CALCOMP SOFTWARE LIBRARY

(CASTL)

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PREFACE

PREFACE

The purpose of this manual is to provide a rapid reference for the CALCOMP Plotter users at TSC. The present system uses FORTRAN 10 on the DECsystem-10 to generate internal files to be plotted in STAND-ALONE Mode on the CALCOMP Model 763.

An extensive software capability is being planned and has, in part, been implemented for use in a wide variety of current data processing applications. Routines are available that construct and annotate axes and grids with symbol types and alphameric lettering of many sizes and angles of printing. Numerous routines are currently operational for two dimensional display of data sets (both scaled and edited). In the future, we plan to add routines which will provide a 3 dimensional plotter capability. Curves may be constructed through the data and specified points identified with special symbols automatically. Information may be filtered and smoothed to reject extraneous noise if required. Programs are also available to interpolate between available points and establish missing points, or to extrapolate from various inputs to extend the curve. These routines are found in the SSP Library of programs and are FORTRAN callable.

The full utility of the system depends upon the use by the applications programmer. Since the entire system is based on simple FORTRAN type call statements, a user may incorporate the plotting capability directly into a data reduction or analysis program. It is the users choice as to whether to generate his plot using the basic standard CALCOMP software or to generate the plot using the individual routines.

Some of the information in this manual is adapted from the California Computer Products, Inc., literature. Other segments are from the Plotting Manual which was generated by the Analysis and Computation Division at the NASA Langley Research Center. Still other portions of this manual are written by Messers. T. Talbot and R. Shah of KHL under Support Services Contract. These two gentlemen were instrumental in modifying (for the DECsystem-10) the majority of the software presented in this document. Appropriate acknowledgements as to the source of the particular routine will be found with the routine write-up.

INTRODUCTION

INTRODUCTION

The purpose of this manual is to provide a common reference for those ADP users at the Transportation Systems Center who are engaged in the development and use of Computer Plotting software. Included are general descriptions of the currently cataloged routines; procedural guidelines for preparing, documenting and processing the plotting routines; and a reference manual of program write-ups with examples.

This manual is prepared and maintained by the Computer Services Division. A copy will be issued to a user by a request to the PIC (Program Information Center), Mr. M. Compagna, PIC Coordinator. Updates are mailed to each manual holder as the situation demands, and it is the holder's responsibility to incorporate them into his manual binder.

Information of a temporary or announcement nature will be mailed out as needed to the user.

Questions on the contents of this manual should be addressed to the ADP Applications Branch (862). Questions on distribution should be directed to the PIC (862).

ROUTINE IDENTIFICATION

A plotting routine, identified by a <u>Program Number</u>, will be assigned when the program is accepted as part of the CALCOMP Library of programs. A program number has the form of one letter followed by five digits. The letter, "S" in this case, designates the basic category of the program, i.e., PLOTTING; the next two digits, 30 indicate that this is CALCOMP plotting vs. 31 which is SC4020 Plotting and 39 which is other Plotting; the remaining three digits are assigned in the following manner by subject category:

- 000 099 Line applications; line types, labeling, etc.
- 100 199 Scale applications
- 200 299 Axis applications; grid types, etc.
- 300 399 Special symbols; alphabets, etc.
- 400 499 Special functions; curve smoothing, french curve, etc.
- 500 599 Special forms; vibrating spring, etc.
- 600 699 Pictoral applications; maps, shading, etc.
- 700 799 Unique plots; 3D applications, etc.
- 800 899 Specialty routines; card deck, etc.
- 900 999 Miscellaneous

The plotting routines are identified by name and are cataloged according to their function. Either the name or the number will find the routine.

ROUTINE DOCUMENTATION

Routines for which documentation will be prepared are expected to be used as a closed loop within other programs and will have general interest and application. The following outline will be followed in preparing routine documentation.

<u>Title</u>: - The title includes the words PROGRAM, SUB-ROUTINE or FUNCTION and the code name; e.g., SUBTROUTINE EGNC.

Language: - Indicate FORTRAN, or other appropriate language.

Purpose: - A brief statement of what the routine does.

<u>Use</u>: - Either control card for a program, function statement for a function, or calling sequence for a subroutine. All variables will be clearly defined. Diagnostic or error messages will be listed.

Restrictions: - Type, dimensions and range of arguments, and special hardware requirements.

<u>Method:</u> - Derivation, equations, or other explanation of the method used.

Accuracy: - A statement of accuracy or "not available" statement.

References: - Published material related to the material used.

Storage: - Storage requirements (words).

<u>Subprograms Used:</u> - List of standard subroutines with number of words required.

Other Coding Information: - This should be included when pertinent and may include such information as timing, explanation of error messages or diagnostic statements, special subprograms, etc.

Source: - Organization and person's name (if not developed at TSC).

Responsible Person: - Name of programmer responsible for providing the program for inclusion into the library.

ROUTINE UTILIZATION PROCEDURES

The following are descriptions of the different available plotter routines. The program number and title of each routine are followed by necessary information for its use. Note that in the argument list of each routines, FORTRAN convention are maintained. Any argument starting with (I, J, K, L, M, N) is a fixed-point integer value; all others are floating point numbers with the exception of ALPHA arrays.

<u>Disclaimer</u>: Although each routine has been tested by its contributor, Data Services gives no warranty as to the proper functioning or accuracy of the routine. No responsibility is assumed in the distribution of these routines by Data Services.

A list of the presently available routines is tabulated on the following pages. This list includes the CALCOMP basis software which is compressed of six routines that can be called by your FORTRAN program. They, in turn, call upon each other for certain operations. A particular application may not need all of these subroutines, depending on the user's requirements. The six basic routines are as follows:

- PLOT* converts all pen movement specifications from inches to actual plotter commands, and outputs these to the attached device.
- SYMBOL* draws any sequence of alphanumeric characters, as well as special point-plotting symbols. It calls only PLOT.

- NUMBER* draws the fixed decimal equivalent of an internal floating point number. It calls only SYMBOL, which then calls PLOT.
- scale* examines a data array to determine an optimum starting value and a scaling factor for use by AXIS and LINE in converting data units to plotter page dimensions. It is the only subroutine that does not call any other because it does no actual plotting.
- AXIS* draws an axis line with the appropriate scale annotation and title. It calls SYMBOL and NUMBER as well as PLOT.
- LINE* plots a series of scaled data points defined by two arrays (X and Y), connecting the points with straight lines, if desired. It may call SYMBOL as well as PLOT.

. .

ROUTINE LIST WITH PROGRAM NUMBER

LINE APPLICATIONS

S30000	PLOTS*
S30001	PLOT*
S30002	PLOTA
S30003	LINE*
S30004	ALINE
S30005	CLINE
S30006	NOMEN
S30007	
S30008	
S30009	
S30010	

^{*}CALCOMP BASIC SOFTWARE

SCALE APPLICATIONS

S30100	FACTOR*
S30101	SCALE*
S30102	ASCALE
S30103	LSCALE
S30104	LOGSCA
S30105	
S30106	
S30107	
S30108	
s30109	
S30110	

^{*}CALCOMP BASIC SOFTWARE

AXIS APPLICATIONS

S30200	AXIS*
S30201	AXIS2
S30202	AXIS3
S30203	LAXIS
S30204	AXLABL
S30205	LOGAX
S30206	DIMENS
S30207	PAXIS
S30208	
S30209	
S30210	
S30211	GRID
S30212	BORDER
S30212	LIGRID

^{*}CALCOMP BASIC SOFTWARE

SPECIAL SYMBOLS

S30300	SYMBOL*
S30301	NUMBER*
S30302	ENUMBER
S30303	LABEL
S30304	NOTATE
S30305	PARROW
S30306	
S30307	
S30308	
S30309	
S30310	

^{*}CALCOMP BASIC SOFTWARE

SPECIAL FUNCTIONS

S30400

S30401

S30402

s30403

S30404

S30405

S30406

s30407

S30408

S30409

S30410

SPECIAL FORMS

S30500	ARC
S30501	ELIPS
S30502	
S30503	
S30504	
S30505	
S30506	
S30507	
S30508	•
S30509	
S30510	

PICTORAL APPLICATIONS

3 30600	WORLD
s30601	SHADE
S30602	SHADIT
s30603	
S30604	
S30605	
S30606	
S30607	
S30608	
S30609	
S30610	

UNIQUE PLOTS

S30700	THREE
s30701	
S30702	
s30703	,
S30704	
S30705	
S30706	
S30707	
S30708	
s30709	
S30710	

SPECIALTY ROUTINES

S30800	DECKS
S30801	DOCPRT
S30802	
s 30803	
S30804	
S30805	
s30806	
S30807	
S30808	
S30809	
S30810	

MISCELLANEOUS

S30900

A 1

ROUTINE DESCRIPTIONS

LINE APPLICATIONS
\$300XX

s30000 PLOTS* IDENTIFICATION:

The call to this subroutine initializes Purpose:

the Plot subroutine. The buffer areas

are established and all devices speci-

fied.

This routine is called only once before Restrictions:

a call to any other plotting routine is

made.

Usage:

Call PLOTS (0,0,16) Calling Sequence:

16 - Logical unit number for plotting Storage Required:

output.

This routine is one of the standard Method:

CALCOMP routines and can be found in

the PROGRAMMING CALCOMP PEN PLOTTERS

manual from CALCOMP, Inc.

CALCOMP, Inc. Original Developer:*

IDENTIFICATION:

PLOT* \$30001

Purpose:

This routine moves the pen either in an up or down state to a new position.

Restrictions:

None

Usage: Calling Sequence:

CALL PLOT (X, Y, ± I)

Y, X - The terminal position coordinates to which the pen is moved, in inches, from the current reference point.

I - Controls pen up/down status, and origin definition.

1 = 2 - pen is down during movement
drawing a line.

I = 3 - Pen is up during movement.

 $\mathbf{I} = -2 - 3 - A$ new origin is defined.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the PROGRAMMING CALCOMP PEN PLOTTERS manual from CALCOMP, Inc.

Original Developer:

CALCOMP, Inc.

Identification: Subroutine PLOTA S30002

Purpose:

To draw a figure or curve rotated about a point (XW, YW)

Usage: FORTRAN Calling Sequence

CALL PLOTA (X Y, I)

Additional input is through common block IANG

COMMON/IANG/SINAN, COSAN, XW, YW

Where,

X, Y and I are exactly the same as in the CALCOMP sub-routine PLOT.

SINAN Sine of angle of rotation

COSAN Cosine of angle of rotation

XW, YW Point of rotation

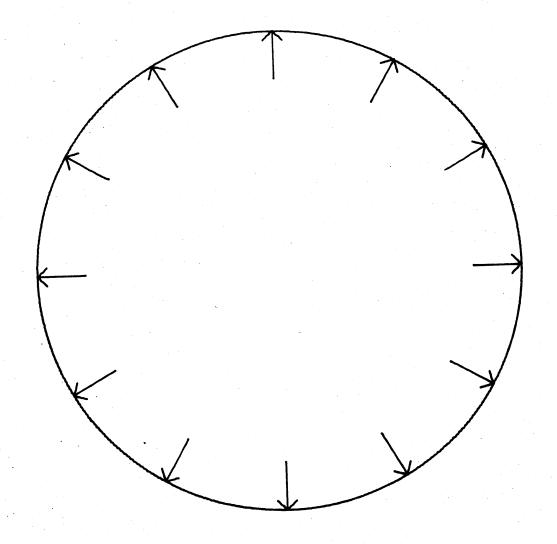
Other Subroutine Required: PLOT

Storage Required: DECsystem (61) Locations

Original Source Tom Talbot/KHL
In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

```
C
   A TEST PROGRAM TO SHOW THE USE OF SUBROUTINES PLOTA AND ARC
      COMMON/IANG/SINAN, COSAN, XW, YW
      DIMENSION X(5),Y(5),TPEN(5)
   SET DATA TO DRAW AN ARROW
^
      DATA X/0.,.5,.4,.5,.4/
      DATA Y/0.,0.,.1.0.,-.1/
      DATA IPFN/3,2,2,3,2/
      CALL PLOTS(0,0,16)
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(3.,4.,-3)
   SET POINT OF ROTATION
      XW=-2.0
      YW=0.0
   SET ANGLE
     DO 1 1=1.12
      ANG=FLOAT(1)*30.*0.0174533
      SINAN=SIN(ANG)
      COSAN=COS(ANG)
  DRAW ARROWS (PLOTA ROUTINE)
      DO 1 J=1.5
     CALL PLOTA(X(J),Y(J), IPEN(J))
    1 CONTINUE
  DRAW A CTRCLE
      CALL ARC(XW,YW,0.,360.,2.5,3)
  END PLOT
      CALL PLOT(8.,0.,-3)
      STOP
      FND
```



IDENTIFICATION:

LINE

S30003

Purpose:

This routine produces a line plot of the pairs of data values in two arrays. The dot points may be represented by centered symbols and/or connecting lines between points.

Restrictions:

Scaling parameters corresponding to FV and DV must immediately follow each array. If these parameters have not been computed by the SCALE subroutine, they must be supplied by the user.

Usage: Calling Sequence:

Call LINE (X, Y, N, INK, + LINETY, ISYM)

X - Array of abscess a values and

scaling parameters (+2) for the X-array.

Y - Array of ordinate values and scaling parameters (+2) for the Y-array.

N - Number of points to be plotted in array X. Y-array must have same number of points.

INK - Increment to use in gathering data from X and Y arrays. Must be same as from SCALE routine or be a calculated value given by the programmer.

<u>+</u> LINETY - Describes the line type to be drawn through the data points. The magnitude determines the frequency of plotted symbols.

NOTE: = 0 = > No symbols plotted. = +K = > points straight line connected.

= -K = > only symbols plotted; no
connecting lines.

ISYM - Value from 0 through 13 for symbol type to be used.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the PROGRAMMING CALCOMP PEN PLOTTERS manual from CALCOMP, Inc.

Original Developer:

CALCOMP, Inc.

Identification: Subroutine ALINE

S32204

Purpose:

To draw line through points (Xi, Yi)

Usage: FORTRAN Calling Sequence

CALL ALINE (X, Y, N, XM, DELX, YM, DELY)

where,

Array of coordinates to be plotted

Number of points

XM, YM Minimum X and Y respectively on the axis

Units per inch on the X and Y axis DELX,

DELY respectively

Comments:

This routine draws a line between points, and the scale factors need not be included in the arrays as is required by Calcomp routine LINE.

Other Subroutines Required: PLOT

Storage Required: DECsystem-10 (102)₈ Locations

Original Source: Tom Talbot/KHL

Tom Talbot/KUL In-house Submitter:

In-house contact: Tom Talbot/KHL Identification: Subroutine CLINE \$30005

Purpose:

To draw different types of lines connecting points (X_i, Y_i) .

Usage: FORTRAN Calling Sequence

CALL CLINE (X, Y, N, XM, DELX, YM, DELY, NC)

where,

X,Y Array of coordinates to be plotted

N Number of points to be plotted

XM, YM Minimum X and Y respectively on the axis

DELX,

DELY Units per inch on the X and Y axis respectively on the axis

NC Line type to be used. NC ranges from 1 to 5.

COMMENT:

CLINE connects points in the arrays X and Y in one of the five Line Types, as follows:

- LINE FOR NC=1

- LINE FOR NC=2

- LINE FOR NC=3

- LINE FOR NC=4

-----LINE FOR NC=5

Other Subroutines Required:

PLOT

Storage Required:

DECsystem-10 (311)₈ Locations

Restrictions:

NC ranges from 1 to 5

Original Source:

Tom Talbot/KHL

In-house Submitter:

Tom Talbot/KHL

In-house Contact:

Tom Talbot/KHL

Identification: Subroutine NOMEN S30006

Purpose:

To draw an inch of line type (as in CLINE) followed by a title for annotation.

