

# **DSPLAY**

**Hydrologic Engineering Center  
Data Storage System Graphics Utility**

**User's Manual**

**Version 2.0  
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# DSPLAY

## Utility Program for Graphical Display of HEC-DSS Data

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# Chapter 1

## Introduction

The **DSPLAY** program is a utility whose main function is to provide a quick and simple means of graphically displaying data stored in an HEC-DSS (HEC Data Storage System) file. A rapid interactive graphical display of data is essential for practical use of a data storage system. This manual only deals with the **DSPLAY** program, therefore it is advised that for users who are not familiar with HEC-DSS, that they first read the HEC-DSS Overview found at the beginning of this document.

The following material describes the current structure and capabilities of the **DSPLAY** program for the UNIX CD-4330 Workstation computer and MS-DOS Microcomputer . The capabilities available on the UNIX version are essentially the same as are available on the MS-DOS Version. The differences or additional capabilities that exist between the two versions are documented in this manual.

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## Chapter 2

### General Program Structure

Two routines make up the DSPLAY program. They are the Data Retrieval Routine and the Data Display Routine.

The Data Retrieval Routine performs two main functions. It provides the interface between the user and the HEC-DSS file and its data. The user defines the data (pathname) that is to be retrieved in this routine for later display. It also provides the user the capability of entering free-format commands interactively that direct the execution of the program. A detailed description of the commands are given in Appendix A.

The Data Display Routine is used to display the data previously defined in the Data Retrieval Routine. Two modes of display are available, a graphical display (**PLOT** command) and a tabular display (**TAB** command).

Up to eight curves and six different y-scales may be displayed at one time. Time-series and paired function data can be displayed by this program, with the limitation that they not be plotted together. The UNIX version allows a total of twenty curves to be used. For time-series data, time is plotted on the abscissa (x-axis) in intervals as small as one minute. For plotted data the time scale is automatically adjusted to provide a time interval that is suitable for the time period presented. Paired function data is displayed with standard x and y labels.

The tabular display function can be used on any alpha-numeric terminal. For large amounts of data, an option has been provided for writing the tabular display to a disk file which can later be sent to a printer.

In addition to the graphical display, the user has the option, once the data has been plotted, to graphically edit the displayed data and save the edited data under a new record or replace the original data record.

A simplified automated computer aided drafting (ACAD) capability is available under the data display module that allows the user to superimpose acad style graphics on the standard DSPLAY plots. For a detailed description of the ACAD capability, refer to Appendix B. At the present time this capability is only available on the UNIX version.

The DSPLAY program operates under the PREAD user interface, permitting the use of macros, selection screens and other execution aids. The PREAD user interface is described in its own document.

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# Chapter 3

## Program Execution

The program is executed on the UNIX computer by entering its name "**dsplay**" in lower case letters. The MS-DOS version is executed in a similar fashion with the addition that device drivers must be loaded first. The loading of the graphics device drivers and execution of the DSPLAY program are done by a batch program "**DSP.BAT**". The DSS filename may be selected by either typing it in or using the arrow cursor keys to move to one of the names in the list that is displayed on the screen, then pressing the carriage return. On the UNIX machine the procedure is the same, except that the space bar key is used to move through the list of names. After the DSS filename has been entered, the program produces the prompt **D>**, where user commands are entered. To exit the program the **FINISH** command is entered.

The following is a list of the options and parameters that can be entered on the program execution line.

DSPLAY - [option keyword]	MS-DOS
dsplay - [option keyword]	UNIX

### Options

- A - A few program prompts, such as the program version number and date, are suppressed.
- B - All program prompts are suppressed but error messages are output.
- C - All program prompts and warning error messages are suppressed. Only critical error messages are output.

DSPLAY [parameters]

### Parameters

- ? - Will produce a listing of parameters that can be entered on the execution line. See Table 1 for a list of the valid parameters.

### Examples

```
dsplay
dsplay dssfile=mas90db.dss
dsplay -c dssfile=mas90db acad=acfile term=plotout
dsplay dss=mas90db ac=acfile te=plotout input=infile output=out.txt
DSPLAY -C DSSFILE=C:\DATA\MAS90DB INPUT=INFILE
```

The first example is an interactive execution in which the program will prompt for the name of the DSS file to use. The next three examples are specific to the UNIX version and the fourth to the DOS version. The second example executes the program and opens the DSS file "mas90db." The third example executes the program, suppresses all program messages (C option), opens the DSS file "mas90db", ACAD file "acfile", and graphics output file "plotout." The fourth example executes the program, opens the DSS file "mas90db", ACAD file "acfile", input file "infile", output file "out.txt" and the graphics output is directed to file "plotout". The fifth example executes the program, suppresses all program messages (C option), opens the DSS file "MAS90DB", and input file "INFILE." The first, second and third examples are interactive executions where the user supplies additional interactive commands to generate plots. The fourth and fifth examples are batch executions in which all commands are read from the input file "INFILE".

**Table 1**  
**Keywords for DSPLAY Execution**

**DSPLAY \?**

**( UNIX version )**

---

```

DSPLAY: Version Date Dec 1,1992

UNIT      KEYWORD    *ABREV  **MAX  DEFAULT                DESCRIPTION
NOP       INPUT      I        83     /dev/tty              Standard input
NOP       OUTPUT     O        83     /dev/tty              Standard output
NOP       DSSFILE    D        83                                     DSS file input
NOP       UDSFILE    U        20     dspld                 User defined pre/post file
4         TERM       T        83     /dev/tty              Graphics output pdn or file
NOP       SCNFILE    S        83     dspscn                PREAD Screen file
7         TABFILE    TA       83     tabfile.out           Output file for TAB.F command
30        SCRAT      SCR      83     SCRATCH.008           Scratch file
NOP       LOGFILE    L        83     SCRATCH.001           PREAD log file
51        SPLOT     SP       83     SCRATCH.010           Scratch file
NOP       FUNFILE    F        83     genfun                PREAD function file
NOP       MACFILE    M        83     dspmac                PREAD macro file
NOP       HELPFILE   H        83     /usr/hec/sup/dsplay.hlp Help file
52        ACAD      A        83     acadfile              ACAD overlay plot file

* ABREV - SHORTEST ABBREVIATION ALLOWED FOR KEYWORD
** MAX - MAXIMUM # OF CHARACTERS FOR FILENAME (OR STRING)
DSPLAY ?

```

**( MS-DOS version )**

---

```

DSPLAY: MS-DOS Version 2.0.5 Date Dec 1,1992

UNIT      KEYWORD    *ABREV  **MAX  DEFAULT                DESCRIPTION
5         INPUT      I        30     CON                   Standard input
6         OUTPUT     O        30     CON                   Standard output
NOP       DSSFILE    D        30                                     DSS file input
NOP       SCNFILE    S        30     DSPSCN                PREAD screen file
9         TAPE9     T        30     SCRATCH.009           Scratch file
7         TABFILE    TAB      30     TABFILE.OUT           Output file for TAB.F command
30        SCRAT      SCR      30     SCRATCH.008           Scratch file
NOP       LOGFILE    L        30     SCRATCH.001           PREAD logfile
39        SCRAT2     SCRAT2   30     SCRATCH.006           Scratch file
NOP       FUNFILE    F        30     GENFUN                PREAD function file
NOP       MACFILE    M        30     DSPMAC                PREAD macro file
NOP       HELPFILE   H        30     DSPLAY.HLP           Help file

* ABREV - SHORTEST ABBREVIATION ALLOWED FOR KEYWORD
** MAX - MAXIMUM # OF CHARACTERS FOR FILENAME (OR STRING)

```

# Chapter 4

## UNIX and MS-DOS Versions

As mentioned previously, two versions of DSPLAY exist. The main difference between the two versions is the graphics software and the hardware that the programs use. The differences in hardware and software have led to each version having some different capabilities. The following is a list of the main differences between the two versions.

- A. Hardware and Software - The UNIX version uses Tektronix, X Window, PostScript and Hewlett Packard software for plotting and is therefore limited to PostScript, HP, X Window or Tektronix hardware or software emulations of this hardware. The following is a list of the hardware that can be used by the UNIX version:

Tektronix 4010 series CRTs	Tektronix 4100 series CRTs
Tektronix 4200 series CRTs	TAB 132/15-G CRT
HP 7475 Pen Plotter	PostScript
X Window workstation	

The MS-DOS Version uses Graphics Software Systems, (GSS) device drivers and software. The number of devices that the MS-DOS Version supports is extensive. A detailed description of the graphics environment settings and a list of the supported hardware devices are provided in separate installation instructions for device drivers.

- B. Data Display Limits - A major difference between the UNIX and MS-DOS Versions is the amount of data that can be plotted. The UNIX version can plot twenty curves per plot and the DOS version can plot a maximum of eight curves per plot. The UNIX version utilizes virtual memory and is capable of plotting fourteen times as much data as the MS-DOS Version. The UNIX version can plot up to 75,000 data points for a single curve or any combination in which the total number of data points for all the curves being plotted does not exceed 75,000. The MS-DOS Version can plot up to 3,050 data points per curve as long as the total number of data points for all the curves being plotted does not exceed 5,300. The following is an example of the maximum number of time series data values that can be plotted at one time.

### **MS-DOS**

1 curve  
4 months of hourly data  
8 years of daily data  
8 curves  
1 month of hourly data  
1 year of daily data

### **UNIX**

1 curve  
100 months of hourly data  
200 years of daily data  
20 curves  
5 months of hourly data  
10 years of daily data

- C. DSS Files - The UNIX computer version can have five DSS files open concurrently but the MS-DOS Version uses a virtual scheme that allows it to have a different DSS file assigned to each pathname being plotted.

## Chapter 5

### HEC-DSS Data Retrieval

There are several methods for retrieving time-series data from an HEC-DSS file. One method is to provide the exact pathname for the block of data that you wish to display. This is done by using the 'PATHNAME' command and entering the pathname. For example, the following command would be used to obtain the entire record for St. Paul.

```
PAT /SCIOTO/STPAUL/FLOW-RES.IN/01JAN1959/1DAY/TEST/
```

As an alternative to entering the full pathname a catalog number or tag may be used. Another method for retrieving data is to enter a time window command and then the pathname command. The program will retrieve data that falls within the time window specified. The time window is entered by the use of the 'TIME' command, which provides the starting and ending military time and dates. Once the 'TIME' command has been entered, it applies to all pathnames that follow. An example of the second method follows:

```
TIME 1200,01MAR1981,1200,01JUL1981  
PAT /SCIOTO/STPAUL/FLOW-RES.IN/01JAN1959/1DAY/TEST/
```

With these methods, the user can obtain time-series data from HEC-DSS and display up to eight (DOS) or twenty (UNIX) curves. The only limitation is that no more than six different y-scales can be used at one time.

