Appendix A.   Language Command Syntax

This Appendix gives the syntax of each command of the system.   The printout is from the "HELP" message file.   The commands are listed alphabetically (with some very new ones added on the end) and are printed exactly as they would appear on the display terminal. This appendix was produced by changing the command device to the hardcopy terminal, an option available to any user.

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ROTATE   GETDSK   GROUP'   DELETE   PUTLID   GETLIB   FILMING
UNFILM   RESUME   READ     WRITE    RENAME   MOVE     PATHMOV
RESTART  SCALE    FIX      GETCON   PUTDSK   TEXT     SHADE
SHADE2   HARD     FILL     INTERP   SETCUT   SETORG   SETDELA
SMOOTH   SETINT   CORE     COLOR    COMPILE  DIRDSK   DIRCORE
DIRCON   DIRALL   HELP     TREE     CLEAR    EYE      COPY
BLEND    TYPE     PRINT    XLIST    LIST     PROMPT   SKIP
GOTO     RETURN   EDIT     FLAP     HIDE     SOFTROT  DASHES
POINTS   LINES    OPEND    GETPOIN  PUTPOIN  EXIT     REMARK
INPUT    RESET    PENSLN   PENOFF   GETINT   FSON     FSOFF
DELPOI
```

*HELP HELP

SYNTAX: HELP COMMAND-NAME

        HELP IS HERE TO ANSWER SYNTAX QUESTIONS.
        CERTAIN ABBREVIATIONS HAVE BEEN USED WHICH WILL, HOPEFULLY,
AID UNDERSTANDING:

        ANAME   IS ANY PICTURE OR MACRO NAME
        PNAME   IS ANY PICTURE NAME (GROUP OR SINGLE PICTURE)
        LNAME   IS ANY SINGLE PICTURE (USUALLY CALLED A 'LEAF')
        GNAME   IS ANY GROUP NAME
        MNAME   IS ANY MACRO NAME
        DNAME   IS ANY DISK FILE NAME
NAMES MAY BE ABBREVIATED TO ENOUGH LETTERS TO INSURE UNIQUENESS.

        DEV   IS ONE OF THE FOLLOWING ANALOG DEVICES OR VARIABLES
                DIALS 0-9   (D0-D9)
                JOYSTICK   .   (JS OR JX,JY,JZ)
                SONIC PEN   (SP OR SX,SY,SZ)
                VARIABLES A-Z (A-Z)

        EXPR   IS A MIX OF NUMBERS,DEVS AND ARITHMETIC OPERATORS WHICH
                ALWAYS EVALUATES TO A SINGLE NUMBER.
                THE OPERATORS ARE +,-,*,/.
                EXAMPLES: A
                                D7
                                200
                                A+D7/200*35-B-K/17
                EXPRESSIONS ARE CURRENTLY EVALUATED FROM LEFT TO RIGHT
                WITH NO OPERATOR PRECEDENCE SO THAT 20+2/2 IS 11 NOT 21.

ALL COMMANDS EXCEPT ON, IF, CALL, AND DO ARE DOCUMENTED. THE
DESCRIPTIONS MAY BE CONSULTED BY TYPING HELP FOLLOWED BY THE
COMMAND NAME.   MACRO SYNTAX ALSO IS NOT DOCUMENTED AT THIS TIME.

REMEMBER TO USE THE PANIC BUTTON IF THINGS GET OUT OF HAND, AND THAT
THE WORST YOU CAN DO IS STALL THE COMPUTER.
*

HELP RESET

SYNTAX: RESET FRAME

  RESET IS THE SAME AS FIX EXCEPT THAT THE ORIGINAL VALUES OF THE
ROTATION MATRIX, ORIGIN, SCALE, INTENSITY, ETC. ARE RESTORED.

SWITCHES:
  SAME AS FIX

EXAMPLE: RESET/R PROP
*:

HELP RETURN

SYNTAX: RETURN

  RETURN POPS UP ONE LEVEL IN A MACRO BEING EXECUTED AND THUS
PROVIDES CONVENIENT EXIT TO THE END OF THE MACRO.

EXAMPLE: TOM:<Y=0
    SAM:<Y=Y+1
    IF Y GT 10, EXIT
    IF Y GT 5, PROM Y*Y
    IF Y GT 1, RETURN>
    IF Y LT 10, GOTO SAM
    PROM "THOSE HERE THE SQUARES OF 5 THROUGH 10">
*:

HELP GETHIT

SYNTAX: GETHIT N, X, Y, Z, K

        GETHIT GIVES THE STATUS OF A LIGHTPEN HIT WHERE N=THE
NUMBER OF THE POINT IN THE LIST, X, Y, Z ARE THE RESPECTIVE COORDINATES,
AND K IS ZERO IF IT IS A DRAWN POINT, ONE IF IT IS THE INITIAL POINT
OF A VECTOR (FOLLOWING A JUMP), AND MINUS ONE IF IT IS THE LAST POINT.
OF COURSE, N, X, Y, Z, AND K CAN BE ANY VARIABLES.

EXAMPLE: GETHIT F, U, V, W, G

*:

HELP GETLIB

SYNTAX: GETLIB PNAME1, PNAME2

        GETS PNAME1 FROM NON-DISPLAYED DATA STRUCTURE (I.E. PUTLIB'D)
AND PUTS IT INTO THE DISPLAYED DATA STRUCTURE AFTER PNAME2. IF NO
PNAME2, THEN PNAME1 BECOMES THE FIRST ELEMENT IN THE DATA STRUCTURE.
PNAME1 MUST HAVE BEEN PUTLIB'D OR GOTTEN BY .BIN FORMAT IN GETDSK.
