX(0,R5)	NTX	D0440180

043

	L	R2,12(0,R1)		D0440181
	ST	R2,XTITLE(0,R5)		D0440182
SET5	DI	SUPXSC(R5),X'0F'	DO NOT SUPPRESS SCALE	D0440183
	L	R6,PLTTMP(0,R13)	NF AND FLAGS FOR DBL PREC	D0440184
	SRL	R6,3(0)		D0440185
	SR	R7,R7		D0440186
	SRDL	R6,1(0)		D0440187
	LTR	R7,R7	TEST X PRECISION	D0440188
	BC	8,*+12		D0440189
	DI	DELTX+1(R5),X'2'		D0440190
	BC	15,*+8		D0440191
	DI	DELTX+1(R5),X'1'		D0440192
	AH	R1,SIXTEN	INCR PARAM	D0440193
	LH	R3,NF(0,R5)	COUNT	D0440194
	SR	R4,R4		D0440195
SET9	L	R2,0(0,R1)		D0440196
	L	R8,0(0,R2)	NTY	D0440197
	N	8,X7FFF		D0440198
	STH	R8,NTY(R4,R5)		D0440199
	BC	7,SET6	NO	D0440200
	ST	R8,YTITLE(R4,R5)	YES-NO TITLE,SCALE	D0440201
	BC	15,SET7		D0440202
SET6	L	R2,4(0,R1)		D0440203
	ST	R2,YTITLE(R4,R5)		D0440204
	L	R8,X0F		D0440205
SET7	STC	R8,SUPYSC(R4,R5)		D0440206
	SR	R7,R7		D0440207
	SKDL	R6,1(0)		D0440208
	LTR	R7,R7		D0440209
	BC	8,*+12		D0440210
	LH	R7,TWO		D0440211
	BC	15,*+8		D0440212
	LH	R7,ONE		D0440213
	STH	R7,DELTY(R4,R5)		D0440214
SET8	AH	R1,EIGHT		D0440215
	AH	R4,YSTOR		D0440216

044

	BCT	R3,SET9	GO BACK IF MORE Y'S	D0440217
	LH	R1,PLOTNO(0,R13)	INCR PLOT NO	D0440218
	AH	R1,ONE		D0440219
	STH	R1,PLOTNO(0,R13)		D0440220
	LH	R1,ONE		D0440221
	LA	R7,BUFCT(0,0)		D0440222
	STH	R7,FULLCT(0,R13)		D0440223
	LA	R7,BUFF(0,R13)		D0440224
	ST	R7,BFSTRT(0,R13)		D0440225
	L	R15,LPLT1		D0440226
	LA	R14,PLTRTN	RETURN	D0440227
	BCR	15,R15		D0440228
DATA	TM	SETFG(R5),X'80'	HAS SETUP BEEN DONE	D0440229
	BC	8,SETERR	NO	D0440230
	L	R2,4(0,R1)	YES	D0440231
	L	R3,0(0,R2)		D0440232
	STH	R3,NP(0,R13)	NUMBER OF POINTS	D0440233
	SR	R2,R2		D0440234
	ST	R2,BASADR(0,R13)		D0440235
	L	R2,8(0,R1)		D0440236
	L	R3,0(0,R2)		D0440237
	LTR	R3,R3	REDEFINE	D0440238
	L	R15,LPLT1		D0440239
	BC	8,DATA1	NO	D0440240
	LH	R1,SEVEN		D0440241
	ST	R5,NEWTBL(0,R13)		D0440242
	BALR	14,15		D0440243
	USING	*,R14		D0440244
	L	R12,LPLT		D0440245
	USING	PLT,R12		D0440246
	DROP	14		D0440247
DATA1	LH	R1,TWO		D0440248
	LA	R14,PLTRTN		D0440249
	BCR	15,R15		D0440250
ANNO	L	R2,16(0,R1)		D0440251
	L	R3,0(0,R2)		D0440252

045

	L	R2,20(0,R1)		D0440253
ANNO	STH	R3,NCHR(0,R13)	NO OF BCD CHAR	D0440254
	ST	R2,ANOTBC(0,R13)	ANNO TITLE	D0440255
	L	R2,4(0,R1)		D0440256
	L	R3,0(0,R2)		D0440257
	STH	R3,IX(0,R13)	IX	D0440258
	L	R2,8(0,R1)		D0440259
	L	R3,0(0,R2)		D0440260
	STH	R3,IY(0,R13)	IY	D0440261
	L	R2,12(0,R1)		D0440262
	L	R3,0(0,R2)		D0440263
	ST	R3,SIZE(0,R13)	SIZE	D0440264
	L	R15,LPLT1		D0440265
	TM	SETFG(R5),X'80'		D0440266
	BC	8,SETERR		D0440267
	LA	R14,PLTRTN		D0440268
	LH	R1,THREE		D0440269
	BCR	15,R15		D0440270
AERO	LH	R3,ONE		D0440271
	LA	R2,LAEROS		D0440272
	BC	15,ANNO		D0440273
CLEAN	TM	SETFG(R5),X'80'	HAS SETUP BEEN DONE	D0440274
	BC	8,SETERR	NO	D0440275
	L	R2,4(0,R1)	YES-IRSC	D0440276
	L	R3,0(0,R2)		D0440277
	STH	R3,IRSC(0,R13)		D0440278
	L	R2,8(0,R1)		D0440279
	ST	R2,PLOTIM(0,R13)	PLOTIM	D0440280
	L	R15,LPLT1		D0440281
	LH	R1,FIVE		D0440282
	BALR	14,15	CLEANUP ENTRANCE	D0440283
	USING	*,R14		D0440284
	L	R12,LPLT		D0440285
	USING	PLT,R12		D0440286
	DROP	14		D0440287
	DI	WDSOUT(R13),X'46'		D0440288

046

	LE	F2,WDSOUT(0,R13)	D0440289
	ME	F2,FGFCTR	D0440290
	L	R1,PLOTIM(0,R13)	D0440291
	STE	F2,0(0,R1)	D0440292
PLTRTN	L	13,REG+4(0,R13)	D0440293
	LM	14,12,12(13)	D0440294
	MVI	12(13),X'FF'	D0440295
	BCR	15,14	D0440296
ERCALL	LA	1,ERMSSG WRITE-ERROR IN ENTRANCE CODE	D0440297
	BC	15,ERROR	D0440298
SETERR	LA	1,SETMSG -ERROR IN SEQUENCE OF CALLS	D0440299
ERROR	LA	14,PLTRTN RETURN TO CALLING PROGRAM AFTER MESSAGE	D0440300
ERROR1	ST	R13,REG(0,R13)	D0440301
	LA	R13,REG(0,R13)	D0440302
PRNT	MVI	PRNT1,X'FF'	D0440303
	L	13,0(0,13)	D0440304
	BCR	15,14	D0440305
PRNT1	DS	C	D0440306
MPLMSG	DC	A(M1)	D0440307
	DC	A(M2)	D0440308
M1	DC	F'30'	D0440309
M2	DC	C'0ERROR IN MULTIPLE REPORT WORD'	D0440310
ERMSSG	DC	A(E1)	D0440311
	DC	A(E2)	D0440312
E1	DC	F'23'	D0440313
E2	DC	C'0ERROR IN ENTRANCE CODE'	D0440314
SETMSG	DC	A(S1)	D0440315
	DC	A(S2)	D0440316
S1	DC	F'27'	D0440317
S2	DC	C'0ERROR IN SEQUENCE OF CALLS'	D0440318
XCOM	EQU	C','	D0440319
LIOSET	DC	A(PLTWSET)	D0440320
FGFCTR	DC	E'.00004'	D0440321
LAEROS	DC	X'3F' X CODE-AEROSPACE SYMBOL	D0440322
YSTOR	DC	H'32'	D0440323
LPLT	DC	A(PLT)	D0440324

047

PLUTID	DC	CL16'IPL0T NUMBER'	D0440325
	DS	OF	D0440326
MPLCHR	DC	CL4',,, '	D0440327
CUMMA	EQU	MPLCHR	D0440328
ZZ	DC	X'6BFFFFFF1'	D0440329
X07	DC	X'00000007'	D0440330
X0F	DC	X'0000000F'	D0440331
ONE	DC	H'1'	D0440332
TWO	DC	H'2'	D0440333
THREE	DC	H'3'	D0440334
FOUR	DC	H'4'	D0440335
FIVE	DC	H'5'	D0440336
SIX	DC	H'6'	D0440337
SEVEN	EQU	X07+2	D0440338
EIGHT	DC	H'08'	D0440339
	DS	OF	D0440340
X7FFF	DC	X'00007FFF'	D0440341
SIXTEN	DC	H'16'	D0440342
NINTEN	DC	H'19'	D0440343
TWNTY	DC	H'20'	D0440344
TWNEG	DC	H'28'	D0440345
EIGHTY	DC	H'80'	D0440346
LIOTERM	DC	A(PLTWTERM)	D0440347
SYMCOD	DC	X'00'	D0440348
	DC	X'4F'	D0440349
	DC	X'00'	D0440350
	DC	X'4C'	D0440351
	DC	X'EF'	D0440352
	DC	X'DA'	D0440353
	DC	X'EA'	D0440354
	DC	X'EC'	D0440355
R1	EQU	1	D0440356
R2	EQU	2	D0440357
R3	EQU	3	D0440358
R4	EQU	4	D0440359
R5	EQU	5	D0440360

048

R6	EQU	6			D0440361
R7	EQU	7			D0440362
R8	EQU	8			D0440363
R9	EQU	9			D0440364
R10	EQU	10			D0440365
R11	EQU	11			D0440366
R12	EQU	12			D0440367
R13	EQU	13			D0440368
R14	EQU	14			D0440369
R15	EQU	15			D0440370
F2	EQU	2			D0440371
* SETUP TABLE STORAGE					
TITLE	EQU	0	F	LOC	D0440372
NT	EQU	4	H		D0440373
GRID	EQU	6	C	=0 NO GRID	D0440374
PRESCL	EQU	7	C	OF-PRESCALED DATA	D0440375
DELTX	EQU	8	H		D0440376
NF	EQU	10	H		D0440377
XD	EQU	12	F		D0440378
DX	EQU	16	F		D0440379
DDX	EQU	20	F		D0440380
X	EQU	24	F	LOC	D0440381
XTITLE	EQU	28	F	LOC	D0440382
NTX	EQU	32	H		D0440383
SUPXSC	EQU	34	C	00=NO SCALE, OF=PRINT SCALE	D0440384
CLNBUF	EQU	35			D0440385
INFO	EQU	36	OF		D0440386
YO	EQU	60	F		D0440387
DY	EQU	Y0+4	F		D0440388
Y	EQU	Y0+8	F	LOC	D0440389
SYMFRQ	EQU	Y0+12	H		D0440390
YSYM	EQU	Y0+14	C	SYM CODE	D0440391
OFSCLY	EQU	Y0+15	C	0X=WILD PT, 1X=MIRROR, 2X=MOD	D0440392
SUPYSC	EQU	Y0+15	C	00=NO SCALE, OF=PRINT SCALE	D0440393
YTITLE	EQU	Y0+16	F	LOC	D0440394
NTY	EQU	Y0+20	H		D0440395

049

DELTY	EQU	Y0+22	H		D0440397
INFOY	EQU	Y0+24	2F		D0440398
*MISC STOR					
* WORD 1 CONTAINS A(PLT)					
REG	EQU	0			D0440399
TBL	EQU	72	F	PARAM TABLE ADDR	D0440400
MPL	EQU	76	F	MPLE REPORT WORD	D0440401
TAPE	EQU	80	F		D0440402
PLOTNO	EQU	84	H	BINARY	D0440403
WDSOUT	EQU	88	F	COUNT OF WORDS OUTPUT	D0440404
PADR	EQU	92	F	LOC-5F PLOT ID	D0440405
PLTIMP	EQU	96	F	SETUP TEMP	D0440406
BASADR	EQU	92	F	DATA PARAM	D0440407
NP	EQU	96	H		D0440408
NEWTBL	EQU	100	F		D0440409
ANOTBC	EQU	92	F	ANNOI PARAM	D0440410
SIZE	EQU	96	F		D0440411
NCHR	EQU	100	H		D0440412
IX	EQU	102	H		D0440413
IY	EQU	104	H		D0440414
IRSC	EQU	92	H	CLEANUP PARAM	D0440415
PLOTIM	EQU	96	F		D0440416
GEN	EQU	112			D0440417
* START TEMP STORAGE-MISC+112					
* MAX NEEDED FOR PLT1 PARAM, 38 BYTES					
SETFG	EQU	INFO+17			D0440418
TABLE	DS	71F			D0440419
PLTTBL	EQU	TABLE			D0440420
XMAX	EQU	GEN+56			D0440421
FULLCT	EQU	XMAX+24			D0440422
BFSTRT	EQU	XMAX+28			D0440423
BUFF	EQU	408			D0440424
MISC	DS	51D			D0440425
	DS	CL1728			D0440426
BUFCT	EQU	864		SIZE OF SINGLE BUFFER	D0440427
LPLT1	DC	A(PLT1)			D0440428
					D0440429
					D0440430
					D0440431
					D0440432

050

ENDMISC	EQU	LPLT1+1		D0440433
	END			D0440434
PLTW	START	0		D0440435
	ENTRY	PLTWSET,PLTWTERM		D0440436
	USING	*,15		D0440437
	ST	10,TMP10		D0440438
	LR	10,15		D0440439
	USING	PLTW,10		D0440440
	DROP	15		D0440441
	LTR	1,1		D0440442
	BC	8,WRT2		D0440443
	ST	14,REG14		D0440444
	ST	0,REGZERO		D0440445
	LA	1,PLOTDCB		D0440446
	PUT	(1),(2)		D0440447
	L	14,REG14		D0440448
	L	0,REGZERO		D0440449
	L	1,TEMP		D0440450
WRT2	LR	15,10		D0440451
	USING	PLTW,15		D0440452
	DROP	10		D0440453
	L	10,TMP10		D0440454
	BCR	15,14		D0440455
	USING	*,15		D0440456
PLTWSET	ST	10,TMP10		D0440457
	IC	11,FLAG		D0440458
	TM	FLAG,X'80'		D0440459
	BCR	1,14	YES-RETURN	D0440460
	LR	10,15		D0440461
	USING	PLTWSET,10		D0440462
	DROP	15		D0440463
	ST	1,TEMP		D0440464
	OPEN	(PLOTDCB,(OUTPUT))		D0440465
	MVI	FLAG,X'80'		D0440466
	L	1,TEMP		D0440467
	LR	15,10		D0440468

051

	USING	PLTWSET,15		D0440469
	DROP	10		D0440470
	L	10,TMP10		D0440471
	BCR	15,14		D0440472
	USING	*,15		D0440473
PLTWTERM	ST	10,TMP10		D0440474
	TM	FLAG,X'80'		D0440475
	BCR	14,14	NO-RETURN	D0440476
	LR	10,15		D0440477
	USING	PLTWTERM,10		D0440478
	DROP	15		D0440479
	ST	1,TEMP		D0440480
	CLOSE	(PLOTDCB)	YES-CLOSE	D0440481
	MVI	FLAG,X'00'	RETURN	D0440482
IUC	L	1,TEMP		D0440483
	LR	15,10		D0440484
	USING	PLTWTERM,15		D0440485
	DROP	10		D0440486
	L	10,TMP10		D0440487
	BCR	15,14		D0440488
TMP10	DS	1F		D0440489
TEMP	DS	1F		D0440490
REG14	DC	F'0'		D0440491
REGZERO	DC	F'0'		D0440492
FLAG	DC	X'00'		D0440493
	DS	0D		D0440494
PLOTDCB	DLB	DDNAME=PLOTPLT,		X00440495
		DSORG=PS,		X00440496
		MACRF=PM,		X00440497
		BUFL=864,LRECL=864,RECFM=F,BLKSIZE=864,		X00440498
		BFTEK=S		D0440499
	DS	0F		D0440500
	END			D0440501
	TITLE	'PLT1-PLOT ROUTINE'		D0440502
	EXTRN	PLTW		D0440503
* SUBROUTINE TO GENERATE PEN COMMANDS FOR CALCOMP PLOTTER				D0440504