There are two methods for retrieving paired function data from HEC-DSS. The first is the same as it is for time-series data as explained above. The second method for retrieving paired function data is done by specifying the curve numbers to be plotted from each pathname. This is done by the use of the 'CURVES' command. Paired function data is different from time-series data in that more than one curve may be stored in one pathname. The 'CURVES' command allows the user to specify which curves stored in the pathname are to be plotted. An example of the second method follows:

```
CURVES 4,6,8  
PAT /JAMES RIVER/DR1/ELEVATION-DAMAGE//1980/PLAN.B/
```

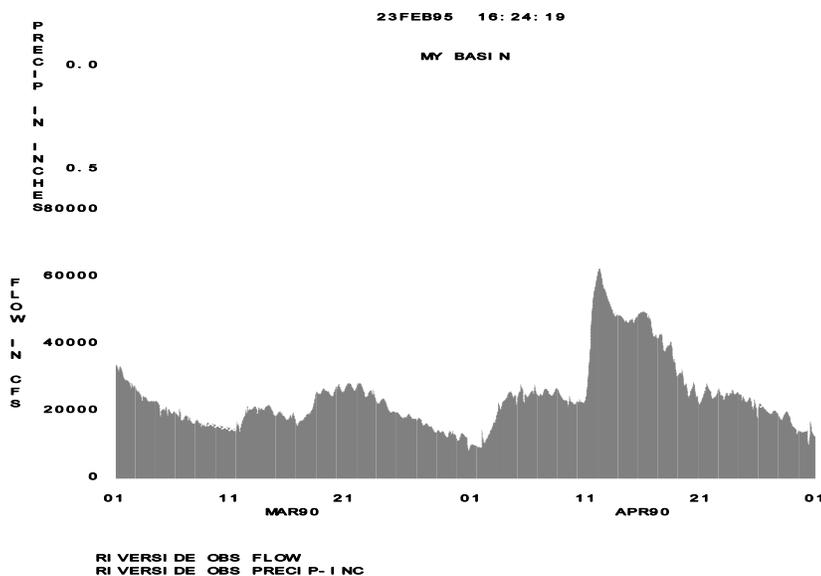
To facilitate the entry of pathnames, alternate input controls are available. The 'CATALOG' command provides a catalog listing of all pathnames by number and tag. Once this list exists, the user can specify the pathname by entering a number or tag instead of the pathname parts (PAT,number).

PREAD functions and macros can be used to enter frequently used pathnames and commands. PREAD is a high level command capability of HEC-DSS. Additional information concerning PREAD can be obtained from the PREAD manual which follows in this document.

# Chapter 6

## DSPLAY Example Application

The following examples are designed to give a basic understanding of the commands in DSPLAY that are used to produce a plot. The examples show the plot of precipitation and flow plotted in two separate y-axis windows but having a common x-axis. Note how the y-axis for precipitation has been inverted on both of the examples. The commands that produced the plots are listed below along with a short explanation.



*Execute and specify SAMPLE.DSS as the DSS file*

```
DSPLAY DSS=SAMPLE.DSS
```

*Set the line colors to use with each curve being plotted*

```
DL CU=1 COLOR=BLUE CU=2 COL=RED CU=3 COL=GREEN CU=4 COL=CYAN
```

*Set the line style to use with each curve being plotted*

```
DL CU=1 STY=DOTTED CU=2 STY=SOLID CU=3 STY=DASHED CU=4 STY=1234
```

*Set the first curve to slashed fill and second curve to be solid fill*

```
DL CU=1 SHADE=1 CU=2 SHADE=ON
```

*The SW command is used to invert the precipitation which is the second curve (I) and is plotted in the second data type window. Note that the first curve is not inverted (N).*

```
SW N,I
```

*Set the time window of the data to be plotted*

```
TIME 01MAR1990 0001 30APR1990 2400
```

*Define the data to be plotted*

```
PATH /MY BASIN/RIVERSIDE/FLOW/01MAR1990/1HOUR/OBS/
```

```
PATH /MY BASIN/RIVERSIDE/PRECIP-INC/01MAR1990/1HOUR/OBS/
```

*Direct the program to plot the data*

```
PLOT
```



## **Appendix A**

### **DSPLAY Commands**

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# Explanation of Command Description Writeup

The following is an explanation of command description layout on subsequent pages.

- Use:** Shows command use syntax. See below for further definition.
- Description:** Purpose and effects of the command. Background on its use and additional information, if necessary.
- Options:** Optional modifiers to command are described here. If no options are part of the command, this section does not appear.
- Parameters:** Required and optional parameters that may be specified for the command. If 'None' is shown as a parameter, define default behavior. Some commands have sub-commands as parameters and the sub-commands require that an = sign follow it.
- Example:** Examples of command usage.

## **Command syntax:** `COMMAND[.options] [parameters]`

- `COMMAND` Name of command, unique 2 or more character abbreviation usually accepted and is case insensitive.
- `options` Modify behavior of command, if used, period separator between command is required. Options are case insensitive.
- `parameters` Command arguments names, sizes, etc., as appropriate. Parameters are generally case sensitive.
- `UPPERCASE` Uppercase designates items that are names or key words to be supplied by user as shown. In many cases the items may be abbreviated and actually entered in either upper or lower case.
- `lowercase` Lowercase designates items that are always supplied by the user. They may be names, numbers, etc and may actually be entered in upper or lower case.
- `[ ]` Optional item of command.
- `....` Preceding item may be repeated.
- `, or blank` Separator for parameters.
- `;` Multiple command separator. The concatenate character ";", can be changed to another character by specifying it on the execution line with the "CONCAT=" parameter.

## ACAD UNIX version

### Use:

AC[.option], [parameters]

### Description:

The ACAD command is used to activate the ACAD capability. It can only be entered after a Plot has been displayed and is at the present time only available on the UNIX computer. For additional information, see Appendix B.

### Option:

E Edit or create an overlay graphics.

### Parameters:

None	The program will prompt for an overlay name.
abc...	Overlay graphics name to plot or edit.

### Example:

AC, PLOT1	Will Plot the Graphics Saved under PLOT1 Name.
AC.E, PLOT1	ACAD editing or creation.

## ADD

### Use:

ADD [parameters]

### Description:

The ADD command is a post plot command that allows the user to combine one or more of the curves plotted into a new curve. The new curve that is generated can be plotted and saved with the SAVE command. The curves can be added or subtracted. To subtract a curve the curve number is specified as a negative curve number. The program does not check to see that the data being combined occurs at the same time. Therefore the user must be certain that all data being combined is appropriate. In other words, the data should start at the same time and have the same time interval.

### Parameters:

None	Nothing happens.
Number	+ or - Curve numbers (1,2,3,4,5,6,7).

### Example:

AD 2 1 -3	Add curves 2 and 1 and subtract curve 3.
-----------	--

## AXIS

### Use:

AX[.options], [parameters]

### Description:

The AXIS command is used to specify the axis label type for the X axis and Y axis. Up to six Y axis types may be entered. The LOG axis type should only be used with data that is greater than 0.0. In addition, the user can force the x-axis scale to be in probability units by using either the % (percent units 0<>100) or P (decimal units 0<>1) options. Probability data can be plotted as either linear or log by using the N option. Make certain that data plotted as probability will be within a valid range, if it is not, a large amount of errors will be printed out.

### Options:

None	Both axis set Linear.
N	Use normal Linear or Log scales for x-axis scale.
%	Use percent probability for x-axis scale.
P	Use probability for x-axis scale.

### Parameters:

LIN	Linear
LOG	Log

### Example:

AX, LIN, LOG, LOG      Linear X axis and log Y axis.

# CATALOG

## Use:

CA[.options], [parameters]

## Description:

The CATALOG command inventories the DSS file currently open and reports all pathnames and assigns a number to each. If the catalog file does not exist, it will be created. If the DSS file has changed, a new catalog must be created (N option). The catalog is usually sorted alphabetically by pathname parts. Each pathname has a record tag and reference number, either of which may be used in place of the pathname. The tags are semi-permanent but not necessarily unique. The reference numbers are unique, and are not permanently associated with the pathnames. On the MS-DOS version, the catalog file is the DSS filename with the extension ".DSC". On the UNIX version, the catalog file is the DSS filename with the extension ".dsc".

The condensed catalog (C option) is designed for time-series data. The pathname parts are listed along with the date span for records where only the date part varies. The condensed catalog can only be created when a sorted catalog is generated with the default sort order.

The CATALOG command displays one page at a time, and the user enters a carriage return to display the following page. If the user enters a "Q" or any other command instead of a carriage return, the program will ignore any additional CATALOG output and execute the command entered.

## Options:

N	New catalog.
S	Suppress list.
P	Send catalog to printer.
U	Unsorted catalog list.
A	Abbreviated list.
C	Condensed catalog list.
X	X Window environment.

## Parameters:

None	Catalogs current DSS filename.
Filename[:]	Dss filename.

## Example:

CA.P	Catalog old file and send list to printer.
CA.N MYDSS	Create a new catalog listing of DSS file MYDSS.

## CURVES

### Use:

CU[.options], [parameters]

### Description:

The CURVES command is used to specify which curves are to be plotted from each pathname. This command only applies to paired function data. The S option allows the user to enter a starting curve number which causes the program to set the curve numbers to the starting number through starting number plus seven.

### Options:

S	Start curve number.
P	Applies to previous pathname.

### Parameters:

None	Uses curves 1, 2, 3, 4, 5, 6, 7 and 8.
n,m, . . . .	Numbers that correspond to curves in Pathname.

### Example:

CU,1,5,9	Curves 1,5, and 9 are to be plotted.
CU.S 15	Curves 15 through 22 are to be plotted.