PNAME2 MUST BE DISPLAYED.

EXAMPLES: GETLIB SAM
                 GETLIB HARY, SAM

*:

HELP GETPOI

SYNTAX: GETPOIN LNAME, N, X, Y, Z, K

        GETPOIN GETS A POINT FROM AN LNAME.   THE X, Y, Z COORDINATES
OF THE POINT INDICATED BY THE EXPRESSION N ARE RETURNED IN VARIABLES
INDICATED HERE BY X, Y, Z.   N RANGES FROM 1 (THE FIRST POINT)
TO THE LAST VECTOR IN THE LNAME (DEPENDS ON HOW BIG THE PICTURE IS).
K IS A VARIABLE IN WHICH THE FOLLOWING IS INDICATED:
        K=0   DRAWN VECTOR
        K=1   NON-DRAWN VECTOR (JUMP)
        K=-1   END OF LIST (LAST VECTOR)

EXAMPLE: GETPOIN WITCH, 20, G, H, I, K
        THIS WILL GET THE COORDINATES IN DECIMAL OF THE TWENTIETH
VECTOR IN WITCH AND PLACE THEM IN VARIABLES G, H, I AND INDICATE WHETHER
THIS LINE WAS DRAWN, A JUMP OR THE END OF THE LIST, IN VARIABLE K..
*

HELP GOTO

SYNTAX: .   GOTO MNAME+EXPRESSION

        GOTO IS USED TO TRANSFER CONTROL TO NAMED MACROS EITHER
INTERNAL OR EXTERNAL TO THE MACRO BEING EXECUTED.

EXAMPLE: TOM:<X=0
                 SAM:<X=X+1>
                 IF FS0=0, GOTO SAM>
        THIS EXAMPLE WILL INCREMENT VARIABLE X UNTIL FS0 IS PUSHED

*:

HELP FSON

SYNTAX: FSON EXPR1,EXPR2,EXPR3....

        FSON TURNS ON (SETS TO ONE) FUNCTION SWITCHES CORRESPONDING
TO EXPR1,EXPR2, ETC. FSON DOES NOT WORK WITH FS15 OR THE PANIC BUTTON.

EXAMPLE: FSON 0,2,4,6,8,10,12,14
        THIS TURNS ON THE EVEN FUNCTION SWITCHES SO THAT THEY LIGHT UP.

HELP GETCOM

SYNTAX: .   GETCOM DNAME.EXT

        GETCOM IS THE SAME AS GETDSK EXCEPT IT TAKES DNAME FROM
THE COMMON AREA ON THE DISK ([30,1]).
        GETCOM IS EQUIVALENT TO:
            GETDSK DNAME.EXT[30,1]

HELP GETDSK

SYNTAX: .   GETDSK DNAME.EXT[30,X]

        GETDSK GETS THE DNAME FROM THE DISK AREA INDICATED BY "[30,X]"
(DEFAULT IS YOUR AREA). IF NO .EXT, IT DEFAULTS TO .DEC.
DNAME BECOMES THE NAME OF THE THING YOU ARE GETDSK'ING.

EXTENSIONS:
            .DEC   DECIMAL MODE
            .BIN   BINARY MODE
            .VGN   VECTOR GENERAL FORMAT
            .CST   CHARACTER SET (AUTOMATICALLY CALLED BY "TEXT")
            .BLN   PRESENT BLEND FORMAT
            .MAC   MACRO FORMAT (FOR MACROS, NOT FOR PICTURES)
NOTE THAT .DEC,.VGN, .BLN COME UP ON THE SCREEN. .BIN PICTURES ARE
PUT INTO THE NON-DISPLAYED DATA STRUCTURE (PUTLIB'D)
AND MUST BE GOTTEN BY GETLIB TO BE SEEN. .BIN ALSO PRESERVES THE
SETUPS OF DIALS, ETC FOR ROTATE, MOVE, SCALE, ETC., WHEREAS THE OTHERS
DO NOT.

EXAMPLES: GETDSK WITCH
                   GETDSK WITCH.DEC
                   GETDSK WITCH.DEC[30,10]
                   GETDSK DRAW.MAC
                   GETDSK ROM2.CST
                   GETDSK OHIO1.BLN

HELP FIX

SYNTAX: FIX PNAME

      FIX FREEZES THE POSITION OF A PICTURE OR THE VALUE OF A PNAME'S MODIFIER ACCORDING TO THE SWITCH OPTIONS.   NO SWITCH FIXES EVERYTHING. FIX ALSO REMOVES DEV ASSIGNMENTS IF ANY.

SWITCHES:
NONE	FIXES ALL OF THE BELOW
/R	FIXES ROTATION
/S	FIXES SCALE
/M	FIXES MOVE
/P	FIXES PATHMOV
/I	FIXES INTENSITY
/C	FIXES CUTOFF PLANE
/H	FIXES HIDE FEATURE
/O	FIXES SETORG

EXAMPLES: FIX/R COPTER
                 FIX GLOBE

HELP FLAP

SYNTAX: FLAP PNAME,EXPR1,EXPR2

      FLAP PUTS BOUNDS ON THE ROTATION ANGLE. THE BOUNDS ARE GIVEN BY EXPR1 (THE HIGHER BOUND) AND EXPR2 (THE LOWER BOUND).   FLAP WILL SETTLE. FASTER IF
        FLAP PNAME,0,0
IS TYPED FIRST, FOLLOWED BY THE FLAP COMMAND WITH THE DESIRED BOUNDS.

