IDENTIFICATION

PRODUCT CODE:	DEC-12-AJAA-LA
PRODUCT NAME:	FOCAL-12 LISTING
DATE CREATED:	JANUARY 11, 1971
MAINTAINER:	SOFTWARE SERVICES

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                        /FOCL12,37
                        /COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
                        FMODE                   /********
                        FIXMRI FPOW=5000/PSEUDO-FLOATING POINT INSTRUCTIONS.
                        FIXMRI FADD=1000
                        FIXMRI FSUB=2000
                        FIXMRI FMUL=4000
                        FIXMRI FDIV=3000
                        FIXMRI FGET=0000
                        FIXMRI FPUT=6000
                7000    FNOR=7000
                0200    FEXT=0
                0000    FXIT=0
                4407    FINT=JMS I 7
                6101    SMP=6101
                        /MISCELLANEOUS ITEMS
                0001    *1
0021  5403               JMP I .+2       /INTERRUPT PROCESSOR ENTRY .
0022  0000    LWETMP, 0                   /********
0023  2603                      INTRPT
0024  0034    DDTJR,  DDTJR   /USED FOR DEBUGGING
0025  0013    P13,    13      /CONSTANT
0026  0100    C100,   100     /CONSTANT
                0000    T=00            /TEXT FIELD NO.
                0000    P=00            /PROGRAM FIELD NO.
                7000    CDF=7000        /(X=MEM) - OPR
0027  6400              FPNT    /ADDRESS OF FLOATING POINT INTERPRETER, (LOC *7)
                        /AUTO-INDEX REGISTERS = (START OF SAVE BY QUAD)
0010  0000    AXIN,   0       /STORAGE INDEX (LOC *10)
0011  0000    XRT,    0       /EXTRA XR
0012  0000    XRT2,   0       /EXTRA XR
0013  3670    PDLXR,  BEGIN-1 /PUSHDOWN LIST INDEX REGISTER.
0014  3117    FLTXR,  IOBUF-1 /XR FOR FLOATING POINT
0015  0000    FLTXR2, 0       /EXTRA FOR F.P.
0016  7402    TELSW,  HLT     /TELETYPE IN PROGRESS SWITCH
                0017    TEXTP=. /TEXT POINTERS (LOC *17)
0017  3214    AXOUT,  FRSTX   /OUTPUT INDEX
0020  0000    XCT,    0       /UNPACK SWITCH
0021  0000    GTEM,   0       /UNPACK STORAGE
0022  2407    PC,     FLTZER  /PROGRAM COUNTER
0023  0000    THISLN, 0       /LINE POINTER FROM 'FINDLN'
0024  0000    THISOP, 0       /CURRENT 'EVAL' OPERATION
0025  0000    LASTLN, 0       /BACK POINTER FROM 'FINDLN'
0026  0001    DEBGSW, 1       /DEBUG SWITCH  1 NON-ZERO FOR LITERAL.
0027  0000    PACKST, 0       /RUBOUT PROTECTION
0030  0000    PT1,    0       /VARIABLE POINTER
0031  3216    LASTV,  BUFBEG  /ADDRESS OF LAST VARIABLE
0032  0000    T1,     0       /TEMPORARY REGISTER - MAIN
0033  0000    T3,     0       /TEMP REGISTER FOR OUTPUT
0034  0000    INBUF,  0       /KEYBOARD INPUT BUFFER
0035  4617    BOTTOM, FEXP-1  /********/LAST LOCATION CURRENTLY AVAILABLE IN FIELD ZERO **
0036  0000    INSUB,  0       /0= GETC1 #0 = READC
0037  0000    HINBUF, 0       /HIGH SPEED INPUT BUFFER
                        /PAGE ZERO OF THE
                        /FLOATING POINT ARITHMETIC INTERPRETER FOR FOCAL
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                *40
EX1,    .       /OPERAND STORAGE
AC1H,   .
AC1L,   .
OVER1,  .
FLAC=,  /FLOATING ACCUMULATOR
EXP,    0       /F.A.
HORD,   0
LORD,   0
OVER2,  .
SIGNF,  0               /FLOATIN SIGN
MINSK1, ACMINS          /NEGATE FLAC SUBROUTINE
FISW,   2004            /OUTPUT FORMAT
INTEGER,FIX             /FIX FLAC
GETSGN=TAD FLAC+1
RETURN=JMP I EFUN31
                *54
                /VARIABLES    =   INITIALIZED FOR THE DIALOGUE
SORTCN, 0       /NUMBER IN TABLE FROM SORTC
LASTOP, 0       /LAST OPERATION FOR EVAL
EFOP=,          /FUNCTION CODE.
ATSW,   0       /ASK-TYPE SWITCH
CNTR,   -20     /DELETE AND ERROR COUNTER(USED BY F.P. ALSO)
STARTV=,        /=END FOR 8K
BUFR,   BUF3EG  /NEXT LOCATION IN BUFFER = LAST LOCATION OF TEXT.
QADD,   0               /********
XCTIN,  133     /PACK SWITCH
OUTDEV, XOUTL   /POINTER TO OUT. SUB.   (OUTL)=FOR DEBUGGING
INDEV,  XI33    /POINTER TO IN. SUB.    (I33)=FOR DEBUGGING
NAGSW,  0001    /NOT ALL AND/OR GROUP SWITCH(4000=ONE)1=ALL)0=GROUP))(0000)=FOR TSS-8
CHAR,   215     /THE MOST IMPORTANT REGISTER
LINENO, 0000    /LINE NUMBER READ BY GETLN;(0400)=FOR TSS-8
GINC,   WORDS*2 /=6 FOR 4=WORD = CONSTANT
T2,     2       /TEMP REGISTER = FOR NEW INST. ROUTINES.
                /FOR DEBUGGING, SET OUTL AND I33 INTO OUTDEV AND INDEV)
                /ALSO PATCH THE ERROR ROUTINE = FOUR
                /PATCHES PLUS TWO FOR THE HIGH SPEED READER.
        0072    LIST6=, /INPUT LIST FOR "SFOUND".
0072    0214            214     /F.F.
0073    0207            207     /BELL
        0074    LIST7=,
0074    0203            203     /CONTROL=C FOR DEBUGGING AND TSS8
0075     337    P337,   337     /LEFT ARR
0076    0212    CLF,    212     /L.F.
        0077    LIST3=, /EXCRETION LIST
0077    0215    CCR,    215     /LIST BRANCHER.
0100    7402    DMPSW,  HLT     /(SEARCH CHARACTER)=VARIABLE
                /=0000 FOR TRACE ON.
                /THE REST OF PAGE ZERO IS PURE TO THE MULTI-USER SYSTEM
         101    M100=,
0101    7700    P7700,  7700    /LEFT MASK
0102     256    PER,    256     /PERIOD
0103    7701    M77,    -77     /EXTEND CODE TEST
0104    7600    P7600,  7600    /GROUP MASK
0105    7760    M20,    -20     /CONSTANT
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111     0106  0177    P177,   177     /STEP MASK
112     0107  0017    P17,    17      /BCD MASK
113     0110  0277    P277,   277     /"?"
114     0111  7776    M2,     -2      /CONSTANT
115     0112  7477    MINUSA, -301    /CONSTANT
116     0113  0260    C260,   260     /ASCII FOR ZERO
117     0114  7540    M240,   -240    /SPACE TEST
118     0115  7522    MPER,   -256    /PERIOD TEST
119     0116  7563    MCR,    -215    /C.R. TEST
120     0117  7775    MFLT,   -WORDS  /= -4 FOR 4-WORD
121     0120  7773    M5,     -5      /PAREN TEST
122     0121  7767    M11,    -11     /PAREN TEST
123     0122  0077    P77,    77      /RIGHT MASK
124     0123  0200    C200,   200     /CONSTANTS
125     0124  4000    P4000,  4000    /NAGSW TEST CONSTANT (FOR PDP-5)
126     0125  2032    FLARGP, FLARG   /DATA ADDRESS
127     0126  2157    PTCH,   CHIN    /GENERAL CHARACTER INPUT ROUTINE.
128     0127  5715    DOUBLE, MULT2   /MULTIPLY FLAC BY 2
129     0130  6000    FOUTPUT,FLOUTP  /FLOATING OUTPUT
130     0131  6200    FINPUT, FLINTP  /FLOATING INPUT
131     0132  3140    COMBUF, COMEIN  /COMMAND BUFFER START
132     0133  3206    CFRS,   FRST    /ADDRESS OF DUMMY LINE.
133     0134  3140    END,    COMEIN  /FIRST LOCATION USED IN 8K.
134     0135  3216    ENDT,   BUFBEG  /START OF STORAGE AREA **
135     0136  2021    EFUN3I, EFUN3   /FUNCTION RETURN
136     0137  2407    CFRSX,  FLTZER  /POINTER TO ZERO DATA
137
138
139                   /'FINPUT' USES CHAR AND GETC OR READC TO DEVELOP
140                   /A NUMBER WHICH IS THEN STORED VIA PT1.
141             0003  WORDS=3 /OR 4
142                   /NEW INSTRUCTIONS!
143             4540  PUSHJ=JMS I .   /RECURSIVE SUBROUTINE CALL
144     0140    0521          XPUSHJ
145             1413  POPA=TAD I PDLXR/RESTORE AC
146             5541  POPJ=JMP I .    /SUBROUTINE RETURN
147     0141    1565          XPOPJ
148             4542  PUSHA=JMS I .   /SAVE AC
149     0142    0477          XPUSHA
150             4543  PUSHF=JMS I .   /SAVE GROUP OF DATA
151     0143    0534          PD2
152             4544  POPF=JMS I .    /RESTORE GROUP
153     0144    0554          PD3
154             4545  GETC=JMS I .    /UNPACK A CHARACTER
155     0145    2274          UTRA
156             4546  PACKC=JMS I .   /PACK A CHARACTER
157     0146    2542          PACBUF
158             4547  SORTJ=JMS I .   /SORT AND BRANCH ON AC OR CHAR
159     0147    1312          SORTB
160             4550  SORTC=JMS I .   /SORT CHAR
161     0150    0721          XSORTC
162             4551  PRINTC=JMS I .  /PRINT AC OR CHAR
163     0151    2465          OUT
164             4552  READC=JMS I .   /READ DATA INTO CHAR AND PRINT IT
165     0152    2157  RDIV,   CHIN
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                4553    PRNTLN=JMS I ,  /PRINT C(LINENO)
0153    2425            xPRNT
                4554    GETLN=JMS I ,   /UNPACK AND FORM A LINENUMBER
0154    3?2             xGETLN
                4555    FINDLN=JMS I ,  /SEARCH FOR A GIVEN LINE
0155    2244            xFIND
                4556    ENDLN=JMS I ,   /INSERT LINE POINTERS
0156    2360            xENDLN
                4557    RTL6=JMS I ,    /ROTATE LEFT SIX
0157    1413            xRTL6
                4560    SPNOR=JMS I ,   /IGNORE SPACES AND LEADING ZEROS
0160    1535            xSPNOR
                4561    TESTN=JMS I ,   /PERIOD, OTHER, NUMBER
0161    1546            xTESTN
                4562    TSTLPR=JMS I ,  /SKIP IF 5<SORTCN<= 11 (I.E. AN L=PAR)
0162    2037            LPRTST
                4563    TSTGRP=JMS I ,  /SKIP IF G(AC) = G(LINENO)
0163    1744            GRPTST
                4564    TESTC=JMS I ,   /TERM, NUMBER, FUNCTION, LETTER= AND IGNORE SPACES.
0164    1700            xTESTC
                4565    DELETE=JMS I ,  /REMOVE OLD TEXT LINE
0165    2064    PSIN,   xDELETE
                4566    ERROR2=JMS I ,  /EXCESS SOMETHING ERROR
                4566    ERROR3=JMS I ,  /MISCELLANEOUS ERROR
                4566    ERROR4=JMS I ,  /FORMAT ERROR
0166    2726            ERR2
                        /USED BY 8K
                        /FOCAL'S COMMAND/INPUT DRIVER
                4167    *167                    /********
0167    0000    SUBS2,  0                       /********
0170    0000    LESUB2, 0                       /********
0171    0000    SUBS,   0                       /********
0172    6163    LEPUT,  LEPUT                   /********
0173    0000    LESUBS, 0                       /********
0174    7657    PWAIT,  WAIT                    /********
0175    7672    PCLEAR, CLEAR                   /********
0176    3601            BEGIN   /BECOMES (RECOVR+1) **
0177    7610    START,  SKP CLA                 /PROGRAM START FROM SELF
0200    5576            JMP I .+2               /CONSOLE START, SW=200,
0201    1137            TAD CFRSX               /(PC) => 0
0202    3022            DCA PC                  /FOR COMMAND MODE
0203    7001            IAC                     /USE ONE IN THE AC TO
0204    3100            DCA DMPSW               /INIT UNPACK AND TRACE SWITCH,
0205    3026            DCA DEBGSW              /ENABLE TRACE FOR INPUT OF (?),
0206    1226            TAD COMBOT              /PROTECT COMMAND BUFFER,
0207    3013            DCA POLXR               /NO PATCH TEST,
0210    1225            TAD CSTAR               /ANNOUNCE PRESENCE
0211    4551            PRINTC                  /BY TYPING THE LEAD-IN CHARACTER
0212    1132    IBAR,   TAD COMBUF              /INITIALIZE COMMAND BUFFER
0213    3210            DCA AXIN                /FOR UNPACKING,
0214    3762            DCA XCTIN
0215    1132            TAD COMBUF              /RUBOUT PROTECTION
0216    3027            DCA PACKST
0217    4552    IGNOR,  READC                   /READ COMMAND STRING
0220    4547            SORTJ
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                        LIST7=1
                        INLIST=LIST7
          PACKC         /SAVE STRING CHARACTER,
          JMP IGNOR
CSTAR,    252           /ACKNOWLEDGE CHARACTER
COMBOT,   COMEOUT+12    /END OF COMMAND BUFFER,LESS PROTECTION COUNT.
          /COMMAND/INPUT PROCESSOR
IRETN,    PACKC         /START TO PACK C.R.
          PACKC         /FINISH C.R.
          TAD COMBUF    /INITIALIZE "TEXTP"
GONE,     DCA AXOUT     /SETUP CURRENT LINE
          DCA XCT
          GETC          /READ FIRST CHARACTER,
          TAD BOTTOM    /INIT PUSH-DOWN-LIST
          DCA PDLXR
          SPNOR         /IGNORE LEADING BLANKS
          TESTN         /DOES THE LINE BEGIN WITH 1-9?
          JMP GZERR     /PERIOD =ILLEGAL GROUP ZERO USAGE
          JMP INPUTX    /NO
          ISZ DEBGSW    /YES,DISABLE TRACE FOR REPACKING
          GETLN         /READ THIS LINE NUMBER