## DATE

### Use:

DA[.options], [parameters]

### Description:

The DATE command is used to turn ON/OFF the date and time label which appears on the plot. The L option allows the user to center the date any where on the screen by the use of screen coordinates (0-1023 x and 0-780 y) and specify the character size to use (1-4 on Tektronix 4014).

### Option:

L                                    Define character size and x-y location of date label.

### Parameters:

None	Will turn on the date label and place it at its default location.
ON	Will turn on the date label and place it at its default location.
OFF	Will turn off the date label.
n, x, y	Character size, x and y screen coordinate location.

### Example:

```
DA.L 1,90,760  
DA,OFF
```

## DECIMAL

### Use:

DEC, [parameters]

### Description:

The DECIMAL command is used to set the number of decimal places to print for each curve that is being tabulated. The tabulation fields are a fixed width of 13 characters, therefore the user should take care that the maximum values to be tabulated will fit within the fixed width.

### Parameters:

None	Will set all decimal places to 3.
n,m,...	Integer values 0 through 10.

### Example:

```
DEC 3,3,2,2,1,0,0
```

## DEVICE UNIX version

### Use:

DEV[.options], [parameters]

### Description:

The DEVICE command is used to specify the type of terminal being used and the environment under which it will function. If no parameters are entered, the default device is assumed to be a nongraphics device. If parameters are entered, it is required that a legitimate device be specified. For the 4510 rasterizer device, the user should first specify the Tektronix device that the rasterizer will emulate.

### Options:

X This option is only valid for the XTERM device. It provides the user the capability of opening additional x-windows without erasing the existing plot on the existing window. The "XC" command can be used to close all existing windows.

### Parameters:

None Device will be set to non-graphics (Alpha).  
Device ALPHA, 4014, 4105-4113, 4207, TABG, 4510 (rasterizer), HDS, BATCH, INTER, XTERM, POST, CPOST and HP

The following parameters are specific to the Tektronix 4510 rasterizer.

SG= Turn ON or OFF the Tektronix segment option. The segment option is only for Tektronix 4100/4200 series terminals.  
ORIENTATION= Used with the 4510 rasterizer device to specify the orientation of the plot. Options are as follows: LA (landscape), BO (portrait bottom), CE (portrait center), and TO (portrait top). Landscape is the default.  
PP= Turn ON or OFF the pre/post plot option  
SF= Turn ON or OFF the 4100/4200 software font  
NO= Turn ON or OFF the automatic setting of color and line types when a device is changed

The following parameters are specific to the HP plotter.

MODEL= HP plotter model number  
PAPER= Paper size (A B or C)  
VELOCITY= Pen speed in percent  
PORT= **Not available** - Default set to DEF (deferred plotting).  
TERM= Used to redirect the graphics (HPGL) output to a file name.  
GSTOP= ON/OFF Set it to ON if the program is to allow graphics commands to be specified after the plot command. This allows the use of the ACAD command. Default is OFF.

## DEVICE UNIX version (continued)

The following parameters are specific to the XTERM device.

XPOSITION=	Upper left hand corner x-coordinate of graphics window.
YPOSITION=	Upper left hand corner y-coordinate of graphics window.
WIDTH=	Width of graphics window (0-1024).
HEIGHT=	Height of graphics window (0-1024).
INVERT	Used to invert the background and foreground colors.
XWINDOW=	FLOAT/FIX Default is Fixed; which means the graphics window will not be closed automatically after each plot. FLOAT will close graphics window after each plot. The graphics window can be closed selectively by using the XCLOSE command when the window is in FIXED mode.
HOLDPLOT=	ON/OFF When set to ON; will hold the graphics plot in an active state until a key is entered or a mouse button is pressed inside the graphics window. This makes the contents of the graphics window permanent and prevents it from being deleted if another window is placed on top. The default is OFF. Note: commands will not be executed until a key or button is pressed in the graphics window. The following single key commands are available:

KEY	Command
W	Windowing command is initiated
E	Graphical data editing is initiated
T	TAB.X command is initiated
I	Will cause the back/foreground to invert
P	Will replot the data
Q	Quits the plot
X	Clears the plot window
K	Exit and create a new plotting window without erasing the previous plotting window.
0 - 9	Run macro name "MAC#" where # is a number between 0 and 9.
`	Activates user input commands from the graphics area. Enter "" followed by a valid DISPLAY or PREAD command.

GINPUT=	ON/OFF When set to ON; input will be accepted from the graphics window when displaying a plot. Note that if a command is given that returns you to the user input, the input prompt will be modified to "GD>". The default is ON.
---------	---

The following are specific to the PostScript Plotter Option.

POST=	PostScript option is being used. Specify the output postscript file name after the "=". If no filename is specified, the output will be written to a default name of "post".
CPOST=	The same as for "POSTSCRIPT" parameter with the addition that a color printer is to be used.
PSFONT=	This parameter can be used to specify a postscript font name to use.

## DEVICE UNIX version (continued)

The default font is Courier. The valid fonts available are as follows and can be specified by number or by name. If the name is used, make certain that it is used exactly as listed below.

No.	Font Name	No.	Font Name
1	Courier	21	Bookman-LightItalic
2	Courier-Bold	22	Helvetica-Narrow
3	Courier-Oblique	23	Helvetica-Narrow-Bold
4	Courier-BoldOblique	24	Helvetica-Narrow-Oblique
5	Times-Roman	25	Helvetica-Narrow-BoldOblique
6	Times-Bold	26	NewCentury-SchIBk-Roman
7	Times-Italic	27	NewCentury-SchIBk-Bold
8	Times-BoldItalic	28	NewCentury-SchIBk-Italic
9	Helvetica	29	NewCentury-SchIBk-BoldItalic
10	Helvetica-Bold	30	Palatino-Roman
11	Helvetica-Oblique	31	Palatino-Bold
12	Helvetica-BoldOblique	32	Palatino-Italic
13	Symbol	33	Palatino-BoldItalic
14	AvantGarde-Book	34	ZapfChancery-MediumItalic
15	AvantGarde-BookOblique	35	ZapfDingbats
16	AvantGarde-Demi	36	Helvetica-Condensed
17	AvantGarde-DemiOblique	37	Helvetica-Condensed-Bold
18	Bookman-Demi	38	Helvetica-Cond-BoldOblique
19	Bookman-DemiItalic	39	Helvetica-Condensed-Oblique
20	Bookman-Light		

DUPLEXMODE=  
TUMBLE=

Turn duplexmode ON or OFF. Default is OFF.  
Turn tumble mode ON or OFF. Default is OFF.

### Example:

```
DEV,4107
DEV HP MO=7475 TERM=hpgl.out PA=A
DEV XTERM XPOS=150 YPOS=50 WIDTH=600 HEIGHT=400 INVERT
DEV,4109,4510,TERM=plot.out
DEV POST=postoutput PSFONT=Courier-Bold
```

## DEVICE PC version

### Use:

DEV, [parameters]

### Description:

The DEVICE command serves two functions on the PC. It selects the device driver to be used and an optional coordinate transform. The coordinate transforms determine how much of the screen or page is used. FULL uses the entire area. ASPECT preserves the aspect ratio, (ie, a circle symbol is drawn as a circle not an ellipse). The DEVICE command is also used to turn the MOUSE on or off. When the MOUSE is turned off, the cursor is controlled by the keyboard arrow keys.

If no parameters are entered, the device is assumed to be a non-graphics device. Enter PC as a parameter in order to set it back to a graphics device.

When the META device driver is specified, DSPLAY will automatically write the plots to separate files that start with the letters "META" followed by a number count that goes from 01 through 99 and has an extension of ".CGM". The program will not overwrite an existing file, therefore it is up to the user to remove all existing META##.CGM files. The user can specify a different name to use by entering META as a command followed by a four character name to use. The advantage of using META files is that they can be easily imported into a large number of third party programs such as Lotus FREE LANCE and be further modified graphically.

### Parameters:

None	Device will be set to non-graphics (Alpha).
PC, MOUSE, SCREEN, PRINTER, PLOTTER, META	Valid devices.
ON/OFF, FULL, ASPECT, SHORT	Valid transforms.

### Example:

DEV SCREEN	Select the screen.
DEV PRINTER ASPECT	Use the ASPECT coordinate transform.
DEV MOUSE ON	Turn the mouse on.
DEV META	Will use the META device driver.
META PLOT	Will write ".CGM" plots to file names of the form "PLOT##.CGM"

## DGRID

### Use:

DG, parameters

### Description:

The define grid (DGRID) command will allow the user to specify the grid line width, color, style, tick type, and line width of the axis box for each of the three possible data windows available in the program and for both the major and minor grids. (Note: Do not use in conjunction with the old GRID command).

### Parameters:

- DWINDOW= The user can specify the data window to which the following parameters apply. This is done by specifying **ALL, TOP, MIDDLE, or BOTTOM**. If no DW parameter is used then **ALL** is assumed.
- GRID= The user can specify which of the two grids for which the following parameters apply. This is done by specifying **ALL, MAJOR, or MINOR**.
- WIDTH= The user specifies the width of the line to use with the grid specified. Two widths are available for the Tektronix 4114, **THICK and THIN**. **THIN** is the standard line width. Only devices that have the capability of producing different line widths will be able to use this option. At the present time only the Tektronix 4114, Tektronix rasterizer, and the Personal Computer are able to provide different line widths. In addition to the two line widths mentioned above, the user can specify a line width in raster units. Depending on the device being used, the program will only allow a valid width to be used. For example, the rasterizer has line widths of **1, 2, 3, and 4 rasters**. The PC has an unlimited line width.
- COLOR= The user specifies the color index number to use with the grid specified. If an HP pen plotter is being used the color index will function as a pen number. Consult your color terminal for information as to what colors have been assigned to each possible color index value. In addition to using color index numbers, the program will accept the following; **BLACK, WHITE, RED, GREEN, BLUE, CYAN, MAGENTA, YELLOW, and ORANGE**.