EXAMPLE: ROTATE WING,X,D0,D1,D2
                 FLAP WING,100,-120

HELP FSOFF

SYNTAX: FSOFF   EXPR1,EXPR2,EXPR3, ETC.

      FSOFF TURNS OFF THE FUNCTION SWITCHES CORRESPONDING TO THE EXPRESSIONS.

EXAMPLE: FSOFF 1,3,5,7,9,11,13
      THIS TURNS OFF THE ODD FUNCTION SWITCHES. (NOTE THAT FS15 IS NOT USER PROGRAMMABLE.)

HELP DASHES

SYNTAX: DASHES LNAME

        DASHES CHANGES THE LNAME'S VECTORS TO DASH MODE.
SWITCHES:
        NONE   DASHES MODE
        /R   DOTS MODE (REALLY SHORT DASHES)

EXAMPLE: DASHES DIAMON

HELP DELETE

SYNTAX: DELETE ANAME

        DELETES THE ANAME FROM CORE, REMOVES THE NAME AND RECLAIMS THE
STORAGE THE ANAME TOOK.   DOES NOT PRESENTLY WORK WITH GROUPS.

SWITCHES:
        NONE   AS ABOVE
        /D   DELETES ON YOUR DISK AREA.

EXAMPLES:
        DELETE GLOBE
        DELETE JSDRAW
        DELETE/D WITCH.DEC

HELP DELPOI

SYNTAX: . DELPOI

        DELPOI DELETES THE LAST PREVIOUSLY PUT POINT IN AN OPENO'D LIST.
IT TAKES THE LNAME FROM THE OPENO COMMAND ISSUED.

EXAMPLE: <PUTPOI D0/16,D1/16,D2/16,1
                 IF FS1, DELPOI
                 SKIP -2>
        THIS CAUSES VECTORS TO BE DRAWN UNLESS FS1 IS PUSHED.

HELP DIRALL

SYNTAX: DIRALL

        DIRALL GIVES THE USER THE DISK DIRECTORIES OF EVERYONES'
AREAS.

HELP BYE

SYNTAX: BYE

          BYE LOGS USER OUT IF HE TYPES "YES" TO "CONFIRM". LOGIN
MUST BE USED TO REENTER SYSTEM.   BYE IS USEFUL FOR CHANGING DISK
AREAS WHILE RUNNING THE GRAPHICS SYMBIOSIS SYSTEM.
*:

HELP CLEAR

SYNTAX: CLEAR

          CLEAR SIMPLY CLEARS THE VT05 SCREEN.
*:

HELP COPY

SYNTAX: COPY LNAME1,LNAME2

          COPY CAUSES LNAME2 (THE NEW NAME) TO SHARE THE DATA OF LNAME1
(THE OLD NAME).   ANY COMMAND THAT DOES NOT MODIFY DATA LISTS (E. G.
ROTATE, SCALE,MOVE, ETC)MAY BE THEN INDEPENDENTLY BE USED ON EITHER
LNAME.   COMMANDS THAT ALTER DATA LISTS (E. G. SMOOTH, SOFTROT) WILL
MODIFY BOTH COPIES. COPY MAY BE USED TO REFLECT A PICTURE AROUND
AN AXIS BY USING THE SINGLE DIMENSIONAL SCALE.

EXAMPLE: COPY GLOBE,WORLD
                 ROTATE GLOBE,X,D0,D1,D2
                 ROTATE WORLD,Z,D9
                 SCALE WORLD,D6
*:

EHLP COLOR^U

HELP COLOR

SYNTAX: COLOR LNAME,EXPR

          COLOR SETS UP THE LNAME FOR USE WITH THE COLOR WHEEL. THE
EXPR MUST EVALUATE TO 0,1,2,3,4, OR THE LNAME WILL BE BLANKED.
ZERO INDICATES ALL COLORS. THAT IS, WHITE.   THE OTHER VALUES
INDICATE ONE OF THE FOUR SEPARATE COLOR WHEEL COLORS, THE CHOICE OF
WHICH MUST BE DONE AFTER THE COLOR WHEEL IS SPINNING.   COLORS MAY BE
MIXED BY USING THE COPY COMMAND AND SETTING THE COPY TO A
DIFFERENT COLOR THAN THE ORIGINAL.   IF THE IMAGE DOES NOT APPEAR TO HAVE
PURE COLORS, TOO MUCH PICTURE IS BEING DISPLAYED AND THE
NUMBER OF VECTORS BEING DRAWN MUST BE REDUCED IN THIS CASE.

EXAMPLES: COLOR LEAF,1
                 COLOR BUMP,4

HELP EXIT

SYNTAX: EXIT

        EXIT IS A SUPER RETURN.   IT ACTS LIKE A "^C" WITHIN A MACRO
AND RETURNS CONTROL TO "*" (I.E. VT05) LEVEL.

HELP FILL

SYNTAX: FILL   OUTLINE,FILL-LINES,FILL-CHARACTER,SPEED,DEGREES

        FILL TAKES A LNAME AS AN OUTLINE, BUILDS A NEW LNAME COMPOSED
OF THE FILL CHARACTER RANDOMLY PLACED WITHIN THE OUTLINE UNTIL FS 13 IS
PUSHED.   THE FILL CHARACTER SHOULD BE COMPOSED OF A SMALL NUMBER OF
VECTORS IF MANY ARE NEEDED TO FILL THE OUTLINE.   DEGREES (/P ONLY)
INDICATES THE ANGLE AT WHICH THE FILL CHARACTER IS ROTATED. THE DEV FOR
SPEED CONTROLS THE RATE AT WHICH THE FILL CHARACTER IS REPEATED.