          TAD P4000     /TEST  FOR SINGLE LINE,
          TAD NAGSW
          SZA CLA
          ERROR3        /ILLEGAL LINE NUMBER ON INPUT
          TAD BUFR      /SET POINTERS
          DCA AXIN
          DCA XCTIN
          TAD LINENO    /SAVE LINE #
          DCA I AXIN    /(X-MEM)
          SPNOR         /IGNORE SPACES AFTER LINE NUMBER
          SKP
          GETC          /READ 1ST AFTER LINENO TERMINATOR,
SRETN,    PACKC         /SAVE TEXT AND RESTORE DATA FIELD
          TAD CHAR      /TEST FOR END OF INPUT STRING
          TAD MCR
          SZA CLA
          JMP .-5
          DELETE        /REMOVE OLD LINE, IF ANY,
          ENDLN         /INSERT NEW LINE
          JMP START     /POINTERS MUST BE REINITIALIZED
INPUTX,   PUSHJ         /PROCESS IMMEDIATE COMMAND,
                PROC
          TAD I PC      /CHECK NEXT LINE (X-MEM)
          SNA           /END OF PROGRAM?
          JMP START     /YES
          DCA PC        /SAVE NEW LINE NO,
          TAD PC        /START NEW LINE
          IAC
          JMP GONE      /PROCESS OTHER COMMANDS
/TEXT LINE BUFFER FORMAT*
/#1 : POINTER OR ZERO IN LAST
/#2 : LINENO
/#3 - #N-1 : TEXT
/#N : C.R.
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```
                        /LINE NUMBER FORMATION
0302  0000      XGETLN, 0                   /DEVELOP I.D. = "GETLN"
0303  4562              SPNOR               /IGNORE LEADING SPACES.
0304  1066              TAD CHAR            /"ALL" IS A SPECIAL ARGUMENT.
0305  1112              TAD MINUSA
0306  7650              SNA CLA
0307  5322              JMP TESTA
0310  3036              DCA INSUB           /CALL 'GETC' FROM 'INPUT' VIA 'DECON'
0311  4771              JMS I LCON          /(DECONV - IN FLOAT.)
0312  1047              TAD FLAC+3          /GROUP TOO LARGE?
0313  0372              AND P7740
0314  1046              TAD FLAC+2
0315  7640              SZA CLA
0316  4566              ERROR2              /GROUP NUMBER TOO LARGE
0317  1047              TAD FLAC+3
0320  4557              RTL6
0321  7004              RAL
0322  3067      TESTA,  DCA LINENO
0323  4561              TESTN               /TEST3
0324  4545              GETC                /READ STEP NUMBER.
0325  4561              TESTN               /TEST4, OTHER
0326  5340              JMP GERR            /DOUBLE PERIODS
0327  5352              JMP GEXIT           /OTHER
0330  1054              TAD SORTCN          /NUMBER
0331  7106              RTL CLL
0332  1054              TAD SORTCN
0333  7004              RAL
0334  1067              TAD LINENO
0335  3067              DCA LINENO
0336  4545              GETC                /READ SECOND STEP NUMBER.
0337  4561              TESTN               /TEST4, OTHER
0340  4566      GERR,   ERROR4              /DOUBLE PERIODS
0341  5352              JMP GEXIT           /OTHER
0342  1054              TAD SORTCN          /NUMBER
0343  1067              TAD LINENO
0344  3067              DCA LINENO
0345  4545              GETC                /TEST FOR CORRECT TERMINATOR
0346  4561              TESTN               /CHECK SIZE
0347  5340              JMP GERR            /.
0350  7410              SKP
0351  4566              ERROR2              /TOO LARGE A LINE NUMBER.
0352  7100      GEXIT,  CLL                 /CLEAR LINK BIT
0353  1067              TAD LINENO          /TEST FOR GROUP NUMBER.
0354  0104              AND P7600
0355  7640              SZA CLA
0356  7020              CML
0357  1067              TAD LINENO
0360  0106              AND P177            /REPARE "NAGSW"
0361  7460              SNL SZA
0362  4566      GZERR,  ERROR2              /0.X = ERROR:ILLEGAL LINE NUMBER.
0363  7640              SZA CLA
0364  1373              TAD P2000
0365  7020              CML
0366  7004              RAL
0367  3065              DCA NAGSW
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                        JMP I XGETLN
                LCON,   DECONV
                P7740,  7740
                P2000,  2000
                /RANGE OF ACCEPTIBLE LINE NUMBERS = 1,21 TO 31,99
                /NAGSW:
                /GROUP=2000
                /LINE=4000
                /ALL=0001
                /LIST OF FUNCTION ADDRESSES. (NAMES ARE IN "FNTABL")
        0374    FNTABF=.
0374    2016            XABS    /ABS    =ABSOLUTE VALUE
0375    2012            XSGN    /SGN    =SIGN PART
0376    1156            XINT    /ITR    =INTEGER PART
0377    7602            XDISP   /DIS    /********
0400    1145            XRAN    /RAN    =RANDOM NUMBER
0401    1341            XADC    /ADC    =READ ANALOG TO DIGITAL CONVERTER
0402    5000            ARTN    /ATN    =
0403    4620            FEXP    /EXP    =EXPONENTIAL FUNCTIONS
0404    5040            FLOG    /LOG    =
0405    5204            FSIN    /SIN    =TRIG FUNCTIONS
0406    5177            FCOS    /COS    =
0407    7490            XSQRT   /SQT    =SQUARE ROOT
0410    2725    PFNEW,  ERROR5  /NEW    =USER DEFINED FUNCTIONS
0411    2725    PFX,    ERROR5  /FX     /********
0412    2725    PFZ,    ERROR5  /FZ     /********
0413    0000    XRTL6,  0       /ROTATE AC LEFT SIX = "RTL6"
0414    7106            CLL RTL
0415    7006            RTL
0416    7006            RTL
0417    5613            JMP I XRTL6
                /RECURSIVE OPERATE, EXECUTE, OR CALL
0420    4554    DO,     GETLN           /EXECUTE ONE LINE, A GROUP,OR ALL
0421    1022            TAD PC          /SAVE ADDRESS
0422    4542            PUSHA           /OF CURRENT LINE
0423    4543            PUSHF           /SAVE REST OF THIS LINE
0424    0017                    TEXTP   /ADDRESS OF TEXT POINTERS
0425    4543    DGRP,   PUSHF           /SAVE NAGSW: CHAR: AND LINENO,
0426    1065                    NAGSW
0427    1065            TAD NAGSW       /CHECK DATA FROM GETLN,
0430    7710            SPA CLA         /SKIP IF GROUP OR ALL
0431    5263            JMP DODNE       /DO ONE LINE
0432    4555            FINDLN          /INIT FOR GROUP AND SET THISLN
0433    7000            NOP
0434    1023            TAD THISLN      /TEST FOR GOOD GROUP NUMBER,
0435    3011            DCA XRT
0436    1411            TAD I XRT       /(X-MEM)
0437    4563            TSTGRP
0440    4566            ERROR2          /NO SUCH GROUP NUMBER
0441    4543    DGRP1,  PUSHJ           /EXECUTE OBJECT LINE AND SET PC,
0442    1646                    PROCESS-2
0443    4544            POPF            /RESTORE THE DATA
0444    1065                    NAGSW
0445    1422            TAD I PC        /CHECK FOR END OF TEXT (X-MEM)
0446    7450            SNA
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 306  0447  5271          JMP DCONT       /ALL DONE
 307  0450  7001          IAC
 308  0451  3030          DCA PT1         /SAVE POINTER TO LINENO
 309  0452  1065          TAD NAGSW       /CHECK FOR GROUP
 310  0453  7741          SMA SZA CLA
 311  0454  5260          JMP .+4         /DO ALL
 312  0455  1430          TAD I PT1       /TEST GROUP (X=MEM)
 313  0456  4563          TSTGRP
 314  0457  5271          JMP DCONT       /NOT IN GROUP
 315  0460  1430          TAD I PT1       /READ NEXT LINE NO. (X=MEM)
 316  0461  3067          DCA LINENO
 317  0462  5225          JMP DGRP        /CONTINUE THE SUBROUTINE
 318  0463  4555  DOONE,  FINDLN          /FIND THE LINE
 319  0464  4566          ERROR2          /NO SUCH LINE NUMBER
 320  0465  4540          PUSHJ           /EXECUTE IT
 321  0466  1610                PROCESS
 322  0467  4544          POPF            /RESTORE CHAR
 323  0470  1065                NAGSW
 324  0471  4544  DCONT,  POPF            /RESTORE TEXT POINTERS
 325  0472  1017                TEXTP
 326  0473  1413          POPA            /RESTORE ADDRESS OF CURRENT LINE,
 327  0474  3022          DCA PC
 328  0475  5676          JMP I .+1       /CONTINUE PROCESSING THIS LINE,
 329  0476  1611                PROC
 330                      /PUSHDOWN LIST CONTROLS
 331  0477  0000  XPUSHA, 0               /PUSHDOWN THE AC = "PUSHA"
 332  0500  3071          DCA T2          /BACKUP POINTER
 333  0501  7040          CMA             /AND THEN
 334  0502  4310          JMS PCHK        /CHECK CORE USAGE
 335  0503  1071          TAD T2          /OK
 336  0504  3413          DCA I PDLXR     /PUSH DOWN LIST POINTER
 337  0505  7040          CMA             /BACKUP AGAIN
 338  0506  4310          JMS PCHK
 339  0507  5677          JMP I XPUSHA
 340  0510  0000  PCHK,   0
 341  0511  1013          TAD PDLXR       /INC IN AC
 342  0512  3013          DCA PDLXR
 343  0513  1013          TAD PDLXR
 344  0514  7141          CIA CLL
 345  0515  1031          TAD LASTV
 346  0516  7630          SZL CLA
 347  0517  4566          ERROR3          /STORAGE FILLED BY PUSH-DOWN LIST
 348  0520  5710          JMP I PCHK
 349  0521  0000  XPUSHJ, 0               /RECURSIVE SUBROUTINE CALL = "PUSHJ"
 350  0522  1721          TAD I XPUSHJ
 351  0523  3071          DCA T2          /SAVE SUBR. ADDR.
 352  0524  7040          CMA
 353  0525  4310          JMS PCHK
 354  0526  1321          TAD XPUSHJ
 355  0527  7001          IAC
 356  0530  3413          DCA I PDLXR     /SAVE RETURN
 357  0531  7040          CMA
 358  0532  4310          JMS PCHK
 359  0533  5471          JMP I T2        /TRANSFER CONTROL
 360  0534  0000  PD2,    0               /SAVE A FLOATING POINT NUMBER = "PUSHF"
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 441  0535  7240            CLA CMA          /COMPUTE VARIABLE ADDR
 442  0536  1734            TAD I ,-2
 443  0537  3311            DCA XRT
 444  0540  2334            ISZ PD2          /FIX RETURN
 445  0541  1117            TAD MFLT         /COMPUTE PUSH, POINTER
 446  0542  4310            JMS PCHK
 447  0543  1117            TAD MFLT
 448  0544  3371            DCA T2
 449  0545  1411            TAD I XRT
 450  0546  3413            DCA I PDLXR
 451  0547  2071            ISZ T2
 452  0550  5345            JMP .-3
 453  0551  1117            TAD MFLT         /RESET POINTER
 454  0552  4310            JMS PCHK
 455  0553  5734            JMP I PD2
 456
 457
 458  0554  0000  PD3,      0                / RESTORE A FLOATING POINT NUMBER = "POPF"
 459  0555  7240            CLA CMA          /GET VAR, ADDR,
 460  0556  1754            TAD I PD3
 461  0557  2354            ISZ PD3
 462  0560  3011            DCA XRT
 463  0561  1117            TAD MFLT
 464  0562  3071            DCA T2
 465  0563  1413            TAD I PDLXR      /MOVE
 466  0564  3411            DCA I XRT
 467  0565  2071            ISZ T2
 468  0566  5363            JMP .-3
 469  0567  5754            JMP I PD3        /EXIT
 470        0570  INLIST=.          /INPUT CONTROL CHARACTERS
 471  0570  2740                    RECOVR   /C.C. = BREAK
 472  0571  0212                    IBAR     /B.A. = RESTART
 473  0572  0217                    IGNOR    /L.F. = IGNORE
 474  0573  0227                    IRETN    /C.R. = TERMINATE STRING
 475  0574  1075  FLIST2: FLIMIT   /,=STANDARD
 476  0575  1137                    FINFIN   /)=SHORT
 477  0576  2725                    ERROR5   /CR=DUMB
 478  0577  1065  FLIST1: FINCR    /,=STANDARD FORMAT
 479  0600  0610                    PROCESS  /)=SETIPLUS ,,,
 480  0601  0614                    PC1      /C.R.=SET COMMAND.
 481  0602  7472  MF,       -306    /USED BY TESTC
 482              /PRIMARY CONTROL AND TRANSFER
 483  0603  4554  GOTO,     GETLN            /READ THE LINE NUMBER REQUESTED
 484  0604  4555             FINDLN          /LOCATE IT AND RESET TEXTP
 485  0605  4566             ERROR2          /NOT THERE
 486  0606  1023             TAD THISLN      /SET PC
 487  0607  3022             DCA PC
 488  0610  4545  PROCESS,GETC              /TEST FOR END OF LINE
 489  0611  1066  PROC,     TAD CHAR         /FIRST CHARACTER READY = USE PROC
 490  0612  1116             TAD MCR
 491  0613  7650             SNA CLA
 492  0614  5541  PC1,      POPJ             /EXIT "PROCESS"
 493  0615  4550             SORTC           /IGNORE "SPACE",",", AND ")",
 494  0616  0374                     GLIST-1
 495  0617  5210             JMP PROCESS
```