## DGRID (continued)

STYLE=	The user specifies the style of grid line to use by entering <b>NONE, SOLID, or DOTTED</b> . Note: The default is NONE, therefore the <b>STYLE=</b> must be specified in order to Produce a grid.
TICK=	The user specifies the ticks orientation by entering <b>IN, OUT, or BOTH</b> .
CROSS=	The user specifies whether the major grids will have a cross drawn when a dotted style is being used. The user enters <b>ON or OFF</b> .
BOX=	The user can set the line width being used for the axis box. The color of the box will be based on the major tick color. See WIDTH command above for additional information of valid parameters to enter.
CBOX=	The user can set the background color being used for the axis box. See COLOR command for valid colors.

### Example:

```
DG DW=TOP GR=MAJ COL=GREEN STY=SOLID WI=THICK BOX=THICK CBOX=CYAN
```

## DLINE

### Use:

DL[.options], parameters

### Description:

The define line (DLINE) command can be used to specify the color, shade pattern, square option, line type, symbol, symbol size, type of data and width of line. In addition it can also be used to set the back-ground color and character color. The graphics options are dependent on the output device being used.

### Options:

The following options are only available when the SHADE subcommand is used.

- P Use a pattern instead of solid color for shade index 0.
- V Use the vertical line style of shading.
- S Use the vertical line style of shading that suppresses overlap for curves of increasing magnitude.

### Parameters:

CURVE= The user specifies the curve number that the following parameters are to be used with. Legitimate values are numbers **1 through 7 and ALL**. If no CU parameter is used then the program will assume that the data applies to all curves or if a numeric value between 1 and 7 is found it will be assumed to be the curve number.

STYLE= The user specifies the line style to use. The following line styles are acceptable; **SOLID, DOTTED, DASHED, NONE, -1 (none), 0 (solid), 1 (long dash), 2 (dash), 3 (dot dash), 4 (dot)**. Software line styles are specified by concatenating integers describing line segment length and visibility. Odd integers are visible and even integers are invisible. A maximum of six integers can be specified for the software line styles.

COLOR= The user specifies the color index number to use with the curve specified. If an HP pen plotter is being used the color index will function as a pen number. Consult your color terminal for information as to what colors have been assigned to each possible color index value. In addition to using color index numbers, the program will accept the following; **BLACK, WHITE, RED, GREEN, BLUE, CYAN, MAGENTA, YELLOW, and ORANGE**.

## DLINE (continued)

**WIDTH=** The user specifies the width of the line to use with the curve specified. Two widths are available for the Tektronix 4114; **THICK and THIN**. **THIN** is the standard line width. Only devices that have the capability of producing different line widths will be able to use this option. At the present time only the Tektronix 4114, Tektronix rasterizer, and the Personal Computer are able to provide different line widths. In addition to the two line widths mentioned above, the user can specify a line width in raster units. Depending on the device being used, the program will only allow a valid width to be used. For example, the rasterizer has four line widths of **1, 2, 3, and 4**. The PC has an unlimited line width.

**SYMBOL=** The user specifies the symbol to use with the curve specified. The user enters an index number to specify the symbol. In addition to index numbers, the user can use the following symbol names; **CIRCLE, CROSS, SQUARE, TRIANGLE, STAR, DIAMOND, and WEDGE**. The following index numbers are also valid entries.

0	no symbol	7	bar circle
1	circle	8	cross
2	x	9	up arrow
3	triangle	10	down arrow
4	square	11	wedge
5	star	33-127	ASCII characters
6	diamond		

**SIZESYMB=** The user specifies a size factor that can be used to make the symbol smaller by using a number less than 1 or larger by using a number greater than 1.

**SQUARE=** The user can control the use of the square form of plotting the curve by entering **DEF** (use default pathname header setting), **ON** (to force it on based on the ending time period), **START** (to force on based on starting time period) and **OFF** (to force it off).

## DLINE (continued)

- SHADE= The user can turn **ON/OFF** the shade option. The shading option is defaulted to shading all curves when using a Tektronix 41/4200 series terminal or a PC and shading only the first curve when a Tektronix 4014 terminal or monochrome terminal is used. The user has the option of shading specific curves by specifying the number of raster units between solid vertical shade lines for the 4014 or turning off the shading altogether by specifying a **0 for the 4014 or a -1 for the color terminals**. The user also has the option of specifying a pattern to be used on the color series terminal by specifying **numbers greater than 0 or by using the .P option if the shade number is set to 0**. In addition to using a pattern index number, the user can specify the following types; **HATCH, VERTICAL, HORIZONTAL, GRID, BRICK, DOTTED, and SLANTED**. The Tektronix color terminals can be forced to use the vertical line shading by using the **.V option**. The patterns available on the Tektronix and PC can be determined by reading the terminal manual or by using DSPLAY to plot the different patterns.
- TYPE= The user can temporarily change the type of the data, as defined by the header information in the pathname, by entering it for the curves being used. The program assigns **types 1 2 3 4 5 and 6** as the temporary types, therefore the user should set the temporary type for each curve being used. In other words, if this parameter is used with one curve, it must be used with all curves being plotted. To turn the types back to their default setting, just set one curve to **OFF**. To restore the temporary data types, just set one curve to **ON**.
- CHCOL= The user specifies the color index number to use for the character color. If an HP pen plotter is being used the color index will function as a pen number. Consult your color terminal for information as to what colors have been assigned to each possible color index value. In addition to using color index numbers, the program will accept the following; **BLACK, WHITE, RED, GREEN, BLUE, CYAN, MAGENTA, YELLOW, and ORANGE**.
- BACKG= The user specifies the color index number to use for the background color. Consult your color terminal for information as to what colors have been assigned to each possible color index value. In addition to using color index numbers, the program will accept the following; **BLACK, WHITE, RED, GREEN, BLUE, CYAN, MAGENTA, YELLOW, and ORANGE**.

### Example:

```
DL CU=1 COL=GREEN STY=SOLID WI=THICK CU=2 COL=BLUE STY=DOT
```

## DPATHNAM

### Use:

DP[.options], [parameters]

### Description:

The DPATHNAM command displays pathnames and their reference numbers from the catalog file (see catalog command). The DP command has the selective display capability which provides the option of selecting and listing only certain pathnames based on matching pathname parts.

### Option:

- |   |   |
|---|---|
| F | In an interactive session, this option displays all pathnames in the catalog without pausing after each screen. All pathnames are automatically displayed in a batch job. |
| X | Activate the x-window style of output. This option is only valid with an XTERM device.  |
| C | Display information about record. This information is the same as that printed in the CHECK command in DSSUTL.  |

### Parameters:

- |             |  |
|-------------|--|
| None        | Displays all pathnames.  |
| A=..B=..etc | Display catalog based on pathname parts.                         |
| n           | Integer number of starting reference pathname number to display. |
| n-m         | Displays pathnames n through m.                                  |

### Example:

- |           |  |
|-----------|--|
| DP,C=FLOW | Displays all pathnames that have a C part equal to FLOW. |
|-----------|--|

## EDIT

### Use:

ED[.options], [parameter]

### Description:

The EDIT command is used to interactively edit the last curve plotted on the screen by the use of Cross Hair Cursor. The user can edit any of the curves plotted by entering the curve number as a parameter. The user must use specific keys to edit the plotted data, all other keys will be ignored. The Cross Hair Cursor is positioned by the use of the arrow keys or by a mouse if present and active. The left mouse button is equivalent to entering a "C" on the keyboard and the right mouse button is equivalent to a "D".

### Options:

P	Single Point Editing.
D	Do not Merge Old Data With Digitized Data.
S	Single data point editing by use of the numeric keys; Valid numeric keys are: <b>4 (left), 6 (right), 8 (up), 2 (down), 7 (first value), 9 (last value), 1 (left missing value) and 3 (right missing value)</b> . The < moves to the left half way between the present and previous left position and > does the same but to the right. The + or . keys increase and the - or 0 keys decrease the rate of cross hair movement.

### Parameters:

None	Edit the last curve plotted.
n	Curve number (1-7) to edit.

### Valid Keys:

C	Digitize a point on the screen.
I	Input y-axis data value through the keyboard. The x-axis data value is based on the cross hairs.
M	A missing value (-901) is digitized. Do not mix the use of M with C and I digitized points when using line editing mode.
B	Cancel previous digitized point.
D	One entry specifies that present digitized line segment is finished. Two entries in a row will terminate editing and plot the edited curve.

### Example:

ED	Cross hair digitizing
----	-----------------------

# FACTOR

## Use:

FA, parameters

## Description:

The FACTOR command is used to change the size of the plot. There are three methods available for changing the size of the plot. The first method is to specify a factor that is less than 1.0. The second method is to specify an integer number between 1 and 14 which corresponds to a predefined screen location (minimum and maximum x y screen coordinates). The third method specifies the screen location based on a row and column location. The third method requires eight parameters be set initially, but once the parameters have been set, the user only has to specify those parameters that change. (NOTE: x-axis 1023 rasters; y-axis 780 rasters.)

## Parameters:

none	Set Screen coordinates back to default settings.
x	Real Number Greater than 0.0 and less than .99
1	Screen Coordinates: 100 420 160 720 (LEFT HALF).
2	Screen Coordinates: 600 920 160 720 (RIGHT HALF).
3	Screen Coordinates: 160 850 150 350 (LOWER HALF).
4	Screen Coordinates: 160 850 520 720 (UPPER HALF).
5	Screen Coordinates: 100 420 150 370 (LOWER LEFT QUARTER).
6	Screen Coordinates: 600 920 150 370 (LOWER RIGHT QUARTER).
7	Screen Coordinates: 100 420 500 720 (UPPER LEFT QUARTER).
8	Screen Coordinates: 600 920 500 720 (UPPER RIGHT QUARTER).
9	Screen Coordinates: 100 420 150 290 (LOWER LEFT SIXTH).
10	Screen Coordinates: 100 420 370 510 (MIDDLE LEFT SIXTH).
11	Screen Coordinates: 100 420 590 750 (UPPER LEFT SIXTH).
12	Screen Coordinates: 600 920 150 290 (LOWER RIGHT SIXTH).
13	Screen Coordinates: 600 920 370 510 (MIDDLE RIGHT SIXTH).
14	Screen Coordinates: 600 920 590 750 (UPPER RIGHT SIXTH).
n, m, k, n, m, k, n, m	Row, Column, Total Rows, Total Columns, Left margin, Right margin, Bottom margin, Top margin in rasters.