SWITCHES:
        NONE   FILL CHARACTER IS RANDOMLY ROTATED AS
                  IT IS PLACED WITHIN OUTLINE.
        /P   FILL CHARACTER IS PLACED AT ANGLE INDICATED BY
                  DEGREES.
EXAMPLE: FILL SQUARE,HAIR,CURL,D0
                  FILL/P HILL,FOREST,TREE,D0,45

HELP FILMING

SYNTAX: ·   FILMING

        SETS SINGLE FRAMING MODE ("F" IS ENOUGH TO TRIGGER THIS COMMAND)

HELP GROUP

SYNTAX: :   GROUP   PNAME1,PNAME2,GNAME

       GROUPS PNAME1, PNAME2 AND EVERYTHING BETWEEN THEM INTO A GROUP
NAMED GNAME.   PNAMES MUST BE DISPLAYED.   PUTLIB/GETLIB SEQUENCES MAY
BE USED TO ALTER GROUP STRUCTURE BY ELIMINATING OR ADDING PICTURES IF
NECESSARY.   ANY COMMAND WHICH WILL WORK ON PNAMES WILL WORK ON
GROUPED PICTURES.

EXAMPLE: GROUP AIRPLAN,PROP,PLANE
#

HELP HIDE

SYNTAX: HIDE

       HIDE MAY BE USED TO HIDE THE REAR SURFACES OF SPECIALLY PREPARED
3-D SHADED PICTURES.   THE SURFACES MUST BE SET BY SETINT/S, DRAWN
COUNTER-CLOCKWIZE AS THEY ROTATE INTO VIEW, AND BE SHADED BY SHADE
/3,/4,5 OR /6.

EXAMPLE: SHADE/5 STEEPL,TOM,4
                SETINT/S TOM,D9
                HIDE TOM
#

HELP INTERP

SYNTAX: .   INTERP OUTLINE,SHADE-LINES,EXPR

       INTERP CREATES A NEW PICTURE BY RUNNING LINES BETWEEN THE
VECTORS OF THE OUTLINE.   THE NEW LINES ARE SPACED AS INDICATED
BY THE EXPR.   THE OUTLINE MUST HAVE AT LEAST ONE JUMP IN IT, BUT MAY
HAVE MORE.

EXAMPLE: INTERP FLUFF,STUFF,30
#

HELP LINES

SYNTAX: .   LINES LNAME

       LINES PUTS LNAME'S VECTORS IN REGULAR DRAWING MODE.   IT ,
IS USED TO RECOVER FROM DASHES AND POINTS MODES.

EXAMPLE: LINES DIAMON

HELP LIST

SYNTAX: LIST

        LIST CAUSES LINES OF MACROS TO BE ECHOED DURING EXECUTION.
IT IS A USEFUL DEBUGGING TOOL.   LIST IS SUPPRESSED BY XLIST.
*:

HELP MOVE

SYNTAX: MOVE FNAME, ORIGIN

        MOVES FNAME TO PLACE INDICATED BY ORIGIN. ORIGIN IS NEW
X, Y, Z POSITION AND IS SPECIFIED BY DEV, DEV+1, AND DEV+2.

EXAMPLE: MOVE WITCH, JS
                  MOVE TOM, F
        THE FIRST EXAMPLE MOVES THE WITCH ACCORDING TO JX, JY, AND JZ.
        THE SECOND EXAMPLE MOVES TOM ACCORDING TO VARIABLES F, G, AND H.
*:

HELP OPENO

SYNTAX: ·   OPENO LNAME

        OPENO IS NECESSARY TO ALLOCATE THE CORE MEMORY NECESSARY
TO CREATE A PICTURE.   IT SETS THE LNAME FOR DELPO1 AND PUTPO1 ALSO.

EXAMPLES: OPENO SAM
                   OPENO $A
        THE SECOND EXAMPLE ILLUSTRATES THE USE OF THE "$" FEATURE
        (SEE HELP MACRO).
*:

HELP PATHMOV

SYNTAX:·   PATHMOV FNAME, LNAME, SPEED

        PATHMOV MOVES FNAME TANGENTIALLY ALONG LNAME ACCORDING TO THE
SPEED INDICATED BY A DEV.
        THE FIGURE MUST BE ROTATING IF TANGENTIAL QUALITY IS DESIRED.
OTHERWIZE, FIGURE WILL BE ORIENTED ALONG PATH JUST AS IT WAS ORIGINALLY.
THE FIGURE ALSO SHRINKS AS IT MOVES INTO THE Z AXIS.

EXAMPLE: PATHMOV BFLY, TSINE, D0
*

HELP PENOFF

SYNTAX: PENOFF

        PENOFF TURNS THE LIGHT PEN OFF.

*

-HELP PENSEN

SYNTAX: PENSEN LNAME

PENSEN MAKES A LNAME SENSITIVE TO LIGHT PEN HITS, AND TURNS
OFF THE PREVIOUS PENSEN ASSIGNMENT. ONLY ONE LNAME
MAY BE PENSEN'D AT A TIME.

EXAMPLE: PENSEN TARGET

*HELP POINTS

SYNTAX: POINTS LNAME

POINTS CHANGES LNAME'S VECTORS TO DISPLAY ONLY THE ENDPOINTS.

EXAMPLE: POINTS MOREY
*

HELP PRINT
SYNTAX: PRINT DNAME.EXT[30,X]

PRINT IS THE SAME AS TYPE BUT IT CREATES HARDCOPY ON THE
DECWRITER INSTEAD OF DISPLAY ON THE VT05. PRINT RUNS AS
A SUBJOB AND CANNOT BE EASILY STOPPED.