```
                        TAD CHAR        /SAVE COMMAND CHARACTER
                        AND P337        /EXECUTE LOWER CASE ALSO
                        PUSHA
                        GETC            /GO TO TERMINATOR
                        SORTC
                                GLIST-1
                        SKP
                        JMP .+4
                        POPA
                        SORTJ           /GO TO COMMAND
                                COMLST-1
                                COMGO-COMLST
                        ERROR2          /ILLEGAL COMMAND
COMMENTS-PC1            /ALSO IS CONTINUE


                        /OUTPUT COMMAND TEXT
WRITE,  GETLN           /SET LINENO
                        ISZ DEBGSW      /DISABLE TRACE
                        FINDLN          /SEARCH FOR LINE NUMBER
                        JMP WTESTG      /NOT THERE OR GROUP
                        TAD LINENO
                        SZA CLA
                        PRNTLN          /PRINT LINE NUMBER AND A SPACE,
                        GETC
                        PRINTC          /PRINT TEXT OF A LINE,
                        TAD CHAR
                        TAD MCR
                        SZA CLA         /SKIP IF END OF LINE
                        JMP .+5
                        TAD I THISLN    /TEST FOR END OF TEXT (X-MEM)
WTEST2, SNA
                        JMP WX-2        /EXIT;DO NEXT INDIRECT LINE.
                        IAC
                        DCA PT1         /SAVE POINTER TO LINENO OF NEXT
                        TAD NAGSW
                        SMA CLA
                        TAD I PT1       /(X-MEM)
                        TSTGRP          /TRY NEXT LINENO FOR GROUP,
                        JMP WX
WALL,   TAD I PT1       /SET LINENO (X-MEM)
                        DCA LINENO
                        JMP WRITE+2
WTESTG, TAD THISLN      /INIT GROUP PRINTOUT
                        JMP WTEST2
                        DCA DEBGSW
                        POPJ
WX,     TAD NAGSW
                        SPA SNA CLA     /SKIP IF ALL
                        JMP WX-2
                        PRINTC          /PRINT C.R. AGAIN
                        JMP WALL
XTESTC, 0               /TEST THE NATURE OF THE NEXT ALPHANUMERIC - "TESTC"
                        SPNOR           /IGNORE SPACES
                        SORTC           /TEST THE VARIABLE TERMINATORS
```

```
                        TERMS-1
                JMP I XTESTC    /YES - SORTC' IS SET
                TAD CHAR        /NO
                ISZ XTESTC
                TAD MF
                SNA CLA         /TEST FOR "F"
                JMP XT3
                TESTN
                JMP I XTESTC    /,
                SKP             /OTHER
                JMP I XTESTC    /NUMBER
                ISZ XTESTC
XT3,            ISZ XTESTC      /RETURNS:T;N;F;A
                JMP I XTESTC
XSORTC, 0       /SORT CHAR AGAINST TABLE - "SORTC"
                TAD I XSORTC
                DCA XRT2        /1ST ARG IS LIST-1
                TAD I XRT2
                SPA             /LIST IS ENDED BY A NEGATIVE NUMBER
                JMP SEXC        /2AND EXIT - NOT IN LIST
                CIA
                TAD CHAR
                SZA CLA         /COMPARE
                JMP .+6
                TAD I XSORTC    /COMPUTE INCREMENT ; 0 - N
                CMA
                TAD XRT2
                DCA SORTCN
                SKP             /1ST EXIT - YES
SEXC,           ISZ XSORTC
                ISZ XSORTC
                CLA CLL
                JMP I XSORTC
GRPTST, 0       /AC VS LINENO - "TSTGRP"
                AND P7600
                CIA
                DCA T2
                TAD LINENO
                AND P7600
                TAD T2
                SNA CLA
                ISZ GRPTST
                JMP I GRPTST
/INPUT FROM TEXT OR KEYBOARD!
/IF BACK-ARROW, RESTART INPUT
INPUT,  0               /INPUT A CHARACTER
                TAD INSUB       /NON-ZERO FOR KEYBOARD
                SZA CLA
                JMP .+3
                GETC
                JMP I INPUT
                READC
                SORTJ
                        SPECIAL-1
                        INFIX-SPECIAL
```

```
0770  5756              JMP I INPUT
0771  1035    ILIST,    IF1             /,
0772  0610              PROCESS         /;
0773  0614              PC1             /CR
                                /ENGLISH-FRENCH
       774    COMLST=.,                 /COMMAND DECODING LIST
0774  0323              323     /SET     - ORGANIZE
0775  0306              306     /FOR     - QUAND
0776  0311              311     /IF      - SI
0777  0304              304     /DO      - FAIZ
1000  0307              307     /GOTO    - VA
1001  0303              303     /COMMENT- COMMENTE
1002  0301              301     /ASK     - DEMANDE
1003  0324              324     /TYPE    - TAPE
1004  0317              317     /OUTPUT /********
1005  0305              305     /ERASE   - BIFFE
1006  0327              327     /WRITE   - INSCRIS
1007  0315              315     /MODIFY - MODIFIE
1010  0321              321     /QUIT    - ARRETE
1011  0322              322     /RETURN - RETOURNE
1012  0314              314     /LIBR*****
              /THIS COMMAND LIST IS SPEED OPTIMIZED.