## Example:

```
FA, .5  
FA 1,1,2,2,100,100,150,25
```

## **FINISH**

**Use:**  
FI

### **Description:**

The FI command is used to terminate the execution of the program.

### **Example:**

FI                    Terminates execution.

## FRAME

### Use:

FR[.options], [parameters]

### Description:

The FRAME command is used to set the plot's frame settings which consist of interval in raster units and the number of iterations which determine the thickness of the frame. In addition to the standard frame, four user defined frames can be defined by using the U option. The user defined frame can be sized and positioned any place on the screen.

### Option:

U                      User defined option.

### Parameters:

None                      Will turn on the frame.  
OFF                        Will turn off the frame.  
n,m,k,x,x,y,y            Frame number, Interval, Iterations, x-min, x-max, y-min, y-max

### Example:

```
FR,1,5  
FR.U 1,1,4,18,500,10,90
```

## GETPATHN

### Use:

GE, [parameters]

### Description:

The GETPATHN command is used to select pathnames based on a catalog sort by part or parts of a pathname. Only the first seven pathnames that meet the selected pathname parts are plotted.

### Parameters:

None

A=..., B=...,etc

The first seven pathnames in the catalog will be used.  
Select pathnames based on parts specified.

### Example:

GE, A=SCIOTO, C=FLOW

The first seven pathnames that have the A part of SCIOTO and B part of FLOW will be plotted.

## HELP

### Use:

HE [.option] [parameters]

### Description:

The HELP command is used to request a listing of the commands available and to provide a detailed description of the commands.

The HELP command displays one page at a time and the user enters a carriage return to display the following page. If the user enters a "Q" or any other command instead of a carriage return, the program will ignore any additional HELP output and execute the command entered.

### Option:

x                      Activate the x-window style of output. This option is only valid with an XTERM device.

### Parameters:

None                      Provide list of available commands.  
ALL                        Define all commands.  
Command                    Define specified command.

### Example:

HELP , OPEN              Define OPEN command.

## **INVERT UNIX version**

**Use:**  
IN

### **Description:**

The INVERT command is only functional when the XTERM device is active. It allows the user to invert the background and foreground colors.

### **Example:**

```
INVERT
```

## LEGEND

### Use:

LE[.options], [parameters]

### Description:

The LEGEND command is used to specify user defined labels for each of the curves or it can be used to set the default legend labels for both paired function and time series data. The default legend labels are composed of the A - F pathname parts for both paired and time series data, but paired data also uses the curve label stored in the header. The curve label is defined in this command as the G part.

### Options:

A	Will use the B part of the pathname and add the user defined label to it.
XT	Redefine the time series default legend components.
XP	Redefine the paired function default legend components.
L	Legend rows, columns, character size, and location.
P	Turn ON/OFF polygon fill option. Default is OFF.

### Parameters:

None	Will set the legend based on pathname parts BFC (time series) and BDGF (paired data).
n, abc . . .	Curve number, Alpha-numeric label of no more than 40 characters.
ABCDEFG	Pathname parts (ABCDEFG).
n, k, k, x, x, y, y	Rows, columns, character size, x-min, x-max, y-min, y-max.
OFF	Will turn off the legend labels when used with the L option.

### Example:

```
LE,1, COMPUTED STAGE AT MARYSVILLE
LE.A,2, - OBSERVED STAGE
LE.XT ABFC
LE.XP ABEGF
LE.L 7,1,4,600,1020,100,450
LE.L OFF
```

## **LISTX** UNIX version

### **Use:**

LI, [parameters]

### **Description:**

The LISTX command is used to list a text file in an X Window. This option is only active when an XTERM device has been specified. The file listed can be sent to the default printer by clicking on the hardcopy button.

### **Parameters:**

None	Nothing will happen.
Filename	The full path and name of the file being listed.

### **Example:**

```
LIST /usr2/reports/flooddam.rpt
```

## **NORMALIZ**

### **Use:**

NO [parameters]

### **Description:**

The NORMALIZ command is used to normalize the y-axis data values by subtracting from each the first data value.

### **Parameters:**

None	Turn off normalizing of the data.
ON	Turn on normalizing of the data.
OFF	Turn off normalizing of the data.

### **Example:**

NO, ON

## OPEN

### Use:

OP, [parameters]

### Description:

The OPEN command is used to open a new DSS file. A maximum of five DSS files may be open at one time. The last DSS file opened or referenced by a PA, PL, or TA command is considered the default DSS file. The user may refer to any opened DSS file by entering the name followed by a ':' or by a number (1-5) followed by a ':'. On the PC version, if no filename follows the command, a list of DSS files within that directory is displayed. By moving the cursor to a filename then pressing the return key, that file will be opened.

### Parameters:

None	Program will prompt for a DSS filename.
Filename[:]	Dss filename.

### Example:

OP, YOURDSS

## PATHNAME

### Use:

PA [.options], [parameters]

### Description:

The PATHNAME command is used to define the pathnames to be used for plotting or tabulating. In addition to entering the pathname parts, the user can specify the DSS file that the pathname belongs to by entering as the first parameter the DSS filename followed by a colon. If no DSS filename is entered, the last referenced DSS file will be used.

### Options:

S	Switch the X and Y axis for paired data.
A	Modify all pathnames entered by the pathname parts entered.
C	Display information about record. This information is the same as that printed in the CHECK command in DSSUTL.

### Parameters:

[dssfile:]	May precede any of the pathname references that follow and will continue to be used until changed.
/a/b/c/d/e/f/	All pathname parts defined.
A=...,B=...	Pathname parts A through F specified.
n,m,...	Pathname numbers based on catalog listing.
tag1,tag2...	Pathname tags based on catalog listing.

### Examples:

```
PA, /SCI/STJOE/FLOOD-RES IN/01JAN59/6HOUR/TEST/  
PA,A=SCI,B=STJOE,C=FLOOD-RES IN,D=01JAN59,E=6HOUR,F=TEST  
PA,25  
PA,DSSDAT:/SCI/STJOE/FLOOD-RES IN/01JAN59/6HOUR/TEST/  
PA,MASDB:T12, T1812  
PA.A B=NEWSTJOE
```

## PLOT

### Use:

PL[.options], [parameters]

### Description:

The PLOT command is used to execute the plotting of the DSS data. The user may enter the pathname parts, pathname numbers or tags as parameters. In addition to entering the pathname parts, the user can specify the DSS file that the pathname belongs to by entering as the first parameter, the DSS filename followed by a colon. If no DSS filename is entered, the last referenced DSS file will be used.

### Options:

- O Will cause all curves to be shifted in time to start at the same time as the first curve.
- M Will cause all missing value markers not to be displayed.
- X Plotting curve order is based on maximum values.
- A Plotting curve order is based on maximum mean values.
- E Do not erase the screen and do not exit graphics mode. (Note: This option can be used to place multiple plots on a single screen).
- 0 Plot only the curves.
- 1 Plot curves and legend only.
- C Display information about record. This information is the same as that printed in the CHECK command in DSSUTL.

### Parameters:

- None Will plot previously defined pathnames.
- [dssfile:] May precede any of the pathname references that follow and will continue to be used until changed.
- /a/b/c/d/e/f/ All pathname parts defined.
- A=...,B=... Pathname parts A through F specified.
- n,m,... Pathname numbers based on catalog listing.
- tag1,tag2... Pathname tags based on catalog listing.

### Examples:

```
PL,/SCI/STJOE/FLOOD-RES IN/01JAN59/6HOUR/TEST/  
PL,A=SCI,B=STJOE,C=FLOOD-RES IN,D=01JAN59,E=6HOUR,F=TEST  
PL DSSFILE: 25,30,41  
PL MASDB: T12, T1812
```

# QUIT

## Use:

QU

## Description:

The QUIT command is used to exit the DATA DISPLAY MODULE. A carriage return and no command will have the same effect as the QUIT command. The QUIT command is used primarily when PREAD macros are being used, in a batch mode and when several individual plots are being plotted together by the use of the "E" option of the PLOT command. The QUIT command will signal a hardcopy when the plotting is being directed to a printer.

## RESET

### Use:

RE[.options]

### Description:

The RESET command is used to clear out the pathnames back to initial conditions and turn off time shift command if entered. To do a global reset back to initial conditions on all graphics parameters use the A option.

### Option:

A Will cause all graphics settings to be reset to default settings.

### Example:

RE Resets pathnames defined back to zero.  
RE . A Resets all graphics and pathnames to initial default settings.

## ROUND

### Use:

RO, [parameters]

### Description:

The ROUND command is used to specify the value to round the edited data points. It is impossible to edit with the screen cross hairs to an exact value, therefore it is usually practical to set the data being digitized to be rounded to some appropriate value. For example, if flow values are being edited, the values may be rounded to the nearest 10 to 100 cfs.

### Parameters:

None	Turn off the rounding of the data.
x	Positive Real Numbers.

### Example:

RO, 100	Round Digitized Data to Nearest 100.
---------	--------------------------------------

## ROUTE

### Use:

ROUT, parameters

### Description:

The ROUTE command is a post plot command that allows the user to do a Muskingum routing of the curves plotted. The new curve that is generated can be plotted and saved with the SAVE command. The program requires that the user specify the curve number to be routed, the number of routing steps, the Muskingum K (travel time) and X (attenuation).

### Parameters:

NSTPS	Number of routing steps = $K/(t_2-t_1)$ Constraint $2KX < (t_2-t_1) \leq K$
K	Muskingum travel time coefficient in hours
X	Muskingum attenuation coefficient ( $0.0 \leq X \leq .5$ ) X of 0.0 produces maximum attenuation.

### Example:

ROUTE 1 3 9.5 .4 Route curve 1 using 3 routing steps, 9.5 hours travel time, and attenuation coefficient of 0.4.

## RPLOT UNIX version

### Use:

RP[.option], parameters

### Description:

The RPLOT command is used to replot plots that have been saved by the SPLOT command. This option turns off the SPLOT option once entered. This Command is not available on the PC version.

### Options:

S	Prevent screen clear from occurring.
Z	Plot from a DSS file, plot name is a pathname.

### Parameters:

abc . . .	Plot Name not to Exceed 8 Characters.
CATALOG	Will List Plot Names Available.