EXAMPLE: PRINT DRAW.MAC
                  PRINT WITCH.DEC[30,1]
*

-HELP PUTDSK

SYNTAX: PUTDSK DNAME.EXT

PUTDSK PUTS DNAME OUT TO YOUR AREA ON THE DISK IN THE FORMAT
INDICATED BY THE EXTENSION.
          EXTENSIONS:
                  .BIN   BINARY
                  .DEC   DECIMAL (DEFAULT)
                  .MAC   MACRO
                  .VGN   VECTOR GENERAL FORMAT
          .BIN PRESERVES DEVICE ASSIGNMENTS AND OTHER MOTION INFORMATION.
THE OTHERS DO NOT.   .VGN AND .BIN MAY BE USED WITH ANY LNAME.
.DEC MAY ONLY BE USED WITH 3-D NON-SHADED DATA. YOU CANNOT
WRITE ON ANYONE ELSE'S AREA.

EXAMPLES: PUTDSK DRAW.MAC
                  PUTDSK WITCH.VGN
                  PUTDSK BLOB.BIN
                  PUTDSK GLOBE
                  PUTDSK WITCH.DEC
*

HELP PUTLIB

SYNTAX: PUTLIB PNAME

        PUTS PNAME INTO NON-DISPLAYED DATA STRUCTURE. REMOVES
PNAME FROM HIGHER GROUPS IF ANY. PNAME MUST BE DISPLAYED.
ALL COMMANDS WORK ON PUTLIB'D PICTURES EXCEPT THOSE EXPLICITLY
STATED NOT TO BY THE COMMAND DESCRIPTION ITSELF.

EXAMPLE: PUTLIB OUTLINE
*

HELP PUTPOI

SYNTAX: PUTPOIN X, Y, Z, K

        PUTPOIN PUTS A POINT INTO THE LNAME INDICATED BY AN OPENO.
X, Y, Z ARE ANY EXPRESSIONS DETERMINING THE X, Y, AND Z COORDINATES OF THE
POINT IN DECIMAL (RANGE -2048 TO 2047). K INDICATES THE FOLLOWING:
        K=0   DRAW THE VECTOR
        K=1   MOVE TO A NEW PLACE BUT DO NOT DRAW (JUMP)
        K=-1   END OF LIST
NOTE THAT (UNLIKE GETPOIN) IF K=-1, THE LAST X, Y, Z ARE IGNORED
(I.E. THE LAST POINT SHOULD BE SPECIFIED
        PUTPOIN 0, 0, 0, -1
TO TERMINATE THE LIST). ALSO NOTE THAT THE FIRST POINT AUTOMATICALLY
IS STORED AS K=1

EXAMPLE: PUTPOIN D0/16, D1/16/D2/16, 1
                  PUTPOI A, B, C, 0
                  PUTPOI 0, 0, 0, -1
        THIS WILL CREATE A PICTURE WITH A LINE DRAWN FROM THE
INSTANTANEOUS POSITIONS OF D0, D1, AND D2 TO THE POSITIONS
OF THE VARIABLES A, B, AND C. (THE /16 IS NECESSARY BECAUSE DIALS
ARE READ LEFT JUSTIFIED.)
*

HELP READ

SYNTAX: READ DOSDEVICE

        READ CHANGES THE READ DEVICE FOR TYPE AND PRINT TO THE NEW
PDP-11 DIRECTORY DEVICE.

SWITCH:
        NONE   FOR TYPE JOB
        /P   FOR PRINT JOB

EXAMPLE: READ/P DF
                  PRINT GRASS. MAP[30, 4]
*

HELP REMARK

SYNTAX: REMARK *   ANY TEXT YOU WANT FOR COMMENTS
                                    UNTIL A DELIMITER IS SEEN!*

        THE FIRST CHARACTER AFTER THE COMMAND IS TAKEN AS A
DELIMITER AND ALL THE FOLLOWING TEXT UNTIL THE DELIMITER IS SEEN AGAIN
IS TAKEN AS COMMENTS. REMARK IS USEFUL FOR DOCUMENTING MACROS.

EXAMPLE: REMARK % THIS MACRO MAKES FLIES FLY
                                    ON DIAL 0, AND THE JOYSTICK
                        %

HELP RENAME

SYNTAX: RENAME ANAME1, ANAME2

        RENAME REPLACES ANAME1 WITH ANAME2 IN THE NAME TABLE.
IT IS USEFUL IF A NAME HAS TO BE CHANGED TO BRING ANOTHER COPY OF
A CORE RESIDENT PICTURE INTO CORE, OR TO PUTDSK A MODIFIED
PICTURE WHOSE NAME IS ALREADY ON THE DISK.

SWITCHES:
        NONE   AS ABOVE
        /D   RENAMES DISK FILE ON YOUR AREA

EXAMPLES: GETDSK HITCH
                 RENAME HITCH, OLDLADY
                 GETDSK HITCH
        NOW THERE ARE TWO COPIES OF HITCH IN MEMORY.

                 RENAME/D HITCH. DEC, LADY. DEC
        HITCH. DEC IS NOW CALLED LADY. DEC ON THE DISK.

HELP RESTART

SYNTAX: RESTART

        RESTART RE-INITIALIZES THE ENTIRE GRASS SYSTEM.

HELP RESUME

SYNTAX: RESUME

        USED ONLY TO RETURN FROM VT05 INPUT MODE TO A MACRO IN EXECUTION
OR TO A FS15-INTERRUPTED GETDSK.