Usage: FORTRAN Calling Sequence

CALL NOMEN (X, Y, NC, HT, BCD, NCHAR)

where,

X, Y Start point of title in inches

NC Line type (1-5), to be used with title

HT Height of characters to be used in title in inches

BCD Array containing characters for title (H format accepted)

NCHAR Number of characters in title

Other Subroutines Required:

PLOT, CLINE

Storage Required:

DECsystem-10 (110) Locations

Original Source:

Tom Talbot/KHL

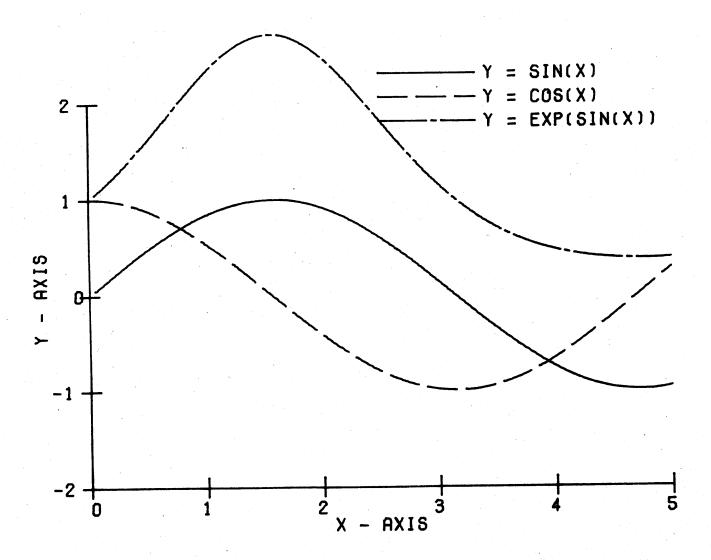
In-house Submitter:

Tom Talbot/KHL

In-house Contact:

Tom Talbot/KHL

```
(A TEST PROGRAM TO SHOW THE USE OF SUBROUTINES ALINE, AXIS2, CLINE,
C
     AND NOMEN
      DIMENSION X(100), Y(100), YC(100), YE(100)
C
      CALL PLOTS(0,0,16)
ċ
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(0.5,0.5,-3)
   GENERATE DATA FOR CURVES
      DO 1 I=1,100
      X(I)=FLOAT(I)*.05
      Y(I)=SIN(X(I))
      YC(I)=COS(X(I))
      YE(I) = EXP(Y(I))
      CONTINUE
Ċ
   FACH CALL TO AXIS2 RETURNS THE APPROPRIATE SCALING FACTOR
      XSC AND YSC
      CALL AXIS2(0.,0.,5.,0.,1.,-6.,8HX - AXIC,8,-1,XSC)
      CALL AXIS2(0.,0.,2.,-2.,1.,4.,8HY - AXIS,8,-1,YSC)
C
   DRAW A SINE CURVE WITH SOLID LINE -- USE OF SUBROUTINE ALINE
CALL ALINE(X,Y,100,0.,XSC,-2.,YSC)
(
C
   DRAW A COSINE CURVE WITH DASH LINE
~
   DRAW AN EXPONENTIAL CURVE WITH LONG-SHORT DASH LINE
      USE OF SUBROUTINE CLINE
      CALL CLINE(X,YC,100,0. XSC,-2.,YSC,2)
      CALL CLINE(X,YE,100,0.,XSC,-2.,YSC,3)
C
   SEPARATE ANNOTATION ON CURVES -- USE OF SUBROUTINE NOMEN
      CALL NOMEN(3., 4.25, 1.0.12, 10HY = SIN(X), 10)
      CALL NOMEN(3.,4.0,2.0.12.10HY = COS(X),10)
      CALL NOMEN(3.,3.75,3,0.12,15HY = EXP(SIN(X)),15)
   FND PLOT
      CALL PLOT(8.,0.,-3)
      STOP
      FND
```



SCALE APPLICATIONS

S301XX

IDENTIFICATION:

FACTOR * \$30100

Purpose:

This routine enables the user to enlarge or reduce the size of the entire plot by changing the number of plotter steps per inch of page coordinates.

Restrictions:

None

Usage:

Calling Sequence:

Call FACTOR (FAC)

FAC - The ratio of new plot size to normal plot size, e.g., if FAC = 2.0, the plot will be twice the size of a normal plot.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the PROGRAMMING CALCOMP PEN PLOTTERS manual from CALCOMP, Inc.

Original Developer: *

CALCOMP, Inc.

IDENTIFICATION:

SCALE

S30101

Purpose:

This routine is used to examine the data values in an array and to determine a starting value, either maximum or minimum, and a scaling factor.

Restrictions:

None:

Usage:

Calling Sequence:

Call SCALE (A, AX, N, + INK)

A - First location of array of points to be sealed.

AX - Length of axis to which data will be scaled, must be greater than 1.0 inch.

N - Number of points in A-array. A should be dimensioned at least A(AR + 2)

+ INK - Increment to select values.Usually 1.

Note:

If positive, the A (N + 1) is a minimum and A(N + 2) is positive.

If negative, then A(N +1) is a maximum and A(N +2) is negative.

A(N + 1) is the starting value and A(N + 2) is the scaling factor.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the PROGRAMMING CALCOMP PEN PLOTTER manual from CALCOMP, Inc.

Original Developer: *

CALCOMP, Inc.

scale factor and stores it in X ((N*K) +1+K). The scale factor will be a power of 10 x; 2, 4, 5, or 10. The data in the array may be scaled to floating point inches by using a formula similar to the following: SV = (AE-MV)/SF, where SV = scaled value, AE = present value of array element, MV = either the minimum value or the value desired at the origin, and SF = the scale factor computed by the subroutine.

Other Coding Information:

Example: DIMENSION ORD (102),
ABS (204) CALL ASCALE (ORD,10.,
100,1,10.) CALL ASCALE (ABS,15.,
100,2,10)

Other Subroutines Required:

Storage Required:

Restrictions:

None

DECsystem-10 (401)₈ Locations
The array must be dimensioned
to include storage space for
two extra elements per interleave factor. For example:
N = 100, K = 1, DIMENSION X
(102); N = 75, K = 3, DIMENSION

X (231)

Original Source:

In-house Submitter:

In-house Contact:

Langley Research Center

Tom Talbot/KHL

Tom Talbot/KHL

Identification: Subroutine ASCALE S30102

Purpose:

To compute a scaling factor for an array of numbers to be plotted and find the minimum data value within the array.

Usage: FORTRAN Calling Sequence

CALL ASCALE (X, S, N, K, DV)

where,

- X is the name of the array containing the floating piint values to be scaled.
- s is the length (floating point inches) over which the data are to be plotted (usually the length of one of the axes).
- N is the number of data values in X from which points are to be plotted in accordance with K.
- K is the interleave factor which specifies the the sequence in which data are stored.
 - = 1 indicates that values are stored sequentially
 - = 2 indicates that values are stored in every other location in the array, etc.
- DV is the number of divisions per inch of the plotting paper to be used (should be: 10.0, 20.0, 25.0, or 25.4). DV scales the polar magnitude array.

Method:

This routine scans the elements in the array to find the minimum and maximum. ASCALE computes an adjusted minimum (origin value) and stores it in X ((N*K) +1) and computes a

Identification: Subroutine LSCALE S30103

Purpose:

To scale the array to be plotted with a log axis allowing user to specify the scaling of his data.

Usage: FORTRAN Calling Sequence

CALL LSCALE (X, N, KVAL, ALONG, NCYCLE)

where,

X Array of values to be scaled

N Number of points in the array

KVAL Value of exponent (power of ten) at the first tic mark

ALONG Length in inches of the log axis to be used NCYCLE Number of log cycles to be used

Comments:

LSCALE was written to allow the user to specify the scaling of his data. Unlike subroutine LOGSCA, the variables KVAL and NCYCLE are input by the user. The array X is altered as in subroutine LOGSCA.

Other Subroutines Required: None

Storage Required: DEC-10 (62) Locations

Original Source: Tom Talbot/KHL In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

Identification: Subroutine LOGSCA S30104

Purpose:

where,

To scale the array to be plotted with a log axis and to return the variables required by the subroutine LAXIS.

Usage: FORTRAN Calling Sequence
CALL LOGSCA (ARRAY, N, ALONG, KVAL, NCYCLE)

ARRAY Array to be scaled

N Number of points in the array

ALONG Length in inches of the log axis to be used

KVAL Values returned by LOGSCA for use by sub-NCYCLE not defined

Comment:

This routine scales data to be plotted with a log axis and returns variables required by LAXIS. The values in the array are altered, so care must be taken by the user in its use after the call. After scaling of both x and y arrays, the line may be drawn by subroutines ALINE or CLINE which do not require that the scaling factors be in ARRAY (N + 1) and ARRAY (N + 2) as does the Calcomp routine LINE. LINE may be used by setting ARRAY (N + 1) = 0. and ARRAY (N + 2) = 1. The scale factors for ALINE or CLINE are:

XM=0. DELX = 1.

Other Subroutines Required:

None

Storage Required:

DECsystem-10 (155)₈ Locations

Original Source:

Tom Talbot/KHL

In-house Submitter:

Tom Talbot/KHL

In-house contact:

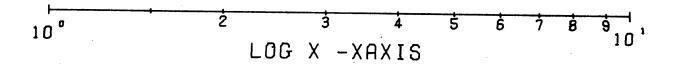
Tom Talbot/KHL

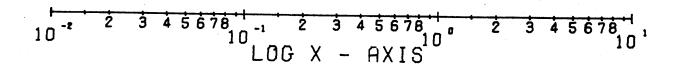
•

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINES ASCALE, LOGSCA, LAXIS
   DIMENSION XARRAY(10) .FX(7)
   DATA FX/598.,299.,119.,59.,29.,0.,0./
   CALL PLOTS(0.0.16)
SET OPIGIN
   CALL PLOT(0.,-11.,-3)
   CALL PLOT(1.,1.,-3)
SET SCALE FACTOR
   CALL ASCALE(FX,7.,5,1,10.)
PLOT AXIS
   CALL AXIS2(0.,0.,.1,0.,.02,-5.,37HPROBABILITY OF SUCCESS AFTER N
  *TRIALS,37,3,DELX)
FND PLOT
   CALL PLOT(8.,0.,-3)
RESET ORIGIN
   CALL PLOT(0.,-11.,-3)
   CALL PLOT(.5,.5,-3)
USE OF LAXIS
   CALL LAXIS(.5,.5,3,12HLOG X - AXIS, 12,6,.-2,2)
CREATE ARRAY TO BE SCALED
   DO 1 I=1.10
   XARRAY(I)=FLOAT(I)
 1 CONTINUE
SCALE DATA USING LOGSCA
   CALL LOGSCA(XARRAY, 10, 6., KVAL, NCYCLE)
PLOT DATA
   CALL LAXIS(.5,5.,NCYCLF,12HLOG X - AXIS,12,6.,KVAL,2)
FND PLOT
   CALL PLOT(10.,0.,-3)
   STOP
   FND
```

2 16 4 2

PROBABILITY OF SUCCESS AFTER N TRIALS





AXIS APPLICATIONS S302XX

IDENTIFICATION:

AXIS ^{*}

S30200

Purpose:

This routine draws any length line at any angle, divides it into one-inch intervals, annotates the divisions with appropriate scale values, and labels the axis with a centered title. Axis is called separately for each axis.

Restrictions:

None

Usage Calling Sequence:

Call AXIS (BGINX, BGINY, IHOL, ±ICHAR, AX, AN, FV, DV)

BIGNX, BIGNY - Coordinates of starting point of axis line.

IHOL - Annotation on axis may be an alphameric array or hollerth literal.

title, an by the sign, determines on which side of the line the tick marks are made and the title will be placed.

Note: If positive, all amotation appears on the positive side of the axis (y-axis). If negative, all annotation appears on the negative side of the axis (x-axis).

AX - Length of axis line in inches.

AN - The angle at which the axis is drawn. Usually 0° for the x-axis and 90.0° for the y-axis.

FV - Starting value to be placed on first tick mark.

DV - Ratio of data units to be added per inch of axis.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the Programming CALCOMP PEN PLOTTERS manual from CALCOMP, Inc.

Original Developer:

CALCOMP, Inc.

Identification: Subroutine AXIS2 S30201

Purpose:

To draw an axis with control over; the number of tic marks to be drawn on the axis, the spacing between these tic marks, and the number of decimal places on the values at the tic marks.

Usage: FORTRAN

Calling Sequence:

CALL AXIS2 (XO, YO, AMAX, AMIN, DELX, AINCH, BCD, NCH, NDEC, DELN)

where,

XO, YO Coordinates of the starting point for the axis

AMAX, Maximum and minimum values on the axis AMIN (AMIN is the first value, AMAX the last)

DELX Increment along axis (the value between tic marks). DELX should divide evenly into AMAX-AMIN

AINCH Length of the axis in inches. If AINCH is negative a horizontal axis is drawn

BCD Hollerith string containing the title for the axis

NCH Number of characters in the title

NDEC Number of decimals to be used for values on tic marks. If NDEC is set to -1, no decimals or decimal point is drawn

DELN Value returned by AXIS2. It contains the number of units per inch for this axis.

DELN is to be used for scaling data.

Comments

The user must scale his data to the axis. The values of AMAX and AMIN need not be the maximum and minimum of the data array. For example, if the data ranges from 1000 to 20000, and the integers 1 thru 20 are drawn, the values along the axis represent thousands and the scaling is:

X(I) = (X(I) - AMIN*1000)/(DELN*1000)

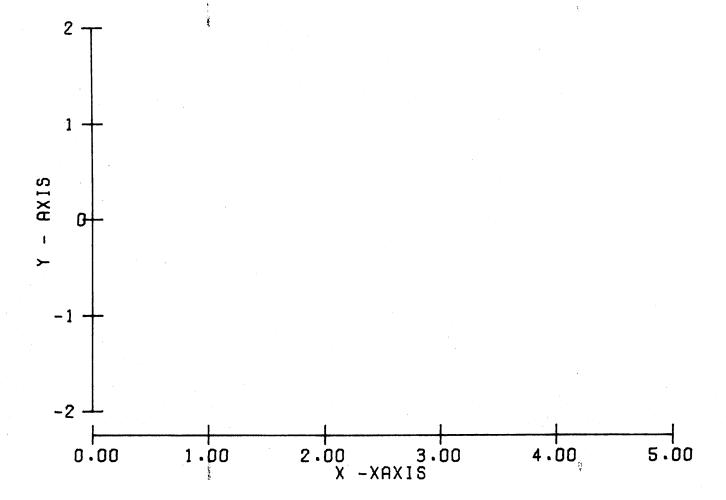
Other Subroutines Required: PLOT, SYMBOL, NUMBER

Storage Required: DECsystem-10 (427)8 Locations

Original Source: Tom Talbot/KHL

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL



```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE AXIS2
      CALL PLOTS(0,0,16)
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(.5,.5,-3)
   DRAW X-AXIS,5 IN.LONG, BEGINNING AT COORD. (.5,.5)
      WITH 2 DIGITS TO THE RIGHT OF THE DECIMAL POINT AT THE TIC MARKS
C
      AND WITH THE ANNOTATION 'X -AXIS!
      CALL AXIS2(.5,.5,5,0.,1.,-6.,8HX - AXIS,8,2,XSC)
Ċ
   DRAW Y-AXIS.4 IN.LONG.BEGINNING AT COORD. (.5.1.)
      WITH INTEGER VALUES AT THE TIC MARKS AND ANNOTATED WITH 'Y-AXIS'
      CALL AXIS2(.5,1.,2.,-2.,1.,4.,8HY - AXIS,8,-1,YSC)
   FND PLOT
      CALL PLOT(8.,0.,-3)
      STOP
      FND
```

Identification: Subroutine AXIS3 \$30202

Purpose:

To draw an axis with tic marks at specified intervals, annotate the value of the variable at the tic marks and provide an axis identification label.

Usage: FORTRAN Calling Sequence

CALL AXIS3 (X,Y, THETA, DIST, ORIGIN, DV, TMAJ,

TMIN, BCD, HGT, N)

where,

X,Y are the coordinates in floating point inches of the starting point of the axis with reference to the plotting area origin as established by CALPLT.

THETA is the angle of rotation measured counterclockwise from the X-axis in floating point degrees. NOTE: Normally, THETA is 0° for an X-axis and 90° for a Y-axis.

DIST is the length of the axis in floating point inches. Should be a multiple of TMAJ.

ORIGIN is the functional value to be assigned to the origin (i.e., the value of the first scale), in floating point.

DV is the adjusted scale factor for the array to be plotted (change in value per inch).

NOTE: Values of ORIGIN and DV which will produce a reasonable scale may be calculated using the subroutine ASCALE.

is the distance in floating point inches for major tic marks (0.25 inches high).

Numbers are placed on the axis at the major tic marks in accordance with the values of ORIGIN and DV. The numbers written along the axis are adjusted to be between 1000.00

and 0.01 in magnitude. Immediately after the last number on the axis is placed the caption, $xl0^{exp}$, where exp is the required exponent. If the values are integer multiples, the decimal point and decimal places are eliminated. A negative TMAJ will cause the actual value to be written instead of the adjusted value.

MINT

is the divisions per inch in floating point for minor tic marks (0.125 inches high). To eliminate minor tic marks the following may be used:

TMIN = 0.

BCD

is the character label for the axis. Can use array.

HGT

is the height of the full-size characters in the BCD title. Numbers at the tic marks will be (0.75 *HGT) high. HGT is in floating point inches.

If HGT = 0., all annotation will be eliminated.

N

is an integer specifying the number of characters in BCD title. A negative N places the annotation on the clockwise side of the axis. N = 0 is not allowed. If it is desired to have no label, then the BCD parameter should be lH, and N either + or -1.

Other Subroutines Required:

PLOT, SYMBOL, NUMBER

Storage Required:

DECsystem-10 (1207) 8 locations

Comments:

Only perpendicular axes

Original Source:

Langley Research Center

In-house Submitter:

Tom Talbot

In-house Contact:

Tom Talbot

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE AXIS3
  CALL PLOTS(n,n,16)
SET ORIGIN
   CALL PLOT(0.,-11.,-3)
  CALL PLOT(.5,.5,-3)
DRAW X-AXIS(THFTA=0.DFG), BEGINNING AT COORD. (0.,0.)
    5 IN-LONG, WITH MAJOR TIC MARKS EVERY INCH AND MINOR TIC
    MARKS, 10 PER INCH. ANNOTATE ON CLOCKWISE SIDE OF AXIS
    WITH 'Y - AXIS!
   CALL AXIS3(0.,0.,0.,5.,0.,1.,1.,10.,8HX - AXIS,0.14,-8)
DRAW Y-AXIS(THETA=90.DEG), BEGINNING AT COORD. (0.,95)
    6 IN. LONG. WITH MAJOR TIC MARKS EVERY HALF INCH AND NO
    MINOR TIC MARKS. ANNOTATE ON COUNTERCLOCKWISE SIDE OF
    AXIS WITHIY - AXIS!
   CALL AXIS3(0.,.5,90.,6.,0.,1.,.5,0.,8HY / AXIS,0.14,8)
FND PLOT
   CALL PLOT(8.,0.,-3)
   STOP
   END
```

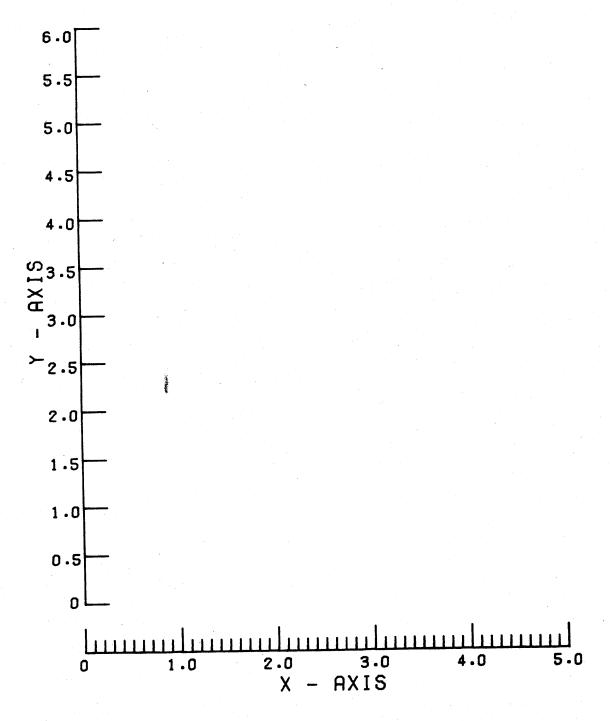
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Identification: Subroutine LAXIS S30203

Purpose:

To draw a log (base 10 axis for use in log-log or semi-log plots.