              /CONDITIONAL TRANSFER PROCESS.
1013  4564    IF,       TESTC                   /IGNORE SPACES AND TEST
1014  4637              JMS I IECALL    /T
1015  2013              ISZ PDLXR       /N=DUMP THE (EFOP)
1016  4640              JMS I IPART     /F=CHECK FOR PAREN MATCH
1017  1111              TAD M2          /A
1020  3032              DCA T1
1021  1045              TAD FLAC+1      /TEST -,0,+
1022  7510              SPA
1023  2032              ISZ T1          /N=TO   -1,-2,-3
1024  7750              SPA SNA CLA
1025  2032    IF3,      ISZ T1          /COUNT COMMAS
1026  7410              SKP
1027  5765              JMP I COMGO+4   /TRANSFER
1030  4547              SORTJ           /SEARCH TEXT UNTILL ,;C.R.
1031  1375                      TLIST-1
1032  7373                      ILIST-TLIST
1033  4545              GETC
1034  5230              JMP .-4
1035  4545    IF1,      GETC            /MOVE PAST COMMA
1036  5225              JMP IF3
1037  1601    IECALL,   ECALL
1040  2051    IPART,    PARTEST
              /LOOP CONTROL STATEMENT
      1241    SETT=.,                   /SUBSET OF "FOR".
1041  4540    FOR,      PUSHJ           /LOOPS, ETC.
1042  1401                      GETARG  /LOOK FOR "=" NEXT
1043  4560              SPNOR           /IGNORE SPACES
1044  1066              TAD CHAR
1045  1335              TAD MEQ
1046  7440              SZA
```

```
661  1147  4566            ERROR4          /LEFT OF "=" IN ERROR! 'FOR' OR 'SET'
662  1150  1330            TAD PT1
663  1151  4542            PUSHA           /SAVE POINTER TO VARIABLE
664  1152  4540            PUSHJ
665  1153  1612                    EVAL-1  /GET INITIAL VALUE EXPRESSION
666  1154  1413            POPA
667  1155  3030            DCA PT1
668  1156  4407            FINT            /INITIALIZE NOW.
669  1157  6430            FPUT I PT1
670  1160  7000            FXIT
671  1161  4547            SORTJ           /TEST LAST CHAR FROM "EVAL"
672  1162  1375                    TLIST-1
673  1163  7201                    FLIST1-TLIST
674  1164  4566            ERROR4          /EXCESS R-PAR
675  1165  1030    FINCR,  TAD PT1         /SAVE VARIABLE ADDRESS *
676  1166  4542            PUSHA
677  1167  4540            PUSHJ           /EVALUATE THE INCREMENT,IF ANY.
678  1170  1612                    EVAL-1
679  1171  4547            SORTJ           /TEST TERMINATORS
680  1172  1375                    TLIST-1
681  1173  7176                    FLIST2-TLIST
682  1174  4566            ERROR4          /ILLEGAL TERMINATOR IN 'FOR'
683  1175  4543    FLIMIT, PUSHF           /SAVE THE INCREMENT,    *
684  1176  2032                    FLARG
685  1177  4540            PUSHJ           /GET THE LIMIT(NO ERROR DETECTION AFTER LIMIT)
686  1200  1612                    EVAL-1
687  1201  4543    FCONT,  PUSHF           /SAVE THE LIMIT *
688  1202  2032                    FLARG
689  1203  4543            PUSHF           /SAVE TEXT OF OBJECT STATEMENTS
690  1204  4017                    TEXTP
691  1205  4540            PUSHJ           /DO THE OBJECT STATEMENTS
692  1206  4610                    PROCESS
693  1207  4544            POPF            /RESTORE REMAINING TEXT.
694  1210  4017                    TEXTP
695  1211  4544            POPF            /GET LIMIT
696  1212  2032                    FLARG
697  1213  4544            POPF            /GET INCREMENT
698  1214  7470                    ITER1
699  1215  1413            POPA            /GET VARIABLE ADDRESS
700  1216  3030            DCA PT1
701  1217  4407            FINT            /INCREMENT AND TEST
702  1220  6430            FGET I PT1      /LOAD THE VARIABLE
703  1221  1733            FADD I FINKP    /INCREMENT IT
704  1222  6430            FPUT I PT1      /CHANGE IT
705  1223  2525            FSUB I FLARGP   /TEST IT
706  1224  7000            FXIT
707  1225  1045            TAD FLAC+1
708  1226  7740            SMA SZA CLA
709  1227  5541            POPJ            /END OF LOOP
710  1230  1330            TAD PT1
711  1231  4542            PUSHA           /SAVE ADDRESS *
712  1232  4543            PUSHF           /SAVE INCREMENT AGAIN *
713  1233  7470    FINKP,          ITER1
714  1234  5301            JMP FCONT
715  1235  7503    MEQ,    -275
```

```
                        XCOM,   -254
                        FINFIN, PUSHF           /SET INCREMENT TO ONE.
                                        FLTONE
                                JMP FCONT
                                /
                                /SAME FRAN + JUST MOVED
                                /
1142  7200              RANO,   0000            /********
1143  2000                      2000            /********
1144  0000                      0000            /********
1145  4407              XRAN,   FINT            /********
1146  1342                      FADD    RANO    /********
1147  4755                      FMUL I  CRUDDY  /********
1150  6342                      FPUT    RANO    /********
1151  7000                      FXIT            /********
1152  3342                      DCA     RANO    /********
1153  3044                      DCA     FLAC    /********
1154  5536                      JMP I   EFUN3I  /********
1155  6160              CRUDDY, RANMUL          /********
                                /TAKE THE INTEGER PART
1156  4453              XINT,   JMS I INTEGER   /(FIX)
1157  7200                      CLA
1160  5536                      JMP I EFUN3I
      1161              COMGO=. /COMMAND ROUTINE ADDRESSES
1161  1041                      SETT
1162  1041                      FOR
1163  1013                      IF
1164  0420                      DO
1165  0603                      GOTO            /(REFERENCED)
1166  0614                      COMMENT
1167  1200                      ASK
1170  1201                      TYPE
1171  7706                      OUTPUT          /********
1172  2206                      ERASE
1173  0635                      WRITE
1174  1254                      MODIFY
1175  0177                      START   /RETURN TO COMMAND MODE VIA 'QUIT'
1176  1563                      RETRN
1177  6346                      LTAPE           /********
                                /INPUT-OUTPUT STATEMENTS
1200  7240              ASK,    CLA CMA         /REMEMBER WHICH CALL.
1201  3056              TYPE,   DCA ATSW
1202  4547              TASK,   SORTJ           /SPECIAL CHAR? *****
1203  1367                              ALIST=1
1204  1200                              ATLIST=ALIST
1205  2056                      ISZ ATSW        /TEST QUOTE SWITCH
1206  5223                      JMP TYPE2
1207  4540                      PUSHJ           /DO ASK; SETUP PT1
1210  1401                              GETARG
1211  1066                      TAD CHAR        /SAVE IN-LINE CHARACTER,
1212  4542                      PUSHA
1213  1253                      TAD COL         /TYPE COLON
1214  4551                      PRINTC          /(CLA)= TO SUPRESS "1"
1215  2036                      ISZ INSUB       /INDICATE 'READC'
1216  7001                      IAC             /POINT PAST CHAR
```

```
 771  1220  4531          JMS I FINPUT    /READ DATA AND SAVE
 772  1221  1413          POPA            /RE-TEST LAST TERMINATOR
 773  1222  3066          DCA CHAR
 774  1223  5230          JMP ASK         /CONTINUE PROCESSING
 775  1224  4542  TYPE2,  PUSHJ           /DO TYPE
 776  1225  1613                EVAL
 777  1226  4530          JMS I FOUTPUT   /PRINT
 778  1227  5201          JMP TYPE
 779  1230  2026  TQUOT,  ISZ DEBGSW      /DISABLE TRACE
 780  1231  4545          GETC            /TYPE LITERALS
 781  1232  4547          SORTJ
 782  1233  1531                TLIST2-1
 783  1234  1645                TLIST3-TLIST2
 784  1235  4551          PRINTC
 785  1236  5230          JMP TQUOT+1
 786  1237  4545  TINTR,  GETC            /PASS PERCENT SIGN
 787  1240  4554          GETLN           /READ FORMAT CONTROL: "X7,03"
 788  1241  1067          TAD LINENO
 789  1242  3052          DCA FISW        /SAVE FORMAT CODE
 790  1243  5202          JMP TASK
 791  1244  1077  TCRLF2, TAD CCR        /SPLAT=CR ALONE
 792  1245  4463          JMS I OUTDEV
 793  1246  7001          IAC             /NON-PRINTING DELAY FOR C,R, *****
 794  1247  1077  TCRLF,  TAD CCR        /EXCLAMATION POINT=CR,LF,
 795  1250  4551          PRINTC
 796  1251  3026  TASK4,  DCA DEBGSW      /*
 797  1252  4545          GETC            /*
 798  1253  5202          JMP TASK
 799  1254  0272  COL,    272             /":"
 800                      /IF DEBGSW=0 ! ENABLE FLIP-FLOP "DMPSW"
 801                      /       #0: DISABLE AND RETURN ALL"?" ! S,
 802                      /IF DMPSW = 0! TRACE ON, IF ENABLED
 803                      /       #0: TRACE OFF
 804                      /IF BOTH = 0 ! PRINT TRACE,
 805                      /SEARCH ROUTINES
 806  1255  4554  MODIFY, GETLN           /READ LINE NO,
 807  1256  4555          FINDLN          /LOOK IT UP NOW,
 808  1257  4566          ERROR2          /NOT THERE = BAD COMMAND UNLESS ZERO,
 809  1260  1060          TAD BUFR        /SET POINTERS
 810  1261  3010          DCA AXIN        /FOR INPUT
 811  1262  3062          DCA XCTIN
 812  1263  1067          TAD LINENO      /COPY THE SAME LINE NUMBER,
 813  1264  3410          DCA I AXIN      /(X-MEM)
 814  1265  1010          TAD AXIN        /SAVE START OF NEW LINE
 815  1266  3027          DCA PACKST
 816  1267  4464  SCONT,  JMS I INDEV     /READ THE TELETYPE INPUT SILENTLY,
 817  1270  3130          DCA LIST3+1     /SAVE SEARCH CHARACTER
 818  1271  2026          ISZ DEBGSW      /NO BREAKS,
 819  1272  4545  SCHAR,  GETC            /TYPE=TEST=F,F,
 820  1273  4551          PRINTC          /PLAYBACK THE TEXT
 821  1274  4547          SORTJ           /LOOK FOR MATCH
 822  1275  1276                LIST3-1
 823  1276  1267                LISTGO-LIST3
 824  1277  4546          PACKC           /SAVE NEW LINE,
 825  1300  5271          JMP SCHAR
```

```
      1300  1062   SBAR,  TAD BUFR        /RESTART-B.A.
      1301  7001          IAC
      1302  3012          DCA AXIN        /SET POINTERS
      1303  3062          DCA XCTIN
      1304  4552   SFOUND, READC          /READ FROM KEYBOARD
      1305  4547          SORTJ           /TEST
      1306  0071                  LIST6-1
      1307  1267                  SRNLST-LIST6
      1310  4546   SGOT,  PACKC           /PACK CHAR.
      1311  5304          JMP SFOUND      /MORE
      1312  0000   SORTB, 0       /SORT AND BRANCH ROUTINE, - "SORTJ"
      1313  7450          SNA
      1314  1066          TAD CHAR        /ASSUME CHAR IF AC=0
      1315  7041          CIA
      1316  3071          DCA T2          /SAVE SORT ITEM
      1317  1712          TAD I SORTB     /FIRST ARG IS LIST LESS ONE
      1320  2312          ISZ SORTB       /2AND IS INTRA-LIST LENGTH
      1321  3012          DCA XRT2
      1322  1412          TAD I XRT2
      1323  7510          SPA             /**LISTS ENDED BY NEGATIVE NUMBERS**
      1324  5336          JMP SEX         /READ EXIT
      1325  1071          TAD T2          /FIND ADDRESS
      1326  7640          SZA CLA
      1327  5322          JMP .-5
      1330  1012          TAD XRT2        /MATCH FOUND.
      1331  1712          TAD I SORTB
      1332  3071          DCA T2
      1333  1471          TAD I T2
      1334  3071          DCA T2          /DEBUG : AC = ADDRESS
      1335  5471          JMP I T2
      1336  2312   SEX,   ISZ SORTB       /MATCH NOT FOUND.
      1337  7300          CLA CLL
      1340  5712          JMP I SORTB     /RETURN TO CALLING SEQUENCE.
                   /ANALOGUE TO DIGITAL CONVERSION FOR PDP-12
      1341  4453   XADC,  JMS I INTEGER
      1342  0360          AND     O37     /********
      1343  1357          TAD     OSAMP   /********
      1344  3347          DCA     .+3     /********
      1345  6002          IOF             /********
      1346  6141          6141    /LINC   /********
      1347  0100          0100    /SAM ?  /********
      1350  0002          0002    /PDP    /********
      1351  6001          ION             /********
      1352  3045          DCA     FLAC+1  /********
      1353  3046          DCA     FLAC+2  /********
      1354  7326          CLA CLL CML RTL /********
      1355  3044          DCA     FLAC    /********
      1356  5536          JMP I   EFUN3I  /********
      1357  0100   OSAMP, 0100    /SAM 0  /********
      1360  0037   O37,   37              /********
            1361   SRNLST=.       /'MODIFY' CONTROL CHARACTER TABLE
      1361  1271          SCHAR   /F.F. = CONTINUE
      1362  1266          SCONT   /BELL = CHANGE SEARCH CHARACTER
      1363  2740          RECOVR  /C.C. = BREAK
      1364  1330          SBAR    /B.A. = RESTART
```