EXAMPLE: *GETDSK GLOBE
                         (PUSH FS15)
                 #ROTATE GLOBE, X, D0
                 @RESUME
                         (FINISH GETDSK)
                 * ..ETC
        ALSO SEE "WAIT" WHICH IS USED FOR GETTING VT05
        INPUT WHEN IN A MACRO.

HELP ROTATE

SYNTAX: ROTATE FNAME,AXIS,SPEED,TILT,ORIGIN

        ROTATE TAKES THE FNAME AND ROTATES IT ACCORDING TO THE
AXIS (MUST BE INDICATED AS 'X', 'Y', OR 'Z') AT THE
SPEED (OR WITH /D, THE ANGLE) INDICATED BY A DEV. IF INCLUDED,
THE TILT MODIFIES THE AXIS ACCORDING TO THE SETTING OF A DEV.
IF INCLUDED, ORIGIN TAKES DEV,DEV+1, AND DEV+2 FOR THE
ORIGIN OF THE AXIS OF ROTATION.

SWITCHES:
        NONE   FAST ROTATION
        /S   SLOW ROTATION
        /D   DEV INDICATES ANGLE OF ROTATION INSTEAD OF SPEED

EXAMPLES: ROTATE PROP,X,D9
                  ROT/S GLOBE,A
                  ROT/D CUBE,Z,D8
                  ROTATE GLOBE,X,D0,D1
                  ROTATE BLADE,Z,D0,D1,D2
                  ROTATE SAM,X,D0,D1,A
                  ROTATE/D FRED,K,L,F

HELP SCALE

SYNTAX: ·   SCALE FNAME,FACTOR

     ·   SCALES FNAME BY FACTOR INDICATED BY A DEV.

SWITCHES:
        NONE   USES HARDWARE SCALE WHICH SCALES TO PICTURE'S 0,0,0
                  AS MODIFIED BY MOVE,ROTATE,ETC.
        /X   SCALES ALONG X AXIS (SINGLE DIMENSIONAL SCALING).
        /Y   SCALES ALONG Y AXIS
        /Z   SCALES ALONG Z AXIS
        /A   SINGLE DIMENSIONAL SCALING ON DEV,DEV+1 AND DEV+2
        SCALING WITH SWITCHES ALSO ALLOWS THE ORIGIN OF SCALE TO BE
        RESET BY USING SETORG COMMAND

EXAMPLES: SCALE TOM,D0
                  SCALE/X NOSE,D9
                  SCALE/A SPIRAL,J
        THE LAST LINE TAKES J FOR X SCALE, K FOR Y SCALE AND L FOR
        Z SCALE.

HELP SETCUT

SYNTAX: SETCUT,PNAME,VALUE

     SETCUT SETS THE CUTOFF PLANE ACCORDING TO THE VALUE
SPECIFIED BY A DEV. IF DEV IS SET TO BE SLIGHTLY NEGATIVE,
THEN VARYING THE INTENSITY SET BY SETINT WILL MOVE THE CUTOFF
PLANE WITH RESPECT TO THE Z-AXIS.

EXAMPLE: SETCUT GLOBE,D8
*

 HELP SETDELA

SYNTAX: ... _ SETDELA DELAY

     THE DELAY, INDICATED BY A DEV, IS USED TO SLOW DOWN GETDSK
FOR .DEC AND.VGN MODES.   SETDELA REMAINS SET FOR THE REST
OF YOUR SESSION OR UNTIL RESET BY, FOR EXAMPLE
     A=0
     SETDELA A

EXAMPLE: SETDELA D0
*

 HELP SETINT

SYNTAX:.   ...   SETINT PNAME,VALUE

     SETINT SETS THE INTENSITY OF THE PNAME AS INDICATED BY THE
DEV USED FOR VALUE.

SWITCHES:
     NONE   CHANGES INTENSITY FOR ENTIRE PNAME
     /S   FOR USE WITH 3-D SHADED OBJECTS ONLY.   FS13
                 IS USED TO GO FROM SURFACE TO SURFACE,
                 SETTING THE INTENSITY ON THE DEV INDICATED.

EXAMPLE: SETINT GLOBE,D0
                  SETINT/S CUBE,D9
*

SYNTAX: SHADE OUTLINE,SHADE-LINES,SPACING,DEGREES

     SHADE HAS MANY OPTIONS.   THE OUTLINE IS ALWAYS A 3-D DATA
LNAME (WHICH SHOULD BE PLANAR FOR THE EXPECTED EFFECT).   SHADE LINES
ARE BUILT IN A NEW LNAME ACCORDING TO THE SWITCH INDICATED.   SPACING
IS AN EXPRESSION WHICH CONTROLS HOW FAR THE LINES ARE SPACED APART
(3 IS THE DEFAULT).   DEGREES INDICATES THE ANGLE OF THE SHADING
LINES (/P, /N, /3, AND /4 MODES ONLY)

SWITCHES:

    NONE   2-D AUTO-INCREMENT SHADING.   VERY ECONOMICAL FOR FILLING
             CONVEX AREAS DRAWN IN X-Y PLANE ONLY.   (ONE WORD PER
             VECTOR.)

    /P   PARALLEL 2-D SHADING.   BETTER QUALITY SHADING THAN AUTO-
             INCREMENT MODE.   (TWO WORDS PER VECTOR.)

    /M   2-D AUTO-INCREMENT SHADING WHICH OBSERVES JUMPS.   (E. G.
             IT WILL SHADE A DONUT CORRECTLY WHEREAS NO-SWITCH MODE
             WILL NOT).   (ONE WORD PER VECTOR PLUS JUMPS.)