Usage: FORTRAN Calling Sequence

CALL LAXIS (XO, YO, NCYCLE, BCD, NCHAR, ALONG, KVAL, IWAY)

where.

XO, YO Starting point in inches for axis

NCYCLE Number of log cycles to be drawn

BCD Array containing characters for title.
(H format accepted)

NCHAR Number of characters in the title. If NCHAR is negative, labeling is above axis for x-axis or to the right of axis for y-axis

ALONG Length of the axis in inches

KVAL The starting exponent of the axis

IWAY =1 vertical axis is drawn (y-axis)
=2 horizontal axis is drawn (x-axis)

Comments:

The variables NCYCLE and KVAL may be obtained from the routine LOGSCA. The three variables NCYCLE, ALONG, AND KVAL must agree with the same variables in the routines LOGSCA or LSCALE for correct scaling of data.

Other Subroutines Required:

PLOT, SYMBOL, NUMBER

Storage Required:

DECsystem-10 (1100)₈ Locations

Original Source:

Tom Talbot/KHL

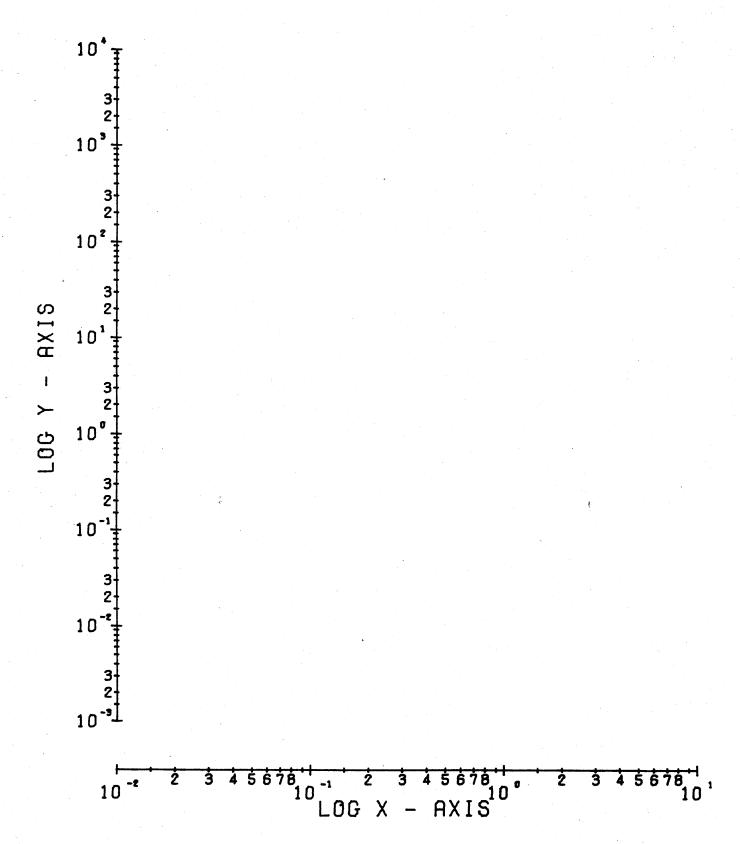
In-house Submitter:

Tom Talbot/KHL

In-house contact:

Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE LAXIS
   CALL PLOTS(0.0.16)
SET ORIGIN
   CALL PLOT(0,-11.,-3)
   CALL PLOT(.5,.5,-3)
DRAW LOG-XAXIS,6 IN.LONG, BEGINNING AT COORD. (.5,.5)
   WITH EACH LOG CYCLE 2 IN. LONG, AND STARTING EXPONENT
   -2. ANNOTATE WITH 'LOG X - AXIS'
  CALL LAXIS(.5,.5,3,12HLOG X - AXIS,12,6.,-2,2)
DRAW LOG-YAXIS,7 IN.LONG, REGINNING AT COORD. (.5,1.)
  WITH FACH LOG CYCLF 1 IN. LONG, AND STARTING EXPONENT
   -3. ANNOTATE WITH ILOG Y - AXIS!
  CALL LAXIS(.5,1.,7,12HLOG Y - AXIS,12,7.,-3,1)
FND PLOT
   CALL PLOT(8.,0.,-3)
   STOP
   FND
```



S30204

Identification: Subroutine AXLABL

Purpose:

To number and label the co-ordinate axes, mainly used in conjunction with subroutine GRID.

Usage: FORTRAN Calling Sequencé

CALL AXLABL (XMAX, YMAX, H, XF, XX, XL, MODX, IFMX, YF, YY, YL, MODY, IFMY, IXLABL,

IX, IYLABL, IY)

where,

The parameters of the calling sequence are:

XMAX length of the x axis, inches

YMAX length of the y axis, inches

H height of letters and numbers, inches

XF first number to be printed on x-axis

XX the increment or factor by which successive numbers of the x axis differ (positive number)

XL the last number to be printed on the x axis

MODX the "mode" desired. If MODX = 1, XX will be regarded as an increment (or decrement), resulting in arithmetic progression.

If MODX = 2, XX will be a factor, resulting in geometric progression. For example, if XF = 1 and XX = 2, with MODX = 1 the successive numbers will be 1, 3, 5... With MODX = 2 they will be 1, 2, 4, 8, ...

IFMX a parameter that determines how many decimal places will be printed. With IFMX = 0, each

number will be printed with as many decimal places as required by the significant digits of the number, and no more. With IFMX = 1, all the numbers will be printed with the same number of decimal places, determined by the number that has the most places. For example, if XF = 0. and XX = .25, with IFMX = 0 the successive numbers will be printed 0, 0.25, 0.5, 0.75, 1, 1.25, etc. With IFMX = 1 they will be printed 0.00, 0.25, 0.50, 0.75, 1.00 etc.

YF analogous to XF, but for y axis

yy analogous to XX, but for y axis

YL analogous to XL, but for y axis

MODY analogous to MODX, but for y axis

IFMY analogous to IFMX, but for y axis

IXLABL hollerith material for labeling the x axis. (for example, 16HRANGE, NAUT. MI.)

the number of hollerith characters in IXLABL (in example , IX = 16).

IYLABL hollerith material for y axis

IY number of characters in IYLABL.

It was mentioned above that for modes 1 and 2 the parameter XX is always positive. However, XF and XL may be either positive or negative (except that in Mode 2 both must have the same sign). In Mode 1, if XL > XF, the successive numbers will be incremented by the amount XX; if XL < XF, they will be decremented by XX.

The maximum number of characters that any one number can have is seven (including negative sign, if

present, and including decimal point, if present).

Therefore, if the program calls for printing the number -5.73928, the number actually printed will be -5.7393.

The integer 9999999 is the largest number that can be printed. The numbers to be printed are always given in the program as floating-point numbers, but will be printed as integers (without decimal point) if they are whole numbers and if IFMX (or IFMY) is zero.

Provision must be made for printing the numbers and labels below and to the left of the graph by establishing the origin of coordinates above and to the right of the lower left corner of the plotting area. For example, before doing any plotting, or making calls to GRID, a call such as

CALL PLOT (1.5, 1.5, -3)

should be made. This provides a 1.5-inch margin in which the lettering and numbering will be done. The actual size of the necessary margin will of course depend on the size of the letters.

The user of the subroutine should choose a size (N) of numbers suitable for the total size of the graph:

A typical appropriate value for N is about 0.02 times XMAX or times YMAX, whichever is larger. Care must be taken that the numbers of the x axis are of size and spacing so that they do not overlap.

Special Options

to go either in arithmetic or geometric progression. A third mode (MODX or MODY > 2) provides for placing arbitrary numbers at arbitrary positions on the axes. For example, if MODX =5, the parameter XF becomes an array of dimension 5. (It must be so dimensioned in the plotting program - i.e., in this example there must be a statement DIMENSION XF(5).) This is the array of numbers to be on the x axis. Before calling AXLABL, the program must define the array XF, either by Fortran statements, a READ statement, or a DATA statement.

Also, the parameter XX becomes an array of the same dimension. This array defines the positions (in inches from the origin) at which the numbers of the XF array will be printed.

This mode can be exercised on either the x or the y axis alone, or on both.

The option that permits one or both axes to be labeled with "powers of ten," instead of with simple numbers is obtained by means of a COMMON declaration:

COMMON/PTEN/IXTEN, IYTEN

If this declaration is made in the calling routine, and if

IXTEN is set equal to 1 prior to calling AXLABL, and if

for example XF = 5, XX = 1, and MODX = 1, then the axis will

be labeled 10⁵, 10⁶, 10⁷,...etc. (instead of 5, 6, 7 ...).

Setting TYTEN = 1 produces the same result for the y axis.

This option is of course most useful for labeling logarithmic scales.

of the axes can be omitted, if this is desired. To omit x-axis numbering, set XX = -1. To omit y-axis numbering set YY = -1. When this is done, dummy variables must be inserted for unused parameters in the calling statement e.g., for XF, XL, and MODX when XX = -1.

If it is desired, for some reason, to omit the x-axis descriptive label, this result is accomplished by setting IX = 0. However, a dummy parameter must of course then be inserted for IXLABL -- e.g., 1HX. If it is desired to omit the y-axis descriptive label, this is done by setting IY = 0, following a dummy parameter TYLABL.

Subroutine AXLABL has subordinate subroutines named CERTER, DECDGT, and PWRTEN.

Other Subroutines Required: PLOT, SYMBOL, NUMBER, CENTER, DECOGT, PWRTEN

Storage Required:

Original Source

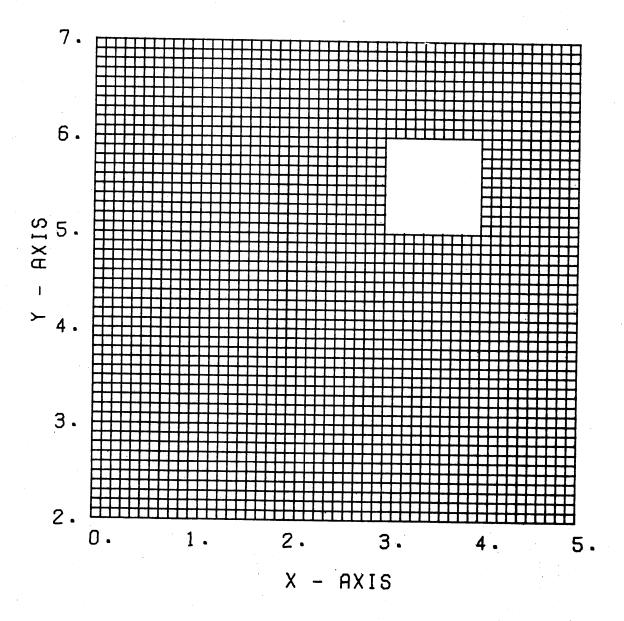
Computer Subroutines to plot and label curves for Scientific Naval Research Lab., Washington D.C. In-house Submitter:

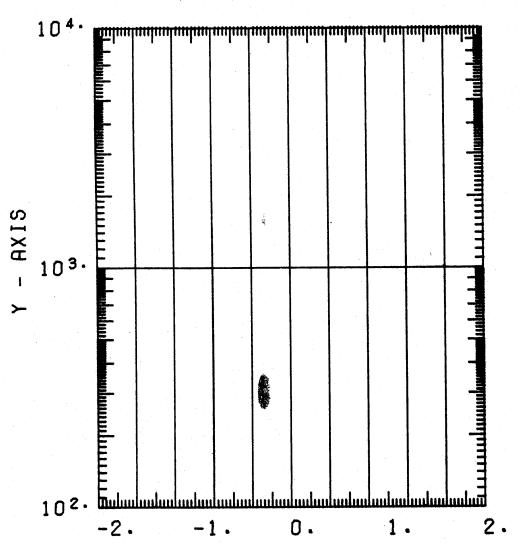
Tom Tallbot/Klll.

In-house Contact:

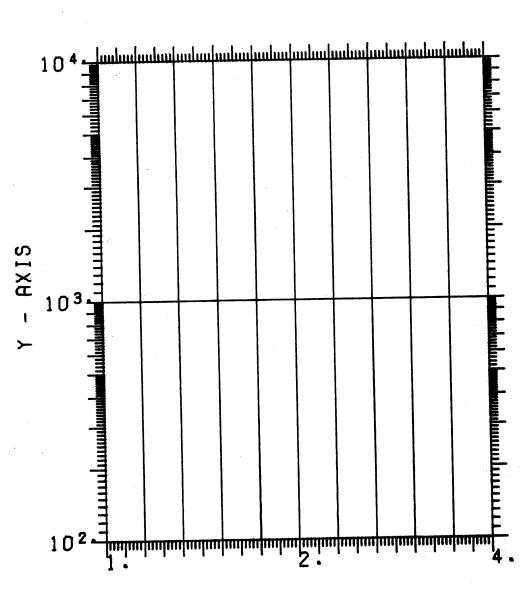
Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBPOUTINES GRID AND AXLABL
   DIMENSION XX(5), XF(5), YY(1), YF(1)
   COMMON ! IPFN ! IXTFN , IYTEN
   CALL PLOTS(0,0,16)
SET ORIGIN
   CALL PLOT(0.,-11.,-3)
   CALL PLOT(4.,1.,-3)
LAYOUT SX5 GRID, NO TIC MARKS
   CALL GRID(5.,5.,0.,0.,5,5,1,1,3,3,1,1,1,1)
SET PARAMETERS
   XF(1)=0.
   XX(1) = 1.
   YF(1)=2.
   YY(1)=1.
HISE SHEROHTINE AXLARL
   CALL AXLABL(5.,5.,.14,XF,XX,5.,1,1,YF,YY,7.,1,0,8HX - AXIS,8,8HY -
  * AXIS,8)
FND .PL.OT
   CALL PLOT(8.,0.,-3)
CFT NEW GRID
   CALL GRID(4.,5.,.08,.08,10,2,1,2,2,2,1,1,1,10)
FILL ARRAY FOR ANNOTATION
   DO 1 1=1.5
   XF(I)=FLOAT(I)-3.
   XX(T) = FLOAT(T) - 1.
 1 CONTINUE
   TYTEM= ]
   CALL AXLARL(4.,5.,.14,XF,XX,4.,5,0,YF,YY,4.,1,1,8HX - AXIS,8,8HY -
  * AXTS.A)
FND PLOT
   CALL PLOT(8.,0.,-3)
SET NEW GRID
  CALL GRID(4.,5.,-.08,-.08,10,2,1,2,2,2,1,1,1,1,10)
```





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X - AXIS

Identification: Subroutine LOGAX \$30205

Purpose:

Plots axes with \log_{10} scale. Options permit labeling on either side of axis and grid lines at powers of 10.

Usage: FORTRAN Calling Sequence

CALL LOGAX (XO, YO, NCYCLE, BCD, NCHAR, AXLEN, KVAL, GRID)

where,

XO, YO Coordinates at origin

NCYCLE No.log cycles along axis

BCD Array containing characters for title

NCHAR No. characters in title; positive for conventional labeling, negative for opposite side of axis.

AXLEN Axis length, inches; positive for Y-axis (vertical), negative for X-axis (horizontal)

KVAL Power of 10 at origin

GRID Length of grid lines (use length of other axis); if zero, conventional tics are used - no grid.