052

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*
*   PARAMETER TABLE SETUP
*
*   TABLE1 CONTAINS 15+7*NF WORDS CONTAINING PLOT INFORMATION
*
*       DC      A(PLOT TITLE)
*       DC      H'NO OF CHAR IN TITLE'
*       DC      C'0=NO GRID DRAWN,1=1 INCH GRID'
*       DC      X'F0' - PRESCALED  X'00' - NOT PRESCALED
*       DC      H'DELTA X-STORAGE'
*       DC      H'NF'
*       DC      A(X0)
*       DC      A(DX)
*       DC      A(DDX)
*       DC      A(X)
*       DC      A(X TITLE)
*       DC      H'NTX'
*       DC      X'00'--NO SCALE OR X'0F' PRINT SCALE
*       DC      X'0=DO NOT CLEAR BUF, '80'=CLEAR BUF
*       DS      6F  LOADED BY ROUTINE
*   THE FOLLOWING IS REPEATED FOR EACH DEPENDENT VARIABLE
*       DC      A(Y0)
*       DC      A(DY)
*       DC      A(Y)
*       DC      H'SYMBOL FREQUENCY'
*       DC      X'SYMBOL CODE'
*       DC      X'OFFSCALE TREATMENT AND Y SCALE'
*               FIRST HEX CHAR  0=WILD POINT,1=MIRROR,2=MOD
*               SECOND HEX CHAR  0=NO SCALE  F=PRINT SCALE
*       DC      A(Y TITLE)
*       DC      H'NTY'
*       DC      H'DELTA Y STORAGE'
*       DS      2F
*
*   TABLE 2 CONTAINS WORK STORAGE AND CALL PARAMETERS
*       DS      18F

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D0440505
D0440506
D0440507
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D0440510
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D0440512
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D0440516
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053

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*       DC      A(TABLE 1)
*       DC      CL4'MPLE REPORT WORD'  IF ZERO,STANDARD WORD IS LOADED
*       DC      F'TAPE NUMBER'
*       DC      H'NUMBER OF PLOT-STORED BY ROUTINE'
*       DC      CL2'FLAGS SET BY ROUTINE'
*       DC      F'COUNT OF WORDS OUTPUT-SET BY ROUTINE'
*   PARAMETERS FOR CALLS BEGIN IN BYTE 92
*
*   SETUP  DC      A(PLOT ID)
*           LPR     R9,R9          X
*           CR      R8,R9
*           BC      11,BCD3
*           LR      R8,R9          Y IS GREATER
BCD3      ST      R8,BCDS2(0,R13)
           LR      R9,R2
           MR      R8,R10
           ST      R9,BCDS1(0,R13)  LENGTH OF LINE
           TM      BCDFG(R13),X'80'  X OR Y DIR
           BC      8,BCD5          X-BRANCH
           AR      R9,R5          IX+LENGTH = END OF LINE
           LR      R8,R4          IX
           BC      15,BCD6
BCD5      LR      R8,R9          LENGTH OF LINE
           AR      R8,R4          IX + LENGTH
           LR      R9,R5          IX
BCD6      STM     R8,R9,TEMP(R13)
           AR      R8,R10
           C      R8,XMAX(0,R13)
           BC      12,BCD7
           ST      R8,XMAX(0,R13)
BCD7      SR      R8,R10
           S      R8,XLOC(0,R13)
           S      R9,YLOC(0,R13)
           LPR     R8,R8
           LPR     R9,R9
           CR      R8,R9

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D0440541
D0440542
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D0441649
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D0441671
D0441672

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054

BC	11,*+6		D0441673
LR	R8,R9		D0441674
C	R8,BCDS2(0,R13)		D0441675
BC	11,BCD8		D0441676
DI	BCDFG(R13),X'40'	BIT1-FLAG-ON WRITE BACKWARD	D0441677
AR	R1,R2	COUNT+ADDR OF LINE-1	D0441678
ST	R1,BCDADR(0,R13)		D0441679
LH	R10,ONE		D0441680
LCR	R10,R10	INCR=-1	D0441681
STH	R10,BCDINC(0,R13)		D0441682
LM	R4,R5,TEMP(R13)		D0441683
L	R10,BCDS(0,R13)		D0441684
LCR	R10,R10		D0441685
ST	R10,BCDS(0,R13)		D0441686
BC	15,BCD9		D0441687
BCD8	LH	R10,ONE	D0441688
	STH	R10,BCDINC(0,R13)	D0441689
BCD9	L	R15,LSYM	D0441690
BCD11	IC	R2,0(0,R1)	PICKUP CHAR
	DI	PENST(R13),X'04'	D0441691
	BALR	R14,R15	BRANCH TO SYM
	L	R12,RLNK3+4(0,R13)	D0441692
	LH	R10,BCDCT(0,R13)	D0441693
	BCI	R10,*+8	FINISHED
	BC	15,BCDRTN	YES
	STH	R10,BCDCT(0,R13)	D0441697
	TM	BCDFG(R13),X'80'	VERT OR HORIZ
	BC	8,BCD10	HORIZ-BRANCH
	A	R5,BCDS(0,R13)	VERT-ADD SIZE TO 1Y
	BC	15,*+8	D0441701
BCD10	A	R4,BCDS(0,R13)	HORIZ-ADD SIZE TO 1X
	L	R1,BCDADR(0,R13)	INCR CHAR ADDR
	AH	R1,BCDINC(0,R13)	D0441703
	ST	R1,BCDADR(0,R13)	D0441704
	LH	R3,BCDSZ(0,R13)	D0441705
	BC	15,BCD11	D0441706
			D0441707
			D0441708

055

BCDRTN	L	R14,RLNK3(0,R13)	LOAD RETURN REG	D0441709
	LR	R15,R12	LOAD R15	D0441710
	BCR	15,R14		D0441711
LSYM	DC	A(SYM)		D0441712
*		ROUTINE TO MOVE PEN		D0441713
*		TEST FOR CHANGE IN PEN STAT.		D0441714
*	ENTER	MR6 - X		D0441715
*		MR8 - Y		D0441716
*				D0441717
	USING	*,MR12		D0441718
MVE	LR	R12,R15		D0441719
	STM	R14,R15,RLNK5(R13)		D0441720
	STM	MR6,MR8,MVESTR(R13)		D0441721
	TM	PENST(R13),X'0C'	TEST PEN STATUS	D0441722
	BC	8,MVE2	IS DOWN-SHOULD BE DOWN	D0441723
	BC	1,MVE1	IS UP-SHOULD BE UP	D0441724
	TM	PENST(R13),X'04'		D0441725
	BC	8,MVE3	IS UP-SHOULD BE DOWN	D0441726
	DI	PENST(R13),X'08'	IS DOWN-SHOULD BE UP-SET CODE	D0441727
	IC	MR1,PENUP	GET COMMAND-PENUP	D0441728
	BC	15,MVE4		D0441729
MVE3	IC	MR1,PENDN	GET COMMAND PENDOWN	D0441730
*	DATA	DC	F'BASE ADDRESS OF DATA'	D0440550
*	DATA	DC	H'NP'	D0440551
*	ANNGT	DC	A(BCD)	D0440552
*		DC	E'SIZE'	D0440553
*		DC	H'NCHR'	D0440554
*		DC	H'IX'	D0440555
*		DC	H'IY'	D0440556
*	CLEAN	DC	H'IRSC'	D0440557
*	TERM-NONE			D0440558
*				D0440559
*				D0440560
*				D0440561
*				D0440562
*				D0440563

ENTRY MUST BE MADE WITH ADDRESS OF TABLE 2 IN REG 13
NUMBER OF CALL IN REG 1

056

PLT1	START 0		D0440564
	USING *,15		D0440565
	BC 15,*+10		D0440566
	DC CL5*PLT1*		D0440567
	DC X*5*		D0440568
	STM 14,12,REG+12(13)		D0440569
	LR R12,13		D0440570
	LR R12,15		D0440571
	ST 15,0(0,R13)		D0440572
	USING PLT1,R12		D0440573
	DROP 15		D0440574
	L R11,TBL(0,R13) ADDR PF PARAM TABLE		D0440575
	STM R1,PL1TMP(0,R13)		D0440576
	LM R2,R7,INFO(R11) PREV INFO		D0440577
	STM R2,R7,XMAX(R13)		D0440578
	TM CLNBUF(R11),X*80*		D0440579
	BC 8,PLT11		D0440580
	LH R1,BUFFCT(0,R13) ANYTHING LEFT IN BUFF		D0440581
	LTR R1,R1		D0440582
	BC 8,PLT12 NO		D0440583
	SH R1,FULLCT(0,R13)		D0440584
	BC 10,PLT12 NO		D0440585
	LA R15,WRT		D0440586
	BALR R14,R15		D0440587
	L R12,0(0,R13) CLEAR BUFFER		D0440588
PLT12	L R15,LFRESH GET FRESH BUFFER		D0440589
	BALR R14,R15		D0440590
PLT11	LH R1,FOUR		D0440591
	MH R1,PL1TMP(0,R13)		D0440592
	LTR R1,R1		D0440593
	BC 12,PLT1ER ZERO OR NEG CODE		D0440594
	CH R1,TWNEG		D0440595
	BC 2,PLT1ER CODE GT SEVEN		D0440596
	BC 15,* (R1) TRA TO ENTRANCE		D0440597
	BC 15,SET		D0440598
	BC 15,DTA		D0440599

057

	BC 15,ANOT		D0440600
	BC 15,ANOT		D0440601
	BC 15,CLN		D0440602
	BC 15,TRM		D0440603
	BC 15,CHT		D0440604
SET	SR R2,R2 STORE ZEROS		D0440605
	ST R2,XMAX(0,R13)		D0440606
	ST R2,XLOC(0,R13)		D0440607
	LH R3,FIFTY		D0440608
	ST R3,YLOC(0,R13)		D0440609
	ST R2,WDSOUT(0,R13)		D0440610
	NI PENST(R13),X*00* ASSUME PEN DOWN		D0440611
	L R15,LFRESH		D0440612
	BALR R14,R15		D0440613
	L R1,PADR(0,R13) STORE I IN PLOT ID		D0440614
	MVI 0(R1),C*I*		D0440615
	LH R2,PLOTNO(0,R13)		D0440616
	L R15,LWBA WRITE PLOT ID		D0440617
	BALR R14,R15		D0440618
	L R12,0(0,R13)		D0440619
	L R15,LYSC WRITE Y SCALES		D0440620
	BALR R14,R15		D0440621
	L R12,0(0,R13)		D0440622
	L R1,XMAX(0,R13)		D0440623
	LTR R1,R1 ANY SCALES WRITTEN		D0440624
	BC 8,SET1 NO		D0440625
	AH R1,TEN		D0440626
	ST R1,XMAX(0,R13)		D0440627
	L R15,LMDH GET EVEN HALF INCH AFTER		D0440628
	BALR R14,R15		D0440629
	L R12,0(0,R13)		D0440630
SET1	LH R5,TNSXTY		D0440631
	ST R1,XMAX(0,R13) STORE EVEN 1/2 INCH		D0440632
	ST R1,LMCT(0,R13)		D0440633
	LR R4,R1		D0440634
	L R3,SIZE15 WRITE TITLE		D0440635

058

	LH	R2,NT(0,R11)		D0440636
	L	R1,TITLE(0,R11)		D0440637
	L	R15,LBCD		D0440638
	BALR	R14,R15		D0440639
	L	R12,0(0,R13)		D0440640
	L	R6,LMCT(0,R13)		D0440641
	CH	R6,SIXTY	ANY Y SCALES	D0440642
	BC	12,SET2	NO	D0440643
	LH	R8,TNFFTY	YES	D0440644
	OI	PENST(R13),X'04'	MOVE WITH PEN UP TO TOP	D0440645
	LA	R15,MVE		D0440646
	BALR	R14,R15		D0440647
	L	R12,0(0,R13)		D0440648
	L	R6,LMCT(0,R13)		D0440649
	LH	R8,FIFTY		D0440650
	BALR	R14,R15		D0440651
	L	R12,0(0,R13)		D0440652
SET2	LH	R1,NF(0,R11)	SET INIT VALUE	D0440653
	SR	R2,R2		D0440654
SET3	ST	R2,INFOY(0,R11)		D0440655
	ST	R2,INFOY+4(0,R11)		D0440656
	OI	INFOY+7(R11),X'FF'		D0440657
	AH	R11,YSTOR		D0440658
	BCI	R1,SET3		D0440659
	L	R15,LDUN	RETURN	D0440660
	BCR	15,R15		D0440661
ANOT	LE	F2,SIZE(0,R13)		D0440662
	ME	F2,HUNDRF		D0440663
	DE	F2,SIXF	DIVIDE SIZE BY SIX	D0440664
	AU	F2,FXFS8	FIX AT 823	D0440665
	STE	F2,ANOTTP(0,R13)		D0440666
	NI	ANOTTP(R13),X'80'	TO FIXED	D0440667
	L	R3,ANOTTP(0,R13)		D0440668
	BC	8,ANOT1	NEG SIZE-NO	D0440669
	NI	ANOTTP(R13),X'00'	YES	D0440670
	L	R3,ANOTTP(0,R13)		D0440671

059

	LCR	R3,R3	SET NEG	D0440672
ANOT1	L	R1,ANOTBC(0,R13)	LOAD PARAM	D0440673
	SRA	R3,2(0)	FS6	D0440674
	LH	R2,NCHR(0,R13)		D0440675
	LH	R4,IX(0,R13)		D0440676
	LH	R5,IY(0,R13)		D0440677
	A	R4,LMCT(0,R13)	ADD DIST TO LEFT MARGIN	D0440678
	L	R15,LBCD	TRA TO BCD	D0440679
	BALR	R14,R15		D0440680
	L	R12,0(0,R13)		D0440681
	L	R15,LDUN		D0440682
	BALR	R14,R15		D0440683
CHT	L	R11,NEWTBL(0,R13)	PICKUP NEW TABLE ADDR	D0440684
	ST	R11,TBL(0,R13)		D0440685
	BC	15,SET2		D0440686
TRM	LA	R15,WRT		D0440687
	BALR	R14,R15		D0440688
	L	R12,0(0,R13)		D0440689
	LA	R1,ENDPLT		D0440690
	SR	R2,R2		D0440691
	L	R15,LWBA		D0440692
	BALR	R14,R15		D0440693
	L	R12,0(0,R13)		D0440694
	MVI	CLNBUF(R11),X'80'		D0440695
	L	R15,LDUN		D0440696
	BALR	R14,R15		D0440697
CLN	L	R3,XMAX(0,R13)	COMPUTE NUMBER OF INCHES OF PLOT	D0440698
	AH	R3,NINNIN		D0440699
	S	R3,LMCT(0,R13)		D0440700
	SR	R2,R2		D0440701
	D	R2,FUL100		D0440702
	STH	R3,MOHS(0,R13)		D0440703
	M	R2,FUL100		D0440704
	A	R3,LMCT(0,R13)		D0440705
	ST	R3,XMAX(0,R13)	STORE EVEN INCHES IN XMAX	D0440706
	TM	GRIDX(R11),X'FF'		D0440707

060

	BC	8,CLN1	NO	D0440708
	L	R15,LGRID	YES	D0440709
	BALR	R14,R15		D0440710
CLN1	L	R12,0(0,R13)		D0440711
	L	R1,XTITLE(0,R11)		D0440712
	LH	R2,NTX(0,R11)		D0440713
	L	R3,SIZE12		D0440714
	L	R4,LMCT(0,R13)		D0440715
	LH	R5,EIGHT		D0440716
	L	R15,LBCD	WRITE TITLE	D0440717
	BALR	R14,R15		D0440718
	L	R12,0(0,R13)		D0440719
	TM	SUPXSC(R11),X'0F'	X-SCALE	D0440720
	BC	8,CLN2		D0440721
	LH	R1,MDHS(0,R13)	YES	D0440722
	AH	R1,ONE		D0440723
	LH	R2,HUNDRED		D0440724
	SR	R3,R3		D0440725
	L	R4,XD(0,R11)		D0440726
	L	R4,0(0,R4)		D0440727
	L	R5,DX(0,R11)		D0440728
	L	R5,0(0,R5)		D0440729
	L	R6,LMCT(0,R13)		D0440730
	LTR	R6,R6		D0440731
	BC	8,CLN3		D0440732
	SH	R6,FIFTEEN		D0440733
CLN3	LH	R7,TWENTY		D0440734
	L	R15,LSCN	WRITE X SCALE	D0440735
	BALR	R14,R15		D0440736
	L	R12,0(0,R13)		D0440737
CLN2	LH	R1,IRSC(0,R13)	RIGHT Y SCALE	D0440738
	CH	R1,MDHS(0,R13)		D0440739
	BC	4,CLN4		D0440740
	L	R1,XMAX(0,R13)		D0440741
	BC	15,CLN5		D0440742
CLN4	L	R15,LMDH		D0440743