```
1365  1267          SCONT+1 /L.F. = FINISH THE LINE AS BEFORE.
      1366  LISTGO=.
1366  1261          SRETN   /C.R. = END THE LINE HERE AS IS.
1367  1310          SGOT    /CHAR = SEARCH CHARACTER
      1370  ALIST=. / ASK/TYPE LIST OF CONTROLS.
1370  0245          245     /%
1371  0242          242     /"
1372  0241          241     /!
1373  0243          243     /#
1374  0244          244     /$///
      1375  GLIST=.
1375  0240          240     /SPACE
      1376  TLIST=.
1376  0254          254     /,
1377  0273          273     /;
1400  0215          215     /C.R.
            /THIS LIST IS ENDED BY 'TESTC'.
            /FIND OR ENTER A VARIABLE IN THE LIST.
1401  4564  GETARG, TESTC           /FIRST LETTER OF ARG
1402  7200  P7200,  7200            /******** LETS F THRU
1403  4566          ERROR4          /********
1404  7000          NOP             /********
1405  3062  GETVAR, DCA XCTIN       /PACK INTO ADD.
1406  4546          PACKC
1407  4545          GETC            /SECOND LETTER
1410  4550          SORTC           /TERMINATOR?
1411  1771                  TERMS-1
1412  5224          JMP GSERCH      /YES
1413  1066          TAD CHAR        /NO
1414  0122          AND P77         /SAVE 2AND LETTER OF NAME
1415  1061          TAD QADD
1416  3061          DCA QADD
1417  4545          GETC            /IGNORE THE REST
1420  4550          SORTC
1421  1771                  TERMS-1
1422  5224          JMP GSERCH
1423  5217          JMP .-4
1424  4562  GSERCH, TSTLPR          /LOOK FOR SUBSCRIPT VIA SORTCN
1425  5235          JMP GS1         /NOT SUBSCRIPTED BY L-PAR.
1426  1061          TAD QADD                /SAVE NAME
1427  3056          DCA EFOP        /FOR RECURSIVE AND ERROR CHECK
1430  4663          JMS I GECALL    /TO EVAL
1431  1413          POPA
1432  3061          DCA QADD                /RESTORE NAME
1433  4662          JMS I PTEST     /TEST PAREN MATCH, ETC.
1434  4453          JMS I INTEGER   /CONVERT TO 12-BIT NUMBER.
1435  3171  GS1,    DCA SUBS        /SAVE SUBSCRIPT
1436  1061          TAD     QADD    /******** LETS F THRU
1437  0131          AND     P7700   /********
1440  1202          TAD     P7200   /********
1441  7650          SNA CLA         /********
1442  5322          JMP     FFF     /********
1443  1060          TAD STARTV      /SEARCH FOR VARIABLE(CHANGE FOR X-MEM)
1444  3030  GS3,    DCA PT1
1445  1030          TAD PT1
```

```
 936  1446  7041            CIA
 937  1447  1031            TAD LASTV       /TEST FOR END OF LIST
 938  1450  7751            SPA SNA CLA
 939  1451  5264            JMP GS2         /END SEARCH
 940  1452  1430            TAD I PT1       /GET TABLE ENTRY
 941  1453  7041            CIA
 942  1454  1061            TAD QADD
 943  1455  7650            SNA CLA
 944  1456  5312            JMP GFND1       /FOUND XX
 945  1457  1030  GS4,      TAD PT1         /TRY NEXT ONE
 946  1460  1070            TAD GINC
 947  1461  5244            JMP GS3
 948  1462  2051  PTEST,    PARTEST
 949  1463  1601  GECALL,   ECALL
 950  1464  1031  GS2,      TAD LASTV       /ADD THE VARIABLE
 951  1465  1005            TAD P13         /TEST STORAGE LIMITS
 952  1466  7141            CIA CLL
 953  1467  1013            TAD POLXR
 954  1470  7620            SNL CLA
 955  1471  4566            ERROR3
 956  1472  1031            TAD LASTV       /UPDATE THE LIST.
 957  1473  1070            TAD GINC
 958  1474  3031            DCA LASTV
 959  1475  1061            TAD QADD                /SAVE NAME
 960  1476  3430            DCA I PT1
 961  1477  2030            ISZ PT1         /SAVE SUBSCRIPT
 962  1500  1171            TAD SUBS
 963  1501  3430            DCA I PT1
 964  1502  2030            ISZ PT1         /SET PT1
 965  1503  4407            FINT
 966  1504  6537            FGET I CFRSX
 967  1505  6430            FPUT I PT1
 968  1506  6000            FXIT
 969  1507  5541            POPJ            /EXIT
 970  1510  1030  GFND1,    TAD PT1         /FOUND SAME
 971  1511  3011            DCA XRT         /TEST SUBSCRIPTS
 972  1512  1411            TAD I XRT
 973  1513  7041            CIA
 974  1514  1171            TAD SUBS
 975  1515  7640            SZA CLA
 976  1516  5257            JMP GS4         /WRONG SUBSCRIPT
 977  1517  2030            ISZ PT1         /SET POINTER TO DATA
 978  1520  2030            ISZ PT1
 979  1521  5541            POPJ
 980  1522  3030  FFF,      DCA     PT1     /******** SAVES SUBSCRIPT ON F
 981  1523  1061            TAD     QADD    /********
 982  1524  3002            DCA     LWETMP  /********
 983  1525  1045            TAD     HORD    /********
 984  1526  3170            DCA     LESUB2  /********
 985  1527  1171            TAD     SUBS    /********
 986  1530  3167            DCA     SUBS2   /********
 987  1531  5541            POPJ            /********
 988  1532  0242  TLIST2,   242             /********
 989  1533  0215            215             /********
 990  1534  7520  M260,     -260            /********
```

```
                                        /********
1535  0000  XSPNOR, 0                   /IGNORE LEADING SPACES = "SPNOR"
1536  1066          TAD CHAR
1537  1114          TAD M242
1540  7640          SZA CLA
1541  5735          JMP I XSPNOR
1542  4545          GETC
1543  5336          JMP XSPNOR+1
                                        /******** RECODING FOR SPACE
1544  7506  M272,   -272                /********
1545  0012  012,    12                  /********
                                        /********
                                        /********
1546  0000  XTESTN, 0                   /RETURNS: ;) OTHER) NUMBER = "TESTN"
1547  1066          TAD CHAR
1550  1115          TAD MPER
1551  7640          SZA CLA
1552  2346          ISZ XTESTN
1553  1066          TAD     CHAR        /******** RECODING FOR SPACE
1554  1344          TAD     M272        /********
1555  7100          CLL                 /********
1556  1345          TAD     012         /********
1557  3054          DCA     SORTCN      /********
1560  7430          SZL                 /********
1561  2346          ISZ     XTESTN      /********
1562  5746          JMP I   XTESTN      /********
                                        /********
                    /EXIT FROM A "DO" SUBROUTINE
1563  1137  RETRN,  TAD CFRSX           /(PC) => 0
1564  3022          DCA PC
1565  1413  XPOPJ,  TAD I PDLXR         /RECURSIVE EXIT = "POPJ"
1566  3071          DCA T2
1567  5471          JMP I T2
1570          ATLIST=.                  /ASK=TYPE CONTROL CHARACTER TABLE
1570  1236          TINTR   /% = FORMAT DELIMITER
1571  1227          TQUOT   /" = LITERAL DELIMITER
1572  1246          TCRLF   /! = CARRIAGE RETURN AND LINE FEED
1573  1243          TCRLF2  /# = CARRIAGE RETURN ONLY
1574  3052          TDUMP   /$/= DUMP THE SYMBOL TABLE CONTENTS
1575  1250          TASK4   /SP= TERMINATOR FOR NAMES
1576  1250          TASK4   /, = TERMINATOR FOR EXPRESSIONS
1577  0610          PROCESS /! = TERMINATOR FOR COMMANDS
1600  0614          PC1     /C.R. = TERMINATOR FOR STRINGS
                    /$ = FOR 'TDUMP' TERMINATES THE COMMAND.
                    /EVALUATE AN EXPRESSION WHICH
                    /TERMINATES WITH AN R-PAR,! OR C.R, AND
                    /LEAVE THE RESULT IN FLAC AND IN FLARG,
1601  0000  ECALL,  0        /RECURSIVE CALL TO "EVAL"
1602  1054          TAD SORTCN        /SAVE 'SORTCN','LASTOP',AND 'EFOP'
1603  4542          PUSHA
1604  1055          TAD LASTOP
1605  4542          PUSHA
1606  1056          TAD EFOP          /SAVE FUNCTION CODE.
1607  4542          PUSHA
1610  1201          TAD ECALL         /RETURN TO CALLING
```

```
1046  [illegible]  4542          PUSHA           /ADDRESS AFTER NEXT POPJ
1047  1612  4545                 GETC            /MOVE PAST EXTRA CHARACTER
1048  1613  3055  EVAL,  DCA LASTOP     /EVAUATION CONTROLLER (CHECKPOINT ?)
1049  1614  4564                 TESTC           /TEST CHARACTER AND IGNORE SPACES
1050  1615  5227                 JMP ETERM1      /TERMINATOR
1051  1616  5332                 JMP ENUM        /NUMBER
1052  1617  5343                 JMP EFUN        /FUNCTION
1053  1620  4540                 PUSHJ           /LETTER OF VARIABLE
1054  1621  1405                       GETVAR    /FIND OR CREATE VARIABLE;ALSO SET PT1,
1055  1622  4564  OPNEXT, TESTC           /PT1=>ARG
1056  1623  5244                 JMP ETERMN      /T
1057  1624  0212  ECHOLST,0212             /N=ERROR IN FORMAT
1058  1625  0377                 0377            /F
1059  1626  4566                 ERROR4          /L = MISSING OPERATOR
1060  1627  1137  ETERM1, TAD CFRSX     /SET PT1,
1061  1630  3030                 DCA PT1         /TO POINT TO ZERO
1062  1631  1111                 TAD M2          /TEST FOR UNARY OPERATIONS
1063  1632  1054                 TAD SORTCN
1064  1633  7450                 SNA
1065  1634  5247                 JMP ETERM       /CREATE DUMMY FOR UNARY MINUS
1066  1635  7001                 IAC
1067  1636  7650                 SNA CLA
1068  1637  5323                 JMP ARGNXT      /IGNORE UNARY PLUS
1069  1640  1054                 TAD SORTCN      /TEST FOR NULL PARENS,
1070  1641  1121                 TAD M11
1071  1642  7710                 SPA CLA
1072  1643  5364                 JMP ELPAR       /MIGHT BE AN L-PAR,
1073  1644  4562  ETERMN, TSTLPR
1074  1645  7410                 SKP
1075  1646  4566                 ERROR4          /OPERATOR MISSING BEFORE PAREN
1076  1647  1054  ETERM,  TAD SORTCN      /SET FROM "TESTC"="SORTC"
1077  1650  3024                 DCA THISOP
1078  1651  1024                 TAD THISOP
1079  1652  1121                 TAD M11
1080  1653  7700                 SMA CLA         /END?
1081  1654  3024                 DCA THISOP      /"THISOP" EQUIV. TO END OF EXP,
1082  1655  1024  ETERM2, TAD THISOP      /COMPARE PRIORITIES
1083  1656  7041                 CIA
1084  1657  1055                 TAD LASTOP
1085  1660  7710                 SPA CLA
1086  1661  5310                 JMP EPAR        /CONTINUE
1087  1662  1055                 TAD LASTOP      /FIND OPERATION
1088  1663  7112                 CLL RTR
1089  1664  7012                 RTR
1090  1665  1331                 TAD OPTABL
1091  1666  3274                 DCA FLOP
1092  1667  1055                 TAD LASTOP
1093  1670  7640                 SZA CLA         /TEST FOR END OF DATA INTO FLOATING AC,
1094  1671  4544                 POPF            /GET LAST DATA
1095  1672  0044                       FLAC
1096  1673  4407                 FINT
1097  1674  0000  FLOP,   00              /(FLOPR I PT1)**/
1098  1675  6525                 FPUT I FLARGP   /SAVE RESULT
1099  1676  0200                 FXIT
1100  1677  1125                 TAD FLARGP
```