Other Subroutines Required: PLOT, SYMBOL, NUMBER

Storage Required: DECsystem-10 core requirements

Comments: Modification of LAXIS (Improved to adjust axis labeling according

to length of one cycle and provide

grid option)

Restrictions: Do not use less than 1 inch per

cycle

Original Source: Alex Robb, Tom Talbot/KHL

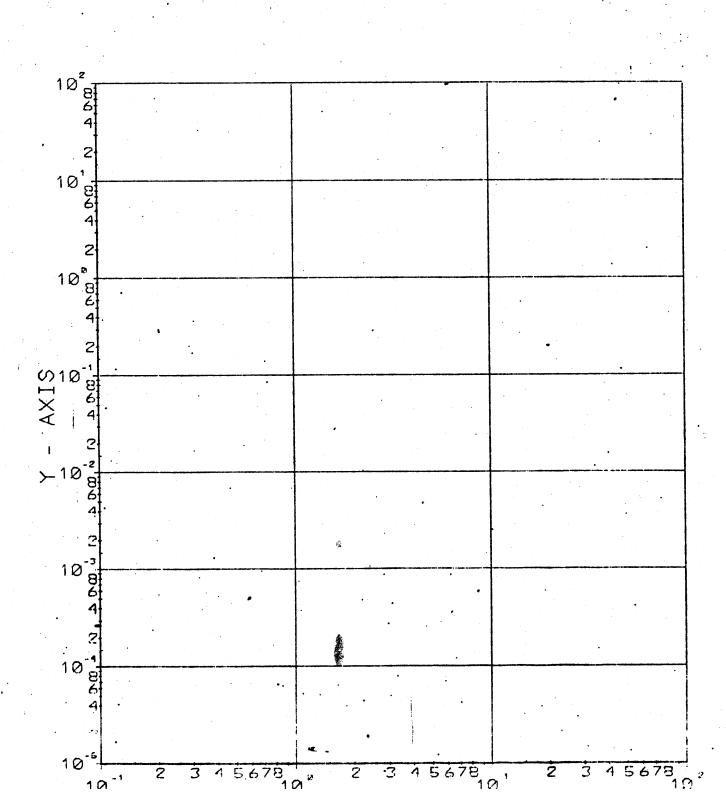
In-house Submitter: Alex Robb/KHL

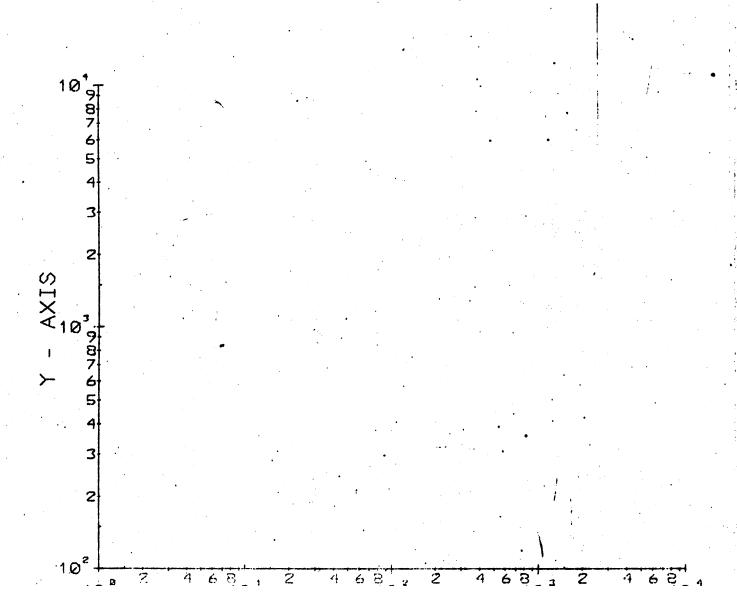
In-house Contact: Alex Robb/KHL

```
CALL PLOTS(0,0,16)
       CALL PLOT (0.,-11.,-3)
       CALL PLOT (5, , , 5, -3)
         WRITE(5,29)
29
         FORMAT(1 ?1)
       READ(5,100,END=50) LOC, NCYCLE, KVAL, XO, YO, XLEN, XTIC
         IF(LUC.GT.1) GO TO 50
       CALL LUGAX(XØ, YØ, NCYCLE, 8HX-AXIS ,8*LOC, XLEN, KVAL, XTIC)
         WRITE(5,29)
       READ(5,100, END=50) LOC. NCYCLE, KVAL, XO, YO, YLEN, YTIC
       CALL LOGAX(XØ, YØ, NCYCLE, BHY - AXIS, 8*LOC, YLEN, KVAL, YTIC)
CALL PLOT(ABS(XLEN)+3.,0.,-3)
       GO TO 1
   50 CONTINUE
       CALL PLOT (10.,0.,-3)
       STOP
 100
       FORMAT(31,4F)
       END
```

? -1,2,0,5,,0,,7.

? 1,3,-1,0,,0,,-6,,7.





Identification: Subroutine DIMENS \$30

S30206

Purpose:

To draw dimensions for drafting purposes

Usage: FORTRAN Calling Sequence

CALL DIMENS (XO, YO, DS, THETA, SCALE)

where,

XO, YO are the floating point coordinates of the left end of the dimension.

DS is the floating point length of the dimension.

THETA is the angle in floating point degrees at which the dimension is to be drawn.

SCALE is the scale of the drawing in floating point.

Other Subroutines Required: P.

PLOT: NUMBER

Storage Required:

DECsystem-10 (406)₈ Locations

Restrictions:

The dimensions are limited to three (3) types which are determined automatically by the actual plotted length of the dimension. Type 1 is utilized when (DS*SCALE) is $0 \le 0.80$ inch, Type 2 when $0.81 \le 1.19$ inches, and Type 3 when 1.20 inches or greater.

Type 1 — .125

Type 2 — .282

Type 3 — .362

Original Source:

In-house Submitter:

In-house Contact:

Langley Research Center

Tom Talbot/KHL

Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINES DIMENS AND LIGRID
   CALL PLOTS(0,0,16)
SET OPIGIN
   CALL PLOT(0.,-11.,-3)
   CALL PLOTION, S, -31
DRAW LINEAR GRID LINES VERTICAL LINES ARE 1 INCH APART(XS=1.)
                       HORIZONTAL LINES ARE 2 INCHES APART(YS=2.)
  CALL LIGRID(0.,0.,1.,2.,5,3)
DRAW 3 TYPES OF REPRESENTATIVE DIMENSIONS
  CALL DIMFNS(1.,6.2,1.,0.,1.)
  CALL DIMENS(5.2,2.,2.,90.,1.)
  CALL PLOT (4.5,6.,3)
  CALL PLOT (4.5,5.75,2)
  CALL DIMFNS(4.,6.2,.5,0.,1.)
FND PLOT
  CALL PLOT(8.,0.,-3)
   STOP
   FND
```

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Identification: Subroutine PAXIS S30207

Purpose:

To draw a probability axis with tic marks at specified intervals and annotate the value at the tic marks, when space permits.

Usage: FORTRAN

Calling Sequence:

CALL PAXIS (XO, YO, HIGH)

where,

HIGH Height of the axis in inches

Comments:

The user must scale his data to the probability axis drawn.

Other Subroutines Required:

PLOT, NUMBER

Storage Required:

274₈

Original Source:

Scott Moffatt/KHL

In-house Submitter:

Tom Talbot/KHL

In-house Contact:

Tom Talbot/KHL

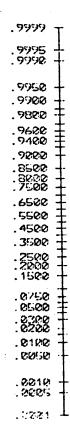
```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE PAXIS
      CALL PLOTS(0,0,16)
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(0.,1.,-3)
   SET HEIGHT OF PROBABILITY AXIS
      HH=8.0
   SET AXIS COORDINATES
      X0=0.0
      Y0=0.0
      CALL PLOT(3.,0.,-3)
   PLOT PROBABILITY AXIS
      CALL PAXIS(XO, YO, HH)
   SET ORIGIN FOR NEXT PLOT
      CALL PLOT (3.,0.,-3)
      HH=4.0
      CALL PAXIS(XO, YO, HH)
      CALL PLOT(3.,0.,-3)
\mathbf{C}
      HH=2.0
      CALL PAXIS(XO, YO, HH)
   FND PLOT
      CALL PLOT(3.,0.,-3)
      STOP
      END
```

0.9995 0.9890-0.9950-0.9900-0.9850-0.9800-0.9700-0.9600-0.9500-0.9400-0.9250-0.9000-0.8500-0.8000 0.7500-0.7000-0.6500-0.6000-0.5500-0.5000-0.4600-0.4000-0.3500-0.3000-0.2500-0.2000 0.1500-0.1000-0.0750 0.0800 0.0500 0.0400 0.0300 0.0200+ 0.0100-0.0050-0.0010-0.0005-

0.9999-

_ _ _

0.00011





S30210

IDENTIFICATION: SUBROUTINE GRIDD

Purpose:

To draw grid lines inside specific boundaries with an optimal box left open for labels. GRIDD can be used with AXIS routines to add the finish lines to the outside parimeter of a graph.

Usage: FORTRAN

Callling Sequence:

CALL GRIDD (X0, Y0, XGRID, YGRID, KX, KY, LAST, IOPN, XLOW, XUP, YLOW, YUP)

where,

X0, Y0 The coordinates of lower left hand corner of the graph.

XGRID, YGRID The lengh of the X and Y axis.

KX, KY

The number of cycles on each axis.

One less line than the number will be drawn.

LAST Options to draw graph outlines.

= 0 - No outlines drawn
= 1 - Right outline drawn
= 2 - Upper outline drawn
= 3 - Both outlines drawn

IOPN This place the Box option

= 0 - No box left

= 1 - Box with no borders = 2 - Box with border drawn

XLOW, YLOW Bottom coordinates of the box boundaries relative to X0, Y0.

XUP, YUP Top coordinates of the box boundaries relative to X0, Y0.

Other Subroutine Required:

Plot

Storage Required:

DECsystem-10 (3060)₈ Locations

Restrictions:

If IPON = 0, XLOW, YLOW, XUP,
YUP must contain dummy

variables.

Original Source:

Langely Research Center

In-house Submitter:

Tom Talbot, KHL

In-house Contact:

Tom Talbot, KHL

Identification: Subroutine GRID \$39211

Purpose:

To draw different combinations of linear and logarithmic grid lines with decade, unit and fractional tic marks.

Usage: FORTRAN

Calling Sequence:

CALL GRID (XMAX, YMAX, TICX, TICY, NCX, NCY, LLX, LLY, MODX, MODY, MI, MF, NI, NF)

where,

XMAX The desired width of the coordinate grid, inches (X-axis).

YMAX The desired height of the coordinate grid, inches (Y-axis).

TICX The length of the X-axis tic marks, if any. (If none are called for, enter zero). If TICX is positive, tic marks will be directed inward from border; if negative, they will be outward.

TICY The length of the Y-axis tic marks.

NCX The number of linear decades or log cycles in the X direction.

NCY The number of linear decades or log cycles in the Y direction.

LLX An integer that indicates whether the Xcoordinate scale is to be linear or
logarithmic; l for linear, 2 for logarithmic,
3 for reversed-logarithmic.

LLY An integer that indicates whether the Y-coordinate scale is to be linear or logarithmic; 1 for linear, 2 for logarithmic, 3 for reversed-logarithmic.

MODX An integer indicating whether or not tic marks are desired and whether or not fine-pen coordinate lines are desired for the units in each decade, in the X

dimension of the grid. (A listing and description of the various modes is given on the next page.)

MODY Parameter corresponding to MODX for the Y dimension of the grid.

An integer between 1 and 9 that indicates at which unit the initial decade of an X-axis logarithmic scale is to begin.

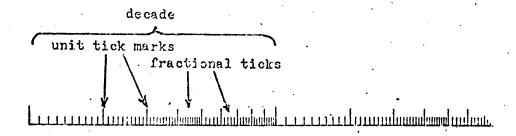
MF An integer between 2 and 10 that indicates at which unit the final decade of an X-axis logarithmic scale is to end.

NI Same as MI except refers to Y-axis.

NF Same as MF except refers to Y-axis.

(The last four parameters are not used by the subroutine when a linear-scale grid is plotted, but "dummy" parameters must be inserted in the parameter list in this case.)

With respect to logarithmic decades, the terms decade, unit, and fraction are defined as indicated by the following diagram:



Modes

The modes (MODX, MODY) that can be called are listed below. The numerals in parenthesis refer to Gerber penturret locations:

- Mode = 1: (For log scales only) Decade lines, broad pen (12). Unit lines, fine pen (10). Fractional tic marks, fine pen (10).
- Mode = 11: (For log scales only) Decade lines, broad pen (12)
 Unit tic marks, fine pen (10).
 No fractional tic marks.
- Mode = 2: Decade lines, broad pen (12).

 No unit lines.
 Fractional tic marks, fine pen (10).
 For log scales, tic marks at unit
 intervals are 2.0 times as long.
 For linear scales, there are 10 tic
 marks per decade, with fifth tic
 mark 2.0 times as long.
- Mode = 3: Decade lines, broad pen (12).

 Log scales, unit lines fine pen (10).

 Linear scales, 10 fine lines per

 decade (10).

 Log scales, no fractional lines.

 No tic marks.
- Mode = 4: (For linear scales only) Decade lines, broad pen (12) Four tic marks per decade (5 intervals), fine pen (10).
- Mode = 41: (For linear scales only) Decade lines, broad pen (12).

 Four fine lines per decade (10).

 No tic marks.
- Mode = 5: (For log scales only) Decade lines, broad pen (12).

 Unit lines, medium pen (11).

 Fractional lines, fine pen (10).

 No tic marks.

Comments

Grid Opening Option

An opening can be left in the grid lines to annotate the curves or for any other purpose.

The following common statement should be included in the calling routine.

COMMON/OPN/XA, XB, YA, YB, IOPN

Prior to calling Subroutine GRID, the statement IOPN = 1 is made, XA, XB, YA and YB are given numerical values (inches).

- XA X coordinate of left edge of the grid opening
- XB X coordinate of right edge of the grid opening
- YA Y coordinate of the bottom edge of the opening

YB Y coordinate of the top edge of the opening

The opening can be surrounded by solid lines (rectangle) if desired or it can be left "OPEN".

If the lines are desired, a call to subroutine BOX is made (CALL BOX) just after the call to GRID.

If, after a call to GRID with the "opening" option, another call without an opening is desired, set IOPN = 0 to deactivate the opening feature.

Other Subroutines Required: PLOT, BOX, COORDS, TICKS, PENCHG

Storage Required: DECsystem-10 (3060) locations

.

Restrictions:

The user must provide a dummy

routine

e.g. Subroutine PENCHG

SUBROUTINE PENCHG (IPEN) RETURN

END

Original Source: -

Computer Subroutine to Plot and

Label Curves for Scientific

Publications,

Naval Research Lab.

Washington, D.C.

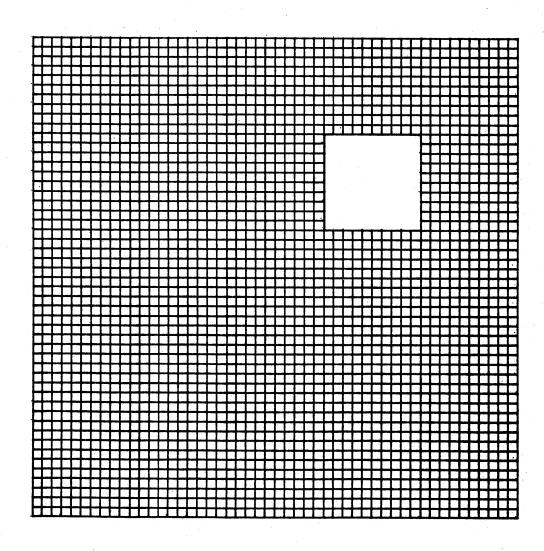
In-house Submitter:

Tom Talbot/KHL

In-house Contact:

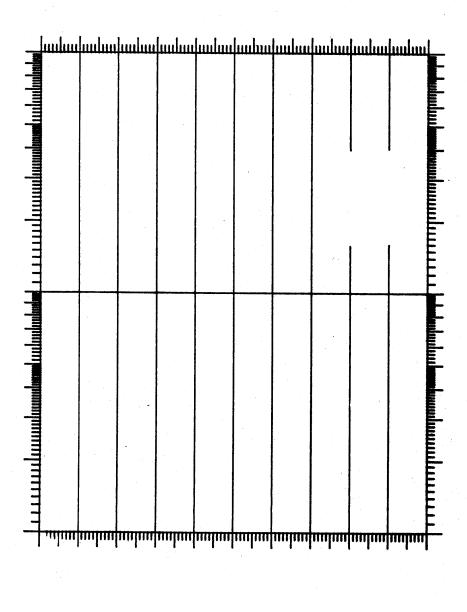
Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE GRID
      DIMENSION XF(5), XX(5), YF(5), YY(5)
      COMMON /OPN / X1 , X2 , Y1 , Y2 , TOPN
 SET COORD. FOR GRID OPENING. IOPN=1 ACTIVATES THE GRID OPENING
      DATA X1, X2, Y1, Y2, IOPN/3, 4, 4, 3, 4, 1/
      CALL PLOTS(0,0,16)
_
   SFT ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(4.,1.,-3)
   USF GRID SUBROUTINE
      CALL GRID(5.,5.,0.,0.,5,5,1,1,3,3,1,1,1,1)
   CALL TO SUBROUTINE BOX DRAWS LINES AROUND THE OPENING
C
      CALL BOX
C
   CALL TO STANDARD ROUTINE SYMBOL WILL ANNOTATE THE BOX
CALL SYMBOL(3.25,3.25,.25,2H ,0.,3)
   FND PLOT
      CALL PLOT(8.,0.,-3)
   MAKE NEW GRID
      CALL GRID(5.,5.,.08,.08,1,1,2,2,1,1,1,10,1,10)
      CALL PLOT(8.,0.,-3)
   IOPN=0 DF-ACTIVATES THE GRID OPENING
      CALL GRID(5.,5.,-.08,-.08,1,1,2,2,1,1,1,10,1,10)
      CALL PLOT(8.,0.,-3)
\overline{\phantom{a}}
      I OPN = O
(
      CALL GRID(4.,5.,-.08,-.08,10,2,1,2,2,2,1,1,1,10)
      CALL PLOT(8.,0.,-3)
      CALL GRID(5.,4.,0.,0.,1,1,2,2,3,3,1,10,1,10)
      CALL PLOT(8.,0.,-3)
~
      CALL GRID(6.,5.,.08,.08,5,5,1,1,4,41,1,1,1,1)
      CALL PLOT(8.,0.,-3)
CALL GRID(6.,5.,-.02,-.02,3,1,2,2,5,5,5,5,3,2,9)
FND PLOT
\overline{\phantom{a}}
      CALL PLOT(8.,0.,-3)
      STOP
       END
```



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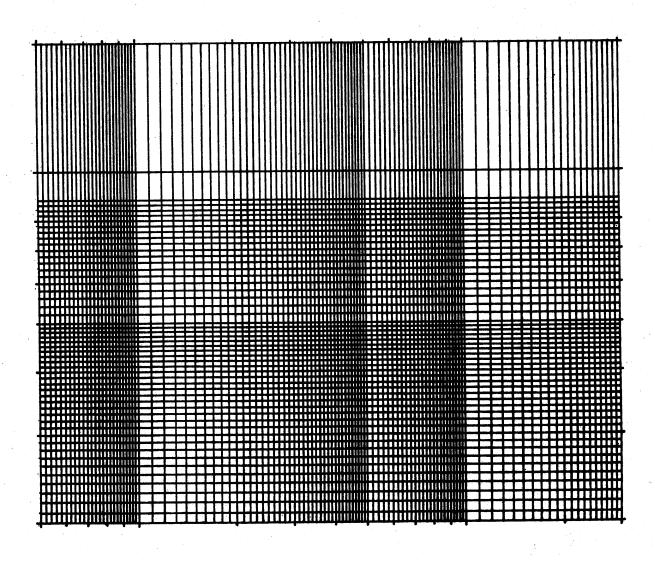
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Identification: Subroutine LIGRID \$30212

Purpose:

To draw linear grid over the specified plotting

area.