061

	BALR	R14,R15		D0440744
	L	R12,0(0,R13)		D0440745
	ST	R1,XMAX(0,R13)		D0440746
	L	R15,LYSC	YSCALES	D0440747
	BALR	R14,R15		D0440748
CLN5	L	R12,0(0,R13)		D0440749
	L	R15,LMDH		D0440750
	BALR	R14,R15		D0440751
	L	R12,0(0,R13)		D0440752
	AH	R1,TWOHND		D0440753
	LR	R6,R1		D0440754
	LH	R8,FIFTY		D0440755
	OJ	PENST(R13),X'04'	PUT PEN UP	D0440756
	LA	R15,MVE		D0440757
	BALR	R14,R15		D0440758
	L	R12,0(0,R13)		D0440759
	MVI	CLNBUF(R11),X'80'		D0440760
	L	15,LBUN		D0440761
	BCR	15,R15		D0440762
DTA	LH	R1,NP(0,R13)	NO OF PTS	D0440763
	LTR	R1,R1		D0440764
	BC	8,DTADUN	NO PTS	D0440765
	SH	R1,ONE		D0440766
	LH	R3,DELTX(0,R11)	DELTA STOR-X	D0440767
	MH	R3,FOUR	X4	D0440768
	STH	R3,XDEL(0,R13)	NO OF BYTES/X	D0440769
	MR	R2,R1		D0440770
	ST	R3,DISPLX(0,R13)	DISPL -LAST X FROM FIRST	D0440771
	L	R2,LMCT(0,R13)	LEFT MARGIN	D0440772
	SLA	R2,4(0)		D0440773
	ST	R2,XZER(0,R13)		D0440774
	OJ	XZER(R13),X'45'		D0440775
	LE	F2,FHUNDR		D0440776
	L	R1,DX(0,R11)	DX LOC	D0440777
	DE	F2,0(0,R1)	DX	D0440778
	STE	F2,XMUL(0,R13)	100./DX	D0440779

062

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L      R1,DDX(0,R11)                                D0440780
TM      O(R1),X'FF'                                    D0440781
BC      8,DTA1                                TABULAR X,DDX=0    D0440782
L      R1,XO(0,R11)    XO LOC -ROUTINE GENERATED-X,DDX NON ZERO D0440783
LE      F2,O(0,R1)    XO                                D0440784
L      R1,X(0,R11)                                    D0440785
A      R1,BASADR(0,R13)                                D0440786
SE      F2,O(0,R1)    XO-X1                                D0440787
LE      F4,XMUL(0,R13)                                D0440788
MER      F2,F4                                D0440789
STE      F2,DENS1(0,R13) (XO-X1)*XMUL                    D0440790
L      R1,DDX(0,R11)    DDX LOC                            D0440791
ME      F4,O(0,R1)    DDX                                D0440792
STE      F4,XMUL(0,R13)    INCR PER DATA POINT-PLOTTER INCR-FLOAT D0440793
AER      F2,F4                                D0440794
BC      15,DTA2                                D0440795
DTA1    TM      PRESCL(R11),X'FO'    PRESCALED DATA          D0440796
BC      8,DTA3                                NO                D0440797
L      R2,LMCT(0,R13)    YES                            D0440798
ST      R2,XZER(0,R13)                                D0440799
BC      15,DSU                                D0440800
DTA3    LE      F2,XMUL(0,R13)                                D0440801
L      R1,XO(0,R11)    XO LOC                            D0440802
ME      F2,O(0,R1)    XO                                D0440803
STE      F2,DENS1(0,R13)    XO*XMUL                      D0440804
DTA2    SU      F2,XZER(0,R13)                                D0440805
STE      F2,XZER(0,R13)                                D0440806
BC      7,DSU                                D0440807
DI      XZER(R13),X'45'                                D0440808
DSU     LH      R1,NF(0,R11)                                D0440809
STH     R1,NFDTA(0,R13)    NUMBER OF FUNCTIONS            D0440810
LR      R10,R11    TABLE FIRST FUNCY                    D0440811
DSU1    TM      PRESCL(R11),X'FO'                                D0440812
BC      8,DSU2                                D0440813
LH      R2,FIFTY                                PRESCALED        D0440814
ST      R2,YZER(0,R13)                                D0440815

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063

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DSU2    BC      15,DSU3                                D0440816
LE      F2,FHUND8                                D0440817
L      R1,OY(0,R10)                                D0440818
DE      F2,O(0,R1)                                D0440819
STE      F2,YMUL(0,R13)    100./OY                    D0440820
L      R1,YO(0,R10)                                D0440821
ME      F2,O(0,R1)                                D0440822
SU      F2,X50                                D0440823
STE      F2,YZER(0,R13)    100/OY * YO                D0440824
BC      7,DSU3                                D0440825
MVI     YZER(R13),X'45'                                D0440826
DSU3    L      R1,X(0,R11)                                D0440827
A      R1,BASADR(0,R13)    ADD BASE THIS ENTRANCE        D0440828
ST      R1,XADDR(0,R13)                                D0440829
L      R1,Y(0,R10)                                D0440830
A      R1,BASADR(0,R13)                                D0440831
ST      R1,YADDR(0,R13)    Y+BASE=ADDR OF FIRST Y      D0440832
*
SR      R2,R2                                D0440833
TM      YSYM(R10),X'FF'    SYMBOL WANTED                D0440834
BC      8,DTA4                                NO-FORCE LINE PLOT    D0440835
LH      R1,SYMFRQ(0,R10)    YES-SYMBOL                  D0440836
LTR      R1,R1    SYMFRQ=0,POINT PLOT                  D0440837
BC      7,DTA40                                NO-LINE PLOT        D0440838
DI      PTPLT(R13),X'FF'    YES-POINT PLOT              D0440839
BC      15,DTA5                                D0440840
DTA40    LH      R3,NP(0,R13)                                D0440841
DR      R2,R1                                D0440842
DTA4    NI      PTPLT(R13),X'0'    LINE PLOT              D0440843
DTA5    STH     R2,DSU4(0,R13)                                D0440844
NI      FRWD(R13),X'0'    PRESET FORWARD PLOT            D0440845
LH      R1,ONE                                D0440846
LA      R2,DTA6                                ERROR RETURN        D0440847
L      R15,LSCD                                D0440848
BALR    R14,R15    SCALE DATA-RETURN IX-R5,IY-R6      D0440849
DTA6    L      R12,O(0,R13)                                D0440850

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064

S	R4,XLOC(0,R13)		D0440852
LPR	R4,R4		D0440853
ST	R4,DTATMP(0,R13)	DISTANCE TO FIRST X	D0440854
LH	R1,NP(0,R13)		D0440855
SH	R1,ONE	NP-1	D0440856
LH	R3,DELTY(0,R10)		D0440857
MH	R3,FOUR	DELTY*4	D0440858
STH	R3,YDEL(0,R13)	DELTY * 4	D0440859
MR	R2,R1		D0440860
ST	R3,DISPLY(0,R13)	(NP-1) * (DELTY*4)	D0440861
A	R3,YADDR(0,R13)	SCD PARAM-LAST Y	D0440862
L	R2,XADDR(0,R13)		D0440863
A	R2,DISPLX(0,R13)	A(LAST X)	D0440864
STM	R2,R3,XADDR(R13)		D0440865
LH	R1,NP(0,R13)	NP	D0440866
LA	R2,DTA7		D0440867
BALR	R14,R15	SCD	D0440868
L	R12,0(0,R13)		D0440869
STM	R4,R5,TEMP(R13)		D0440870
S	R4,XLOC(0,R13)		D0440871
LPR	R4,R4		D0440872
C	R4,DTATMP(0,R13)	COMPARE TO DIST FROM FIRST	D0440873
LH	R7,UNE		D0440874
BC	4,BAKPLT		D0440875
L	R4,BASADR(0,R13)	ADDR OF FIRST X,Y	D0440876
L	R2,X(0,R11)		D0440877
L	R3,Y(0,R10)		D0440878
AR	R2,R4		D0440879
AR	R3,R4		D0440880
STM	R2,R3,XADDR(R13)		D0440881
STH	R7,INCPT(0,R13)	INCR POINTS BY ONE-FOREWARD PLOT	D0440882
L	R15,LMLP		D0440883
OI	PENST(R13),X'04'		D0440884
BALR	R14,R15	MOVE TO PREV POINT	D0440885
L	R12,0(0,R13)		D0440886
LH	R6,INFOY+6(0,R10)	SYMBOL COUNT-PREV ENT	D0440887

065

N	R6,MSK3F		D0440888
LH	R1,ONE		D0440889
BC	15,DTA10		D0440890
BAKPLT	R7,R7		D0440891
STH	R7,INCPT(0,R13)	INCR PTS BY -1	D0440892
LH	R6,XDEL(0,R13)		D0440893
LCR	R6,R6		D0440894
STH	R6,XDEL(0,R13)		D0440895
LH	R6,YDEL(0,R13)		D0440896
LCR	R6,R6		D0440897
STH	R6,YDEL(0,R13)		D0440898
MVI	FRWD(R13),X'FF'		D0440899
TM	INFOY+7(R10),X'FF'		D0440900
BC	14,DTA22		D0440901
LH	R6,DSU4(0,R13)	(SYMFREQ-INFOY+6)+DSU4+1 MOD SFRQ	D0440902
BC	15,DTA23	INFOY+6 = COUNT FOR FOREWARD PLOT	D0440903
DTA22	R6,INFOY+6(0,R10)	DSU4 = REMAINDER OF NP/SFRQ	D0440904
N	R6,MSK3F		D0440905
LCR	R6,R6		D0440906
AH	R6,DSU4(0,R13)		D0440907
AH	R6,ONE		D0440908
BC	2,DTA23		D0440909
AH	R6,SYMFREQ(0,R10)		D0440910
DTA23	R1,NP(0,R13)		D0440911
OI	PENST(R13),X'04'		D0440912
DTA10	R6,SYMCT(0,R13)	COUNT TO NEXT SYM	D0440913
IC	R2,INFOY+6(0,R10)	STORE PREV OFF SCALE FLAGS	D0440914
STC	R2,BADDTA(0,R13)		D0440915
LA	R2,DTAERR	ERR RTN	D0440916
LH	R3,NP(0,R13)		D0440917
DTA21	R1,R3,DTATNP(R13)	STORE PARAM	D0440918
DTA20	L		D0440919
	R15,LSCD		D0440920
	BALR		D0440921
	R14,R15		D0440922
	L		D0440923
	R12,0(0,R13)		D0440924
	TM	BADDTA(R13),X'80'	D0440925
	BC	8,DTA11	D0440926
		NO	D0440927

066

	NI	INFOY+6(R10),X'3F'	SET SW OUT OF BAD	D0440924
	TM	BADDTA(R13),X'40'	MOD OR MIR	D0440925
	BC	7,DTA30	YES	D0440926
	TM	BADDTA(R13),X'20'	2ND WILD POINT	D0440927
	BC	8,DTA30	NO	D0440928
	OI	PENST(R13),X'04'		D0440929
	IC	R2,BADTMP+11(0,R13)		D0440930
	L	R3,SIZE12		D0440931
	STM	R4,R5,BADTMP+8(R13)		D0440932
	LM	R4,R5,BADTMP(R13)		D0440933
	SH	R4,FOUR		D0440934
	SH	R5,FOUR		D0440935
	L	R15,LSYM		D0440936
	BALR	R14,R15		D0440937
	L	R12,0(0,R13)		D0440938
	LM	R4,R5,BADTMP+8(R13)		D0440939
DTA30	NI	BADDTA(R13),X'1F'		D0440940
	OI	PENST(R13),X'04'	PENUP	D0440941
	LH	R6,ONE		D0440942
	STH	R6,SYMCT(0,R13)		D0440943
DTA11	TM	PTPLT(R13),X'FF'	POINT PLOT	D0440944
	BC	8,DTA12	NO	D0440945
	OI	PENST(R13),X'04'	YES-PENUP	D0440946
DTA12	LR	R6,R4		D0440947
	LR	R8,R5		D0440948
	LA	R15,MVE		D0440949
	BALR	R14,R15	MOVE PEN	D0440950
	L	R12,0(0,R13)		D0440951
	TM	YSYM(R10),X'FF'	SYMBOL THIS PLOT	D0440952
	BC	8,DTA13+4		D0440953
	LH	R6,SYMCT(0,R13)	YES	D0440954
	SH	R6,ONE	SYM NOW	D0440955
	BC	3,DTA13		D0440956
	L	R4,XLOC(0,R13)	YES	D0440957
	L	R5,YLOC(0,R13)		D0440958
	SH	R4,FOUR	GET LOC	D0440959

067

	SH	R5,FOUR		D0440960
	IC	R2,YSYM(0,R10)	SYM CODE	D0440961
DTA15	L	R3,SIZE12		D0440962
	NI	BCDFG(R13),X'7F'		D0440963
	L	R15,LSYM	DRAW SYM	D0440964
	BALR	R14,R15		D0440965
	L	R12,0(0,R13)		D0440966
	LH	R6,SYMFRQ(0,R10)		D0440967
DTA13	STH	R6,SYMCT(0,R13)		D0440968
	LM	R1,R3,DTATMP(R13)	RELOAD-NO THIS PT-ERR RTN-COUNT	D0440969
	BCT	R3,*+8	DONE	D0440970
	BC	15,NRYS	YES	D0440971
	AH	R1,INCPT(0,R13)	NO-NEXT POINT	D0440972
	LM	R4,R5,XADDR(R13)	NEXT X,Y	D0440973
	AH	R4,XDEL(0,R13)		D0440974
	AH	R5,YDEL(0,R13)		D0440975
	STM	R4,R5,XADDR(R13)		D0440976
	BC	15,DTA21		D0440977
NRYS	TM	FRWD(R13),X'FF'	FOREWARD PLOT	D0440978
	BC	8,NRYS1	YES	D0440979
	L	R15,LMLP	NO-MOVE PREV POINT	D0440980
	BALR	R14,R15		D0440981
	L	R12,0(0,R13)		D0440982
	LH	R4,XDEL(0,R13)		D0440983
	LCR	R4,R4		D0440984
	STH	R4,XDEL(0,R13)		D0440985
	LM	R4,R5,TEMP(R13)		D0440986
	BC	15,NRYS2		D0440987
NRYS1	LM	R4,R5,XLOC(R13)	LOAD LOC LAST X,Y	D0440988
NRYS2	ST	R4,INFOY(0,R10)	LOC LAST X	D0440989
	STH	R5,INFOY+4(0,R10)	LOC LAST Y	D0440990
	LH	R4,INFOY+6(0,R10)		D0440991
	N	R4,MSK3F		D0440992
	SH	R4,DSU4(0,R13)		D0440993
	BC	2,NRYS3		D0440994
	AH	R4,SYMFRQ(0,R10)		D0440995

068

NRYS3	STH	R4,INFOY+6(0,R10)		D0440996
	TM	BADDTA(R13),X'80'	STORE FLAG BAD DATA REGION	D0440997
	BC	8,*+8		D0440998
	OI	INFOY+6(R10),X'80'		D0440999
	TM	BADDTA(R13),X'40'		D0441000
	BC	8,*+8		D0441001
	OI	INFOY+6(R10),X'40'		D0441002
	LH	R1,NFDTA(0,R13)	MORE Y'S	D0441003
	BCT	R1,*+8		D0441004
	BC	15,DTADUN		D0441005
	STH	R1,NFDTA(0,R13)	YES	D0441006
	AH	R10,YSTOR		D0441007
	BC	15,DSU1		D0441008
DTADUN	L	R15,LDUN		D0441009
	BALR	R14,R15		D0441010
DTAERR	L	R12,0(0,R13)		D0441011
	TM	INFOY+6(R10),X'80'	PREV BAD	D0441012
	BC	8,DTAER1	NO	D0441013
	NI	INFOY+6(R10),X'3F'		D0441014
	CH	R6,MISCOD	YES-MISS DATA	D0441015
	BC	7,DTA13+4		D0441016
	LH	R5,INFOY(0,R10)	YES-PICKUP LAST Y	D0441017
DTAER2	SH	R4,FOUR		D0441018
	SH	R5,FOUR		D0441019
	LR	R2,R6	SYM CODE	D0441020
	BC	15,DTA15	DRAW SYM	D0441021
DTAER1	TM	BADDTA(R13),X'80'	ALREADY IN BAD	D0441022
	BC	8,DTAER3		D0441023
	OI	BADDTA(R13),X'20'	FLAG-SECOND OFF SCALE	D0441024
	STH	R4,R6,BADTMP(R13)		D0441025
	BC	15,DTA13+4		D0441026
DTAER3	OI	BADDTA(R13),X'80'	NO-SET FLAG	D0441027
	CH	R6,MISCOD		D0441028
	BC	7,DTAER2		D0441029
	L	R5,YLOC(0,R13)		D0441030
	BC	15,DTAER2		D0441031