```
1161  1770  3030            DCA PT1
1162  1771  1024            TAD THISOP
1163  1772  1055            TAD LASTOP      /=07
1164  1773  7650            SNA CLA
1165  1774  5541            POPJ            /EXIT "EVAL"
1166  1775  1413            POPA            /GET PRIOR OP
1167  1776  3055            DCA LASTOP
1168  1777  5255            JMP ETERM2      /COMPARE THIS OP
1169  1710  4562  EPAR,     TSTLPR          /TEST FOR SUB-EXPRESSION
1170  1711  7410            SKP
1171  1712  5366            JMP EPAR2       /GO EVALUATE EXPRESSION
1172  1713  1055            TAD LASTOP      /CONTINUE READING THE EXPRESSION
1173  1714  4542            PUSHA           /SAVE "LASTOP",
1174  1715  1030            TAD PT1
1175  1716  3320            DCA .+2
1176  1717  4543            PUSHF           /SAVE LAST ARGUMENT
1177  1720  .000                  00
1178  1721  1024            TAD THISOP      /MORE TO COME
1179  1722  3055            DCA LASTOP
1180  1723  4545  ARGNXT,   GETC            /READ 1ST CHAR OF AN ARG,
1181  1724  4564            TESTC           /DO SPECIAL CHECK
1182  1725  5364            JMP ELPAR       /COULD BE LEFT PAREN
1183  1726  5332            JMP ENUM        /N
1184  1727  5343            JMP EFUN        /F
1185  1730  5220            JMP OPNEXT-2    /L
1186  1731  0430  OPTABL,   FGET I PT1      /BASE FOR OPERATION COMPUTATION
1187  1732  4543  ENUM,     PUSHF           /TO PROCESS A NUMBER,SAVE AC
1188  1733  7044                  FLAC
1189  1734  1125            TAD FLARGP      /SET POINTER AS FOR A VARIABLE,
1190  1735  3030            DCA PT1
1191  1736  3036            DCA INSUB       /POINT TO 'GETC' AND USE CHAR
1192  1737  4531            JMS I FINPUT    /READ TEXT NUMBER => (PT1)
1193  1740  4544            POPF            /RESTORE THE AC
1194  1741  7044                  FLAC
1195  1742  5222            JMP OPNEXT      /CONTINUE
1196  1743  3056  EFUN,     DCA EFOP        /SET CODE
1197  1744  4545            GETC            /READ FUNCTION NAME.(1,2,OR 3 LETTERS)
1198  1745  4564            TESTC           /******** SEPARATES FILE BECAUSE F DIGIT
1199  1746  5355            JMP     EFUN2   /********
1200  1747  5771            JMP I   PFNUM   /********
1201  1750  7200            NOP             /********
1202  1751  1056            TAD     EFOP    /********
1203  1752  7104            CLL RAL         /MISH-MASH HASH CODE
1204  1753  1066            TAD CHAR
1205  1754  5343            JMP EFUN
1206  1755  4562  EFUN2,    TSTLPR
1207  1756  4566            ERROR4          /MUST BE FOLLOWED BY PARENS TO SET ARGUMENT
1208  1757  4201            JMS ECALL       /CALL "EVAL" TO COMPUTE ARGUMENT
1209  1760  1413            POPA            /BRANCH ON FUNCTION CODE;RETURN VIA EFUN3I.
1210  1761  4547            SORTJ
1211  1762  2166                  FNTABL-1
1212  1763  6205                  FNTABF-FNTABL
1213  1764  4562  ELPAR,    TSTLPR          /LEFT PAREN OR FELL THROUGH FUNCTION TABLE
1214  1765  4566            ERROR4          /DOUBLE OPERATORS OR ILLEGAL FUNCTION NAME,
1215  1766  4201  EPAR2,    JMS ECALL       /EVALUATE NESTED EXPRESSION
```

```
      1767  2213             ISZ PDLXR              /DUMP EXTRA ARG.
      177Ø  5536             JMP I EFUN3I
      1771  6311   PFNUM,    FNUM                   /********
            1772   TERMS=.              /TERMINATOR TABLE FOR 'EVAL' AND 'GETVAR'
      1772  Ø24Ø             24Ø                    /SPACE  Ø
      1773  Ø253             253                    /+      1
      1774  Ø255             255                    /-      2
      1775  Ø257             257                    //      3
      1776  Ø252             252                    /*      4
      1777  Ø336             336                    /UP ARR 5
      2ØØØ  Ø25Ø             25Ø                    /(      6 L-PARS
      2ØØ1  Ø333             333                    /[      7
      2ØØ2  Ø274             274                    /<      1Ø
      2ØØ3  Ø251             251                    /)      11 R-PARS
      2ØØ4  Ø335             335                    /]      12
      2ØØ5  Ø276             276                    />      13
      2ØØ6  Ø254             254                    /,      14
      2ØØ7  Ø273             273                    /;      15
      2Ø1Ø  Ø215             215                    /C.R.   16
      2Ø11  Ø275             275        /= TO END GETARG FROM 'SET'
                   /TWO MINOR FUNCTIONS
      2Ø12  4543   XSGN,     PUSHF                  /TAKE SIGN*1 OF FLARG
      2Ø13  24Ø5                       FLTONE
      2Ø14  4544             POPF
      2Ø15  ØØ44                       FLAC
      2Ø16  1233   XABS,     TAD FLARG+1            /TAKE ABSOLUTE VALUE OF FLAC
      2Ø17  771Ø             SPA CLA                /SKIP TO CONTINUE
      2Ø2Ø  4451             JMS I MINSKI           /NEGATE THE FLOATING AC
                   /CONTINUATION OF FUNCTION CALLS.
      2Ø21  44Ø7   EFUN3,    FINT
      2Ø22  7ØØØ             FNOR                   /NORMALIZE FUNCTION RETURN
      2Ø23  6232             FPUT FLARG             /SAVE FUNCTION VALUE
      2Ø24  ØØØØ             FXIT
      2Ø25  1125             TAD FLARGP             /SET POINTER
      2Ø26  323Ø             DCA PT1
      2Ø27  4251             JMS PARTEST
      2Ø3Ø  5631             JMP I .+1              /FUNCTION RETURN IS OK
      2Ø31  1622                       OPNEXT

      2Ø32  ØØØØ   FLARG,    Ø          /DATA TEMPORARY STORAGE
      2Ø33  ØØØØ             Ø
      2Ø34  ØØØØ             Ø
      2Ø35  ØØØØ             Ø
      2Ø36  ØØØ3   P3,       3
      2Ø37  ØØØØ   LPRTST,   Ø                      /SKIP IF LEFT PAREN, = 'TSTLPR'
      2Ø4Ø  1Ø54             TAD SORTCN
      2Ø41  1121             TAD M11
      2Ø42  77ØØ             SMA CLA
      2Ø43  5637             JMP I LPRTST
      2Ø44  1Ø54             TAD SORTCN
      2Ø45  112Ø             TAD M5
      2Ø46  774Ø             SMA SZA CLA
      2Ø47  2237             ISZ LPRTST
      2Ø5Ø  5637             JMP I LPRTST
      2Ø51  ØØØØ   PARTEST,Ø                        /TEST THE PAREN MATCHINGS
```