Usage: FORTRAN Calling Sequence

CALL LIGRID (X, Y, XS, YS, M, N)

where,

X, Y are the page coordinates in floating point inches of the origin (lower left-hand corner) of the grid.

XS is the increment in floating point inches between vertical grid lines.

YS is the increment in floating point inches between horizontal grid lines.

M is the number of increments along the X-axis.

N is the number of increments along the Y-axis.

Other Subroutines · Required: PLOT

Storage Required: DECsystem-10 (153), Locations

Original Source: Langley Research Center

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHI.

SPECIAL SYMBOLS
S303XX

IDENTIFICATION:

SYMBOL * \$30300

Purpose:

This routine produces plot annotation at any angle and in practically any size. There are two SYMBOL call formats: (1) the standard call which can be used to draw text; and (2) the special call which can be used to draw special symbols.

Restrictions:

None

Usage:

Calling Sequence:

Call SYMBOL (BGINX, BGINY, HT, IHOL, AN, TNCH)

BGINX, - Coordinates, in inches, of the lower

BGINY - Left corner of the first character.

HT - Height, in inches, of character to be plotted (e.g., .07, .14, .21, ...)

IHOL - Text to be used as annotation.

Usually stored in BCD or A-type format.

AN - The angle in degrees, at which the annotation is drawn.

TNCH - Number of characters to be plotted from IHOL. IF NCH > 0, data must be left-justified in IHOL.

IF NCH = 0, one alphanumeric character'
is produced.

Usage: Calling Sequence:

Call SYMBOL (BGINX, BGINY, HT, INT, AN, -IC)

BEGINX - Coordinates, in inches, of the lower left.

BGINY - corner of the first character.

HT - Height, in inches, of the character to be plotted.

INT - Integer equivalent of the desired symbol.

AN - The angle, in degrees, at which the annotation is drawn.

- -IC Determines the per status.
- = -1, Pen up during move, symbol produced.
- = -2, Pen down during move, symbol produced.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the PROGRAMMING CALCOMP PEN PLOTTERS manual from CALCOMP, Inc.

Original Developer: * CALCOMP, Inc.

IDENTIFICATION:

NUMBER *

S30301

Purpose:

This routine functions as a pre-processor to the symbol subroutine. It converts a real variable to the appropriate fixed-point equivalent so that it may be plotted.

Restrictions:

ND should be less than or equal to nine.

Usage:

Calling Sequence:

Call Number (BGINX, BGINY, HT, FN, AN, IND)

BGINX, Coordinates in inches, of the lower left corner BGINY of the first character.

HT - Height in inches of character to be plotted (e.g., .07, .14, .21,...)

FN - Location of the floting-point number that is to be converted and plotted.

AN - The angle in degrees, at which the number is drawn.

±ND - Determines the prevision of the number FN.

Note:

If

ND > 0 = the number of digits to the right of the decimal point.

ND = 0 = > plots, rounded integer and decimal point.

ND < 0 = > digits are truncatedafter rounding.

Storage Required:

Method:

This routine is one of the standard CALCOMP routines and can be found in the PROGRAMMING CALCOMP PEN PLOTTERS Manual from CALCOMP, Inc.

Original Developer:

CALCOMP, Inc.

Identification: Subroutine ENUMBR 30302

Purpose:

To convert a floating point number to ASCII (expressed in scientific notation), and draw the resulting alphanumeric characters.

Usage: FORTRAN Calling Sequence

CALL ENUMBR (X, Y, SIZE, FPN, THETA, N)

where,

x,y are the coordinates in floating point inches of the left lower corner of the first digit of output.

SIZE is the height of the plotted number is floating point inches (see symbol routine).

FPN is the floating point number to be drawn.

THETA is the angle in floating point degrees at which the number is to be drawn (see symbol routine).

is an integer specifying the number of significant digits to be drawn.

If N is negative, the digits will be to the right of the decimal.

Examples:

FPN = 9093.1200

CALL ENUMBR (X,Y,S,FPN,0.,3) will draw;
909 x 10¹

CALL ENUMBR (X,Y,S,FPN,0.,-3) will draw;
.909 x 10

FPN - .01020
CALL ENUMBR(X,Y,S,FPN,0.,2)
will draw;

 1×10^{-2}

CALL ENUMBR(X,Y,S,FPN,0.,-2) will draw;

 $.1 \times 10^{-1}$

Other Subroutines Required:

SYMBOL, NUMBER, WHERE

Storage Required:

DECsystem-10 (457)₈ Locations

Restrictions:

The resulting number is restricted to a maximum of 8 significant digits.

Original Source:

Langley Research Center

In-house Submitter:

Tom Talbot/KHL

In-house Contact:

Tom Talbot/KHL

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```
C A TEST PROGRAM TO SHOW THE USF OF SUBROUTINES FNUMBR AND ENUM

CALL PLOTS(0.0.16)

SET ORIGIN

CALL PLOT(0...11...3)
CALL PLOT(.5...5...3)

PROVIDE THE FLOATING POINT NUMBER EPN(FN)

FPN=12345.

CALL SUBROUTINES

CALL ENUMBR(2...2...28.FPN.0...3)
CALL ENUMBR(2...4...14.FPN.0...4)

CALL FNUMBR(2...4...14.FPN.0...4)

CALL FNUM(2...6...14.FN.90...5)

END PLOT

CAIL PLOT(8...0...3)
STOP
END
```

 1234×10^{1}

 123×10^{2}

Identification: Subroutine LABEL \$30303

Purpose:

To draw a label following a given curve defined by points (X_i, Y_i) .

Usage: FORTRAN Calling Sequence

CALL LABEL (X, Y, NTOT, XM, DELX, YM, DELY, K, LAB, NLBL, HT, IWAY).

Where,

X,Y Arrays defining curve

NTOT Number of points in arrays X and Y

XM Minimum value for X-array

DELX Units per inch in X-direction

YM Minimum value for Y-array

DELY Units per inch in Y-direction

K Index in X-array to start label

LAB Array containing label (H format accepted)

NLBL Number of characters in label. If NLBL is negative, the label is drawn below the curve.

HT The height of the characters to be drawn

IWAY = 0, characters are drawn vertically

= 1, slope of characters follow slope of curve (in both cases, the title will follow the curve)

Comments:

LABEL draws a label following a given curve defined by the arrays X and Y. The label will start at X(K), Y(K) and will be slightly above or below the curve. The label will not continue beyond the end of the curve and the curve is not drawn.

Subroutine required: PLOT

Other Subroutines Required: PLOT

Storage Required: DECsystem-10 (311) Locations

Restrictions: The label will not continue

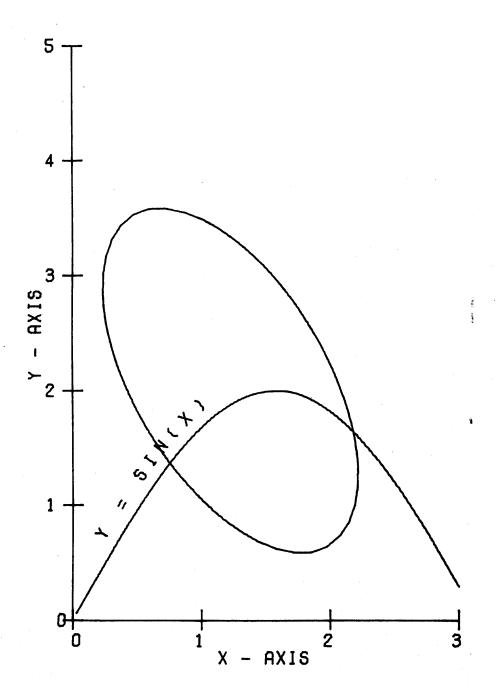
beyond the end of the curve.

Original Source: Tom Talbot/KHL

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE LABEL (ELIPS)
      DIMENSION X(100), Y(100)
(
   SET OPIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT( . 5 . . 5 . - 3)
C
   DRAW X AND Y AXES
      CALL AXIS2(0.,0.,3.,0.,1.,-4.,8HX - AXIS,8,-1,XSC)
      CALL AXIS2(0.,0.,5.,0.,1., 6.,8HY - AXIS,8,-1,YSC)
GENERATE ARRAYS FOR CURVES
      DO 1 I=1,100
      X(I) = FLOAT(I) *.03
      Y(T)=2.*SIN(X(T))
    1 CONTINUE
   DRAW A SINE CURVE
C
      CALL ALINE(X,Y,100,0.,XSC,0.,YSC)
   LARFL THE SINE CURVE
      CALL LABFL(X,Y,100,0.,XSC,0.,YSC,11,10HY = SIN(X),10,.12,1)
   SUPERIMPOSE AN FLLIPSE
      CALL FLIPS(2.5,3.,1.,2.,30.,0.,360.,3)
   END PLOT
      CALL PLOT(8.,0.,-3)
      STOP
      END
```



Identification: Subroutine PARROW \$30305

Purpose:

To draw an arrowhead at the end of the line proportional to the length of the line.

Usage: FORTRAN Calling Sequence

CALL PARROW (XA, YA, XB, YB, NC, ALNGTH)

where,

XA, YA are the starting coordinates of the line in floating point inches.

XB,YB are the coordinates of the arrowhead at the end of the line.

NC =1 plot the line from A to B and then draw an arrowhead one-fourth of the length of line AB.

=2 draw an arrowhead at B one-fourth of the length of line AB:

=-l plot the line from A to B and then draw an arrowhead as specified by ALNGTH.

=-2 draw an arrowhead at B of length as specified by ALNGTH.

ALNGTH is the length of the arrowhead when NC is negative; it may be omitted when NC is positive.

Comments:
The PARROW routine allows the plotting of an arrowhead that is either proportioned to the length of line it is associated with or is of a stated length (ALNGTH).

The arrowhead used subtends an angle of 60°. It does not use the LINE routine.

Other Subroutines Required:

PLOT

Storage Required:

DECsystem-10 (237)₈ Locations

Original Source:

Langley Research Center

In-house Submitter:

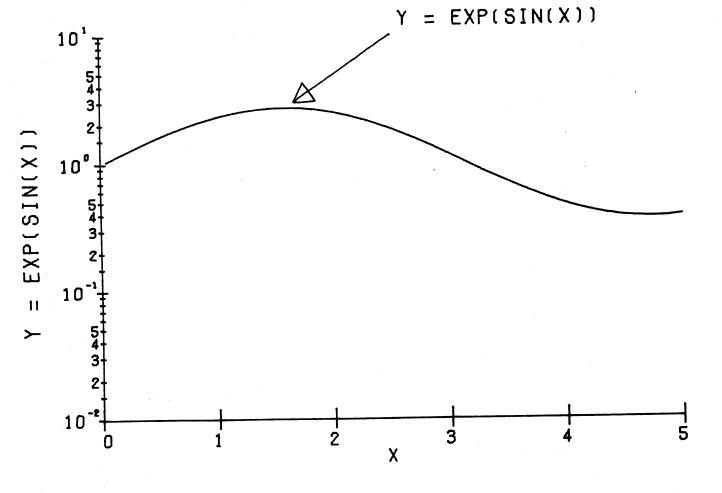
Tom Talbot/KHL

In-house Contact:

Tom Talbot/KHL

2 10 /

```
A TEST PROGRAM TO SHOW THE USE OF SURROUTINE PARROW(LISCALE)
      LAXIS.AXIS2.SYMBOL)
      DIMENSION X(100), Y(100)
      CALL PLOTS(0,0.16)
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT ( . 5 , . 5 , -3 )
   CET DATA APPAYS
      DO 1 J=1.100
      X(I) = FLOAT(I) * .05
      Y(I)=SIN(X(I))
      Y(\uparrow)=FXP(Y(\uparrow))
    1 CONTINUE
   SET VALUES FOR LOG AXTS
      KVAL =-2
      NCYCLF=3
   SCALF DATA
      CALL LSCALE(Y, 100, KVAL, 4., NCYCLE)
   DRAW LOG AXIS FOR Y ARRAY
      CALL LAXIS(0.,0.,NCYCLE,15HY = FXP(SIN(X)),15,4.,KVAL,1)
   DRAW LINEAR AXIS FOR X ARRAY
      CALL AXIS2(0.,0.,5.,0.,1.,-6.,1HX,1.-1,XSC)
~
   DRAW CURVE
(
      CALL ALINF(X,Y,100,00,XSC,00,10)
(
   DRAW ARROW TO ANNOTATE CURVE
•
      CALL PARROW(3.,4.,2.,3.3,-1,.2)
      CALL SYMBOL(3.1,4,1,.14,15HY = EXP(SIN(X)),0.,15)
   FND PLOT
      CALL PLOT (R. . O. . -3)
      STOP
      FND
```



IDENTIFICATION: SUBROUTINE ENUM \$30306

Purpose:

To convert a floating point number to ASCII (expressed in scientific notation), and draw the resulting alphanumeric characters.

Usage: FORTRAN Calling Sequence

CALL ENUM (X, Y, H, FN, A, N)

where,

X,Y are the coordinates in floating point inches of the left lower corner of the first digit of output.

H is the height of the plotted number in floating point inches.

FN is the floating point number to be drawn.

A is the angle in floating point degrees at which the number is to be drawn.

N. is an integer specifying the number of significant digits to be drawn.

if N is negative, the digits will be to the right of the decimal.

Examples:

FN = 9093.1200

CALL ENUM (X, Y, S, FN, 0.,3)

will draw:

 909×10^{1}

CALL ENUM (X, Y, S, FN, 0.,-3)

will draw:

 $.909 \times 10^4$

FN - .01020

CALL ENUM (X, Y, S, FN, 0.,2)

will draw;

$$1 \times 10^{-2}$$

CALL ENUM (X, Y, S, FN, 0., -2)

will draw;

 $.1 \times 10^{-1}$

Other Subroutines Required: SYMBOL, NUMBER

Storage Required: DECsystem-10 (457) Locations

Restrictions: The resulting number is

restricted to a maximum of 8

significant digits.

Original Soruce: Langley Research Center

In-house Submitter: Tom Talbot

In-house Contact: Tom Talbot, KHL

SPECIAL FUNCTIONS

S304XX

SPECIAL FORMS

S305XX

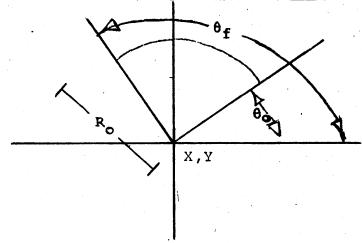
Identification: Subroutine ARC S30501

Purpose:

To draw a circle or portion there of

FORTRAN Calling Sequence Usage:

CALL ARC (KO, YO, THO, THF, RO, IP)



where,

XO, YO are the page coordinates of the center

of the circle.

is the initial angle between the radius THO

and the X-axis in floating point degrees.

is the final angle between the radius and THE

the X-axis in floating point degrees.

RO is the length of radius in floating point

inches.

= 2 move to start of arc segment with pen IP

down. (Trace a line to starting point).

= 3 move to start of arc segment with pen up.