069

PLT1ER	BC	15,DTADUN		D0441032
* SETUP	TABLE	STORAGE		D0441033
TITLE	EQU	0 F	LOC	D0441034
NT	EQU	4 H		D0441035
GRIDX	EQU	6 C		D0441036
PRESC1	EQU	7 C	OF-PRESCALED DATA	D0441037
DELTX	EQU	8 H		D0441038
NF	EQU	10 H		D0441039
XO	EQU	12 F		D0441040
DX	EQU	16 F		D0441041
DDX	EQU	20 F		D0441042
X	EQU	24 F	LOC	D0441043
XTITLE	EQU	28 F	LOC	D0441044
NTX	EQU	32 H		D0441045
SUPXSC	EQU	34 C	OF NO SCALE, 00 PRINT SCALE	D0441046
CLNBUF	EQU	35		D0441047
INFO	EQU	36 6F		D0441048
YO	EQU	60 F		D0441049
DY	EQU	Y0+4 F		D0441050
Y	EQU	Y0+8 F	LOC	D0441051
SYMFRQ	EQU	Y0+12 H		D0441052
YSYM	EQU	Y0+14 C	SYM CODE	D0441053
OFSCLY	EQU	Y0+15 C	OX WILD PT,IX MIRROR,2X MOD	D0441054
SUPYSC	EQU	Y0+15 C	XO-NO SCALE, XF-PRINT SCALE	D0441055
YTITLE	EQU	Y0+16 F	LOC	D0441056
NTY	EQU	Y0+20 H		D0441057
DELTY	EQU	Y0+22 H		D0441058
INFOY	EQU	Y0+24 2F		D0441059
*MISC STOR				D0441060
* WORD 1 CONTAINS A PLT				D0441061
REG	EQU	0		D0441062
TBL	EQU	72 F	PARAM TABLE ADDR	D0441063
MPL	EQU	76 F	MPL REPORT WORD	D0441064
TAPE	EQU	80 F		D0441065
PLOTNO	EQU	84 H	BINARY	D0441066
WDSOUT	EQU	88 F	COUNT OF WORDS OUTPUT	D0441067

PAOR	EQU	92	F	LOC-5F PLOT ID	D0441068
PLTTMP	EQU	96	F	SETUP TEMP	D0441069
BASADR	EQU	92	F	DATA PARAM	D0441070
NP	EQU	96	H		D0441071
NEWTBL	EQU	100	F		D0441072
ANOTBC	EQU	92	F	ANNOY PARAM	D0441073
SIZE	EQU	96	F		D0441074
NCHR	EQU	100	H		D0441075
IX	EQU	102	H		D0441076
IY	EQU	104	H		D0441077
IRSC	EQU	92	H	CLEANUP PARAM	D0441078
PLOTIM	EQU	96	F		D0441079
* MAX NEEDED FOR PLT1 PARAM, 38 BYTES					D0441080
* START TEMP STORAGE-MISC+112					D0441081
GEN	EQU	112			D0441082
RLNK1	EQU	GEN 2F			D0441083
RLNK2	EQU	RLNK1+8	2F		D0441084
RLNK3	EQU	RLNK1+16	2F		D0441085
RLNK4	EQU	RLNK1+24	2F		D0441086
RLNK5	EQU	RLNK1+32	2F		D0441087
RLNK6	EQU	RLNK1+40	2F		D0441088
RLNK7	EQU	RLNK1+48	2F		D0441089
XMAX	EQU	GEN+56	F		D0441090
XLOC	EQU	XMAX+4	F		D0441091
YLOC	EQU	XMAX+8	F		D0441092
LMCT	EQU	XMAX+12	F		D0441093
PENST	EQU	XMAX+16	C	X'04' PUT PEN UP	D0441094
SETFG	EQU	XMAX+17	BIT 0 ON	-SETUP GIVEN	D0441095
FULLCT	EQU	XMAX+24	H		D0441096
BUFFCT	EQU	XMAX+26	H		D0441097
BFSTRT	EQU	XMAX+28	F		D0441098
BUFLOC	EQU	XMAX+32	F		D0441099
TMPSTR	EQU	204			D0441100
PLITMP	EQU	TMPSTR	H		D0441101
ANUITP	EQU	TMPSTR	E	ANOT	D0441102
MDHS	EQU	TMPSTR	H	CLN	D0441103

071

NFOA	EQU	TMPSTR	H	NO/FUNCT	D0441104
SYMCT	EQU	TMPSTR+2	H	SYM COUNT	D0441105
XDEL	EQU	TMPSTR+4	H	DELT ADDR-X	D0441106
YDEL	EQU	TMPSTR+6	H	-Y	D0441107
DISPLX	EQU	TMPSTR+8	F	DISPL-LAST PT FROM FIRST	D0441108
DISPLY	EQU	TMPSTR+12	F	X	D0441109
DENS1	EQU	TMPSTR+16	E	X0-X1 * XMUL(GEN-X) X0*XMUL(TAB-X)	D0441110
XZER	EQU	TMPSTR+20	E	DENS1-UNNORM LMCT, AT S6	D0441111
YZER	EQU	XZER+4	E	100/DY * YO	D0441112
XMUL	EQU	TMPSTR+28	E	100/DX * DDX OR 100/DX (NORM)	D0441113
YMUL	EQU	XMUL+4	E	100/DY	D0441114
XADDR	EQU	TMPSTR+36	A	X+BASADR	D0441115
YADDR	EQU	XADDR+4	A	Y+BASADR	D0441116
DSU4	EQU	TMPSTR+44	H	REMAINDER NP/SYMFQ	D0441117
INCPT	EQU	TMPSTR+46	H	+1 OR -1	D0441118
PTPLT	EQU	TMPSTR+48	C	00=LINE, FF=POINT PLOT	D0441119
FRWD	EQU	TMPSTR+49	C	00=FOREWARD PLOT,FF=BACK	D0441120
BADOTA	EQU	TMPSTR+50	C	80-FLAG BAD DATA SECT	D0441121
DTATMP	EQU	TMPSTR+52	3F	RESULTS-DTG	D0441122
PNODEC	EQU	TMPSTR+4	2D	WBA-TEMP	D0441123
SCDTMP	EQU	TMPSTR+68	3F	SCD	D0441124
GRDTMP	EQU	TMPSTR+64	7F	GRID	D0441125
YSCTMP	EQU	TMPSTR+64	3F	YSC	D0441126
SCNTMP	EQU	TMPSTR+76	2D+4F		D0441127
SCNSTR	EQU	TMPSTR+96	7F	SCN-PARAM	D0441128
BADTMP	EQU	TMPSTR+96		4F	D0441129
SCNS1	EQU	TMPSTR+124	E		D0441130
SCNS2	EQU	TMPSTR+128	E		D0441131
SCNSGN	EQU	TMPSTR+132	E		D0441132
BCDADR	EQU	TMPSTR+136	F	BCD	D0441133
BCDS	EQU	TMPSTR+140	F		D0441134
BCDCT	EQU	TMPSTR+144	H		D0441135
BCDINC	EQU	TMPSTR+146	H		D0441136
BCDFG	EQU	TMPSTR+148	C		D0441137
BCDSZ	EQU	TMPSTR+150		H	D0441138
BCDS1	EQU	TMPSTR+156	F		D0441139

072

BCDS2	EQU	TMPSTR+160 F	D0441140
SYMSTR	EQU	TMPSTR+152 4F SYM	D0441141
SYMADR	EQU	TMPSTR+168 F	D0441142
MYESTR	EQU	TMPSTR+172 6F MVE TO 196	D0441143
TEMP	EQU	TMPSTR+196 2F	D0441144
BUFF	EQU	408 (TMPSTR+204)	D0441145
R1	EQU	1	D0441146
R2	EQU	2	D0441147
R3	EQU	3	D0441148
R4	EQU	4	D0441149
R5	EQU	5	D0441150
R6	EQU	6	D0441151
R7	EQU	7	D0441152
R8	EQU	8	D0441153
R9	EQU	9	D0441154
R10	EQU	10	D0441155
R11	EQU	11	D0441156
R12	EQU	12	D0441157
R13	EQU	13	D0441158
R14	EQU	14	D0441159
R15	EQU	15	D0441160
F2	EQU	2	D0441161
F4	EQU	4	D0441162
F6	EQU	6	D0441163
TWNEG	DC	H*28°	D0441164
SIXTY	DC	H*60°	D0441165
NINNIN	DC	H*99°	D0441166
TWOHND	DC	H*200°	D0441167
TNSXTY	DC	H*1060°	D0441168
LDUN	DC	A(DUN)	D0441169
LGRID	DC	A(GRID)	D0441170
LMLP	DC	A(MLP)	D0441171
LMDH	DC	A(MDH)	D0441172
LWBA	DC	A(WBA)	D0441173
LYSC	DC	A(YSC)	D0441174
LSCD	DC	A(SCD)	D0441175

073

FHUNDR	DC	E*100.°	D0441176
HUNDRF	EQU	FHUNDR	D0441177
MSK3F	DC	X*00003FFF°	D0441178
SIZE15	DC	FS6*2.5°	D0441179
X50	DC	X*45000320°	D0441180
ENDPLT	DC	CL20°END OF PLOT TAPE°	D0441181
SIXF	DC	E*6.°	D0441182
FXFS8	DC	X*44000000°	D0441183
	USING	*,R12	D0441184
DUN	LR	R12,R15	D0441185
	STM	R14,R15,RLNK2(R13)	D0441186
	L	R11,TBL(0,R13)	D0441187
	TM	CLNBUF(R11),X*80°	D0441188
	BC	8,DUN1	D0441189
	L	R15,LWRT	D0441190
	BALR	R14,R15	D0441191
	BALR	R14,R15	D0441192
DUN1	L	R12,RLNK2+4(0,R13)	D0441193
	LM	R1,R6,XMAX(R13)	D0441194
	STM	R1,R6,INFO(R11)	D0441195
	LR	13,R13	D0441196
	LM	14,12,REG+12(13)	D0441197
	BCR	15,14	D0441198
	USING	*,R15	D0441199
FRESH	LH	FS1,FULLCT(0,R13) FULL BUFF CT	D0441200
	L	FS2,BFSTRT(0,R13) A(DOUBLE BUFF)	D0441201
	AR	FS2,FS1 ADD COUNT	D0441202
	C	FS2,BUFLOC(0,R13) USING SECOND BUFF	D0441203
	BC	10,FRESH1	D0441204
	SR	FS2,FS1 YES-GET ADDR OF FIRST	D0441205
FRESH1	SH	FS1,SIX	D0441206
	STM	FS1,BUFFCT(0,R13)	D0441207
	L	FS1,MPL(0,R13) NORMALLY ,,,BLANK	D0441208
	ST	FS1,0(0,FS2)	D0441209
	LH	FS1,GG PLOT CONTROL	D0441210
	STH	FS1,4(0,FS2)	D0441211

074

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      AH  FS2,SIX
      ST  FS2,BUFLOC(0,R13)
      BCR 15,R14
FS1 EQU 1
FS2 EQU 2
*ROUTINE TO WRITE BUFFER
      USING *,WR12
WRT LR WR12,R15
      STM R14,R15,RLNK7(R13)
      LH WR1,FULLCT(0,R13)
      L WR2,BFSTRT(0,R13) START OF DOUBLE BUFF
      AR WR2,WR1 START OF 2ND BUFF
      C WR2,BUFLOC(0,R13) USING SECOND BUFF
      BC 4,++6
      SR WR2,WR1 NO-ADDR OF FIRST BUFF
      SH WR1,BUFFCT(0,R13)
      CH WR1,SIX
      BC 2,WRT4 ANY DATA IN BUFF
      SR WR1,WR1 YES
      BC 15,WRT1 NO-CLEAR BUFF
WRT4 L WR3,WDSOUT(0,R13)
      AR WR3,WR1
      ST WR3,WDSOUT(0,R13)
      CH WR1,FULLCT(0,R13)
      BNL WRT1
*
* TEST BUFFER FULL
* IF NOT FULL BUFFER, ADD TERMINATION CHARACTER
* AFTER LAST PLOT COMMAND
* ALWAYS OUTPUT FULL BUFFER
      AR WR1,WR2
      MVI 0(WR1),X'FF' TERM CHAR
      LH WR1,FULLCT(0,R13) OUT FULL BUFFER
WRT1 L R15,A10WRT
      BALR R14,R15
      L WR12,RLNK7+4(0,R13)
      L R15,LFRESH SETUP FRESH BUFFER

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075

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      BALR R14,R15
WRTTN LM R14,R15,RLNK7(R13)
      BCR 15,R14
      DS OF
* ROUTINE TO WRITE BCD RECORDS
* WRT-START ADDR OF 20 BCD CHAR
* WR2 - PLOT NUMBER, 0 IF NO PLOT NUMBER
*
      USING *,R12
WBA LR R12,R15
      STM R14,R15,RLNK1(R13)
      L WR4,BUFLOC(0,R13) GET LOC OF CURRENT BUFF
      SH WR4,FOUR
      LH WR5,GT TYPE
      STH WR5,2(0,WR4)
      MVI 1(WR4),X'F1'
      AH WR4,FOUR
      SR WR5,WR5
      LH WR6,ONE
      LH WR7,FIFTEEN
WBA1 IC WR3,0(WR5,WR1)
      STC WR3,0(WR5,WR4)
      BXLE WR5,WR6,WBA1
      LTR WR2,WR2
      BC 8,WBA2
      CVD WR2,PNODEC+8(0,R13)
      UNPK PNODEC(4,R13),PNODEC+12(4,R13)
      LH WR7,NINTEN
WBA3 IC WR3,PNODEC-16(WR5,R13)
      STC WR3,0(WR5,WR4)
      BXLE WR5,WR6,WBA3
      SR WR5,WR6
      AR WR5,WR4
      OI 0(WR5),X'F0'
WBA2 AR WR4,WR7
      AR WR4,WR6

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076

ST	WR4,BUFLOC(0,R13)		D0441284
SH	WR7,BUFFCT(0,R13)		D0441285
LCR	WR7,WR7		D0441286
SH	WR7,ONE		D0441287
STM	WR7,BUFFCT(0,R13)		D0441288
L	R15,LWRT	BRANCH TO WRITE RECORD	D0441289
BALR	R14,R15		D0441290
LM	R14,R15,RLNK1(R13)		D0441291
BCR	15,R14		D0441292
*GET NEXT HALF INCH AFTER XMAX			D0441293
* RETURN - MDR1 COUNTS			D0441294
* - MDR3 NUMBER OF HALF INCHES			D0441295
USING *,R12			D0441296
MDH	LR	R12,R15	D0441297
	L	R3,XMAX(0,R13)	D0441298
	AH	R3,FORNIN	D0441299
	SR	R2,R2	D0441300
	LH	R1,FIFTY	D0441301
	OR	R2,R1	D0441302
	LR	R5,R3	D0441303
	MR	R4,R1	D0441304
	LR	R1,R5	D0441305
	BCR	15,R14	D0441306
* ROUTINE TO FILL BUFFER			D0441307
* ENTER FR1-CONTAINS CHARACTER,BITS 25-32			D0441308
*			D0441309
USING *,FR12			D0441310
FILL	LR	FR12,R15	D0441311
	STM	R14,R15,RLNK6(R13)	D0441312
	L	FR2,BUFLOC(0,R13) LOC IN BUFF	D0441313
	LH	FR3,BUFFCT(0,R13) NO OF CHAR REMAIN IN BUFF	D0441314
	STC	FR1,0(0,FR2)	D0441315
	AH	FR2,ONE	D0441316
	ST	FR2,BUFLOC(0,R13) STORE COUNT	D0441317
	BCT	FR3,FILL2	D0441318
	STH	FR3,BUFFCT(0,R13)	D0441319