```
1211  2052  1413          POPA            /RESTORE LAST OPERATION
1212  2053  3355          DCA LASTOP
1213  2054  1236          TAD P3          /+3 TO COMPARE CODES
1214  2055  1413          POPA            /GET LAST PAREN CODE.
1215  2056  7041          CIA             /CHECK FOR PAREN MATCH.
1216  2057  1054          TAD SORTCN      /(STILL SET FROM THE LAST "EVAL")
1217  2060  7640          SZA CLA         /SKIP IF MATCH
1218  2061  4566          ERROR4          /PAREN ERROR
1219  2062  4545          GETC            /MOVE PAST R-PAR
1220  2063  5651          JMP I PARTEST
1221                /THE DELETE A LINE ROUTINE
1222  2064  0000  XDELETE, 0             /UNCHAIN A LINE AND RECOVER THE SPACE.
1223  2065  6002          IOF             /PROTECT POINTER CHANGES FROM INTERRUPTIONS
1224  2066  4555          FINDLN          /SETS "THISLN" AND "LASTLN".
1225  2067  5664          JMP I XDELETE   /ALREADY GONE
1226  2070  2026          ISZ DEBGSW      /DISABLE TRACE
1227  2071  4545          GETC            /MEASURE LENGTH
1228  2072  1066          TAD CHAR
1229  2073  1116          TAD MCR
1230  2074  7640          SZA CLA
1231  2075  5271          JMP .+4
1232  2076  1017          TAD AXOUT       /SAVE LAST ADDRESS
1233  2077  7040          CMA
1234  2100  1023          TAD THISLN
1235  2101  3057          DCA CNTR        /LENGTH < 0
1236  2102  1133          TAD CFRS        /IT IS ILLEGAL TO DELETE THE FIRST LINE
1237  2103  7041          CIA
1238  2104  1023          TAD THISLN
1239  2105  7650          SNA CLA
1240  2106  5177          JMP START       /JUST IGNORE SUCH COMMANDS
1241  2107  7000          CDF 7           /CHANGE DATA FIELD TO TEXT.(X-MEM)
1242  2110  1423          TAD I THISLN    /DISCONNECT
1243  2111  3425          DCA I LASTLN
1244  2112  1133          TAD CFRS        /START LIST AT TOP
1245  2113  3071  DOK,     DCA T2          /EXAMINATION ADDRESS
1246  2114  1471          TAD I T2        /GET THE NEXT ADDR.
1247  2115  7450          SNA             /TEST FOR END
1248  2116  5331          JMP DONE        /YES-WRAP UP ALL.
1249  2117  3032          DCA T1          /SAVE NEXT ADDRESS.
1250  2120  1023          TAD THISLN      /COMPARE LINE POSITIONS
1251  2121  7141          CIA CLL
1252  2122  1032          TAD T1
1253  2123  7630          SZL CLA         /SKIP IF THISLN > X
1254  2124  1057          TAD CNTR        /CHANGE (X) TO ACCOUNT FOR
1255  2125  1032          TAD T1          /GARBAGE COLLECTION.
1256  2126  3471          DCA I T2
1257  2127  1032          TAD T1          /GET NEXT
1258  2130  5313          JMP DOK
1259                /GARBAGE COLLECTION
1260  2131  7040  DONE,    CMA             /BACKUP L FOR XR
1261  2132  1023          TAD THISLN
1262  2133  3011          DCA XRT
1263  2134  1057          TAD CNTR        /SETUP END OF HOSE
1264  2135  7040          CMA
1265  2136  1023          TAD THISLN
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1266  2137  3012          DCA XRT2
1267  2140  1057          TAD CNTR        /CORRECT END OF BUFFER POINTER,
1268  2141  1364          TAD BUFR
1269  2142  3360          DCA BUFR
1270  2143  1013          TAD AXIN        /COMPUTE COUNT
1271  2144  7040          CMA
1272  2145  1012          TAD XRT2
1273  2146  3032          DCA T1
1274  2147  1010          TAD AXIN
1275  2150  1057          TAD CNTR
1276  2151  3010          DCA AXIN
1277  2152  1412          TAD I XRT2      /SIPHON LOWER PART,
1278  2153  3411          DCA I XRT
1279  2154  2032          ISZ T1
1280  2155  5352          JMP .-3
1281  2156  5265          JMP XDELETE+1   /RESET 'LASTLN','THISLN', AND DATA FIELD.
1282  2157  0000  CHIN,   0               /READ IN A CHARACTER SUBR, = "READC"
1283  2160  4464          JMS I INDEV
1284  2161  3066          DCA CHAR
1285  2162  4550          SORTC           /LINEFEED OR RUBOUT?
1286  2163  1623                ECHOLST-1
1287  2164  5757          JMP I CHIN      /YES
1288  2165  4551          PRINTC          /ECHO THE INPUT
1289  2166  5757          JMP I CHIN
1290        2167  FNTABL=.
1291  2167  2533          2533    /ABS
1292  2170  2650          2650    /SGN
1293  2171  2636          2636    /ITR
1294  2172  2565          2565    /DIS
1295  2173  2630          2630    /RAN
1296  2174  2517          2517    /ADC
1297  2175  2572          2572    /ATN
1298  2176  2624          2624    /EXP
1299  2177  2625          2625    /LOG
1300  2200  2654          2654    /SIN    /LIST OF CODED FUNCTION NAMES
1301  2201  2575          2575    /COS
1302  2202  2702          2702    /SQT
1303  2203  2631          2631    /NEW
1304  2204  0330          0330    /FX     /********
1305  2205  0332          0332    /FZ     /********
1306                /ERASE SINGLE LINES, GROUPS, OR VARIABLES
1307  2206  4564  ERASE,  TESTC           /TEST THE SECOND WORD, IF ANY,
1308  2207  5241          JMP ERVX        /ERASE VARIABLES
1309  2210  5224          JMP ERL         /LINES OR GROUPS
1310  2211  5215          JMP .+4         /ERROR
1311  2212  1066          TAD CHAR        /ALL TEXT
1312  2213  1112          TAD MINUSA
1313  2214  7440          SZA
1314  2215  4566          ERROR3          /BAD ARG FOR ERASE,
1315  2216  1135  ERT,    TAD ENDT        /ERASE ALL TEXT **
1316  2217  3060          DCA BUFR
1317  2220  3533          DCA I CFRS      /(X-"EM)
1318  2221  1060  ERV,    TAD STARTV      /ERASE VARIABLES **
1319  2222  3031          DCA LASTV
1320  2223  5177          JMP START       /POINTERS MAY BE DIFFERENT NOW,
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1321  2224  4554  ERL,  GETLN           /ERASE LINES.
1322  2225  1060        TAD BUFR        /PROTECT REST OF TEXT.
1323  2226  3312        DCA AXIN
1324  2227  4565  ERG,  DELETE          /EXTRACT ONE LINE
1325  2230  2023        ISZ THISLN
1326  2231  1065        TAD NAGSW
1327  2232  7700        SMA CLA
1328  2233  1423        TAD I THISLN    /(X#MEM)
1329  2234  4563        TSTGRP          /SKIP IF G(AC) # G(LINENO)
1330  2235  5221        JMP ERV
1331  2236  1423        TAD I THISLN    /(X#MEM)
1332  2237  3067        DCA LINENO
1333  2240  5227        JMP ERG
1334  2241  1060  ERVX, TAD STARTV     /INIT VARIABLES MAY BE INDIRECT COMMAND
1335  2242  3031        DCA LASTV
1336  2243  5541        POPJ
1337                    /ROUTINE CALLED VIA "FINDLN"!
1338                    /SEARCH FOR A GIVEN LINE I.D. #[ "LINENO" ]
1339                    /1ST RETURN IF NOT FOUND,
1340                    /2AND IF FOUND,
1341                    /"THISLN" # FOUND LINE OR NEXT LARGER,
1342                    /"LASTLN" # LESSER AND/OR LAST,
1343                    /"TEXTP" IS SET
1344  2244  0000  XFIND, 0
1345  2245  1133        TAD CFRS        /INITIALIZE POINTERS TO FIRST LINE
1346  2246  3025        DCA LASTLN
1347  2247  1133        TAD CFRS
1348  2250  3023  FINDN, DCA THISLN     /SAVE THIS ONE
1349  2251  1023        TAD THISLN
1350  2252  3011        DCA XRT
1351  2253  1067        TAD LINENO
1352  2254  7141        CLL CMA IAC     /CLEAR LINK AND NEGATE LINENO,
1353  2255  1411        TAD I XRT       /LINENO#0 WILL ALSO BE FOUND(X#MEM)
1354  2256  7450        SNA
1355  2257  2244        ISZ     XFIND   /********
1356  2260  7630        SZL CLA
1357  2261  5267        JMP FEND3       /PAST IT.
1358  2262  1023        TAD THISLN      /MOVE POINTERS
1359  2263  3025        DCA LASTLN
1360  2264  1423        TAD I THISLN    /END OF TEXT? (X#MEM)
1361  2265  7440        SZA
1362  2266  5250        JMP FINDN       /NOT YET
1363                                    /********
1364                                    /********
1365  2267  1023  FEND3, TAD THISLN     /1ST RETURN # NOT FOUND
1366  2270  7001        IAC
1367  2271  3017        DCA AXOUT       /SET "TEXTP".
1368  2272  3020        DCA XCT
1369  2273  5644        JMP I XFIND
1370  2274  0000  UTRA,  0               /UNPACK CHARACTER, # "GETC"
1371  2275  4330        JMS GET1
1372  2276  7710  UTE,   SPA CLA        /NORM & EXTEND
1373  2277  1006        TAD C100        /300#337 & 340#376
1374  2300  1357        TAD M137        /240#276 & 200#236
1375  2301  1066        TAD CHAR
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1376  2302  7450          SNA
1377  2303  5316          JMP UTX         /"?" FOUND
1378  2304  1275          TAD P337
1379  2305  3066  UTQ,    DCA CHAR
1380  2306  1026          TAD DEBGSW
1381  2307  1100          TAD DMPSW
1382  2310  7650          SNA CLA         /PRINT ONLY IF BOTH ARE ZERO.
1383  2311  4551          PRINTC
1384  2312  5674          JMP I UTRA
1385  2313  4330  EXTR,   JMS GET1
1386  2314  7040          CMA
1387  2315  5276          JMP UTE
1388  2316  1026  UTX,    TAD DEBGSW      /TEST FOR TRACE-ENABLED
1389  2317  7640          SZA CLA
1390  2320  5326          JMP .+6
1391  2321  1100          TAD DMPSW       /FLIP THE TRACE FLOP
1392  2322  7650          SNA CLA
1393  2323  7001          IAC
1394  2324  3100          DCA DMPSW
1395  2325  5275          JMP UTRA+1      /GET NEXT CHARACTER INSTEAD.
1396  2326  1110          TAD P277        /TRACE DISABLED = RETURN "?"
1397  2327  5305          JMP UTQ
1398  2330  0000  GET1,   0               /UNPACK 6-BITS
1399  2331  2020          ISZ XCT         /STARTS=0
1400  2332  5345          JMP GET3
1401  2333  1021          TAD GTEM
1402  2334  0122  GEND,   AND P77
1403  2335  3066          DCA CHAR        /SAVE
1404  2336  1066          TAD CHAR
1405  2337  1103          TAD M77
1406  2340  7650          SNA CLA
1407  2341  5313          JMP EXTR        /EXTENDED
1408  2342  1066          TAD CHAR
1409  2343  1356          TAD M40
1410  2344  5730          JMP I GET1
1411  2345  1417  GET3,   TAD I AXOUT     /(X-MEM)
1412  2346  3021          DCA GTEM
1413  2347  7040          CMA
1414  2350  3020          DCA XCT
1415  2351  1021          TAD GTEM
1416  2352  7112          RTR CLL
1417  2353  7012          RTR
1418  2354  7012          RTR
1419  2355  5334          JMP GEND
1420  2356  7740  M40,    -40
1421  2357  7641  M137,   -137
1422  2360  0000  XENDLN, 0       /TERMINATE THE BUFFERED LINE = "ENDLN"
1423  2361  6000          CDF 7           /(X-MEM)
1424  2362  1425          TAD I LASTLN    /SAVE OLD POINTER
1425  2363  3460          DCA I BUFR
1426  2364  1060          TAD BUFR        /POINT TO NEW LAST LINE
1427  2365  3425          DCA I LASTLN
1428  2366  1061          TAD QADD                /CHECK FOR EXTRA INFO
1429  2367  7440          SZA
1430  2370  3410          DCA I AXIN
```

```
2371  1210            TAD AXIN        /COMPUTE NEW END OF BUFFER
2372  7001            IAC
2373  3063            DCA BUFR
2374  1062            TAD STARTV      /RESET VARIABLE LIST (X-MEM)
2375  3031            DCA LASTV
2376  5760            JMP I XENDLN
      2377  TLIST3=.          /LITERAL TERMINATORS
2377  1253            TASK4   /"
2400  0614            PC1     /C.R. = AUTOMATIC QUOTE MATCH
      2401  INFIX=.           /DATA CONTROL CHARACTERS
2401  6202            FLINTP+2        /LEFT ARROW     = KILL
2402   757            INPUT+1         /RUBOUT         = IGNORE
2403   757            INPUT+1         /L.F.           = IGNORE
2404  6250            ENDFI+5         /ALT MODE       = EXIT
2405  0001  FLTONE,   0001    /(NO RELATIVE REFERENCES)
2406  2000            2000
2407  0000  FLTZER,   0000
2410  0000            0000
2411  0000            0000
2412  0000            0000
2413  7766  M12,      -12     /DECIMAL CONVERSION FACTOR FOR "PRNT"
2414  0000  I33,      0               /NO-INTERRUPT INPUT ROUTINE
2415  6031            KSF
2416  5215            JMP .-1
2417  6036            KRB
2420  0106            AND P177        /IGNORE PARITY BIT
2421  7450            SNA
2422  5215            JMP .-5
2423  1123            TAD C200
2424  5614            JMP I I33
2425  0000  XPRNT,    0       /PRINT A LINE NUMBER - "PRNTLN"
2426  1067            TAD LINENO
2427  4557            RTL6
2430  0122            AND P77
2431  4242            JMS PRNT        /TWO DIGIT "PART" NUMBER
2432  1102            TAD PER
2433  4551            PRINTC          /PERIOD FOR SEPARATION
2434  1067            TAD LINENO
2435  4242            JMS PRNT        /TWO DIGIT "STEP" NUMBER.
2436  1356            TAD M140
2437  3066            DCA CHAR        /SAVE SPACE IN CHAR.
2440  4551            PRINTC          /PRINT TRAILING SPACE
2441  5625            JMP I XPRNT
      0032  VAL=T1
2442  0000  PRNT,     0       /PRINT TWO DECIMAL DIGITS
2443  0106            AND P177
2444  3032            DCA VAL
2445  1113            TAD C260
2446  3033            DCA T3
2447  5252            JMP .+3
2450  2033            ISZ T3
2451  3032  XYZ,      DCA VAL
2452  1032            TAD VAL
2453  1213            TAD M12
2454  7500            SMA
```