Other Subroutines Required:

PLOT

DECsystem-10 (174) Locations Storage Required:

No plot if THF = THO Restrictions:

Langley Research Center Original Source:

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

```
CALL PLOTS(0,0,16)

CALL PLOTS(0,0,16)

CALL PLOTS(0,0,16)

CALL PLOT(0,-11,-3)

CALL PLOT(1,10,-3)

CALL PLOT(1,10,-3)

CALL AXIS2(0,0,0,5,0,+6,8HY - AXIS,8,-1,YSC)

CALL AXIS2(0,0,0,3,0,-4,8HX - AXIS,8,-1,XSC)

CALL ARC(2,2,0,360,1,5,3)

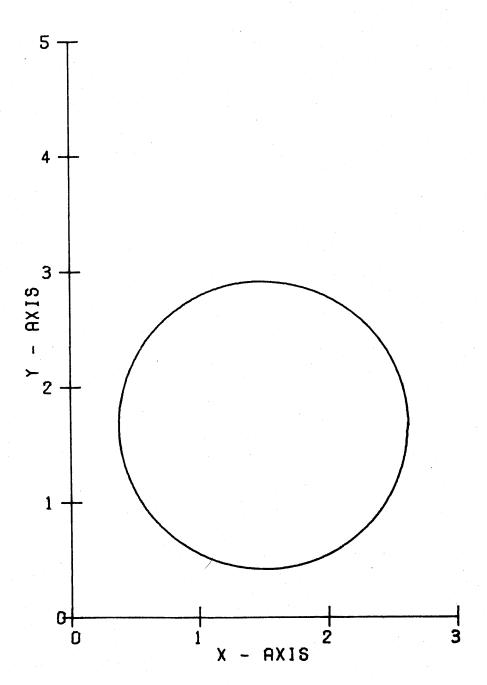
FND PLOT

CALL PLOT(8,0,-3)

STOP

END
```

2 20 1 1

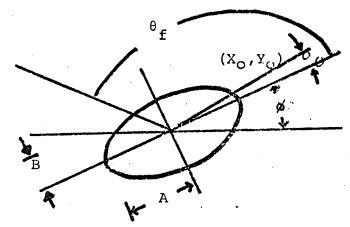


Identification: Subroutine ELIPS

S30502

Purpose:

To draw an ellipse or portion thereof.



Usage: FORTRAN Calling Sequence

CALL ELIPS (XO, YO, A, B, ALPHA, THETAO, THETAF, IV)

where,

XO, YO are the page coordinates of the starting point on the ellipse in floating point inches. This is not the coordinate of the center or of a fucus of the ellipse.

A is the length of the semi-major axis in floating point inches.

B is the length of the semi-minor axis in floating point inches.

is the angle of orientation (rotation) of the major axis in floating point degrees. This angle is measured from the horizontal to the major axis. Counter-clockwise is defined as the positive direction.

THETAO is the starting angle between the radius vector (from center) and the major axis in floating point degrees. Counter-clockwise is positive.

•,

THETAF is the final angle between radius vector and major axis in floating point degrees. Counter-clockwise is positive.

For a closed curve THETAF = THETAO + 360.0.

Other Subroutines Required: PLOT

Storage required: DECsystem-10 (263)₈ Locations

Restrictions: No ellipse is generated

when,

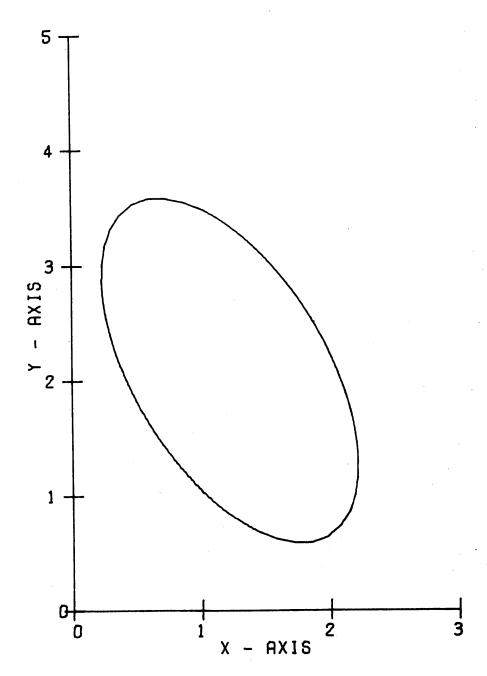
THETAO = THETAF

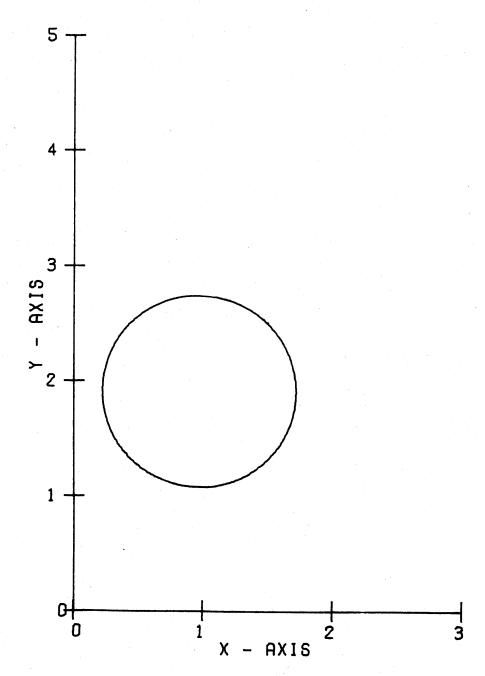
Original Source: Langley Research Center

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE FLIPS
      CALL PLOTS(0,0,16)
   SET OPIGIN
      CALL PINT (0.,-17.,-2)
    CALL PLOT(.5,2.5,-3)
\boldsymbol{C}
   DRAW X AND Y AXES
      CALL AXIS2(0.,0.,3.,0.,1.,-4.,8HX - AXIS,8,-1,XSC)
      CALL AXIS2(0.,0.,5.,0.,1.,+6.,8HY - AXIS,8,-1,YSC)
   DRAW FLLTPSF
      CALL FLIPS(2,5,3.,1.,2.,30.,0.,360.,3)
   PART OF AN FLLIPS CAN BE DRAWN BY CHANGING THE 6TH AND 7TH ARGUMENTS
C
   FND OF PLOT
      CALL PLOT(8.,0.,-3)
   GENERATE A CIRCULAR FLL TPSF
   SET OPIGIN
      CALL PLOT(0.3-11.,-3)
      CALL PLOT(.5,.5,-3)
   DRAW X AND Y AXIS
      CALL AXIS2(1.,2.,3.,0.,1.,-4.,8HX - AXIS,8,-1,XSC)
      CALL AXIS2(1.,2.,5.,0.,1.,+6.,8HY - AXIS,8,-1,YSC)
   DRAW FLLTPSF
      CALL ELLIPS(3.,5.,1.,1.,45.,0.,360.,3)
   FND PLOT
      CALL PLOT(8..0..-3)
      STOP
      FND
```





PICTORAL APPLICATIONS
\$306XX

Identification: Subroutine WORLD S30600

Purpose

To generate projections of the entire earth or selected portions of it as window plots.

Usage: FORTRAN

Calling Sequence:

CALL WORLD (KARD, IARG1, ARG2, RDER, FILEN)

where,

- When KARD=1, a new plot is initiated according to the scaling factors input by the user. When KARD=2, a second plot is executed using the same scaling factors as as the previous call.
- IARGI Projection number, specifies type of projection to be plotted. If no input number given, Mercator projections will be assigned by the program.
- ARG2 Set equal to 0. This argument is included here but intended only for possible future use.

RDER Array containing 12 values

- (1) Central meridian ±xxx.xx
- (2) Floating point variable indicating spacing at which longitude lines are plotted xx.x
- (3) Floating point variable indicating spacing at which latitude lines are plotted xx.x
- (4) Set to 0. (No current use)
- (5) Set to 0. (No current use)
- (6) Floating point variable indicating northern latitude boundary of area to be plotted ±xxx.xx
- (7) Floating point variable indicating southern latitude boundary of area to be plotted ±xxx.xx

- (8) Floating point variable equal to eastern longitude boundary of area to be plotted ±xxx.xx
- (9) Floating point variable equal to western longitude boundary of area to be plotted ±xxx.xx
- (10) Set equal to 0 (No current use)
- (11) Set equal to 0 (No current use)
- (12) Integer variable l=grid, 0=no grid

FILEN Data file indicator. FILEN(1) is data file WORLD.DAT for plotting the earth FILEN(2) is data file US.DAT used to draw boundaries of the continental United States (excluding Alaska).

Comments

The map plot routine is written in FORTRAN as a subroutine which will generate projections of the earth or selected portions. The user must initialize parameters, selecting the routines which will satisfy the user input requirements. The world plot and Continental U.S. boundary data is available on DECtape.

There are four types of cylindrical projections available; 1) Mercator, 2) Equal Area, 3) Stereographic, and 4) Equal Spaced. The axis of the cylinder is parallel to the axis of the generating globe. The basic features and any restrictions or limitations for each projection are presented below. The two digit number in parentheses which follows the projection name is the assigned number for that projection.

Mercator Projection (11)

Basic Features

- 1) Orthomorphic projection; i.e., shape preserved for small areas.
 - 2) Areas grossly exaggerated in polar regions.
 - 3) Windowing available.
 - 4) User may choose any longitude for central meridian.

Restrictions and/or Limitations

- 1) Latitude will not be plotted above 85 degrees for a full earth projection.
- 2) Latitudes will not be plotted above 89 degrees north or 89 degrees south for a window projection.

Equal Area (12)

Basic Features

- 1) Shape badly distorted (compressed) in polar regions.
 - 2) Equal-area property preserved over entire projection.
 - 3) Windowing available.
- 4) User may specify any longitude to be central meridian.

Restrictions and/or Limitations

Latitude will not be plotted above 80 degrees north or below 80 degrees south for a full earth projection.

Cylindrical Stereographic (13)

Basic Features

- 1) Shape slightly deformed in polar regions.
- 2) Scale most accurate between latitudes 45N and 45S (latitudes where cylinder intersects globe).
 - 3) Best compromise projection for shape, area, scale.
 - 4) Windowing available.
- 5) User may specify any longitude to be central meridian.

Equal Spaced (14)

Basic Features

- 1) Equidistant projection-scale correct along all meridians and equator.
 - 2) Windowing available.
 - 3) User may select any longitude to be central meridian.

Other Subroutine Required: PLOT, SYMBOL, NUMBER

Storage Required: 7162g

Original Source: S. Ross and Company

In-house Submitter: Tom Talbot

In-house Contact: Tom Talbot

```
TEST PROGRAM TO SHOW THE USE OF WORLDPLOT
      DIMENSION RDER(12), RDFR2(12), RDFR3(12), RDFR4(12), RDFR5(12)
      DIMENSION FILEN(2)
      INTEGER FILEN
      DATA RDER/-100.,20.,20.,0.,0.,85.,-60.,180.,-180.,0.,0.,1/
      DATA RDFP2/-95.,20.,20.,0.,0.,50.,+20.,-60.,-130.,0.,0.,0/
      DATA RDEP3/15.,20.,20.,0.,0.,50.,25.,40.,-10.,0.,0.,1/
      DATA RDFR4/135.,10.,10.,0.,0.,50.,30.,155.,115.,0.,0.,1/
      DATA RDFR5/125.5.,5.,0.,0.,20.,-15.,160.,90.,0.,0.,1/
~
   WORLD. DAT = INPUT FILE FOR WORLD PLOTTING
C
      US.DAT=INPUT FILE FOR U.S. PLOTTING
      DATA FILEN/'WORLD', 'US'/
      CALL PLOTS(0,0,16)
\boldsymbol{C}
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(0.,1.,-3)
(
\mathbf{c}
   SET PARAMETERS FOR MERCATOR PROJECTION
      ARG2=0.
      IARG1=11
      KARD=1
C
   PLOT CONTINENTAL U.S. OVERLAYED WITH STATE BOUNDARIES
      CALL WORLD (KARD, TARGI, ARG2, RDFR2, FILEN(1))
       KAPD=2
       CALL MORLD (KARD, TARGI, ARG2, RDFR2, FILEN (21)
\overline{\phantom{a}}
   FND PLOT
       CALL PLOT(15.,0.,-3)
       KARD=1
   WORLD PLOT - MERCATOR PROJECTION
       CALL WORLD (KARD, TARGI, APG2, RDER, ETLEN(1))
       CALL PLOT(12.,0.,-3)
   WORLD PLOT - ENUAL AREA PROJECTION
       IARG1=12
       CALL WORLD (KARD, JARG1, ARG2, RDFR, FILEN(1))
       CALL PLOT(12.,0.,-3)
\boldsymbol{c}
   WORLD PLOT - CYLINDRICAL STEREOGRAPHIC PROJECTION
       IARG1=13
       CALL WORLD (KARD, TARGI, ARG2, RDER, FILFN(1))
```

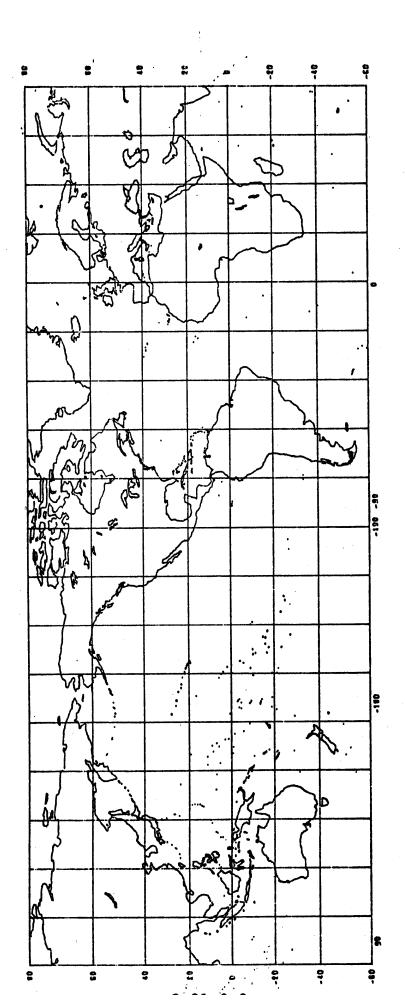
```
CALL PLOT(12.,0.,-3)
(
   WORLD PLOT - EQUALLY SPACED PROJECTION
      IARG1=14
      CALL WORLD(KARD, IARG1, ARG2, RDER, FILEN(1))
      CALL PLOT(12.,0.,-3)
ر
د
   MERCATOR PROJECTION PLOTS OF9
MEDITERRANEAN AREA
      JAPAN AND, KORFA
_
      EAST INDIES
      IARG1=11
      CALL WORLD (KARD, TARG1, ARG2, RDER3, FILEN(1))
      CALL PLOT(12.,0.,-3)
      CALL WORLD (KARD, TARG1, ARG2, RDER4, FILEN(1))
      CALL PLOT(12.,0.,-3)
      CALL WORLD(KARD, IARG1, ARG2, RDER5, IARG3, EILEN(1))
      CALL PLOT(12.,0.,-3)
      STOP
      FND
```

U.S.A.

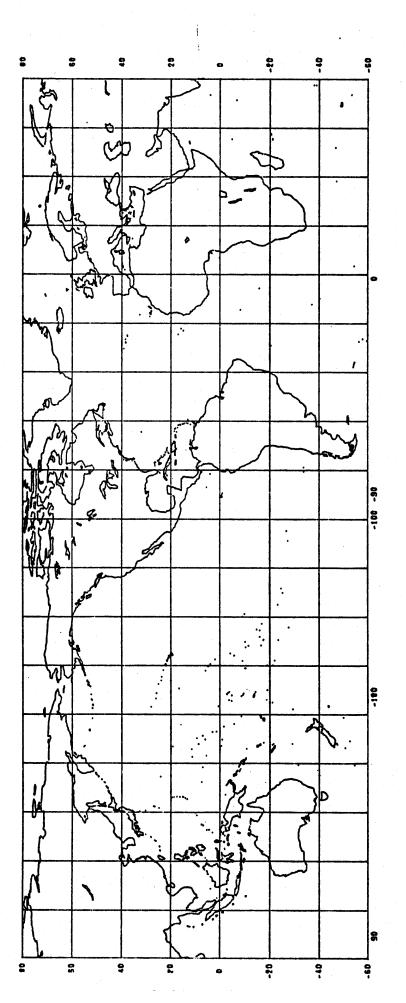
Ę

MERCATOR

Equal Area



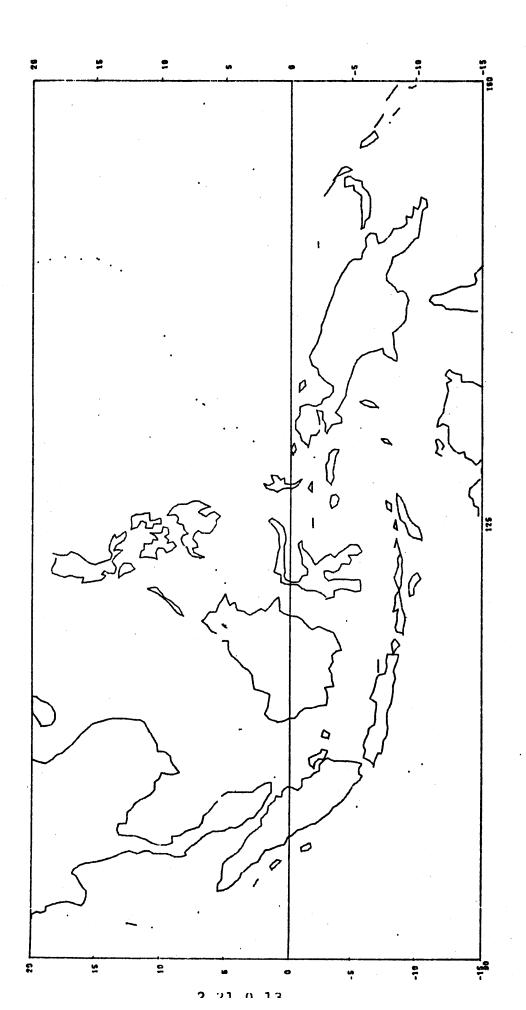
Cylindrical Stereographic



Equal Spaced

Mediterranean

JAPANEESE ISLANDS



East Indies

Identification: Subroutine SHADE \$30601

Purpose:

. To shade a polygonal area with equidistant parallel lines.

Usage: FORTRAN Calling Sequence

CALL SHADE (XVERT, YVERT, NVERT, XWORK, YWORK,

XTEMP, NTEMP, ANGLE, DIST)

where,

XVERT An array containing the X-coordinates

of the vertices of the polygon

(ordered).

YVERT Same for the Y-Coordinates.

NVERT The number of vertices in the polygon

XWORK, Two working arrays dimensioned in the

YWORK users program at (NVERT+1).

XTEMP A temporary array used to hold the

X-coordinates of the end-points of the line segments needed for each shade line.

Should be dimensioned at twice the

maximum number of times a shade line can

be expected to intersect the polygon.

NTEMP Dimension of XTEMP.

ANGLE The angle (with respect to the users

X-AXIS) of the shade lines.

DIST The distance between shade lines (user

units).

The following common area contains the paramters used to convert from user coordinates to plotter coordinates. These values must be set by the user in his program in the same common even.

Before plotting, the following transformation takes place:

U=(X-XOFF)*XSF+UOFF

V = (Y - YOFF) * YSF + VOFF

COMMON/SHDCOM/XOFF, YOFF, XSF, YSF, UOFF, VOFF

Other Subroutines Required: PLOT, INTERX, ORDER,

Storage Required: DECsystem-10 (620) Locations

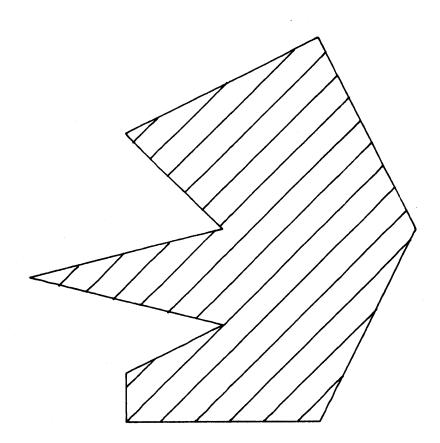
Original Source: Jim Steinberg/EIN

In-house Submitter: Tom Talbot/KHL

In-house Contact: Jim Steinberg/EIN

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE SHADE
   COMMON/SHDCOM/XOFF, YOFF, XSF, YSF, UOFF, VOFF
   DIMENSION XWORK(10), YWORK(10), XTEMP(100), XARRAY(10), YARRAY(10)
   DATA XARRAY/1.,3.,4.,3.,1.,2.,0.,2.,1.,1../
   DATA YARRAY/1.,1.,3.,5.,4.,3.,2.5,2.,1.5,1./
   CALL PLOTS(0,0,16)
SET OPIGIN
   CALL PLOT(0.,-11.,-3)
   CALL PLOT ( . 5 . . 5 , - 3 )
DRAW AREA TO BE SHADED (POLYGONAL)
   CALL PLOT(XARRAY(1), YARRAY(1), 3)
   0011=2.10
   CALL PLOT(XARRAY(I), YARRAY(I), 2)
 1 CONTINUE
DRAW SHADE LINES 0.25 INCH APART, 45 DEGREES TO HORIZONTAL
   XSF=1.
   VSF=1.
   Unffen.
   VOFFED.
   XOFF=0.
   YOFF=0.
   CALL SHADE (XARRAY, YARRAY, 9, XWORK, YWORK, XTEMP, 100, 45., 0.25)
FND PLOT
   CALL PLOT (8.,0.,-3)
   STOP
   FND
```