077

	L	R15,LWRT	D0441320
	BALR	R14,R15	D0441321
FILL1	LM	R14,R15,RLNK6(R13)	D0441322
	BCR	15,R14	D0441323
FILL2	STH	FR3,BUFFCT(0,R13)	D0441324
	BC	15,FILL1	D0441325
FR1	EQU	1	D0441326
FR2	EQU	2	D0441327
FR3	EQU	3	D0441328
FR12	EQU	12	D0441329
WR1	EQU	1	D0441330
WR2	EQU	2	D0441331
WR3	EQU	3	D0441332
WR4	EQU	4	D0441333
WR5	EQU	5	D0441334
WR6	EQU	6	D0441335
WR7	EQU	7	D0441336
WR8	EQU	8	D0441337
WR9	EQU	9	D0441338
WR10	EQU	10	D0441339
WR11	EQU	11	D0441340
WR12	EQU	12	D0441341
WR13	EQU	13	D0441342
WR14	EQU	14	D0441343
WR15	EQU	15	D0441344
* ROUTINE TO WRITE Y SCALES-ALL INFO IN PERM STOR			D0441345
* NO REGISTER INPUT			D0441346
USING *,R12			D0441347
YSC	LR	R12,R15	D0441348
	STM	R14,R15,RLNK1(R13)	D0441349
	L	YR8,TBL(0,R13)	D0441350
	LH	YR7,NF(0,YR8)	D0441351
YSC5	STM	YR7,YR8,YSCMP(R13) BASE REG Y INFO	D0441352
	LH	YR2,NTY(0,YR8) TITLE COUNT-THIS VAR	D0441353
	LTR	YR2,YR2	D0441354
	BC	8,YSC1	D0441355
		ZERO-NO TITLE	

078

	L	YR1,YTITLE(0,YR8)	PICKUP BCD INFO FOR TITLE	D0441356
	L	YR3,SIZE12		D0441357
	LCR	YR3,YR3		D0441358
	L	YR4,XMAX(0,R13)		D0441359
	AH	YR4,EIGHTN		D0441360
	LH	YR5,TWNFVE		D0441361
	ST	YR4,YSCTMP+8(0,R13)		D0441362
	L	R15,LBCD	TRA TO BCD	D0441363
	BALR	R14,R15		D0441364
	L	R12,RLNK1+4(0,R13)	RESTORE BASE	D0441365
	L	YR8,YSCTMP+4(0,R13)	RESTORE INDEX	D0441366
YSC1	TM	SUPYSC(YR8),X'0F'		D0441367
	BC	8,YSC3		D0441368
	IC	YR2,YSYM(0,YR8)		D0441369
	N	YR2,MASKF		D0441370
	BC	8,YSC2	NO-TRA	D0441371
	L	YR4,YSCTMP+8(0,R13)		D0441372
	L	YR3,SIZE12		D0441373
	LH	YR5,EIGHT		D0441374
	OI	PENST(R13),X'04'		D0441375
	L	R15,LSYM	WRITE SYMBOL	D0441376
	BALR	R14,R15		D0441377
	L	R12,RLNK1+4(0,R13)		D0441378
	L	YR8,YSCTMP+4(0,R13)		D0441379
YSC2	LH	YR1,ELEVN	YES-COUNT SCALE VALUES TO WRITE	D0441380
	SR	YR2,YR2		D0441381
	LH	YR3,HNDRD	IY-INCR (UP ONE INCH)	D0441382
	L	YR4,YO(0,YR8)		D0441383
	L	YR4,O(0,YR4)		D0441384
	L	YR5,DY(0,YR8)		D0441385
	L	YR5,O(0,YR5)		D0441386
	L	YR6,XMAX(0,R13)		D0441387
	AH	YR6,TEN	IX	D0441388
	LH	YR7,TWNNIN	IY	D0441389
	L	R15,LSCN		D0441390
	BALR	R14,R15		D0441391

079

	L	R12,RLNK1+4(0,R13)		D0441392
	L	YR9,XMAX(0,R13)		D0441393
	AH	YR9,FIFTN		D0441394
	ST	YR9,XMAX(0,R13)	ASSURE SPACE AFTER SCALE	D0441395
	L	YR8,YSCTMP+4(0,R13)		D0441396
YSC3	L	YR7,YSCTMP(0,R13)	NO OF DEP VAR LEFT	D0441397
	BCT	YR7,YSC4	MORE	D0441398
YSCR7N	LM	R14,R15,RLNK1(R13)	NO-RETURN	D0441399
	BCR	15,R14		D0441400
YSC4	AH	YR8,YSTOR	YES-INCR STOR	D0441401
	BC	15,YSC5	DO NEXT	D0441402
YR1	EQU	1		D0441403
YR2	EQU	2		D0441404
YR3	EQU	3		D0441405
YR4	EQU	4		D0441406
YR5	EQU	5		D0441407
YR6	EQU	6		D0441408
YR7	EQU	7		D0441409
YR8	EQU	8		D0441410
YR9	EQU	9		D0441411
LSCN	DC	A(SCN)		D0441412
LFRESH	DC	A(FRESH)		D0441413
FUL100	DC	F*100'		D0441414
HUNDRO	EQU	FUL100+2		D0441415
HNDRO	EQU	HUNDRO		D0441416
HUNDR	DC	H*100'		D0441417
YSTOR	DC	H*32'		D0441418
EIGHT	DC	H*8'		D0441419
TEN	DC	H*10'		D0441420
FIFTEN	DC	H*15'		D0441421
TWNTWO	DC	H*22'		D0441422
		* ROUTINE TO DRAW SCALE VALUES		D0441423
		* ENTER SCR1=NUMBER TO DO		D0441424
		* SCR2=DELTA X-COUNTS BETWEEN VALUE COORDS		D0441425
		* SCR3=DELTA Y-COUNTS		D0441426
		* SCR4=INIT VALUE (XO OR YO)		D0441427

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*          SCR5=DELTA VALUE (DX OR DY)                                D0441428
*          SCR6=INIT VALUE COORD-X                                  D0441429
*          SCR7= -Y                                                  D0441430
SCN        USING *,R12                                              D0441431
           LR R12,R15                                              D0441432
           STM R14,R15,RLNK2(R13) STORE REGISTERS                 D0441433
           STM SCR1,SCR7,SCNSTR(R13) STORE PARAMETERS            D0441434
           LE F2,SCNSTR+16(0,R13) DX OR DY TO FP REG             D0441435
           LPER F2,F2                                              D0441436
           ME F2,ZEROTST E*4.E-05'                                D0441437
           STE F2,SCNS2(0,R13)                                     D0441438
           SR SCR8,SCR8                                           D0441439
           ST SCR8,SCNS1(0,R13)                                    D0441440
SCN5        LE F4,SCNSTR+16(0,R13) DX OR DY                        D0441441
           ME F4,SCNS1(0,R13)                                     D0441442
           AE F4,SCNSTR+12(0,R13) XO OR YO                         D0441443
           LPER F6,F4 ABS VALUE                                    D0441444
           CER F6,F2 COMPARE-CLOSE TO 0.0                         D0441445
           BC 2,SCN1 NO                                           D0441446
           LA SCR1,LOO                                           D0441447
           LH SCR2,THREE                                          D0441448
           BC 15,SCN9                                              D0441449
SCN1        STE F4,SCNSGN(0,R13) STORE FP NUMBER                 D0441450
           SR SCR8,SCR8 CLEAR COUNT                               D0441451
           LPER F4,F4 ABS VALUE                                    D0441452
SCN3        CE F4,HNNN GT. 9999.                                  D0441453
           BC 13,SCN2 NO                                           D0441454
           DE F4,TENF YES-DIV BY 10                               D0441455
           SH SCR8,ONE                                             D0441456
           BC 15,SCN3 TRY AGAIN                                    D0441457
SCN2        CE F4,THOUSF                                           D0441458
           BC 10,SCN4 NO                                           D0441459
           ME F4,TENF YES-MPY BY 10                               D0441460
           AH SCR8,ONE                                             D0441461
           BC 15,SCN2 TRY AGAIN                                    D0441462
SCN4        AU F4,X45 CONVERT TO INTEGER(S4)                     D0441463

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081

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STE        F4,SCNTMP(0,R13) STORE                                D0441464
NI          SCNTMP(R13),X'00' AND OUT CHARACTERISTIC             D0441465
L          SCR9,SCNTMP(0,R13)                                     D0441466
           A SCR9,ROUND ROUND TO NEAREST FOUR INTEGERS          D0441467
           SRA SCR9,4(0) SHIFT TO RIGHT ADJUST                  D0441468
           CH SCR9,NNNNFX                                         D0441469
           BC 13,SCN12                                             D0441470
           LR SCR2,SCR8                                            D0441471
           SR SCR8,SCR8                                            D0441472
           LH SCR3,TENN                                            D0441473
           DR SCR8,SCR3                                            D0441474
           LR SCR8,SCR2                                            D0441475
           SH SCR8,ONE                                             D0441476
SCN12        CVD SCR9,SCNTMP(0,R13) CONVERT TO DECIMAL           D0441477
           UNPK SCNTMP+11(5,R13),SCNTMP+5(3,R13)                D0441478
           LTR SCR8,SCR8 COUNT LT 0                               D0441479
           BC 4,SCN10 YES                                          D0441480
           CH SCR8,SIX                                             D0441481
           BC 4,SCN11 YES-TRA NO EXP                              D0441482
SCN10        LA SCR1,TENBCD LOAD REGISTERS-INFO FOR BCD          D0441483
           LH SCR2,THREE                                           D0441484
           L SCR3,SIZE9                                             D0441485
           LM SCR4,SCR5,SCNSTR+20(R13)                            D0441486
           ST SCR8,SCNTMP(0,R13)                                   D0441487
           L R15,LBCD                                              D0441488
           BALR R14,R15                                            D0441489
           L R12,RLNK2+4(0,R13)                                    D0441490
           SR SCR9,SCR9                                            D0441491
           LH SCR8,THREE                                           D0441492
           S SCR8,SCNTMP(0,R13)                                    D0441493
           CVD SCR8,SCNTMP(0,R13)                                  D0441494
           TM SCNTMP+7(R13),X'01' TEST-NEG EXP                   D0441495
           BC 8,SCN20 NO-TRA                                       D0441496
           MVI SCNTMP+16(R13),X'60' STORE MINUS IN COUNTER       D0441497
           BC 15,SCN21                                             D0441498
SCN20        MVI SCNTMP+16(R13),X'40' STORE BLANK IN COUNTER     D0441499

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082

SCN21	IC	SCR8,SCNTMP+6(0,R13)	D0441500
	N	SCR8,XF	D0441501
	BC	8,SCN22	D0441502
	D	SCR8,ZONE	D0441503
	STC	SCR8,SCNTMP+17(SCR9,R13)	D0441504
	AH	SCR9,ONE	D0441505
SCN22	IC	SCR8,SCNTMP+7(0,R13)	D0441506
	SRL	SCR8,4(0)	D0441507
	D	SCR8,ZONE	D0441508
	STC	SCR8,SCNTMP+17(SCR9,R13)	D0441509
	AH	SCR9,TWO	D0441510
	LA	SCR1,SCNTMP+16(0,R13)	D0441511
	LR	SCR2,SCR9	D0441512
	LM	SCR4,SCR5,SCNSTR+20(R13)	D0441513
	AH	SCR4,TWNSVN	D0441514
	AH	SCR5,FOUR	D0441515
	L	R15,LBCD	D0441516
	BALR	R14,R15	D0441517
	L	R12,RLNK2+4(0,R13)	D0441518
	LH	SCR8,THREE	D0441519
SCN11	LA	SCR7,4(0,R13)	D0441520
	LH	SCR2,FIVE	D0441521
	LH	SCR6,ONE	D0441522
	LR	SCR9,R13	D0441523
	LR	SCR1,R13	D0441524
	CH	SCR8,FIVE	D0441525
	BC	7,SCN30	D0441526
	MVI	SCNTMP+1(SCR9),X'4B' YES-DECP	D0441527
	MVI	SCNTMP+2(SCR9),X'F0' ZERO	D0441528
	AH	SCR9,TWO	D0441529
	AR	SCR7,SCR6	D0441530
	AR	SCR2,SCR6	D0441531
	BC	15,SCN32	D0441532
SCN30	CH	SCR8,FOUR	D0441533
	BC	7,SCN32	D0441534
	MVI	SCNTMP+1(SCR9),X'4B' DECP	D0441535

083

	BC	15,SCN33	D0441536
SCN32	MVN	SCNTMP+1(1,SCR9),SCNTMP+12(SCR1)	D0441537
	OI	SCNTMP+1(SCR9),X'F0' ADD ZONE	D0441538
	AR	SCR1,SCR6	D0441539
SCN33	AR	SCR8,SCR6	D0441540
	BXLE	SCR9,SCR6,SCN30	D0441541
	LA	SCR1,SCNTMP+1(0,R13)	D0441542
	TM	SCNSGN(R13),X'80' MINUS	D0441543
	BC	8,SCN40	D0441544
	MVI	SCNTMP(R13),X'60' YES	D0441545
	AR	SCR2,SCR6	D0441546
	SR	SCR1,SCR6	D0441547
SCN40	BCT	SCR9,*+4	D0441548
	TM	SCNTMP+1(SCR9),X'0F' LAST CHAR = ZERO	D0441549
	BC	7,SCN9	D0441550
	BCT	SCR2,SCN40	D0441551
SCN9	L	SCR3,SIZE12	D0441552
	LM	SCR4,SCR5,SCNSTR+20(R13)	D0441553
	AH	SCR5,FIFTEEN	D0441554
	L	R15,LBCD	D0441555
	BALR	R14,R15	D0441556
	L	R12,RLNK2+4(0,R13)	D0441557
	LM	SCR1,SCR7,SCNSTR(R13)	D0441558
	BCT	SCR1,*+8	D0441559
	BC	15,SCNRTN	D0441560
	AR	SCR6,SCR2	D0441561
	AR	SCR7,SCR3	D0441562
	STM	SCR1,SCR7,SCNSTR(R13)	D0441563
	LE	F2,SCNS1(0,R13)	D0441564
	AE	F2,ONEF	D0441565
	STE	F2,SCNS1(0,R13)	D0441566
	LE	F2,SCNS2(0,R13)	D0441567
	BC	15,SCN5	D0441568
SCNRTN	LM	R14,R15,RLNK2(R13)	D0441569
	BCR	15,R14	D0441570
SCR1	EQU	1	D0441571

084

SCR2	EQU	2		D0441572
SCR3	EQU	3		D0441573
SCR4	EQU	4		D0441574
SCR5	EQU	5		D0441575
SCR6	EQU	6		D0441576
SCR7	EQU	7		D0441577
SCR8	EQU	8		D0441578
SCR9	EQU	9		D0441579
* ROUTINE TO MOVE PEN TO PREV POINT ON THIS CURVE				D0441580
USING *,R12				D0441581
MLP	LR	R12,R15		D0441582
	TM	INFOY+7(R10),X'FF'	PREV DATA	D0441583
	BC	14,MLP1		D0441584
	NI	INFOY+7(R10),X'01'		D0441585
	BCR	15,R14		D0441586
MLP1	LH	MLR8,SYMFRO(0,R10)		D0441587
	N	MLR8,MASK	POINT PLOT	D0441588
	BCR	8,R14		D0441589
	LH	MLR8,INFOY+4(0,R10)		D0441590
	CH	MLR8,L1050	ABOVE PAPER	D0441591
	BCR	2,R14	YES,RETURN	D0441592
	CH	MLR8,L50	BELOW	D0441593
	BCR	4,R14	YES	D0441594
	TM	INFOY+7(R10),X'A0'	PREV BAD DATA	D0441595
	BCR	5,R14		D0441596
	L	MLR6,INFOY(0,R10)		D0441597
	L	R15,LMVE		D0441598
	BCR	15,R15		D0441599
MLR6	EQU	6		D0441600
MLR8	EQU	8		D0441601
LBCD	DC	A(BCD)		D0441602
SIZE12	DC	FS6'2'		D0441603
* BCD - ROUTINE TO WRITE A BCD LINE				D0441604
* ENTER R1-ADDR OF BCD CHAR				D0441605
* R2-COUNT OF CHAR				D0441606
* R3-SIZE (1/100 INCH)/6 AT 825) NEG IF Y DIR				D0441607