    /N   PARALLEL /M MODE (TWO WORDS PER VECTOR PLUS JUMPS.)

    /3   3-D SHADING WHICH LEAVES OUTLINE VISIBLE.   INCLUDES
             HIDDEN SURFACE AND INTENSITY INFORMATION.   (THREE
             WORDS PER VECTOR.)   ALL THREE-DIMENSIONAL SHADING
             REQUIRES CLOSED SURFACES IN A PLANE WITH THE ENDPOINTS
             REPEATED IN THE CASE OF ADJACENT PLANES.   IF HIDDEN
             SURFACE EFFECT IS DESIRED IN THE CONVEX CASE, SURFACES
             MUST BE SPECIFIED IN A COUNTER-CLOCKWIZE ORDER AS THE
             OBJECT IS ROTATED INTO VIEW.

    /4   LIKE /3 EXCEPT THAT THE OUTLINE IS REMOVED.
    /5   OPTIMIZED /3.   THIS IS THE ONE NORMALLY USED.
    /6   OPTIMIZED /4.

EXAMPLES: SHADE/5 WITCH,OLDLADY
                 SHADE/P BOX,PLANE,10,45
                 SHADE BLOB,NEWBLOB,17
*:

HELP SKIP

SYNTAX: SKIP EXPRESSION

     SKIP IS USED TO TRANSFER CONTROL WITHIN A MACRO FOR LOOPING
EXPRESSION MUST EVALUATE TO A NUMBER WHICH, IF NEGATIVE,SKIPS BACKWARDS
THAT NUMBER OF LINES; IF POSITIVE, CONTROL SKIPS FORWARD THAT
NUMBER OF LINES.   NUMBERS LARGER THAN POSSIBLE WITHIN THE
MACRO WILL RESULT IN TRANSFER TO THE FIRST STATEMENT OF THE PROGRAM IF
NEGATIVE, OR PAST THE LAST (AND THUS EFFECTIVELY A RETURN) IF POSITIVE.

EXAMPLE: <X=X+1
                 PROMPT X
                 IF FS1=0, SKIP -2>
     THIS EXAMPLE WILL INCREMENT X AND PRINT IT UNTIL FS1 IS PUSHED.
*:

HELP SMOOTH
SYNTAX: SMOOTH LNAME,NUMBER

     SMOOTH USES A MODIFIED QUADRATIC SMOOTHING TECHNIQUE TO
SMOOTH THE 3-D LNAME THE NUMBER OF TIMES INDICATED BY AN EXPRESSION.

EXAMPLES: SMOOTH PATH,7
                 SMOOTH GLOBE,11/8-A*D0
*:

HELP SOFT

SYNTAX: SOFTROT LNAME

        SOFTROT TAKES THE VARIOUS HARDWARE MODIFICATIONS TO THE LNAME
(SPECIFICALLY ROTATION, MOVING, AND SCALING) AND SOFTWARE ALTERS
THE DISPLAY LIST TO GIVE ACTUAL VECTORS REPRESENTING THESE CHANGES.
SOFTROT THEN DOES A RESET TO HALT FURTHER HARDWARE ROTATION, MOVING,
SCALING, UNTIL THE USER RE-ROTATES, ETC.. (IF HE DOES). A PUTDSK WOULD
THEN PUT THE TRANSFORMED LIST ONTO THE DISK. TOO MANY SOFTROT'S WILL
SLOWLY DESTROY THE PICTURE DUE TO ROUNDOFF ERRORS.

EXAMPLE: ROT GLOBE, Y, D0
                SCALE GLOBE, D1
                SOFTROT GLOBE

HELP TEXT

SYNTAX: TEXT CNAME, LNAME
                +ONE LINE OF ANY TEXT EXCLUDING "<" AND ">"

        TEXT AUTOMATICALLY CALLS THE CHARACTER SET CNAME INTO CORE AND
IF NECESSARY AND CREATES AN LNAME CONSISTING OF CHARACTER
SUBROUTINE CALLS. DO NOT DELETE THE CNAME, OTHERWISE THE LNAME WILL
INSTANTLY CAUSE THE SYSTEM TO CRASH. EACH LNAME REPRESENTS ONE AND ONLY
ONE LINE OF TEXT. THE AVAILABLE CHARACTER SETS ARE AS FOLLOWS:

        ROM2   DOUBLE LINE ROMAN FONT (UPPER AND LOWER, COMPLETE
                PUNCTUATION)
        SCR   SINGLE LINE SCRIPT FONT (UPPER AND LOWER)
        SCR2   DOUBLE LINE SCRIPT FONT (UPPER AND LOWER)
        MAP   SELECTED MAP SYMBOLS
        ITALL   LOWER CASE ITALIAN GOTHIC FONT
        ITALU   UPPER CASE ITALIAN GOTHIC FONT
        ENGL   LOWER CASE ENGLISH GOTHIC FONT
        ENGU   UPPER CASE ENGLISH GOTHIC FONT
        RUSL   LOWER CASE CYRILLIC FONT
        RUSU   UPPER CASE CYRILLIC FONT
TO INDICATE LOWER CASE IN CHARACTER SETS WITH BOTH UPPER AND LOWER CASE,
YOU MUST TYPE A "~" BEFORE EACH LOWER CASE CHARACTER TO BE USED. A
DOUBLE "~" (I.E. "~~") IS USED AS A SHIFT LOCK. IF "~~" IS USED,
"\" MUST BE USED TO INDICATE AN UPPER CASE LETTER.
"\\" WILL SHIFT LOCK TO UPPER CASE AGAIN.