.



IDENTIFICATION: Subroutine SHADIT S30602

PURPOSE:

To draw bars and to shade these bars in different ways.

USAGE: FORTRAN Calling Sequence

Call SHADIT (X1, Y1, X2, Y2, DX, IPLT) where,

- Xl Left hand X coordinate (inches
- Yl Lower Y coordinate (inches)
- X2 Right hand X coordinate (inches)
- Y2 Upper Y coordinate (inches)
- DX Distance between shade lines

IPLT Type of shading desired

OTHER SUBROUTINES REQUIRED: Plot

STORAGE REQUIRED: DECsystem-10 (1280) location

COMMENTS:

Subroutine SHADIT immediately draws the rectangle defined by the points X1, Y1, X2, Y2. These coordinates are passed to the subroutine in CALCOMP compatible units (inches). Subroutine SHADIT then proceeds to shade the rectangle, depending upon the value of variable IPLT. Not that when IPLT=5, no shading is done, i.e., only the bar is drawn

The following are examples of the five types of shading available.











IPLT=1

IPLT=2

IPLT=3

IPLT=4

IPLT=5

Original Source:

Glenn Farrell, KHL

In-house Submitter:

Glenn Farrell, KHL

In-house Contact:

Glenn Farrell, KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE SHADIT
      CALL PLOTS(0,0,16)
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT( . 5 , . 5 , - 3 )
   DRAW X AND Y AXES
      CALL AXIS2(.5,.5,5.,0.,1.,-6.,8HX - AXIS,8,+2,XSC)
      CALL AXIS2(.5,.5,5.,0.,1.,+4.,8HY - AXIS,8,-1,YSC)
  DRAW BARS WITH DIFFFRENT CROSS HATCHING
      CALL SHADIT( . 7, . 5, 1 . 2, 3 . 5, . 1, 1)
      CALL SHADIT(1.5,.5,1.8,2.5,.1,2)
      CALL SHADIT(2.,.5,2.4,4.,.02,4)
   FND PLOT
^
      CALL PLOT(10.,0.,-3)
      STOP
      FND
```

UNIQUE PLOTS

Identification: Subroutine THREE

S30700

Purpose

To plot a three dimensional perspective of the data of a two dimensional array, interpreting the value of the array as the 'z' component and the indices of the array as the 'x' and 'y' components. The program will also plot a function using subroutine EXTSCH with a user supplied function.

Usage: FORTRAN

Calling Sequence:

CALL THREE (A, AMAX, DISC, MAXDMX, MAXDMY, STARTX, SKIPX, DIMX, STARTY, SKIPY, DIMY, THETA, PHI, OPAQUE, BLOCK, ARRAY, SCALEX, SCALEY, SCALEZ, K1, K2, K3)

where,

A Array to be plotted

AMAX Maximum value of array or function to be plotted

MAXDMX If plotting array, this is the maximum value. If not, set to 1

MAXDMY If plotting array, this is the minimum value. If not, set to 1

STARTX Starting X value

SKIPX X increment, normally 1

DIMX X dimension of array A

STARTY Starting Y value

SKIPY Y increment, normally 1

DIMY Y dimension of array A

THETA Angle from Z-axis to line of sight

PHI Angle in Z-Y plane between X-axis and line

of sight

OPAQUE If OPAQUE=.TRUE. hidden lines are not plotted.

BLOCK Not used at this time

ARRAY Logical variable. If .TRUE. the array
A is to be plotted. If .FALSE. the user
has supplied a function to be plotted in
the form SUBROUTINE EXTSCH (DUMMY, IX,

IY, Z) where DUMMY is not used IX = x value (integer) input

IY = y value

Z = resultant function value

SCALEX Length in inches of plot X-axis

SCALEY Length in inches of plot Y-axis

SCALEZ Length in inches of plot Z-axis

Kl Do not plot in Y direction if .TRUE.

K2 Do not plot in X direction if .TRUE.

K3 Dummy. Not in current use.

Other Subroutines Required: PLOT

Storage Required: 212218

Original Source: Scott Moffatt/KHL

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE THREE
      LOGICAL KI, K2, K3, ARRAY, BLOCK, OPAQUE
      INTEGER STARTY, SKIPX, DIMX, STARTY, SKIPY, DIMY
      DIMENSION A(1)
      CALL PLOTS(0,0.16)
   SET ORIGIN
      CALL PLOT(0.,-11.,-3)
      CALL PLOT(0.,4.5,-3)
   SET DIMENSIONS OF A ARPAY (OMITTED IN THIS EXAMPLE)
\boldsymbol{c}
      MAYDMY = 1
      MAXDMY=1
   SET X AND Y RANGES
      STARTX=1
      SKTPX=4
      DJMX=101
      STAPTY=1
      SKTPY=4
      DIMY=101
   SET SCALING RANGE, MAXIMIM VALUE, AND VIEWING ANGLE
^
      SCALFX=9.
      SCALFY=9.
      SCALF7=7.
      \Delta M \Delta X = 50
      PHI=60.
      THFTA=75.
^
   MAKE PLOT OPAQUES DO NOT PLOT ARRAY(PLOT FUNCTION)
      OPAGUE = . TRUE .
      APPAY= FALSE.
   PLOT IN X DIRECTION IF K2=.TRUE..IN Y DIRECTION IF K1=.TRUE.
(
      K]=.TRUF.
      K2= . TRUF.
      CALL THREE (A, AMAX, DUMMY, MAXDMY, STARTX, SKIPX, DIMX, STARTY, SKI
     *PY,DIMY,THETA,PHI,OPAQUE,BLOCK,ARRAY,SCALEX,SCALEY,SCALEZ,K1,K2,
     *DIMMY1
   FND PLOT
      CALL PLOT(16.,0.,-3)
      STOP
      FND
```

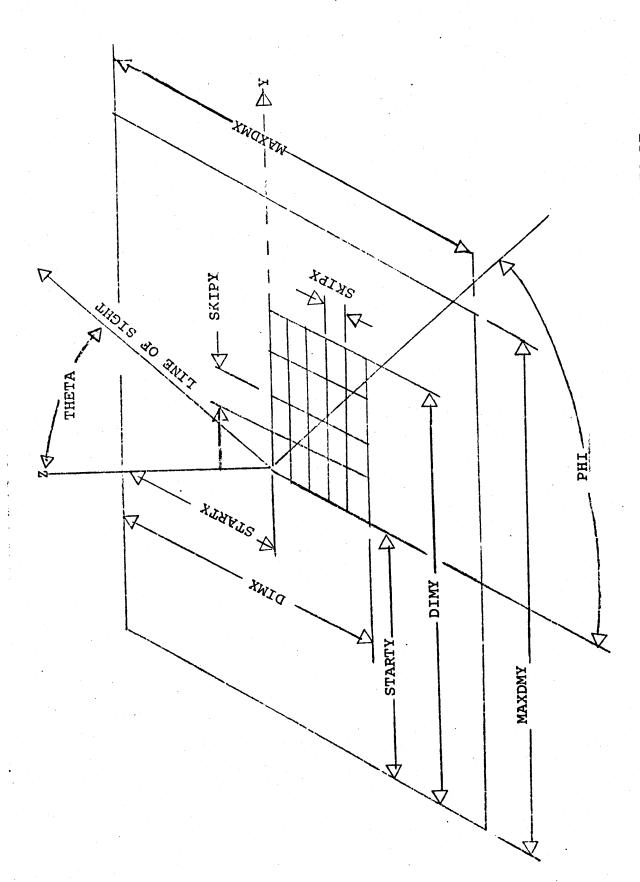
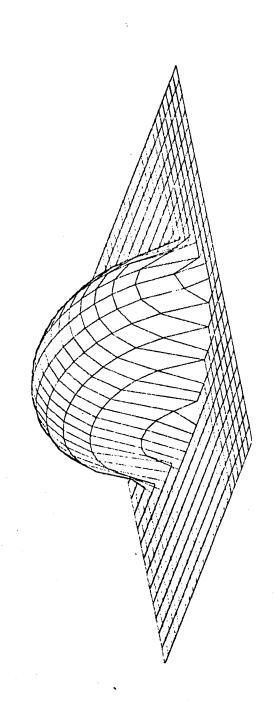


Figure 1. VIEW OF ENTIRE ARRAY SHOWING THE REGION TO BE PLOTTED AND THE OBSERVOR'S LINE OF SIGHT.



SPECIALTY ROUTINES
S308XX

Identification: Program DECKS S30800

Purpose:

To plot program deck structures according to user specification primarily for use in documentation. The subroutine will plot cards and/or decks of variable length with printing space for 40 characters.

Usage: FORTRAN

Calling Sequence

Call Decks

Comments:

The contents and spacing of the plotted decks or cards are specified by the use of control cards in the user's data file. The control cards are identified by an asterisk in column 1. All non-control cards are copied on the plotter. An explanation of the control cards follows:

*CARD Used to add an additional offset space for the next card to be drawn, or to end the drawing of a deck.

*COLUMNS To draw column numbers on next plotted card from the column position specified by the integer ending in column 12 to the position specified by the integer ending in column 16 More than one *COLUMNS card may be used to specify the printing of any column or columns.

*DECK Indicates that a deck representation is to be drawn. The first card after the *DECK card that is not a *CARD or *COLUMNS card will be used as the front of the drawn deck. A blank card my be used if the front of the drawn deck is to be left blank.

All cards after the first card will be used to draw labels on the top of the deck. The size of the drawn deck is controlled by the number of blank cards.

A drawn deck is ended by a *CARD.

*NEXT Begin a new plot.

*STOP Used to end the drawing of a deck setup.

Other Subroutines Required: PLOT, SYMBOL, NUMBER

Storage Required: 1441₈

Restrictions: The user must take care not to

draw a deck longer than the

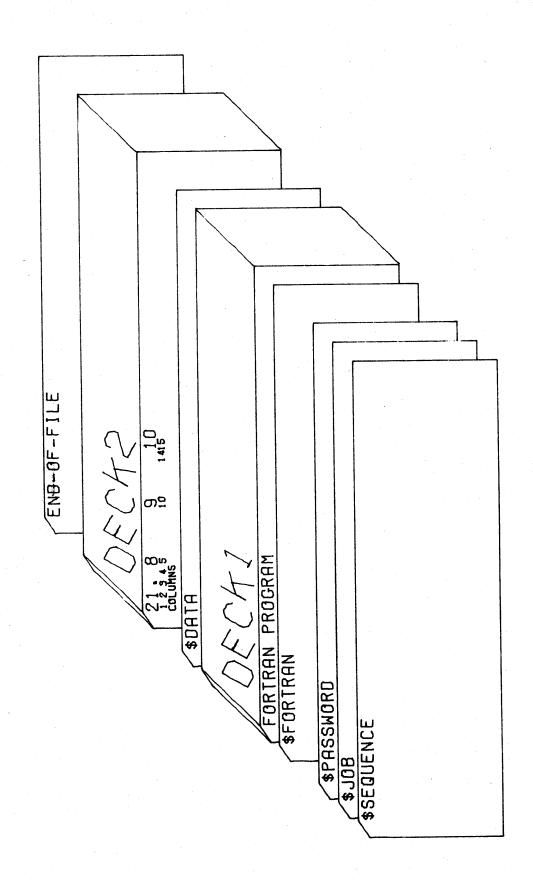
plotter paper size

Original Source: Langley Research Center

In-house Submitter: Tom Talbot/KHL

In-house Contact: Tom Talbot/KHL

```
A TEST PROGRAM TO SHOW THE USE OF SUBROUTINE DECKS
      CALL PLOTS(0,0,16)
       CALL DECKS
(
   FND PLOT
       CALL PLOT(12.,0.,-3)
       STOP
       FND
\boldsymbol{c}
   SAMPLE DATA FILE TO BE USED WITH SUBROUTINE DECKS
   FILE NAME DEK . DAT
   THIS DECK STRUCTURE WAS USED TO PROVIDE THE EXAMPLE
\overline{\phantom{a}}
*SFOURNCE
#JOB
*PASSWORD
*CARD
SFORTRAN
*DFCK
FORTRAN PROGRAM
DECKT
*CARD
SDATA
*COLUMNS
                5
*COLIMNS
           10
                10
*COLUMNS
           14
                15
*DFCK
21. R
          9
DFCK2
ACARD
*CARD
FND-OF-FILE
*CARD
*CARD
*STOP
```



IDENTIFICATION: Program DOCPRT S30801

Purpose:

This program is used to reformat computer listings to page size. The file name and page numbers are placed on each page making it an ideal method for documenting a computer program or data files.

Usage: FORTRAN

Comments:

The procedure for executing this program is as follows:

- MOUNT DTA: SAV/VID: 611/WL✔
- R PIP
- * DSK:/X = DTA :DOCPRT.SAV
- * +C 2
- 1. .RUN DOCPRT
- 2. Type in a page number prefix. This is a one (1) character letter associated with the appendix into which these listings are to be placed. To reduce typing, xeroxing, and collating, all along listings in bound reports will be put in appendices numbered A-1, A-2, etc., for Appendix A; and B-1, B-2, etc., for Appendix B, etc. If the work "NONE" is typed, the listings will be produced without page numbers. This may be desired for some short listings to be inserted in the text of a report or in an external memo. This program can also be used for listing input files or control files, and appendix page numbers may not be desired for these.