### Example:

RP, PLOT1	Will Plot the Graphics Saved under PLOT1 Name.
-----------	--

## SAVE

### Use:

SA, [parameters]

### Description:

The SAVE command is used to save an edited curve to a DSS file. This command can only be used after the EDIT command has been used.

### Parameters:

None	The program will prompt for a pathname to save the edited data.
A= . . , B= . . .	Pathname parts to use for saving the edited data.
REPLACE	Original pathname will be used to save the edited data.

### Example:

SAVE F=EDITED    Save edited data in original pathname but use an F part of EDITED.

## SCALE

### Use:

SCA, [parameters]

### Description:

The SCALE command is used to set an absolute x or y axis scale. The scale can be set by specifying the minimum, maximum, and the number of divisions to use for both the major and minor ticks. For the y axis, the data type index must also be specified. (Note: To permanently clear both X and Y scales, enter SCALE with no parameters.)

### Parameters:

None	Scale option is turned off.
X, a, b, m, n	X, minimum x, maximum x, number of major and minor divisions (X, ON/OFF).
Y, m, a, b, n	Y, data type index, minimum y, maximum y, number of major and minor divisions (Y, ON/OFF).
X, a, b, c, d	X, minimum date, time, maximum date, time (Y, ON/OFF).

### Example:

```
SCA X 0.0,100.0,10,5
SCA X OFF
SCA Y 1 0.0 10000 5
SCA Y OFF
SCA X 01JAN1989 0100 17JAN1989 2400
SCA OFF
```

## SCREEN

### Use:

SCR, [parameters]

### Description:

The SCREEN command is used to define the physical screen plotting dimensions, based on raster units that range between 0 and 1023 on the X-axis and 0 and 780 on the Y-axis.

### Parameters:

None

n, m, i, j

Sets screen coordinate window to 160, 850, 155 and 691.  
Integer numbers of xmin, xmax, ymin and ymax.

### Example:

SCR, 150, 400, 200, 400

Xmin, Xmax, Ymin, Ymax.

## SPLIT

### Use:

SPLI, [parameters]

### Description:

The SPLIT command is used to specify the percentage that the plotting windows will occupy when multiple windows have been specified by the SWINDOW command. The first parameter value sets the percentage of the bottom window for a two window screen and the second parameter value sets the middle window for a three window screen. The number of windows per screen is based on the number of data types being plotted and the settings specified by the SWINDOW command.

### Parameters:

None	Will set the parameters to the following: 2 windows 75% 25%, 3 windows 38% 37% 25%.
n	Percent of bottom window (For two or three window screen).
n, m	Percent of bottom window, Percent of middle window (For three window screen).

### Example:

SPLI, 75	Will split the screen with 75% for bottom window and 25% for the top window.
SPLI, 35, 35	Will split the screen 35% for bottom window, 35% for the middle window, and 30% for the top window.

## **SPLOT UNIX** version

### **Use:**

SPLO[.options], parameters

### **Description:**

The SPLOT command is used to save a plot in a nonstandard format. Each plot is saved under a user defined name entered along with the command. Only one plot is saved for each command entered and saved under the name specified. The name used to save a plot must be different for each plot saved. If the Z option is used, the plot name has to be a DSS pathname. This command is not available on the PC version.

### **Options:**

S	Prevent screen clear from occurring.
Z	Plot from a DSS file, plot name is a pathname.

### **Parameters:**

abc...	An Alphanumeric Plot Name not to Exceed 8 Characters or a DSS pathname if the Z option is used.
--------	---

### **Example:**

SPLO, PLOT1	Will Save the Following Plot under PLOT1 Name.
SPLO.z, /COTT/SP12////	Will Save the Following Plot in an HEC-DSS file under pathname "/COTT/SP12////"

# STATUS

## Use:

ST, [parameters]

## Description:

The STATUS command is used to get a list of the present settings and pathnames entered. The user can specify which settings to display by entering the command names that were used to set them as parameters.

The STATUS command displays one page at a time and the user enters a carriage return to display the following page. If the user enters a "Q" or any other command instead of a carriage return, the program will ignore any additional STATUS output and execute the command entered.

## Parameters:

None	List all status settings.
ALL	List all status settings.
Command	List status of specified commands.

## Example:

ST, DEV, DLINE      Will list current settings for DEVICE and DLINE.

## SWINDOW

### Use:

SW, [parameters]

### Description:

The SWINDOW command is used to specify user defined instructions as to how the program will display different types of data that are being plotted together. The user has the capability of plotting up to six different types of data together on three separate windows. The user can specify the window (B-bottom, M-middle, or T-top), Y-axis label location (L-left or R-right), and direction of Y-axis (N-normal or I-inverted) for each of the possible six different data types that can be plotted together.

### Parameters:

None	Sets window parameters for each curve to the following: LBN LMN LTN RBN RMN RTN.
B M T	Window letters (B-bottom, M-middle, or T-top).
L R	Y-axis label location (L-left or R-right).
N I	Y-axis direction (N-normal or I-inverted).

### Example:

SW, LBN, RBN	First and second data types will plot on one window, with the first y-axis label appearing on the left and the second data type on the right, and both will be plotted in a normal fashion.
SW, LBN, LTI	First data type will plot on the bottom and the second on the top of a two window screen, with the y-axis labels on the left. The second data type is plotted inverted.

# TABULATE

## Use:

TA[.options], [parameters]

## Description:

The TABULATE command is used to display the data retrieved in a tabular format. The user may enter the pathname parts, pathname numbers or tags as parameters. In addition to entering the pathname parts, the user can specify the DSS file that the pathname belongs to by entering, as the first parameter, the DSS filename followed by a colon. If no DSS filename is entered, the last referenced DSS file will be used.

The number of decimal places the data will be tabulated can be set by using the DECIMAL command.

The TABULATE command displays one page at a time and the user enters a carriage return to display the following page. If the user enters a "Q" or any other command instead of a carriage return, the program will ignore any additional TABULATE output and execute the command entered.

## Options:

F	Will write the tabulation to an output file "tabfile.out".
S	Statistics of the data will be tabulated.
R	Rewind tabfile output.
X	Activate the X-Window style of output. This option is only valid with an XTERM device.

## Parameters:

[dssfile:]	May precede any of the pathname references that follow and will continue to be used until changed.
/a/b/c/d/e/f	All pathname parts defined.
A=...,B=...	Selective pathname parts A through F specified.
n,m,...	Pathname numbers based on catalog listing.
tag1,tag2...	Pathname tags based on catalog listing.

## Example:

```
TA, /SCI/STJOE/FLOOD-RES IN/01JAN59/6HOUR/TEST/  
TA,A=SCI,B=STJOE,C=FLOOD-RES IN,D=01JAN59,E=6HOUR,F=TEST  
TA.F,25,30,41  
TA, T12, T1812
```

## TIME

### Use:

```
TI[.options], [parameters]
```

### Description:

The TIME command is used to specify the starting and ending Military Time and Dates which will be used to define the time window for retrieving data from DSS for all the pathnames that follow. If no time window is set, data for the entire record is used.

A time must be given in 24 hour clock time. The date can be one of several styles, but must not contain any spaces within it. A 7 or 9 character military style date may be used.

A time window can be set relative to the system time by the single character "T", optionally followed by a +- sign, a number, then an "H" (hours), or a "D" (days), or a "Y" (years). In addition, a fixed hour for the current day may be specified by using "T" as the date portion, then specifying the time in the next field.

### Options:

P	Applies to previous pathname.
F	Retrieve leading and trailing missing values if present.
W	Use the time window set for x-axis scale.

### Parameters:

None	Turns off the time window.
st, sd, et, ed	Starting time, Starting date, Ending time, Ending date.

### Example:

```
TI, 01JAN1959, 2400, 31DEC1959, 2400
TI, 2400, 01JAN1959, 2400, 31DEC1959
TI T-4H, T
TI T, 0200, T, 1600
TI
```

## **TMARK**

### **Use:**

TM, [parameters]

### **Descriptions:**

The TMARK command is used to set the forecast date marker. The User can set a date or have the program read the date and time from the 'm' and 's' function key definition in file GENFUN which have been set by the MODCON program or through the PREAD TEACH command. The user can turn off the forecast marker by entering OFF as a parameter. The user can turn the forecast marker back on by entering ON as a parameter.

### **Parameters:**

None	Will turn on the time mark.
ON	Will turn on the time mark.
OFF	Will turn off the time mark.
n, date	Time 24 hour clock, date (DayMonthYear)

### **Example:**

```
TM, 2400, 01JAN1959  
TM OFF
```

## TSHIFT

### Use:

TS[.options], parameters

### Description:

The TSHIFT command is used to modify the data stored in a curve by shifting it by a specified number of days, raising or lowering its y-axis values by a specified amount, and multiplying all the y-axis values by a factor. If only a curve number is entered, then the curve will be shifted only in time and set to start at the same time as the first curve. The number of days to shift the curve can be specified by a pair of dates. The number of days to shift the curve is determined by the difference between the two dates entered. Only the time axis can be modified if dates are used.

### Option:

C Cross hairs will be used to shift the data; if a Y is entered after each location specified by the cross hairs, the y-axis will be shifted and the x-axis will be shifted; if any other key is used, only the x-axis will be shifted.

### Parameters:

n, m, x, y Curve number, Time shift in days, y-axis shift, y-axis factor (Standard Method).  
n, d1, d2 Curve number, Date1, Date2 (Optional Method).

### Example:

TS, 2 Will shift curve number 2 to start at same time as curve 1.  
TS, 1, 10.5, 0, 1.5 Shift curve 1 by 10.5 days and multiply by a factor of 1.5.  
TS 2 01JAN77 1200 16FEB88 1000

## USERLABE

### Use:

US, [parameters]

### Description:

The USERLABE command is used to specify a user defined label that will appear on the plot. The L option allows the user to center the label any where on the screen by the use of screen coordinates (0-1023 x and 0-780 y) and specify the character size to use (1-4 on Tektronix 4014). If no label is desired, enter 'NULL' as a parameter.

### Option:

L                      Define character size and x-y location of user label.

### Parameters:

None	Will use the A pathname part as a label.
abc...	Alpha-numeric label of no more than 80 characters.
'NULL'	Do not plot a user label.
n, x, y	Character size and center x-y location of label. Only valid with the L option.