085

*		R4-START LOC-X		D0441608
*		R5-START LOC-Y		D0441609
*				D0441610
	USING	*,R12		D0441611
BCD	LR	R12,R15		D0441612
	STM	R14,R15,RLNK3(R13)		D0441613
	ST	R1,BCDADR(0,R13)	STORE BCD ADR	D0441614
	STH	R3,BCDSZ(0,R13)		D0441615
	STH	R2,BCDCT(0,R13)		D0441616
	LPR	R10,R3		D0441617
	MH	R10,SIX		D0441618
	SRA	R10,6(0)	SHIFT-RIGHT ADJUST	D0441619
	ST	R10,BCDS(0,R13)		D0441620
	LTR	R3,R3	TEST SIZE	D0441621
	BC	8,BCDRTN	=0 RETURN	D0441622
	BC	4,BCDN	NEG	D0441623
	NI	BCDFG(R13),X'00'	FIRST FLAG BIT OFF-SIZE POS	D0441624
	LH	R9,L500		D0441625
	BC	15,BCD1		D0441626
BCDN	LPR	R3,R3	POS SIZE	D0441627
	STH	R3,BCDSZ(0,R13)		D0441628
	OI	BCDFG(R13),X'80'		D0441629
	SR	R8,R8		D0441630
	LH	R9,L1100		D0441631
	SR	R9,R5		D0441632
	DR	R8,R10	INCR/SIZE=MAX CHAR Y DIR	D0441633
BCD1	CR	R9,R2	COMPARE MAX TO COUNT	D0441634
	BC	10,BCD2	EQ OR LESS THAN MAX - OK	D0441635
	LR	R2,R9	USE MAXIMUM	D0441636
	STH	R2,BCDCT(0,R13)		D0441637
BCD2	LTR	R2,R2		D0441638
	BC	12,BCDRTN		D0441639
	BCT	R2,**4		D0441640
	L	R8,XLOC(0,R13)	CURRENT PEN POS	D0441641
	L	R9,YLOC(0,R13)		D0441642
	SR	R8,R4	DELTA X	D0441643

086

	SR	R9,R5	DELTAY	D0441644
	LPR	R8,R8	ABS VALUE	D0441645
	NI	PENST(R13),X'00'	SET CODE	D0441731
MVE4	L	R15,AFILL		D0441732
	BALR	R14,R15 FILL		D0441733
	L	MR12,RLNK5+4(0,R13)		D0441734
	LM	MR6,MR8,MVESTRI(R13)	RESTORE REG	D0441735
MVE1	NI	PENST(R13),X'08'	SET CODE	D0441736
MVE2	LPR	MR1,MR6		D0441737
	S	MR1,XLOC(0,R13)	X-INCREMENT	D0441738
	BC	8,MVE10	NO MOVE X-DIR	D0441739
	BC	4,MVE11	MOVE-X NEG	D0441740
	IC	MR2,XPLUS	MOVE-X POS,LOAD X COMMAND	D0441741
	LH	MR3,ONE		D0441742
	BC	15,MVE13		D0441743
MVE11	IC	MR2,XNEG	X NEG COM	D0441744
	LH	MR3,TWO		D0441745
	BC	15,MVE13		D0441746
MVE10	SR	MR7,MR7	CLEAR DIAG MOVE REG	D0441747
	SR	MR3,MR3	CLEAR INCR REG	D0441748
MVE13	LPR	MR4,MR8	LOAD COUNT OF Y MOVES	D0441749
	S	MR4,YLOC(0,R13)	Y-INCR	D0441750
	BC	8,MVE20	NO MOVE Y-DIR	D0441751
	BC	2,MVE21	POS Y	D0441752
	LPR	MR4,MR4	ABS (Y COUNT)	D0441753
	LH	MR8,THREE		D0441754
	AR	MR3,MR8		D0441755
	BC	15,MVE22		D0441756
MVE21	SR	MR8,MR8	PICKUP Y POS COM	D0441757
MVE22	IC	MR5,YPLUS(MR8)	Y-COMM	D0441758
	IC	MR3,YPLUS(MR3)	XY-COM	D0441759
	LPR	MR6,MR1	ANY MOVE X-DIR	D0441760
	BC	8,MVE23	NO	D0441761
	SR	MR6,MR4	YES	D0441762
	BC	8,MVE24	EQUAL XY	D0441763
	BC	4,MVE25		D0441764

087

	LPR	MR14,MR4	X GREATER - Y INCR TO DIV	D0441765
	LPR	MR6,MR1	COUNT = X INCR	D0441766
	BC	15,MVE26		D0441767
MVE25	LPR	MR14,MR1	Y GREATER - X INCR TO DIV	D0441768
	LR	MR2,MR5	YCOMMAND	D0441769
	LPR	MR6,MR4	COUNT= Y INCR	D0441770
MVE26	SR	MR15,MR15	CLEAR 2ND DIV REG	D0441771
	SRDL	MR14,2(0)	SHIFT	D0441772
	DR	MR14,MR6	N1/N2*2**30	D0441773
	LR	MR4,MR15		D0441774
	AH	MR4,ONEB20	ROUND	D0441775
	LR	MR7,MR4		D0441776
	BC	15,MVE30		D0441777
MVE24	L	MR7,INC3FF	X=Y - DIAGONAL MOVES ONLY	D0441778
	LR	MR4,MR7		D0441779
	LPR	MR6,MR1		D0441780
	BC	15,MVE30		D0441781
MVE23	LR	MR2,MR5	Y-COM	D0441782
	LR	MR6,MR4	YCOUNT	D0441783
	BC	15,MVE27		D0441784
MVE20	LTR	MR3,MR3	NO MOVE Y DIR	D0441785
	BC	8,MVERTN	NO MOVE X DIR-RETURN	D0441786
	LPR	MR6,MR1		D0441787
MVE27	SR	MR4,MR4		D0441788
	SR	MR7,MR7		D0441789
MVE30	L	MR5,INC3FF	COMPARE	D0441790
	L	MR8,MVESTRI(0,R13)		D0441791
	ST	MR8,XLOC(0,R13)		D0441792
	L	MR8,MVESTRI+8(0,R13)		D0441793
	ST	MR8,YLOC(0,R13)		D0441794
	L	MR15,AFILL		D0441795
MVE33	BXH	MR7,MR4,MVE31		D0441796
	LR	MR1,MR2	MOVE X OR Y DIR	D0441797
	BC	15,MVE32		D0441798
MVE31	N	MR7,INC3FF		D0441799
	LR	MR1,MR3	MOVE XY	D0441800

088

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HVE32  STM      MR2,MR7,HVESTR(R13)
        BALR     R14,R15
        L        MR12,RLNK5+4(0,R13)
        LM       MR2,MR7,HVESTR(R13)
        BCT      MR6,HVE33      FINISHED NO-BRANCH
HVERTN  LM       R14,R15,RLNK5(R13)
        BCR      15,R14      RETURN
MR1     EQU      1
MR2     EQU      2
MR3     EQU      3
MR4     EQU      4
MR5     EQU      5
MR6     EQU      6
MR7     EQU      7
MR8     EQU      8
MR9     EQU      9
MR10    EQU      10
MR11    EQU      11
MR12    EQU      12
MR13    EQU      13
MR14    EQU      14
MR15    EQU      15
* ROUTINE TO SCALE DATA
* CDR1 THIS POINT
* CDR2 ERROR RETURN
*
* RETURNS R4 - X PEN LOC
*          R5 - Y
*          R6 - SYM CODE-IF BAD DATA
*
SCD      USING  *,R12
        LR       R12,R15
        STM      CDR1,CDR2,SCDTMP(R13)
        SR       CDR5,CDR5
        L        CDR2,DDX(0,R11)
        TM       0(CDR2),X'FF'

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089

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BC      8,SCD1      NO
A       CDR1,X46      NP-FLOAT
ST      CDR1,SCDTMP+8(0,R13)
LE      F2,SCDTMP+8(0,R13)
BC      15,SCD4
SCD1    TM      PRESCL(R11),X'F0'      PRESCALED
        BC      8,SCD5      NO
        L       CDR2,XADDR(CDR5,R13)      X ADDR
        L       CDR1,0(0,CDR2)      X DATA
        A       CDR1,XZER(CDR5,R13)      PRESCALED-LMCT
        BC      15,SCD6
SCD5    L       CDR2,XADDR(CDR5,R13)
SCD8    LE      F2,0(0,CDR2)      DATA-FP
SCD4    ME      F2,XMUL(CDR5,R13)
        SU      F2,XZER(CDR5,R13)
        STE     F2,SCDTMP+8(0,R13)
        L       CDR1,SCDTMP+8(0,R13)      IN PLOTTER COUNTS
        N       CDR1,MSKFX      FIX
        A       CDR1,ROUND
        SRA     CDR1,4(0)      SHIFT-RIGHT ADJUST
        TM      SCOTMP+8(R13),X'80'      NEG
        BC      8,SCD6
        LCR     CDR1,CDR1      YES
SCD6    LTR     CDR5,CDR5
        BC      7,SCD7      NO
        AH      CDR5,F00R      YES-NOW DO Y
        C       CDR1,XMAX(0,R13)
        BC      12,SCD9
        ST      CDR1,XMAX(0,R13)      NEW MAX-X
SCD9    LR       CDR4,CDR1      XCOUNTS
        L       CDR2,XADDR(CDR5,R13)      Y DATA ADDR
        TM      0(CDR2),X'74'      MISS DATA
        BC      12,SCD1      NO
        LH      CDR6,MISCOD      YES
        L       CDR5,YLOC(0,R13)      USE PREV Y LOC
SCD21   DI      PENSTR(R13),X'04'

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090

	LM	CDR1,CDR2,SCDTMP(R13)	RESTORE REG	D0441873
	BCR	15,CDR2	ERROR RETURN	D0441874
SCD7	LR	CDR5,CDR1		D0441875
	LH	CDR1,FORSIX		D0441876
	CR	CDR5,CDR1		D0441877
	BC	4,SCD20	LOW OFF SCALE	D0441878
	AH	CDR1,TENEGT		D0441879
	CR	CDR5,CDR1		D0441880
	BC	2,SCD20	HIGH OFF SCALE	D0441881
SCD23	TM	BADDTA(R13),X'40'		D0441882
	BC	8,SCD25		D0441883
	OI	PENST(R13),X'04'		D0441884
	NI	BADDTA(R13),X'BF'		D0441885
SCD25	LM	CDR1,CDR2,SCDTMP(R13)		D0441886
	BCK	15,R14		D0441887
SCD20	TM	OFSCLY(R10),X'30'		D0441888
	BC	7,SCD24	YES	D0441889
	LR	CDR5,CDR1	NO	D0441890
	LH	CDR6,WILD	WILD PT	D0441891
	BC	15,SCD21		D0441892
SCD24	LR	CDR7,CDR5		D0441893
	SH	CDR7,FIFTY	PLOT COUNTS	D0441894
	SR	CDR6,CDR6		D0441895
	STC	CDR6,SCDTMP+8(0,R13)	INIT SWITCH	D0441896
	D	CDR6,THOUS		D0441897
	LTR	CDR6,CDR6	NEG	D0441898
	BC	2,*+8	NO	D0441899
	XI	SCDTMP+8(R13),X'01'	YES SET SW.	D0441900
	TM	OFSCLY(R10),X'10'	MIRROR	D0441901
	BC	8,SCD30		D0441902
	XI	SCDTMP+8(R13),X'01'	YES SET SW	D0441903
	STC	7,SCDTMP+9(0,R13)		D0441904
	TM	SCDTMP+9(R13),X'01'	ODD	D0441905
	BC	7,SCD30	YES	D0441906
	XI	SCDTMP+8(R13),X'01'	NO SET SW	D0441907
SCD30	TM	SCDTMP+8(R13),X'01'	SW SET	D0441908

091

	BC	8,SCD31	NO-BRANCH	D0441909
	LNR	CDR5,CDR6	YES 1050-ABS(REMAINDER)	D0441910
	AH	CDR5,INFFTY		D0441911
	BC	15,SCD32		D0441912
SCD31	LPR	CDR5,CDR6	NO ABS(REMAIN)+50	D0441913
	AH	CDR5,FIFTY		D0441914
SCD32	TM	BADDTA(R13),X'40'	SECOND BAD POINT	D0441915
	BC	7,SCD25		D0441916
	OI	PENST(R13),X'04'		D0441917
	OI	BADDTA(R13),X'40'		D0441918
	BC	15,SCD25		D0441919
CDR1	EQU	1		D0441920
CDR2	EQU	2		D0441921
CDR4	EQU	4		D0441922
CDR5	EQU	5		D0441923
CDR6	EQU	6		D0441924
CDR7	EQU	7		D0441925
FOUR	DC	H'4'		D0441926
ONE	DC	H'1'		D0441927
MISCOD	DC	X'002E'		D0441928
WILD	DC	X'001E'		D0441929
INFFTY	DC	H'1050'		D0441930
FIFTY	DC	H'50'		D0441931
* DRAW GRID				D0441932
	USING	*R12		D0441933
GRID	LR	R12,R15		D0441934
	STM	R14,R15,RLNK1(R13)		D0441935
	OI	PENST(R13),X'04'	PENUP	D0441936
	L	GR7,XMAX(0,R13)		D0441937
	S	GR7,LMCT(0,R13)		D0441938
	SR	GR6,GR6		D0441939
	LH	GR1,HUNDR		D0441940
	DR	GR6,GR1		D0441941
	LR	GR5,GR7		D0441942
	MR	GR6,GR1		D0441943
	STH	GR7,GROTMP+24(0,R13)		D0441944

	AH	GR5,ONEN	((XMAX-LMCT)/100)+1	D0441945
	LH	GR4,THOUS		D0441946
	STH	GR4,GRDTMP+2(0,R13)	YINCR	D0441947
	LCR	GR4,GR1		D0441948
	STH	GR4,GRDTMP(0,R13)	XINCR	D0441949
	L	GR6,XMAX(0,R13)	X	D0441950
	LH	GR8,L50	Y	D0441951
	LR	GR7,R13		D0441952
	AH	GR7,TWO	REG-CHANGE Y INCR SIGN	D0441953
	L	R15,LMVE		D0441954
GRD1	LH	GR4,TWO	INCR X OR Y	D0441955
GRD4	STM	GR4,GR8,GRDTMP+4(R13)		D0441956
	BALR	R14,R15		D0441957
	L	R12,RLNK1+4(0,R13)		D0441958
	LH	GR4,GR8,GRDTMP+4(R13)		D0441959
	BCT	GR4,GRD2		D0441960
	BCT	GR5,GRD3		D0441961
	BC	15,GRD5		D0441962
GRD3	AH	GR6,GRDTMP(0,R13)	INCR X	D0441963
	BC	15,GRD1		D0441964
GRD2	AH	GR8,GRDTMP+2(0,R13)	INCR Y	D0441965
	LH	GR1,GRDTMP(0,GR7)		D0441966
	LCR	GR1,GR1		D0441967
	STH	GR1,GRDTMP(0,GR7)		D0441968
	BC	15,GRD4		D0441969
GRD5	SR	GR7,R13		D0441970
	BC	8,GRD6		D0441971
	LH	GR6,GRDTMP+24(0,R13)		D0441972
	STH	GR6,GRDTMP(0,R13)	X INCR	D0441973
	L	GR6,LMCT(0,R13)	START X	D0441974
	LH	GR8,HUNDR		D0441975
	LCR	GR8,GR8		D0441976
	STH	GR8,GRDTMP+2(0,R13)		D0441977
	LH	GR8,L1050		D0441978
	LH	GR5,ELEVN	COUNT	D0441979
	LH	GR4,ONEN	SWCH	D0441980