- 3. Type in the starting page number if needed.
- 4. Type in a project or program name. This is printed on the top of each page of the listing surrounded by asterisks.
- 5. Type in the full filename. A look up error occurs when the named file is not found. When this happens the program simply loops back to accept another filename. Type "DONE" to stop.
- 6. When the program asks for "NEW APPENDIX PREFIX" or "NEW TITLE? P/T/<CR>:", a P returns the program to step 2 above, a T to step 4, and a <CR> to step 5. Previously used titles and appendix prefixes with continuing page numbers are used if new ones are not asked for and accepted.
- 7. After the program exists following a DONE file name, the documentation listings are in a file named DOCUM.DAT. Print with /COPIES: as many copies as are necessary to eliminate any xeroxing of listings.
- 8. DISMOUNT DTA_:/RE.

Other Subroutines Required: None

Storage Required:

Restrictions:

During the execution your file is unamed to PTEMP.DAT.

Therefore if for some reason the program does not do a
normal exit look for your last file to be named PTEMP.DAT.

Original Source: Dr. R. Wassmuth, T. Talbot/KHL

In-House Contact: Dr. R. Wassmuth/KHL

MOUNT DTA:SAVE/VID:611/WL

Request queued

Waiting...2 CC's to Exit

·SYS.)

27 3001,477 TTY43 SYSTAT 12+SPY RN

0 \$

\$ means Execute Only

·RES)
PT12,PC02,PT32,PT10,DSKA,DSKB,DSKD,PVT6,DSKC,TRAS,PVT3,PC01,BIZ4,PVT7,DPA5
DPA7,DPB6,CDR000,LPT000,001,002,DTA001,002,003,005,MTA001,004,PLT000

25 3001,477

TTY43 SYS

SYSTAT 12+SPY RN

0 1

* means Execute Only

Busy devices:

Device Job

ฟกษ

Losical

DTA004 27

as

SAVE

R PIP

*DSKB:/X=DTA004:DOCFRT.SAV2

*^C

.RUN DOCPRT.SAV

ZRUNNING KA-10 CODE ON A KI-10

INPUT APPENDIX PREFIX--NONE FOR NO PAGE NUMBERS: A ✓

TYPE IN STARTING PAGE NUMBER: 12

INPUT PROJECT OR PROGRAM TITLE:
EXAMPLE HYDRAS SYSTEM PROGRAMS

SUPPLEMENTARY PLOTTING ROUTINES?

INPUT FULL FILENAME -- DONE TO STOP: TENCUR.F100

CEXCEEDING QUOTA ON DSKBI

NEW APPENDIX PREFIX OR NEW TITLE? P/T/<CR>:2

INPUT FULL FILENAME -- DONE TO STOP: DONE 2

CPU TIME: 10.93 ELAPSED TIME: 2:33.85

NO EXECUTION ERRORS DETECTED

.DIR DOCUM.DAT

HOCUM DAT 287 <057> 31-Mar-77 DSKB: [3001,477]

.PRINT DOCUM.DAT Total of 287 blocks in 1 file in LFT request

.PRINT The queue is empty

.DEL DOCUM.DAT Files deleted: DOCUM.DAT 287 Blocks freed

MISCELLANEOUS S309XX

SECTION 3

PLOTTING PROCEDURES

THE DECSYSTEM-10 HAS BEEN CHECKED OUT WITH THE NEW CALCOMP 915 STAND ALONE CONTROLLER/PLOTTER FOR BOTH THE 7 OR 9 TRACK MAGNETIC TAPE DRIVES.

THE FOLLOWING PROCEDURE SHOULD BE USED WHEN PEN PLOTTING OR FILM PLOTTING ON MAGNETIC TAPES GENERATED ON THE DECSYSTEM-10.

- 1. LOG ONTO THE DECSYSTEM-10 COMPUTER.
- 2. USE THE RESOURCE COMMAND TO CHECK MTA DRIVES AVAIL-ABLE WHERE MTAO, MTA1, MTA2, MTA3 ARE 7 TRACK AND MTA4, MTA5, MTA6, MTA7 ARE 9 TRACK DRIVES.

EXAMPLE:

- .RESOURCES<CR>
- 3. REQUEST (BY USE OF THE MOUNT COMMAND) A SCRATCH MAGNETIC PLOT TAPE ON A MTA UNIT OR IF DESIRED, YOUR OWN PLOT TAPE NUMBER. EITHER A 7 OR 9 TRACK DRIVE MAY BE USED DEPENDING ON WHAT DRIVES ARE AVAILABLE FROM THE RESOURCE COMMAND.
 7 TRACK IS THE SYSTEM DEFAULT IF TRACK IS NOT SPECIFIED IN THE MOUNT COMMAND.

EXAMPLES:

.MOUNT MTA: 16/REELID:1234/VID:'JONES-7 TRACK PLOT TAPE'/WENABL<CR>.MOUNT MTA: 16/REELID:1234/VID:'JONES-9 TRACK PLOT TAPE'/WEN<CR>

WHERE 16 IS A LOGICAL UNIT NUMBER, 1234 IS THE MAGNETIC TAPE NUMBER, AND JONES IS YOUR NAME. A SCRATCH TAPE IS PREFERRED BY THE OPERATOR BUT YOUR OWN TAPE MAY BE USED IF DESIRED. IMPORTANT-BE SURE TO PUT APOSTROPHES AROUND YOUR MESSAGE ON VID SWITCH.

4. SET BLOCK SIZE 82 FOR FORTRAN-4 FOROTS ONLY, NOT FORTRAN-10 EXAMPLE:

.SET BLOCKSIZE 16: 82<CR> FOR FOROTS F-4 ONLY

5A. FOR PEN PLOTS - EXECUTE YOUR PLOT PROGRAM USING THE STANDARD CALLS AVAILABLE IN THE CALCOMP MANUAL FOR PEN PLOTTERS SEPT. 1969 FOR THE IBM 7094. THESE SUBROUTINES INCLUDE AXIS, LINE, NUMBER, SCALE, SYMBOL, PLOT, BUFF, FACTOR, NEWPEN, WHERE, AND PLOTS.

EXAMPLE:

- .SET BLOCKSIZE 16 82<CR> FOR F-4 ONLY
 - .EXEC/F40/LOADER/FOROTS PGM.F4,SYS:94PLT/LIB<CR>

WHERE PGM IS YOUR PROGRAM FOR PLOTTING.

TILL 3/31/77 WHEN FORTRAN IV WILL BE OFF THE SYS AREA

FOR FORTRAN-10:

.EX PGM.F10,NEW:94PLT1.REL/SEA<CR>

5B. FOR PEN DRAFTING OR LOWER CASE LETTERING SET-EXECUTE YOUR PLOT PROGRAM USING THE STANDARD CALLS IN THE CALCMP GRAPHICS FUNCTIONAL SOFTWARE MANUAL FOR DRAFTING LETTER AND LOWER CASE LETTERING SET (JULY 1971 MANUAL). THIS MANUAL EXPLAINS THE NEW VERSION OF SYMBOL. THESE SUBROUTINES INCLUDE AXIS, LINE, NUMBER (A NEW VERSION), SCALE, SYMBOL (A NEW VERSION), PLOT, BUFF, FACTOR, NEWPEN, WHERE, PLOTS, SYMS (NEW), SCURV (NEW), FLEX (NEW), AND LBYTE (NEW ASSEMBLY LANGUAGE ROUTINE REQUIRED BY SYMBOL). EXAMPLE:

- .SET BLOCKSIZE 16 82<CR> FOR FORTRAN-4 ONLY
- .EXEC/F40/LOADER/FOROTS PGM.F4.SYS:DRAFT/LIB<CR>

TILL 3/31/77 WHEN FORTRAN IV WILL BE REMOVED FROM THE SYS AREA.

FOR FORTRAN-10:

.EX PGM.F10, NEW: DRAFT1.REL/SEA<CR>

5C. FOR FILM PLOTS - EXECUTE YOUR PROGRAM USING THE STANDARD CALLS AVAILABLE FOR FILM PLOTTERS (MAR. 1969 MANUAL) FOR THE IBM 7094. THESE SUBROUTINES INCLUDE - AXIS, LINE, SCALE, NUMBER, SYMBOL, CALCMP, RESET, BUFOUT, AND BUFF.

EXAMPLE:

- SET BLOCKSIZE 16 82<CR> FOR FORTRAN-4 ONLY
- .EXEC/F40/LOADER/FOROTS PGM.F4,SYS:835PT<CR>

TILL 3/31/77 WHEN FORTRAN IV WILL BE REMOVED FROM SYS:

FOR FORTRAN-10:

.EX PGM.F10, NEW: 835PT1.REL/SEA<CR>

6. DISMOUNT YOUR MAGNETIC TAPE WHEN PLOTTING JOB IS COMPLETED.

EXAMPLE:

.DISMOUNT 16:<CR>

7. CALL THE I/O DESK AT X42674 TO FLOT YOUR TAPE.

FOR PEN PLOTS:

EXAMPLE OF WHAT IS NEEDED:
PLEASE PLOT 7 TRACK TAPE NO. 1234, JONES, ACCT. E61616A,
12° PAPER, BALLPOINT PEN, 5 PLOTS, X41121, TAPE TO BIN E56.
YOU MAY ALSO FILL OUT THE PLOT REQUEST AT I/O ROOM 140-C.

FOR FILM PLOTS:

EXAMPLE OF WHAT IS NEEDED:
PLEASE PLOT 7 TRACK TAPE NO. 1234, JONES, ACCT. E61616A,
35 MM FILM, 5 PLOTS, X41121, TAPE TO LIBRARY.
YOU MAY ALSO FILL OUT THE PLOT REQUEST AT I/O ROOM 140-C.

IMPORTANT: YOUR CALL TO PLOTS OR CALCMP SHOULD HAVE A 16 IN THE 3RD ARGUMENT.

EXAMPLE-- CALL PLOTS(0,0,16,0) --- FOR THE PEN PLOTTER CALL CALCMP(0,0,16,0) --- FOR THE FILM PLOTTER

PREVIOUS DECSYSTEM-10 PLOT PROGRAMS WILL HAVE TO BE CORRECTED AND RECOMPILED TO MATCH THE CALLS ON THE 915 CONTROLLER.

FOR THOSE USING KHLIB OR OTHER SPECIAL PLOT PACKAGES, LOAD WITH LINK BEFORE EXECUTION TO AVOID GLOBAL ERRORS.

EXAMPLE

.R LINK<CR>
*MYPLT<CR>
*SYS:KHLIB/SEA<CR>
*SYS:DRAFT/SEA<CR>
*/NOSYSLIB<CR>
*/GO<CR>

NOTE THAT THIS WILL LOAD IN ONE COPY OF ALL MODULES NEEDED AND THAT /SEA (SEARCH SWITCH) IS USED FOR LINK LOADING. THE /LIB SWITCH IS USED FOR LOADING WITH /LOADER. IF GLOBAL ERROR OCCURS, RESTATE THE LIBRARY TWICE WITH THE MODULE THAT IS MISSING.

TWO PLOTTING CAPABILITIES EXIST ON THE DECSYSTEM-10 FOR PLUITING ON THE TEXTRONIX SCREENS:

- 1. CALCOMP PREVIEW PACKAGE WHICH ALLOWS A USER TO PREVIEW A CALCOMP PLOT ON THE TEXTRONIX SCREEN.
- 2. ADVANCED GRAPHICS FACKAGE WHICH ALLOWS A USER TO WRITE HIS OWN TEKTRONIXS GRAPH PACKAGE USING THE TEKTRONIX SUBROUTINES.

PROCEDURE:

- 1. LOCATE A TEKTRONIXS TERMINAL AVAILABLE FOR USE. CALL RUSS NAHIGIAN AT X42015 OR SEE HIM IN BUILDING 3 ROOM 127 FOR LOCATION OF TERMINALS AND AVAILABILITY OF USAGE AND FOR PLOTTING HELP. ALSO, TEKTRONIX MANUALS AND DOCUMENTATION ARE AVAILABLE.
- 2. TURN ON THE MODEM ATTACHED TO THE TETRONIX SCREEN.
- 3. TURN ON THE TEKTRONIXS UNIT (SWITCH IS UNDER THE KEYBOARD ON THE RIGHT SIDE OF THE FRONT PANEL).
- 4. NOTE THE BAUD RATE OF THE TEXTRONIX UNIT. IT MAY BE 300 BAUD OR 1200 BAUD. THE BAUD RATE SWITCH IS ON THE BACK OF THE TEXTRONIXS UNIT NEAR THE OUTGOING CABLES. DO NOT CHANGE THE SETTING BUT DIAL IN THE PROPER BAUD RATE PHONE NUMBER.
- 5. DIAL THE APPROPRIATE PHONE NUMBER FOR THE BAUD RATE AND ATTACH THE PHONE TO THE MODEM. (IN SOME CASES A WHITE BUTTON ON THE PHONE MAY HAVE TO BE ACTIVATED BY LIFTING). THE MODUM LIGHT AND TEKTRONIX UNIT SHOULD BOTH INDICATE AN ON-LINE LIGHT.
- 6. CLEAR THE TEKTRONIX SCREEN WITH CLEAR SCREEN CHARACTER ON THE KEYBOARD. (AFTER WARMUP PERIOD).
- 7. TURN ON THE HARDCOPY UNIT UNIT IF DESIRED (AND AVAILABLE).
- 8. CTRL C THE TERMINAL TO INSURE CORRECT CONNECTION, CLEAR THE INPUT BUFFER, AND RETURN THE PERIOD.
- 9. LOG ONTO THE DEC-10 COMPUTER.
- 10. INITIALIZE THE TELETYPE FOR CALCOMP PREVIEW.
 - A.) .ASSIGN TTY 16 <CR>
 - B.) .TTY FORM <CR>
 - C.) .TTY NO CRLF <CR>
 - D.) .TTY NO FILL <CR>

WHERE <CR> MEANS THE CARRIAGE RETURN KEY

- 11. EXECUTE YOUR PLOT PROGRAM.
 - A.) FOR CALCOMP PREVIEW

EXAMPLE: .EXEC/F40/LOADER/FOROTS MYPLOT,SYS:TEKPLT.REL/LIB <CR>
OR
TILL 3/31/77 WHEN FORTRAN IV WILL BE REMOVED FROM SYS:

B.) FOR ADVANCED GRAPHICS USAGE

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EXAMPLE: .EXEC/F40/LOADER/FOROTS MYPLOT.SYS:TEKADG.REL/LIB <CR>
TILL 3/31/77 WHEN FORTRAN IV WILL BE REMOVED FROM SYS:

WHERE MYPLOT IS YOUR PLOTTING SOFTWARE PACKAGE.

- 12. THE SCREEN WILL BLIP AND ASK YOU FOR OPTIONS? RESPONSES ARE:
 - A.) 1 <CR> PLOT MY COMPLETE GRAPH.
 - B.) 2 <CR> THE USER IS ALLOWED TO RESET THE SCREEN WITH NEGATIVE PEN OPTION.
 - C.) 3 <CR> RESET ORIGIN OF EACH PLOT AND RESET SCREEN WITH NEGATIVE PEN OPTION.
 - D.) 4 <CR> NOT USED, BUT ALLOWS THE USER TO SUPPLY HIS OWN OPTIONS.
- 13. THE TERMINAL WILL AWAIT ANOTHER RESPONSE.
 - A.) C CONTINUE, PROCEED WITH PLOT
 - B.) E ERASE THE SCREEN.
 - C.) H HARDCOPY OF SCREEN IMAGE.
 - D.) Q STOP PROGRAM
 - E.) S SKIP NEGATIVE PEN CALLS.
 A QUESTION FOLLOWS ASKING HOW MANY SKIPS?
 EXAMPLE: 1 <CR> ONE SKIP
 - E.) W WINDOW ADJUST. ALLOWS USER TO RESET THE PLOT ORIGIN. TWO QUESTIONS FOLLOW.
 - 1.) COORDINATES OF THE ORIGIN? (INCHES)
 EXAMPLE: -1,-1 <CR> (BEST START ORIGIN POINT)
 - 2.) WIDTH AND HEIGHT OF THE PLOT? (INCHES) EXAMPLE: 6,8.5 <CR>
 - 3.) TYPE C <CR> TO CONTINUE AFTER COORD. ARE ENTERED.
 - F.) R RESET WHICH ALLOWS THE USER TO SELECT ORIGINS
 OTHER THAN THE LOWER LEFT HAND CORNER OF THE SCREEN.
 QUESTIONS FOLLOW ASKING X AND Y COORDINATES OF THE
 ORIGIN?
 EXAMPLE: 2,3 <CR>
 - ? THIS MESSAGE
- 14. YOUR PROGRAM SHOULD PLOT ON THE TEKTRONIX SCREEN.
- 15. MAKE A HARD COPY OF THE PLOT IF DESIRED.
- 16. PLOT MORE GRAPHS (AFTER RESETTING THE SCREEN) OR LOG OUT.

ONE ADDITIONAL NOTE:

SOME USERS WANT TO USE SPECIAL PLOT PACKAGES SUCH AS KHLIB.

LOAD THESE SPECIAL ROUTINES WITH LINK TO AVOID GLOBAL ERRORS.

EXAMPLE

R LINK<CR>
*MYPLT<CR>
*SYS:KHLIB/SEA<CR>
*SYS:TEKPLT<CR>
*/NOSYSLIB<CR>
*/GO

THE /SEA (SEARCH SWITCH) IS ONLY USED WITH LINK. THE /LIB SWITCH IS USED FOR LOADING WITH /LOADER.

FORTRAN 10 VERSION OF THE PLOT PACKAGE IS NOT AVAILABLE AT THIS TIME.