EXAMPLES: TEXT ITALL, TOM
                THIS IS AN EXAMPLE

                TEXT SCR2, SAM
                G~~RAPHICS\ \SYMBIOSIS\ \SYSTEM
NOTE THAT SPACES MUST BE ENTERED AS UPPER CASE CHARACTERS. PUNCTUATION
IN THOSE SETS WHERE AVAILABLE, IS INDICATED BY THE SAME PUNCTUATION
CHARACTER BEING TYPED. MAP AND RUSU\RUSL HAVE SPECIAL CORRESPONDANCES
AVAILABLE FROM THE SYSTEMS PROGRAMMERS.

HELP TREE

SYNTAX: TREE

TREE GIVES THE USER A DIAGRAM OF HIS DATA STRUCTURE. IT LISTS
THE PICTURES AND GROUPS IN THE DISPLAYED STRUCTURE BY NAME,
INDICATING GROUPING LEVELS AND HIERARCHIES BY TABS.
TREE ALSO CHECKS OUT THE DATA STRUCTURE AND INFORMS THE USER BY AN ERROR
MESSAGE IF HIS DATA STRUCTURE CONTAINS IMPROPER GROUPS (GROUPS ACROSS
LEVELS, FOR INSTANCE) WHICH WOULD CAUSE PROBLEMS IF COMPOUND
TRANSFORMATIONS WERE APPLIED.   IF THE ERROR MESSAGE IS SEEN, THE USER
SHOULD PUTLIB ALL HIS PICTURES AND THEN GETLIB THEM ONE BY ONE, GROUPING
WHERE NECESSARY, AND CHECKING THE INTEGRITY OF THE STRUCTURE BY USING
TREE PERIODICALLY.

HELP TYPE

SYNTAX: TYPE DNAME. EXT[30,X]

TYPE TYPES THE DNAME FROM THE AREA INDICATED BY "[30,X]"
THE DNAME IS TYPED ON THE VT05 AND MAY BE ABORTED BY TYPING:
"^C". IF NO "[30,X]" IS INDICATED, THE DEFAULT IS TO YOUR
AREA.

EXAMPLES: TYPE DRAW. MAC
                 TYPE WITCH. DEC

HELP UNFILM

SYNTAX: UNFILM

          RESETS TO NORMAL RUN MODE AFTER FILMING WAS USED.   ("U" IS
          ENOUGH TO TRIGGER THIS COMMAND.)

HELP WAIT

SYNTAX: .   WAIT

WAIT CAUSES THE MACRO TO WAIT FOR THE USER TO TYPE ON THE VT05.
IT INHIBITS THE EXECUTION OF THE MACRO UNTIL THE USER TYPES "RESUME. "
WAIT IS USEFUL FOR INTERACTION WITH THE USER DURING THE USE OF A
LONG MACRO.

EXAMPLE: <....
                 PROMPT "TYPE HELP FOLLOWED BY THE COMMAND NAME"
                 PROMPT "IF THERE IS A COMMAND THAT YOU DO NOT GROK. "
                 PROMPT "TYPE RESUME WHEN YOU WISH TO CONTINUE WITH THIS
                 PROMPT "SELF-HELP MACRO"
                 WAIT
                 ....>

HELP WARP

SYNTAX: WARP LNAME,DEV1,DEV2

:   WARP CHANGES THE SHAPE OF LINE SEGMENTS ACCORDING TO
THE POSITION OF THE DEV'S.   WARP IS MUCH EASIER TO USE IF THE WARP MACRO
IS USED.   THIS MACRO GETS A CURSOR, SETS THE DIALS FOR MOVING THE CURSOR
AND ALLOWS THE USER TO SWITCH WARP MODES.   THE LNAME MUST
NOT BE IN MOTION OR BE SCALED (IF IT IS, USE SOFTROT).
THE WARP MACRO OVERLAY IS FAIRLY SELF-EXPLANATORY.

SWITCHES:
         .NONE   WARPS LINE BUT PRESERVES ENDPOINTS
         /B   WARPS LINE BETWEEN CHOSEN POINTS (USE WARP MACRO)
         /M   TRANSLATES PART OF PICTURE BETWEEN JUMPS TO CURSOR
                   POSITION

EXAMPLE: USE WARP MACRO
*

HELP WRITE

SYNTAX: WRITE DOSDEVICE

     WRITE IS THE SAME AS READ EXCEPT THAT IT CHANGES THE
PUTDSK DEVICE.
*

HELP COMPIL

SYNTAX: .   COMPILE MNAME1,MNAME2

          COMPILE RESOLVES %LABEL PSEUDO-LABELS IN MNAME1. IF A
MACRO HAS PSEUDO-LABELS, COMPILE MUST BE USED BEFORE IT CAN BE
EXECUTED.,   PSEUDO-LABELS ARE USED TO ELIMINATE THE TASK OF COUNTING
LINES FOR SKIP ARGUMENTS IN LONG MACROS.   MNAME1 IS AUTO-DELETED.
IF MNAME1 IS CALLED FROM THE DISK, OR PUTDSK'D BEFORE IT IS COMPILE'D
IT MUST HAVE THE EXTENSION .MCS.

EXAMPLE: GLOB:<IF FS1, SKIP %FLUFF
                   SKIP -1
                   %FLUFF: DIRCOR>
                   COMPIL GLOB,CGLOB
          CGLOB NOW LOOKS LIKE:
                   CGLOB:<IF FS1,SKIP 2
                   SKIP -1
                   DIRCOR>
          GLOB IS AUTO-DELETED AND CGLOB CAN BE EXECUTED.

*