093

	LR	GR7,R13		D0441981
	BC	15,GRD4		D0441982
GRD6	AH	GR6,GRDTMP(0,R13)		D0441983
	BALR	R14,R15		D0441984
GRDRTN	LM	R14,R15,RLNK1(R13)		D0441985
	BCR	15,R14		D0441986
GR1	EQU	1		D0441987
GR2	EQU	2		D0441988
GR3	EQU	3		D0441989
GR4	EQU	4		D0441990
GR5	EQU	5		D0441991
GR6	EQU	6		D0441992
GR7	EQU	7		D0441993
GR8	EQU	8		D0441994
L50	DC	H'50'		D0441995
L1050	DC	H'1050'		D0441996
LMVE	DC	A(MVE)		D0441997
*	ROUTINE TO DRAW SYMBOLS			D0441998
*	SR2	= CHAR CODE		D0441999
*	SR3	= SIZE (INTEGER(1/100 INCH)/6 AT B25)		D0442000
*	SR4	= X START		D0442001
*	SR5	= Y START		D0442002
	USING	*,SR12		D0442003
SYM	LR	R12,R15		D0442004
	STM	SR14,SR15,RLNK4(R13)		D0442005
	N	SR2,FMSK3F	KEEP LAST 6 BITS	D0442006
	SLA	SR2,1(0)		D0442007
	STH	SR2,SR3,SR4,SR5,SR6,SR7,SR8,SR9,SR10,SR11,SR12,SR13,SR14,SR15,SR16,SR17,SR18,SR19,SR20,SR21,SR22,SR23,SR24,SR25,SR26,SR27,SR28,SR29,SR30,SR31,SR32,SR33,SR34,SR35,SR36,SR37,SR38,SR39,SR40,SR41,SR42,SR43,SR44,SR45,SR46,SR47,SR48,SR49,SR50,SR51,SR52,SR53,SR54,SR55,SR56,SR57,SR58,SR59,SR60,SR61,SR62,SR63,SR64,SR65,SR66,SR67,SR68,SR69,SR70,SR71,SR72,SR73,SR74,SR75,SR76,SR77,SR78,SR79,SR80,SR81,SR82,SR83,SR84,SR85,SR86,SR87,SR88,SR89,SR90,SR91,SR92,SR93,SR94,SR95,SR96,SR97,SR98,SR99,SR100,SR101,SR102,SR103,SR104,SR105,SR106,SR107,SR108,SR109,SR110,SR111,SR112,SR113,SR114,SR115,SR116,SR117,SR118,SR119,SR120,SR121,SR122,SR123,SR124,SR125,SR126,SR127,SR128,SR129,SR130,SR131,SR132,SR133,SR134,SR135,SR136,SR137,SR138,SR139,SR140,SR141,SR142,SR143,SR144,SR145,SR146,SR147,SR148,SR149,SR150,SR151,SR152,SR153,SR154,SR155,SR156,SR157,SR158,SR159,SR160,SR161,SR162,SR163,SR164,SR165,SR166,SR167,SR168,SR169,SR170,SR171,SR172,SR173,SR174,SR175,SR176,SR177,SR178,SR179,SR180,SR181,SR182,SR183,SR184,SR185,SR186,SR187,SR188,SR189,SR190,SR191,SR192,SR193,SR194,SR195,SR196,SR197,SR198,SR199,SR200,SR201,SR202,SR203,SR204,SR205,SR206,SR207,SR208,SR209,SR210,SR211,SR212,SR213,SR214,SR215,SR216,SR217,SR218,SR219,SR220,SR221,SR222,SR223,SR224,SR225,SR226,SR227,SR228,SR229,SR230,SR231,SR232,SR233,SR234,SR235,SR236,SR237,SR238,SR239,SR240,SR241,SR242,SR243,SR244,SR245,SR246,SR247,SR248,SR249,SR250,SR251,SR252,SR253,SR254,SR255,SR256,SR257,SR258,SR259,SR260,SR261,SR262,SR263,SR264,SR265,SR266,SR267,SR268,SR269,SR270,SR271,SR272,SR273,SR274,SR275,SR276,SR277,SR278,SR279,SR280,SR281,SR282,SR283,SR284,SR285,SR286,SR287,SR288,SR289,SR290,SR291,SR292,SR293,SR294,SR295,SR296,SR297,SR298,SR299,SR300,SR301,SR302,SR303,SR304,SR305,SR306,SR307,SR308,SR309,SR310,SR311,SR312,SR313,SR314,SR315,SR316,SR317,SR318,SR319,SR320,SR321,SR322,SR323,SR324,SR325,SR326,SR327,SR328,SR329,SR330,SR331,SR332,SR333,SR334,SR335,SR336,SR337,SR338,SR339,SR340,SR341,SR342,SR343,SR344,SR345,SR346,SR347,SR348,SR349,SR350,SR351,SR352,SR353,SR354,SR355,SR356,SR357,SR358,SR359,SR360,SR361,SR362,SR363,SR364,SR365,SR366,SR367,SR368,SR369,SR370,SR371,SR372,SR373,SR374,SR375,SR376,SR377,SR378,SR379,SR380,SR381,SR382,SR383,SR384,SR385,SR386,SR387,SR388,SR389,SR390,SR391,SR392,SR393,SR394,SR395,SR396,SR397,SR398,SR399,SR400,SR401,SR402,SR403,SR404,SR405,SR406,SR407,SR408,SR409,SR410,SR411,SR412,SR413,SR414,SR415,SR416,SR417,SR418,SR419,SR420,SR421,SR422,SR423,SR424,SR425,SR426,SR427,SR428,SR429,SR430,SR431,SR432,SR433,SR434,SR435,SR436,SR437,SR438,SR439,SR440,SR441,SR442,SR443,SR444,SR445,SR446,SR447,SR448,SR449,SR450,SR451,SR452,SR453,SR454,SR455,SR456,SR457,SR458,SR459,SR460,SR461,SR462,SR463,SR464,SR465,SR466,SR467,SR468,SR469,SR470,SR471,SR472,SR473,SR474,SR475,SR476,SR477,SR478,SR479,SR480,SR481,SR482,SR483,SR484,SR485,SR486,SR487,SR488,SR489,SR490,SR491,SR492,SR493,SR494,SR495,SR496,SR497,SR498,SR499,SR500,SR501,SR502,SR503,SR504,SR505,SR506,SR507,SR508,SR509,SR510,SR511,SR512,SR513,SR514,SR515,SR516,SR517,SR518,SR519,SR520,SR521,SR522,SR523,SR524,SR525,SR526,SR527,SR528,SR529,SR530,SR531,SR532,SR533,SR534,SR535,SR536,SR537,SR538,SR539,SR540,SR541,SR542,SR543,SR544,SR545,SR546,SR547,SR548,SR549,SR550,SR551,SR552,SR553,SR554,SR555,SR556,SR557,SR558,SR559,SR560,SR561,SR562,SR563,SR564,SR565,SR566,SR567,SR568,SR569,SR570,SR571,SR572,SR573,SR574,SR575,SR576,SR577,SR578,SR579,SR580,SR581,SR582,SR583,SR584,SR585,SR586,SR587,SR588,SR589,SR590,SR591,SR592,SR593,SR594,SR595,SR596,SR597,SR598,SR599,SR600,SR601,SR602,SR603,SR604,SR605,SR606,SR607,SR608,SR609,SR610,SR611,SR612,SR613,SR614,SR615,SR616,SR617,SR618,SR619,SR620,SR621,SR622,SR623,SR624,SR625,SR626,SR627,SR628,SR629,SR630,SR631,SR632,SR633,SR634,SR635,SR636,SR637,SR638,SR639,SR640,SR641,SR642,SR643,SR644,SR645,SR646,SR647,SR648,SR649,SR650,SR651,SR652,SR653,SR654,SR655,SR656,SR657,SR658,SR659,SR660,SR661,SR662,SR663,SR664,SR665,SR666,SR667,SR668,SR669,SR670,SR671,SR672,SR673,SR674,SR675,SR676,SR677,SR678,SR679,SR680,SR681,SR682,SR683,SR684,SR685,SR686,SR687,SR688,SR689,SR690,SR691,SR692,SR693,SR694,SR695,SR696,SR697,SR698,SR699,SR700,SR701,SR702,SR703,SR704,SR705,SR706,SR707,SR708,SR709,SR710,SR711,SR712,SR713,SR714,SR715,SR716,SR717,SR718,SR719,SR720,SR721,SR722,SR723,SR724,SR725,SR726,SR727,SR728,SR729,SR730,SR731,SR732,SR733,SR734,SR735,SR736,SR737,SR738,SR739,SR740,SR741,SR742,SR743,SR744,SR745,SR746,SR747,SR748,SR749,SR750,SR751,SR752,SR753,SR754,SR755,SR756,SR757,SR758,SR759,SR760,SR761,SR762,SR763,SR764,SR765,SR766,SR767,SR768,SR769,SR770,SR771,SR772,SR773,SR774,SR775,SR776,SR777,SR778,SR779,SR780,SR781,SR782,SR783,SR784,SR785,SR786,SR787,SR788,SR789,SR790,SR791,SR792,SR793,SR794,SR795,SR796,SR797,SR798,SR799,SR800,SR801,SR802,SR803,SR804,SR805,SR806,SR807,SR808,SR809,SR810,SR811,SR812,SR813,SR814,SR815,SR816,SR817,SR818,SR819,SR820,SR821,SR822,SR823,SR824,SR825,SR826,SR827,SR828,SR829,SR830,SR831,SR832,SR833,SR834,SR835,SR836,SR837,SR838,SR839,SR840,SR841,SR842,SR843,SR844,SR845,SR846,SR847,SR848,SR849,SR850,SR851,SR852,SR853,SR854,SR855,SR856,SR857,SR858,SR859,SR860,SR861,SR862,SR863,SR864,SR865,SR866,SR867,SR868,SR869,SR870,SR871,SR872,SR873,SR874,SR875,SR876,SR877,SR878,SR879,SR880,SR881,SR882,SR883,SR884,SR885,SR886,SR887,SR888,SR889,SR890,SR891,SR892,SR893,SR894,SR895,SR896,SR897,SR898,SR899,SR900,SR901,SR902,SR903,SR904,SR905,SR906,SR907,SR908,SR909,SR910,SR911,SR912,SR913,SR914,SR915,SR916,SR917,SR918,SR919,SR920,SR921,SR922,SR923,SR924,SR925,SR926,SR927,SR928,SR929,SR930,SR931,SR932,SR933,SR934,SR935,SR936,SR937,SR938,SR939,SR940,SR941,SR942,SR943,SR944,SR945,SR946,SR947,SR948,SR949,SR950,SR951,SR952,SR953,SR954,SR955,SR956,SR957,SR958,SR959,SR960,SR961,SR962,SR963,SR964,SR965,SR966,SR967,SR968,SR969,SR970,SR971,SR972,SR973,SR974,SR975,SR976,SR977,SR978,SR979,SR980,SR981,SR982,SR983,SR984,SR985,SR986,SR987,SR988,SR989,SR990,SR991,SR992,SR993,SR994,SR995,SR996,SR997,SR998,SR999,SR1000,SR1001,SR1002,SR1003,SR1004,SR1005,SR1006,SR1007,SR1008,SR1009,SR1010,SR1011,SR1012,SR1013,SR1014,SR1015,SR1016,SR1017,SR1018,SR1019,SR1020,SR1021,SR1022,SR1023,SR1024,SR1025,SR1026,SR1027,SR1028,SR1029,SR1030,SR1031,SR1032,SR1033,SR1034,SR1035,SR1036,SR1037,SR1038,SR1039,SR1040,SR1041,SR1042,SR1043,SR1044,SR1045,SR1046,SR1047,SR1048,SR1049,SR1050,SR1051,SR1052,SR1053,SR1054,SR1055,SR1056,SR1057,SR1058,SR1059,SR1060,SR1061,SR1062,SR1063,SR1064,SR1065,SR1066,SR1067,SR1068,SR1069,SR1070,SR1071,SR1072,SR1073,SR1074,SR1075,SR1076,SR1077,SR1078,SR1079,SR1080,SR1081,SR1082,SR1083,SR1084,SR1085,SR1086,SR1087,SR1088,SR1089,SR1090,SR1091,SR1092,SR1093,SR1094,SR1095,SR1096,SR1097,SR1098,SR1099,SR1100,SR1101,SR1102,SR1103,SR1104,SR1105,SR1106,SR1107,SR1108,SR1109,SR1110,SR1111,SR1112,SR1113,SR1114,SR1115,SR1116,SR1117,SR1118,SR1119,SR1120,SR1121,SR1122,SR1123,SR1124,SR1125,SR1126,SR1127,SR1128,SR1129,SR1130,SR1131,SR1132,SR1133,SR1134,SR1135,SR1136,SR1137,SR1138,SR1139,SR1140,SR1141,SR1142,SR1143,SR1144,SR1145,SR1146,SR1147,SR1148,SR1149,SR1150,SR1151,SR1152,SR1153,SR1154,SR1155,SR1156,SR1157,SR1158,SR1159,SR1160,SR1161,SR1162,SR1163,SR1164,SR1165,SR1166,SR1167,SR1168,SR1169,SR1170,SR1171,SR1172,SR1173,SR1174,SR1175,SR1176,SR1177,SR1178,SR1179,SR1180,SR1181,SR1182,SR1183,SR1184,SR1185,SR1186,SR1187,SR1188,SR1189,SR1190,SR1191,SR1192,SR1193,SR1194,SR1195,SR1196,SR1197,SR1198,SR1199,SR1200,SR1201,SR1202,SR1203,SR1204,SR1205,SR1206,SR1207,SR1208,SR1209,SR1210,SR1211,SR1212,SR1213,SR1214,SR1215,SR1216,SR1217,SR1218,SR1219,SR1220,SR1221,SR1222,SR1223,SR1224,SR1225,SR1226,SR1227,SR1228,SR1229,SR1230,SR1231,SR1232,SR1233,SR1234,SR1235,SR1236,SR1237,SR1238,SR1239,SR1240,SR1241,SR1242,SR1243,SR1244,SR1245,SR1246,SR1247,SR1248,SR1249,SR1250,SR1251,SR1252,SR1253,SR1254,SR1255,SR1256,SR1257,SR1258,SR1259,SR1260,SR1261,SR1262,SR1263,SR1264,SR1265,SR1266,SR1267,SR1268,SR1269,SR1270,SR1271,SR1272,SR1273,SR1274,SR1275,SR1276,SR1277,SR1278,SR1279,SR1280,SR1281,SR1282,SR1283,SR1284,SR1285,SR1286,SR1287,SR1288,SR1289,SR1290,SR1291,SR1292,SR1293,SR1294,SR1295,SR1296,SR1297,SR1298,SR1299,SR1300,SR1301,SR1302,SR1303,SR1304,SR1305,SR1306,SR1307,SR1308,SR1309,SR1310,SR1311,SR1312,SR1313,SR1314,SR1315,SR1316,SR1317,SR1318,SR1319,SR1320,SR1321,SR1322,SR1323,SR1324,SR1325,SR1326,SR1327,SR1328,SR1329,SR1330,SR1331,SR1332,SR1333,SR1334,SR1335,SR1336,SR1337,SR1338,SR1339,SR1340,SR1341,SR1342,SR1343,SR1344,SR1345,SR1346,SR1347,SR1348,SR1349,SR1350,SR1351,SR1352,SR1353,SR1354,SR1355,SR1356,SR1357,SR1358,SR1359,SR1360,SR1361,SR1362,SR1363,SR1364,SR1365,SR1366,SR1367,SR1368,SR1369,SR1370,SR1371,SR1372,SR1373,SR1374,SR1375,SR1376,SR1377,SR1378,SR1379,SR1380,SR1381,SR1382,SR1383,SR1384,SR1385,SR1386,SR1387,SR1388,SR1389,SR1390,SR1391,SR1392,SR1393,SR1394,SR1395,SR1396,SR1397,SR1398,SR1399,SR1400,SR1401,SR1402,SR1403,SR1404,SR1405,SR1406,SR1407,SR1408,SR1409,SR1410,SR1411,SR1412,SR1413,SR1414,SR1415,SR1416,SR1417,SR1418,SR1419,SR1420,SR1421,SR1422,SR1423,SR1424,SR1425,SR1426,SR1427,SR1428,SR1429,SR1430,SR1431,SR1432,SR1433,SR1434,SR1435,SR1436,SR1437,SR1438,SR1439,SR1440,SR1441,SR1442,SR1443,SR1444,SR1445,SR1446,SR1447,SR1448,SR1449,SR1450,SR1451,SR1452,SR1453,SR1454,SR1455,SR1456,SR1457,SR1458,SR1459,SR1460,SR1461,SR1462,SR1463,SR1464,SR1465,SR1466,SR1467,SR1468,SR1469,SR1470,SR1471,SR1472,SR1473,SR1474,SR1475,SR1476,SR1477,SR1478,SR1479,SR1480,SR1481,SR1482,SR1483,SR1484,SR1485,SR1486,SR1487,SR1488,SR1489,SR1490,SR1491,SR1492,SR1493,SR1494,SR1495,SR1496,SR1497,SR1498,SR1499,SR1500,SR1501,SR1502,SR1503,SR1504,SR1505,SR1506,SR1507,SR1508,SR1509,SR1510,SR1511,SR1512,SR1513,SR1514,SR1515,SR1516,SR1517,SR1518,SR1519,SR1520,SR1521,SR1522,SR1523,SR1524,SR1525,SR1526,SR1527,SR1528,SR1529,SR1530,SR1531,SR1532,SR1533,SR1534,SR1535,SR1536,SR1537,SR1538,SR1539,SR1540,SR1541,SR1542,SR1543,SR1544,SR1545,SR1546,SR1547,SR1548,SR1549,SR1550,SR1551,SR1552,SR1553,SR1554,SR1555,SR1556,SR1557,SR1558,SR1559,SR1560,SR1561,SR1562,SR1563,SR1564,SR1565,SR1566,SR1567,SR1568,SR1569,SR1570,SR1571,SR1572,SR1573,SR1574,SR1575,SR1576,SR1577,SR1578,SR1579,SR1580,SR1581,SR1582,SR1583,SR1584,SR1585,SR1586,SR1587,SR1588,SR1589,SR1590,SR1591,SR1592,SR1593,SR1594,SR1595,SR1596,SR1597,SR1598,SR1599,SR1600,SR1601,SR1602,SR1603,SR1604,SR1605,SR1606,SR1607,SR1608,SR1609,SR1610,SR1611,SR1612,SR1613,SR1614,SR1615,SR1616,SR1617,SR1618,SR1619,SR1620,SR1621,SR1622,SR1623,SR1624,SR1625,SR1626,SR1627,SR1628,SR1629,SR1630,SR1631,SR1632,SR1633,SR1634,SR1635,SR1636,SR1637,SR1638,SR1639,SR1640,SR1641,SR1642,SR1643,SR1644,SR1645,SR1646,SR1647,SR1648,SR1649,SR1650,SR1651,SR1652,SR1653,SR1654,SR1655,SR1656,SR1657,SR1658,SR1659,SR1660,SR1661,SR1662,SR1663,SR1664,SR1665		