### Example:

```
US, SCIOTO BASIN STUDY
US.L 1,90,760
```

## WINDOW

### Use:

WI, [parameters]

### Description:

The WINDOW command is used to set a data window. The data will not be altered by this command, only the plot will be windowed. If no parameters are entered, cross hairs will appear. The user then manipulates the cross hairs and keys to either enter the window limits or enter a Z which activates the zoom window. The zoom window can be moved by moving the cross hairs to the location of the desired window and entering another Z. If the window is too small, repeated Z will enlarge the window. It is recommended that the zoom option only be used with 4100 series Tektronix terminals in the UNIX version. See ZOOM command for additional zooming capability.

### Parameters:

None	The cross hairs will be used to establish the window boundary.
x, x	Axis Window Minimum and Maximum Values.
y, y	Axis Window Minimum and Maximum Values.

### Valid Keys:

W	This command is used to window out a part of the plot. There are three methods of windowing on the plotted data. Each method requires that two windowing locations be entered by using the cross hair cursor. After the first location is entered, the cross hair cursor appears for a second time, and the user specifies the second location of the window. When the 'W' is entered for the second cross hair cursor, the data within the window specified is plotted. The actual plot window is adjusted to provide a neat even tick interval. The three methods for windowing are described below. A window based on the time scale is achieved by moving the cross hair cursor horizontally and defining the maximum and minimum time scale values. A window based on the y-scale is achieved by moving the cross hair cursor vertically and defining the maximum and minimum y-scale values. A window based on both the time and y-scales is achieved by moving the cross hair cursor vertically and horizontally to define the maximum and minimum time and y-scale values.
V	This command is used to draw a rectangle that shows the user the window and to set the plot range based on the absolute values set by the cross hairs. When this option is used, the cross hair cursor can be used by the user to redefine the window by entering a 'W'. If a 'W' is entered, the windowing procedure is repeated so that the window can be adjusted. If any other character is entered, the program proceeds to plot the data within the window.

## **WINDOW** (continued)

- z        This command is used to turn on the ZOOM command. See ZOOM and WINDOW commands for additional information. If the user enters any other character besides the ones mentioned above, the program will window based on the cross hair locations.

## **XCLOSE UNIX version**

### **Use:**

XC

### **Description:**

The XCLOSE command is only functional when the XTERM device is active. It allows the user to close the graphics windows when the graphics window is in FIXED mode. Fixed graphics window mode keeps the graphics window open at all times until the program is terminated or the DEVICE command is used to set the XWINDOW subparameter equal to FLOATING mode.

### **Example:**

XCLOSE

## **XLABEL**

### **Use:**

XL, [parameters]

### **Description:**

The XLABEL command is used to specify a user label that will appear on the X-Axis of a plot. The XL Command should only be used with DSS paired data. The US.L command can be used to label the x-axis of DSS time series data.

### **Parameters:**

None	Will turn off the user x-axis label and use the default x-axis label which is based on the pathname parts.
abc...	Alpha-numeric label of no more than 40 characters.
'NULL'	Do not plot a user label.

### **Example:**

```
XL, DAMAGE IN 1000 $
```

## YLABEL

### Use:

YL[.option], [parameters]

### Description:

The YLABEL command is used to specify a user label that will appear on the Y-Axis of a plot for each of the six possible data types that can be plotted. The location and character size to use with the y-axis label can be specified by using the L option. The label will be centered based on the location specified. Note: Option R is only available on the PC version.

### Options:

L	Define character size and x-y location of y-axis label.
R	Toggle to turn on/off 90 degree rotation of y-axis labels. (only available on PC version).

### Parameters:

None	Will turn off the user defined y-axis label and use the default y-axis label based on the pathname parts.
n,m,x,y	Data type number, character size, x, y. Only valid when used with the L option.
n,abc...	Data type number, Alpha-numeric label of no more than 40 characters.
n,'NULL'	Data type number, 'NULL' - Do not plot a label.

### Example:

```
YL.L 1 3 85 450
YL,1,DAMAGE IN 1000 $
YL,2,FLOW IN CFS
```

## YMARKER

### Use:

YM, [parameters]

### Description:

The YMARKER command is used to provide Y-Axis value markers for the curve numbers specified by the user. The markers will use the same color as the curve number specified. Up to ten markers can be specified by the user. The user specifies curve number, marker value, character size, X-axis location in screen coordinates, position of label and label. The label associated with the marker is limited to a maximum of 20 characters. Note: x-location: -1 (Left), -2 (Centered), and -3 (Right) A-above marker, B-below marker, C-centered on marker, CLEAR - Clear all markers, OFF - Turn off the markers but do not clear them, ON - Turn on the markers.

### Parameters:

None	Turn off the markers.
n, x, m, x, p, abc . .	Curve, value, character size, x-location, position, label.
ON	Turn on the markers.
OFF	Turn off the markers.
CLEAR	Clear all markers and turn off the function.

### Example:

```
YM 1 8.23 1 500 A TOP OF BANK  
YM, OFF  
YM CLEAR
```

## YRANGE

### Use:

YR[.options], [parameters]

### Description:

The YRANGE command is used to specify the acceptable range that the Y-axis data should be. The program brackets or sets a window based on this range. The User has the option of having a relative or absolute window by placing a ".A" for absolute or ".R" for relative. Up to six y-axis range pairs can be entered.

### Options:

A	Range values are used to set an absolute window.
R	Range values are used to set a relative window.
S	Use range values for scale only.
X	Specify a range for paired data in the x-axis.

### Parameters:

None	Turns off the option.
r,s,r,s...	Minimum and Maximum range value pairs for each data type.

### Example:

YR,0,10000,0,5	Sets the Range or Window from 0 through 10000 for the first data type and 0 through 5 for the second data type.
----------------	---

## ZOOM

### Use:

ZO, [parameter]

### Description:

The ZOOM command is used to specify a window of the data. The data will not be altered by this command, only the plot will be windowed. A rectangular box will appear centered about the maximum y-axis value of the data curves plotted on the first window operation. On following windows, the box will be centered on the plot. The user then uses the numeric keyboard to either move or modify the size of the window. Repeated Z's will enlarge or decrease the window. Enter a W to plot the window defined by the box. It is recommended that the zoom option only be used with 4100 series Tektronic terminals or on the PC version.

### Parameters:

None	Will window on first window data type.
n	Specifies which window data type (1-6) to ZOOM in.

The following defines the use of the NUMERIC KEYS to move and/or modify the size of the zoom window.

### Valid Keys:

0	Toggle for specifying move or modify (default) size of window.
-	Toggle for enlarging (default) or reducing size of window.
5	Refresh plot; only valid for 4107-9 terminals.
1 - 9	Provide relative movement for moving or modifying size of window.
W	Plot the window.

## **Appendix B**

### **ACAD Command Document**

**(for UNIX Version of DSPLAY)**

# ACAD Command (UNIX version)

## USER'S MANUAL

Invoking the ACAD command in the DSPLAY program initiates a simplified Automated Computer Aided Drafting (ACAD) capability for Tektronix 41/4200 series terminals and X Window workstations. This capability is not available on the PC version. The user can overlap ACAD style graphics on top of the standard DSPLAY plots. The ACAD capability has been implemented in the data display side of DSPLAY.

The ACAD capability is based on the Tektronix screen coordinate system of 1023 units in the x axis and 779 units in the y axis. The maximum number of objects that can be used per ACAD overlay is 100 and the maximum number of coordinates used for poly lines or polygons is 400. The program will warn the user if the limits of an overlay have been exceeded. When this happens, the user should close the overlay and start a new overlay.

There is no limit on the number of overlays that can be created since they are stored permanently in an ASCII file. The user specifies the ACAD filename on the execution line with the command [ **DSPLAY ACAD=filename** ]. If the user does not specify an ACAD file, the program will store the data under a permanent file named "acadfile". The following describes in detail the syntax, drafting options available, and structure of the **ACAD** command.

### Command Syntax:

The syntax of the **ACAD** command is similar to DSPLAY commands in that it has options and parameters. The options are part of the command and are delimited by a period. The parameters follow the command or options and are delimited by a comma or a space.

- Options:** **E** - Edit an existing ACAD overlay or create a new ACAD overlay.  
**I** - Edit an existing ACAD icon overlay or create a new icon overlay. The icon is a special type of ACAD overlay that can be incorporated within a standard ACAD overlay. The value of icons is that they can be created separately and then scaled and placed at any location on a standard ACAD overlay. The creation of an icon is the same as for a standard ACAD overlay, with the exception that the user specifies a rectangular scaling window for the icon.

**Parameters** ACAD name list. If the **E** or **I** options are being used, only one name is allowed. The program will only allow you to edit one overlay at a time. Enter a "?" to get a list of the available ACAD overlay names.

## **Edit Command Syntax:**

The syntax used in the edit mode consists of one or two letter combinations. The commands can be grouped into two parts; object commands and edit commands. The object command will instruct the program to create that object. In addition to the above commands, there are two full length commands that allow the user to quit the editing without saving any of the changes (**QUIT**) and the capability to refresh the graphics screen (**REFRESH**). The REFRESH command is useful when the screen gets cluttered with editing garbage left over from scale, copy, and delete commands.

Screen editing is accomplished by the use of the cross hairs to specify screen locations and by program prompted questions. The program has default values for all prompted questions and the default value can be changed by typing a new value or accepting the default value by entering a carriage return. The cross hair normally does not use the character entered as a command, with the exception of the poly line (P) command and the copy command (CO,CW).