	ST	SR3,SYMSTR+4(0,R13)		D0442017
SYM1	TM	SYMSTR+3(R13),X*7E	AERO SYM	D0442018
	BC	14,SYM4		D0442019
	IC	SR7,SYMCOD(SR6)	X COORD	D0442020
	IC	SR9,SYMCOD+1(SR6)	Y COORD	D0442021
	AH	SR6,ONEN		D0442022
	ST	SR6,SYMADR(0,R13)		D0442023
	N	SR7,FMSK3F	KEEP 6 BITS	D0442024
	N	SR9,FMSK3F	KEEP 6 BITS	D0442025
	BC	15,SYM5		D0442026
SYM4	IC	SR7,SYMCOD(SR6)	X,Y COORD	D0442027
	LK	SR9,SR7		D0442028
	SRA	SR7,4(0)	RIGHT ADJUST X	D0442029
	N	SR7,FMSK07	KEEP 3 BITS-X	D0442030
	N	SR9,FMSK07	KEEP 3 BITS-Y	D0442031
SYM5	M	SR6,SYMSTR+4(0,R13)	MPY BY SIZE	D0442032
	M	SR8,SYMSTR+4(0,R13)	X	D0442033
	AH	SR7,B26		D0442034
	AH	SR9,B26		D0442035
	SRA	SR7,6(0)	RIGHT ADJUST	D0442036
	SRA	SR9,6(0)	RIGHT ADJUST	D0442037
	L	SR6,SYMSTR+8(0,R13)	IX	D0442038
	L	SR8,SYMSTR+12(0,R13)	IY	D0442039
	TM	BCDFG(R13),X*80	HORIZ LINE	D0442040
	BC	8,SYM2	YES	D0442041
	SR	SR6,SR9	NO IX-DY	D0442042
	AR	SR8,SR7	IY+DX	D0442043
	BC	15,SYM3		D0442044
SYM2	AR	SR6,SR7	IX+DX	D0442045
	AR	SR8,SR9	IY+DY	D0442046
SYM3	L	SR15,AMVE		D0442047
	BALR	SR14,SR15		D0442048
	L	SR12,RLNK4+4(0,R13)	LOAD BASE	D0442049
	L	SR6,SYMADR(0,R13)	INCREMENT TABLE ADDR	D0442050
	AH	SR6,ONEN		D0442051
	ST	SR6,SYMADR(0,R13)		D0442052

095

	IC	SR7,SYMCOD(SR6)		D0442053
	N	SR7,FMSKUB		D0442054
	BC	8,SYM1		D0442055
SYMRTN	LM	SR14,SR15,RLNK4(R13)		D0442056
	LM	SR2,SR5,SYMSTR(R13)		D0442057
	BGR	15,SR14		D0442058
SR1	EQU	1		D0442059
SR2	EQU	2		D0442060
SR3	EQU	3		D0442061
SR4	EQU	4		D0442062
SR5	EQU	5		D0442063
SR6	EQU	6		D0442064
SR7	EQU	7		D0442065
SR8	EQU	8		D0442066
SR9	EQU	9		D0442067
SR12	EQU	12	BASE	D0442068
SR14	EQU	14		D0442069
SR15	EQU	15		D0442070
ONEN	DC	H*1		D0442071
AMVE	DC	A(MVE)		D0442072
TENN	DC	H*10		D0442073
FIFTN	DC	H*15		D0442074
TWO	DC	H*2		D0442075
THREE	DC	H*3		D0442076
FIVE	DC	H*5		D0442077
SIX	DC	H*6		D0442078
ELEVN	DC	H*11		D0442079
EIGHTN	DC	H*18		D0442080
NINTEN	DC	H*19		D0442081
TWNEVE	DC	H*25		D0442082
TWNSVN	DC	H*27		D0442083
TWNNIN	DC	H*29		D0442084
FORSIX	DC	H*46		D0442085
FORNIN	DC	H*49		D0442086
L500	DC	H*500		D0442087
THOUS	DC	F*1000		D0442088

096

TENEGT	DC	H'1008'		D0442089
L1100	DC	H'1100'		D0442090
AIOWRT	DC	A(PLTW)		D0442091
AFILL	DC	A(FILL)		D0442092
LWRT	DC	A(WRT)		D0442093
ONEF	DC	E'1.'		D0442094
TENF	DC	E'10.'		D0442095
NNNN	DC	E'9999.'		D0442096
THOUSF	DC	E'1000.'		D0442097
NNNNFX	DC	H'9999'		D0442098
ROUND	DC	FS4'.5'		D0442099
FMSK3F	DC	X'0000003F'		D0442100
FMSK07	DC	X'00000007'		D0442101
FMSK08	DC	X'00000080'		D0442102
X45	DC	X'45000000'		D0442103
X46	DC	X'46000000'		D0442104
MSKFX	DC	X'00FFFFF'		D0442105
ZEROTST	DC	E'4.E-05'		D0442106
ONEB20	DC	X'0800'		D0442107
B26	DC	X'0020'		D0442108
	DS	OF		D0442109
INC3FF	DC	X'3FFFFFF'		D0442110
MASK	DC	X'00007FFF'		D0442111
XF	DC	X'0000000F'		D0442112
ZONE	DC	X'000000F0'		D0442113
TENBCD	DC	C'X10'		D0442114
LOO	DC	C'0.0'		D0442115
SIZE9	DC	FS6'1.5'		D0442116
	DS	OF		D0442117
MASKF	DC	X'000000FF'		D0442118
GT	DC	CL2'GT'		D0442119
GG	DC	CL2'GG'		D0442120
* 1627 COMMANDS				D0442121
YPLUS	DC	X'F1'	Y+	D0442122
	DC	X'F2'	Y+X+	D0442123
	DC	X'F8'	Y+X-	D0442124

097

YNEG	DC	X'F5'	Y-	D0442125
	DC	X'F4'	Y-X+	D0442126
	DC	X'F6'	Y-X-	D0442127
XPLUS	DC	X'F3'	X+	D0442128
XNEG	DC	X'F7'	X-	D0442129
PENUP	DC	X'F9'		D0442130
PENDN	DC	X'F0'		D0442131
SYMCOD	DC	X'00'		D0442132
	DC	X'9353505546261510'	A X'C1'	D0442133
	DC	X'C352514010164655544313'	B X'C2'	D0442134
	DC	X'B1415040'	Q X'D8'	D0442135
	DC	X'51'	O-O X'F0'-X'D6'	D0442136
	DC	X'5546261511204051'	C X'C3'	D0442137
	DC	X'90163654523010'	D X'C4'	D0442138
	DC	X'D0'	E X'C5'	D0442139
	DC	X'101343131656'	F X'C6'	D0442140
	DC	X'C2525140201115264655'	G X'C7'	D0442141
	DC	X'D65053131016'	H X'C8'	D0442142
	DC	X'C62636304020'	I X'C9'	D0442143
	DC	X'80'	NONE X'CA' OR '4A'	D0442144
	DC	X'B04132213032'	.	D0442145
	DC	X'A2214132430312012122' HOUR	GLS X'CC' OR '4C'	D0442146
	DC	X'C0222446'	(X'4D'	D0442147
	DC	X'8531331353'	+ X'4E'	D0442148
	DC	X'A22341012322'	TRI 'CF' OR '4F'	D0442149
	DC	X'A22103432122'	INV TRI 'D0' OR '50'	D0442150
	DC	X'D69140201112'	J X'D1'	D0442151
	DC	X'D0235623131610'	K X'D2'	D0442152
	DC	X'D01016'	L X'D3'	D0442153
	DC	X'9016335650'	M X'D4'	D0442154
	DC	X'D65051151610'	N X'D5'	D0442155
	DC	X'D023'	R X'D9'	D0442156
	DC	X'13435455461610'	P X'D7'	D0442157
	DC	X'A22000111304443331402022'	SPOOL X'DA' OR '5A'	D0442158
	DC	X'C4352423122313036'	\$ X'5B'	D0442159
	DC	X'A03540135320'	* X'5C'	D0442160

DC	X'A0424426'		J	X'5D'	D0442161
DC	X'C44022000402'	SMALL W		X'DE' OR '5E'	D0442162
DC	X'8060'	LINE BOT		X'OF' OR '5F'	D0442163
DC	X'9353'		-	X'60'	D0442164
DC	X'9056'		/	X'61'	D0442165
DC	X'9112234354'		8	X'F8'	D0442166
DC	X'554626151423435251402011'		S	X'E2'	D0442167
DC	X'B0361656'		T	X'E3'	D0442168
DC	X'D65140201116'		U	X'E4'	D0442169
DC	X'963056'		V	X'E5'	D0442170
DC	X'9610335056'		W	X'E6'	D0442171
DC	X'9011555655331516155150'		X	X'E7'	D0442172
DC	X'D6553330331516'		Y	X'E8'	D0442173
DC	X'96565533432333111050'		Z	X'E9'	D0442174
DC	X'A2202422420222'	SMALL +		X'EA' OR '6A'	D0442175
DC	X'A03133232232'		,	X'6B'	D0442176
DC	X'A2004422400422'	SMALL X		X'EC' OR '6C'	D0442177
DC	X'8363'		LINE	X'ED' OR '6D'	D0442178
DC	X'C04422040002'	MISS CODE		X'EE' OR '6E'	D0442179
DC	X'A2004422420222044022242022'	8STR		X'EF' OR '6F'	D0442180
DC	X'A536302040'		1	X'F1'	D0442181
DC	X'D15010545546261514'		2	X'F2'	D0442182
DC	X'A64655544333435251402011'		3	X'F3'	D0442183
DC	X'C046131252'		4	X'F4'	D0442184
DC	X'D61613435251402011'		5	X'F5'	D0442185
DC	X'D54626151120405152432312'		6	X'F6'	D0442186
DC	X'90545616'		7	X'F7'	D0442187
DC	X'D44323141526465551402011'		9	X'F9'	D0442188
DC	X'80'			X'7A' OR 'FA'	D0442189
DC	X'9334321363'	LEFT ARR		X'7B' OR 'FB'	D0442190
DC	X'8353343253'	RT ARROW		X'7C' OR 'FC'	D0442191
DC	X'C634'			X'7D'	D0442192
DC	X'D414221252'			X'7E'	D0442193
DC	X'94152515250F0E0F'	AEROSPACE SYM		X'7F' OR FF	D0442194
DC	X'252625191819292A'				D0442195
DC	X'292F290F200F2038'				D0442196

099

DC	X'040F090F292F090F'				D0442197
DC	X'040F031102130116'				D0442198
DC	X'0018002101260229'				D0442199
DC	X'0328042006300835'				D0442200
DC	X'0C360F381139133A'				D0442201
DC	X'16381B3C213C2638'				D0442202
DC	X'293A2B392D383036'				D0442203
DC	X'3630382D392B3A29'				D0442204
DC	X'3B263C213C183B16'				D0442205
DC	X'3A133911380F360C'				D0442206
DC	X'310730062D042B03'				D0442207
DC	X'2902260121001800'				D0442208
DC	X'1601130211030F04'				D0442209
DC	X'0C060807060C040F'				D0442210
DC	X'8080'				D0442211
DC	EQU 101				D0442212
DC	EQU 182				D0442213
DC	EQU 290				D0442214
DC	Y(0)	BLK	40		D0442215
DC	Y(1)	A	C1		D0442216
DC	Y(9)	B			D0442217
DC	Y(25)	C			D0442218
DC	Y(33)	D			D0442219
DC	Y(40)	E			D0442220
DC	Y(41)	F			D0442221
DC	Y(47)	G			D0442222
DC	Y(57)	H			D0442223
DC	Y(63)	I			D0442224
DC	Y(69)	NONE	4A		D0442225
DC	Y(70)	.	4B		D0442226
DC	Y(76)	HOOR	GLS 4C		D0442227
DC	Y(86)	I	4D		D0442228
DC	Y(90)	+	4E		D0442229
DC	Y(95)	TRI	4F		D0442230
DC	Y(D)	INV TRI	DO		D0442231
DC	Y(D+6)	J	DI		D0442232

DC	Y(D+12)	K		D0442233
DC	Y(D+19)	L		D0442234
DC	Y(D+22)	M		D0442235
DC	Y(D+27)	N		D0442236
DC	Y(24)	O		D0442237
DC	Y(D+35)	P		D0442238
DC	Y(20)	Q		D0442239
DC	Y(D+33)	R	D9	D0442240
DC	Y(D+42)	SPDOL	DA	D0442241
DC	Y(D+54)	S	5B	D0442242
DC	Y(D+63)	*	5C	D0442243
DC	Y(D+69)	J	5D	D0442244
DC	Y(D+73)	SM W	DE	D0442245
DC	Y(D+79)	LINE	DF	D0442246
DC	Y(E)	-	60	D0442247
DC	Y(E+2)	/	61	D0442248
DC	Y(E+9)	S	E2	D0442249
DC	Y(E+21)	T		D0442250
DC	Y(E+25)	U		D0442251
DC	Y(E+31)	V		D0442252
DC	Y(E+34)	W		D0442253
DC	Y(E+39)	X		D0442254
DC	Y(E+50)	Y		D0442255
DC	Y(E+57)	Z	E9	D0442256
DC	Y(E+67)	SM +	EA	D0442257
DC	Y(E+74)	,	EB	D0442258
DC	Y(E+80)	SM X	EC	D0442259
DC	Y(E+87)	LINE	ED	D0442260
DC	Y(E+89)	MISS	EE	D0442261
DC	Y(E+95)	BSTR	EF	D0442262
DC	Y(24)	O	F0	D0442263
DC	Y(F)	1	F1	D0442264
DC	Y(F+5)	2		D0442265
DC	Y(F+14)	3		D0442266
DC	Y(F+26)	4		D0442267
DC	Y(F+31)	5		D0442268

101

DC	Y(F+40)	6		D0442269
DC	Y(F+52)	7		D0442270
DC	Y(E+4)	8		D0442271
DC	Y(F+56)	9	F9	D0442272
DC	Y(F+68)	NONE	7A	D0442273
DC	Y(F+69)	ARR	7B	D0442274
DC	Y(F+74)	ARR	7C	D0442275
DC	Y(F+79)	1	7D	D0442276
DC	Y(F+81)	*	7E	D0442277
DC	Y(F+86)		7F AEROSPACE	D0442278
END				D0442279