## Object Commands

- B** Text block command. This command allows the user to define a rectangular screen area that is used to display text from a file. The limitations are 80 lines by 80 columns. The user provides the name of the text file, starting and ending line numbers of the text, character color, font style, and character size. If the user specifies soft font, the text characters will be sized to fit the text block window.
- C** Circle command. This command allows the user to create a circle. The cross hairs are used to specify the center and radius of the circle. The program will prompt for color, line thickness<sup>1</sup>, and polygon fill option.
- R** Rectangle command. This command allows the user to create a rectangle. The cross hairs are used to specify opposite corners of the rectangle. The program will prompt for color, line thickness<sup>1</sup>, and polygon fill option.
- T** Triangle command. This command is used to generate an isosceles triangle. The cross hairs are used to specify one of the equal sides of the triangle. The program will prompt for color, line thickness<sup>1</sup>, and polygon fill option.
- P** Poly line command. This command is used to generate a poly line or a polygon. The cross hairs are used to specify the coordinate locations of the poly line. The program will prompt for color, line thickness<sup>1</sup>, line style, and fill option when the user uses the **C** cross hair command to terminate coordinate input. The following cross hair key character commands are used to terminate the poly line or polygon.
- Q** - Use to specify the end of the poly line.
  - D** - Delete the last coordinate entered.
  - C** - Use to close a poly line or polygon. The polygon option is only available if the line style is a solid line.
  - A** - Used to specify the end of a poly line with an arrow head terminator.
- L** Label command. This command is used to input a label. The label can be input with either soft or hardware fonts. If soft fonts are used, the character size can be scaled and rotated. If hard fonts are used, the character size is limited to two different sizes (4-smallest and 1-largest). The cross hairs are used to specify the location of the label. For hardware fonts, the user can center, right justify, or left justify the label. For soft fonts, the labels are always left justified. The program will prompt for the character color, type of font, size of font, angle (only for soft fonts), and label position (only for hardware fonts).

---

<sup>1</sup> Only applies when using a Tektronix 4510 rasterizer. Sizes are 0 (thinnest) to 3 (thickest).

- G** Grid command. This command is used to draw a solid or dotted grid. The cross hairs are used to specify the opposite corners of a rectangular region where the grid will be plotted. The program will prompt for the number of x and y grid divisions, color, line thickness, and line style (solid or dotted).
  
- I** Icon command. This command allows the user to insert an icon in the standard ACAD overlay. The user is prompted for the scaling option. If scaling is chosen, the cross hair is used to specify a rectangular window in which the icon is forced to fit. If no scaling is done, the cross hair is used to specify the lower left hand corner of the icon rectangular window.

## **Edit Commands**

The edit commands are used to edit existing objects. The edit commands can consist of a second character that can be used to make specific the object that they are to act on. The cross hair is used to pick the object. The cross hair should be placed as close to the center of the object to be picked as possible. In addition, if the second character is a **W**, a rectangular window can be specified by the use of cross hairs to define the objects to be acted on by the edit command. The following is a description of the editing commands.

- S** Scale command. This command allows a user to pick one object or a group of objects and specify an x and y scale factor to use for scaling. For scaling labels and circles, the x and y scaling factors must be the same.
- M** Move command. This command allows a user to pick one object or a group of objects and move them to another location. The program will prompt the user to use the cross hairs to pick the object or objects, specify an offset reference point and an offset vector.
- CO** Copy command. This command allows a user to pick one object or a group of objects and copy them to another location. The program will prompt the user to use the cross hairs to pick the object or objects, specify an offset reference point and an offset vector. To copy the object or objects to multiple locations, the user can enter the C character key for the offset vector and the program will continue to copy the objects to the cross hair locations. To terminate the copying process, use any character key that is not the C character.
- D** Delete command. This command allows a user to pick one object or a group of objects and delete them.

## ACAD File Structure

The following is a description of the ACAD file structure. The ACAD file is in ASCII format and can be edited by the user with an editing program like COED. In addition the user can write other programs that utilize the file structure described below to create graphics that can then be used by the DSPLAY'S ACAD capability.

The ACAD file structure or format is in fixed format. There are two types of overlays; standard and icon. Each overlay is delimited by a tag line that has the word **#TAG [overlay name]**. The icon overlay has [`<_>`] as its first object definition. The format used and the variables used in both icons and standard overlays are described below.

### BLOCK - Format

1st variable - character - A4 - '`<B>`:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I3 - Character size<sup>2</sup>  
4th variable - integer - 1X,I4 - Screen window, x axis minimum  
5th variable - integer - 1X,I4 - Screen window, x axis maximum  
6th variable - integer - 1X,I4 - Screen window, y axis minimum  
7th variable - integer - 1X,I4 - Screen window, y axis maximum  
8th variable - integer - 1X,I5 - Starting line number  
9th variable - integer - 1X,I5 - Ending line number  
10th variable - character - 1X,A1 - 'T' soft font or 'F' hard font  
11th variable - character - 1X,A20 - Filename

### CIRCLE - Format

1st variable - character - A4 - '`<C>`:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I1 - Line thickness (0,1,2,3)  
4th variable - integer - 1X,I4 - X coordinate of center of circle  
5th variable - integer - 1X,I4 - Y coordinate of center of circle  
6th variable - integer - 1X,I4 - Radius of circle  
7th variable - character - 1X,A1 - 'T' solid fill or 'F' no fill

---

<sup>2</sup> The character size for soft fonts is based on a default size that the user changes by a multiplication factor. The factor is multiplied by 10 and stored as an integer value. For hard fonts the character sizes are 1 (large) and 4 (small).

## **RECTANGLE** - Format

1st variable - character - A4 - '<R>:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I1 - Line thickness (0,1,2,3)  
4th variable - integer - 1X,I4 - X minimum coordinate of rectangle  
5th variable - integer - 1X,I4 - X maximum coordinate of rectangle  
6th variable - integer - 1X,I4 - Y minimum coordinate of rectangle  
7th variable - integer - 1X,I4 - Y maximum coordinate of rectangle  
8th variable - character - 1X,A1 - 'T' solid fill or 'F' no fill

## **TRIANGLE** - Format

1st variable - character - A4 - '<T>:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I1 - Line thickness (0,1,2,3)  
4th variable - integer - 1X,I4 - X minimum coordinate of triangle  
5th variable - integer - 1X,I4 - X maximum coordinate of triangle  
6th variable - integer - 1X,I4 - Y minimum coordinate of triangle  
7th variable - integer - 1X,I4 - Y maximum coordinate of triangle  
8th variable - character - 1X,A1 - 'T' solid fill or 'F' no fill

## **POLYLINE** - Format

1st variable - character - A4 - '<P>:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I1 - Line thickness  
4th variable - integer - 1X,I5 - Line style (1 solid, 2 dotted ...)  
5th variable - integer - 1X,I2 - Number of coordinate pairs on this line  
6th variable - character - A1 - 'T' solid fill, 'F' no fill, or '+' poly line continuation  
7th - 18th variables - 12(1X,I4) - X and Y coordinate pairs that describe the poly line

## **LABEL** - Format

1st variable - character - A4 - '<L>:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I3 - Character size<sup>2</sup>  
4th variable - integer - 1X,I3 - Angle of label (0 - 360)  
5th variable - integer - 1X,I4 - X coordinate location of label  
6th variable - integer - 1X,I4 - Y coordinate location of label  
7th variable - character - A1 - 'T' soft font or 'F' hard font  
8th variable - character - A52 - Label

## **GRID** - Format

1st variable - character - A4 - '<G>:' - Object name  
2nd variable - integer - 1X,I2 - Color index  
3rd variable - integer - 1X,I1 - Line thickness (0,1,2,3)  
4th variable - integer - 1X,I4 - X minimum coordinate of rectangle  
5th variable - integer - 1X,I4 - X maximum coordinate of rectangle  
6th variable - integer - 1X,I4 - Y minimum coordinate of rectangle  
7th variable - integer - 1X,I4 - Y maximum coordinate of rectangle  
8th variable - integer - 1X,I2 - X number of divisions  
9th variable - integer - 1X,I2 - Y number of divisions  
10th variable - character - 1X,A1 - 'T' solid or 'F' dotted

## **ICON** - Format for standard overlay

1st variable - character - A4 - '<I>:' - Object name  
2th variable - integer - 1X,I4 - Icon scale window, x axis minimum  
3th variable - integer - 1X,I4 - Icon scale window, x axis maximum  
4th variable - integer - 1X,I4 - Icon scale window, y axis minimum  
5th variable - integer - 1X,I4 - Icon scale window, y axis maximum  
6th variable - character - A20 - Icon name

## **ICON** - Format for icon overlay

1st variable - character - A4 - '<\_>:' - Object name  
2th variable - integer - 1X,I4 - Icon window, x axis minimum  
3th variable - integer - 1X,I4 - Icon window, x axis maximum  
4th variable - integer - 1X,I4 - Icon window, y axis minimum  
5th variable - integer - 1X,I4 - Icon window, y axis maximum

## EXAMPLE ACAD FILE

The following is an example of an ACAD file.

```
#TAG ARROW
<_>: 38 806 17 572
<P>: 7 0 1 6 T 166 286 537 286 537 196 755 322 537 429 537 339
<P>: 7 0 1 3 + 537 339 166 339 166 286
#TAG EX1
<G>: 1 0 51 858 125 747 2 4 T
<L>: 1 1 0 231 718 F BLOCK
<L>: 1 1 0 222 565 F CIRCLE
<L>: 1 1 0 205 414 F RECTANGLE
<L>: 1 1 0 143 262 F TRIANGLE (isosceles)
<L>: 1 1 0 610 717 F POLYLINE
<L>: 1 1 0 615 566 F LABEL
<L>: 1 1 0 621 410 F GRID
<L>: 1 1 0 621 259 F ICON
<B>: 1 4 106 485 597 712 1 20 F BLOCK
<C>: 2 0 245 495 57 F
<C>: 2 0 245 493 26 T
<R>: 5 0 121 364 309 398 F
<R>: 5 0 162 326 337 366 T
<T>: 8 0 102 235 152 239 F
<T>: 8 0 173 235 172 212 T
<P>: 4 0 1 6 F 511 609 603 595 756 638 786 609 807 680 748 702
<P>: 4 0 1 4 + 748 702 674 666 520 680 511 609
<P>: 5 0 1 6 T 571 624 622 624 622 610 664 624 622 652 622 638
<P>: 5 0 1 3 + 622 638 571 638 571 624
<P>: 1 0 1 6 F 531 709 603 695 622 652 622 666 622 652 611 661
<L>: 1 4 0 521 497 F THIS IS A LABEL SIZE 4
<L>: 1 1 0 520 523 F THIS IS A LABEL SIZE 1
<L>: 1 6 0 520 466 T THIS IS A SOFT LABEL SIZE .8
<G>: 1 0 469 848 295 403 10 5 T
<I>: 490 817 151 245 ARROW
<L>: 1 7 0 492 153 T ARROW
<R>: 1 0 487 817 147 246 F
```