```
1486  2455  5251          JMP XYZ-1
1487  2456  7240          CLA
1488  2457  1233          TAD T3
1489  2460  4551          PRINTC
1490  2461  1232          TAD VAL
1491  2462  1113          TAD C260
1492  2463  4551          PRINTC
1493  2464  5642          JMP I PRNT
1494  2465  0000  OUT,     0                   /OUTPUT A CHARACTER = "PRINTC"
1495  2466  7450          SNA                 /USE (AC) OR (CHAR)
1496  2467  1066          TAD CHAR
1497  2470  1116          TAD MCR
1498  2471  7450          SNA
1499  2472  5276          JMP OUTCR
1500  2473  1077          TAD CCR
1501  2474  4463          JMS I OUTDEV
1502  2475  5665  OUTX,    JMP I OUT
1503  2476  1077  OUTCR,   TAD CCR
1504  2477  4463          JMS I OUTDEV
1505  2500  1076          TAD CLF
1506  2501  5274          JMP OUTX-1
1507  2502  0000  PACBUF,  0                   /PACK A CHARACTER = "PACKC"
1508  2503  1110          TAD P277
1509  2504  7041          CIA
1510  2505  1066          TAD CHAR
1511  2506  7450          SNA                 /CHANGE 277 TO 337
1512  2507  1352          TAD P40
1513  2510  1101          TAD M100
1514  2511  7450          SNA                 /TEST FOR RUBOUT.
1515  2512  5755          JMP I RUBIT
1516  2513  1353          TAD P377
1517  2514  3071          DCA T2              /SAVE INPUT ITEM
1518  2515  1071          TAD T2              /SO THAT QUESTION DOESN'T MAKE
1519  2516  0354          AND C140            /CHAR LOOK LIKE A LEFT-ARROW
1520  2517  1356          TAD M140
1521  2520  7440          SZA                 /DATA WORD.
1522  2521  1354          TAD C140
1523  2522  7650          SNA CLA
1524  2523  5332          JMP ESCA            /340-377 AND 200-237
1525  2524  1071  PA1,     TAD T2              /240-337
1526  2525  0122          AND P77
1527  2526  7440          SZA                 /IGNORE 300
1528  2527  4335          JMS PCK1
1529  2530  7000  PACX,    COF P               /(X-MEM)
1530  2531  5702          JMP I PACBUF
1531  2532  1122  ESCA,    TAD P77
1532  2533  4335          JMS PCK1
1533  2534  5324          JMP PA1
1534  2535  0000  PCK1,    0
1535  2536  2062          ISZ XCTIN           /=0 TO START
1536  2537  5357          JMP ROT
1537  2540  1061          TAD QADD
1538  2541  3410          DCA I AXIN          /(X-MEM)
1539  2542  3061          DCA QADD                    /CLEAR PACKING WORD
1540  2543  1013          TAD PDLXR           /CHECK FOR OVERFLOW
```

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1541  2544  7141          CMA IAC CLL
1542  2545  1005          TAD P13          /RESERVATIONS FOR PUSH-DOWN LIST
1543  2546  1712          TAD AXIN
1544  2547  7620          SNL CLA
1545  2550  5735          JMP I PCK1
1546  2551  4566          ERROR2           /FULL BUFFER
1547  2552  0040    P40,  40
1548  2553  0377    P377, 377
1549  2554  0140    C140, 140
1550  2555  3004    RUBIT, RUB1
1551  2556  7640    M140, -140
1552  2557  4557    ROT,  RTL6    /(EAE)
1553  2560  3761          DCA QADD
1554  2561  7040          CMA
1555  2562  3062          DCA XCTIN
1556  2563  5735          JMP I PCK1
1557                /
1558                /PART OF INTERFACE TO FLD1 TO ALLOW
1559                /GETTING OF CHARS FROM TEXT
1560                /
1561  2564  4545    CGETX, GETC            /********
1562  2565  1066          TAD     CHAR     /********
1563  2566  6213          6213    /CIF CDF 10/********
1564  2567  5770          JMP I   .+1      /********
1565  2570  1137          CGETRET          /********
1566  2571  4566    ERRFIL, ERROR4         /********
1567  2572  4540    LM,   PUSHJ            /*
1568  2573  1612          EVAL-1           /*
1569  2574  4453          JMS I INTEGER    /*
1570  2575  6212          6212             /*
1571  2576  5777          JMP I .+1        /*
1572  2577  1402          LMAKE            /*
1573                /USED BY BK
1574        2600    *2600
1575                /INTERRUPT PROCESSOR,
1576  2600  0000    SAVAC, 0       /CONTENTS OF AC
1577  2601  0000    SAVLK, 0       /CONTENTS OF LINK
1578  2602  7575    MBREAK, -203   /CONTROL-C
1579  2603  3200    INTRPT, DCA SAVAC      /SAVE WORKING DATA
1580  2604  7010          RAR
1581  2605  3201          DCA SAVLK
1582  2606  6041          TSF              /GIVE OUTPUT PRIORITY
1583  2607  5225          JMP KINT
1584  2610  6042          TCF
1585  2611  3016          DCA TELSW        /TURN OFF THE IN-PROGRESS FLAG,
1586  2612  1665          TAD I OPTRI
1587  2613  7450          SNA
1588  2614  5225          JMP KINT         /DONE
1589  2615  6044          TPC              /TYPE NEXT,
1590  2616  3016          DCA TELSW        /CLEAR AC AND TURN ON THE FLAG,
1591  2617  3665          DCA I OPTRI      /ZERO OUT THE DATA AREA
1592  2620  1265          TAD OPTRI
1593  2621  7001          IAC
1594  2622  0107          AND P17
1595  2623  1263          TAD OPTR0
```

```
[illegible]4  3265           DCA OPTRI
2625  6031   KINT.   KSF                 /CHECK FOR KEYBOARD FIRST
2626  5246           JMP EXIT
2627  6036           KRB                 /READ BUFFER AND CLEAR FLAG TO FETCH NEXT
2630  0176           AND P177            /IGNORE BLANK AND L-T AND PARITY BIT.
2631  7450           SNA
2632  5246           JMP EXIT
2633  1123           TAD C200
2634  3262           DCA SIN
2635  1262           TAD SIN
2636  1232           TAD MBREAK          /MANUAL STOP?
2637  7650           SNA CLA
2640  5340           JMP RECOVR
2641  1034           TAD INBUF           /ANY SPACE?
2642  7640           SZA CLA
2643  4566           ERROR2              /WILL WAIT FOR OUTPUT BUFFER
2644  1262           TAD SIN
2645  3034           DCA INBUF           /SAVE INPUT
2646  6131   EXIT,   CLSK                /********
2647  5253           JMP     NOCLK       /********
2650  6135           CLSA                /********
2651  7200           CLA                 /********
2652  3261           DCA     CLKFLG      /********
             /
             /KW12 CLOCK INTERRUPT ROUTINE
             /
2653  6244   NOCLK,  RMF
2654  1201           TAD SAVLK
2655  7104           RAL CLL
2656  1200           TAD SAVAC
2657  6001           ION
2660  5400   EXITJ,  JMP I 0             /MODIFIED FOR PDP-5
2661  0000   CLKFLG, 0                   /******** SET TO 0 EVERY INTERRUPT
2662  0000   SIN,    0
2663  3120   OPTR0,  IOBUF   /OUTPUT POINTERS
2664  3120   OPTRO,  IOBUF   /VARS
2665  3120   OPTRI,  IOBUF
2666  0000   XI33,   0                   /VIA (INDEV)
2667  1034           TAD INBUF           /ANY INPUT?
2670  7450           SNA                 /******** REFRESH SCOPE WHILE WAITING
2671  4574           JMS I   PWAIT       /******** FOR INPUT
2672  3276           DCA XOUTL
2673  3034           DCA INBUF           /CLEAR INPUT BUFFER
2674  1276           TAD XOUTL
2675  5666           JMP I XI33
2676  0000   XOUTL,  0                   /VIA (OUTDEV)
2677  3266           DCA XI33            /SAVE CURRENT CHARACTER.
2700  6001           ION                 /BE SURE INTERRUPT IS ON.
2701  1664           TAD I OPTRO         /ANY ROOM?
2702  7640           SZA CLA             /A CHARACTER IS NON-ZERO
2703  4574           JMS I   PWAIT       /******** REFRESH SCOPE
2704  6002           IOF
2705  1016           TAD TELSW           /IN PROGRESS?
2706  7640           SZA CLA
2707  5314           JMP .+5
```

```
1651  2710  1266          TAD X133        /NO
1652  2711  6046          TLS             /TYPE CHARACTER,
1653  2712  3316          DCA TELSW       /SET IN-PROGRESS FLAG,
1654  2713  5323          JMP .+12        /RETURN
1655  2714  1266          TAD X133        /SEND DATA
1656  2715  3664          DCA I OPTR0
1657  2716  1264          TAD OPTR0       /SET POINTERS
1658  2717  7001          IAC
1659  2720  0107          AND P17
1660  2721  1263          TAD OPTR0
1661  2722  3264          DCA OPTR0
1662  2723  6001          ION
1663  2724  5676          JMP I XOUTL
1664                /ERROR RECOVERY PROCEEDURE
1665  2725  3326    ERROR5, DCA .+1         /ERROR CALLED FROM A TABLE
1666  2726  0000    ERR2,   0               /LIMIT EXCEEDED
1667  2727  7240          CLA CMA         /COMPUTE CALLING ADDRESS (ALSO "SPACE")
1668  2730  1326          TAD ERR2        /AND USE IT AS ERROR NUMBER.
1669  2731  3067          DCA LINENO      /SAVE ERROR CODE.
1670  2732  6001          ION             /                (JMP,+4) = FOR DEBUGGING
1671  2733  1016          TAD TELSW       /WAIT FOR OUTPUT TO FINISH
1672  2734  7640          SZA CLA
1673  2735  5333          JMP .-2
1674  2736  6002          IOF             /DISABLE INTERRUPT FOR INITIALIZATIONS
1675  2737  5342          JMP .+3
1676  2740  1123    RECOVR, TAD C200
1677  2741  3067          DCA LINENO      /SAVE ERROR NUMBER
1678                /****
1679  2742  1105          TAD M20         /SETUP INIT COUNT
1680  2743  3057          DCA CNTR
1681  2744  7040          CMA
1682  2745  1263          TAD OPTR0
1683  2746  3010          DCA AXIN        /INIT I/O BUFFERS.
1684  2747  2016          ISZ TELSW       /*
1685  2750  7000          CDF             /(X-MEM RESET)
1686  2751  3410          DCA I AXIN
1687  2752  2057          ISZ CNTR
1688  2753  5351          JMP .-2
1689  2754  3034          DCA INBUF       /INIT KEY-BUFR,
1690  2755  1263          TAD OPTR0       /INIT TTY POINTERS,
1691  2756  3265          DCA OPTR1
1692  2757  1263          TAD OPTR0
1693  2760  3264          DCA OPTR0
1694  2761  7040    RECOVX, CMA             /PREPARE A STOP BIT FOR TTY
1695  2762  6046          TLS             /AND RAISE FLAG,        (NOP) = FOR DEBUGGING
1696  2763  1101          TAD P7700       /MAKE A "?",
1697  2764  4551          PRINTC          /AND TURN ON THE INTERRUPT
1698  2765  4553          PRNTLN          /PRINT ERROR NUMBER AND,
1699  2766  2022          ISZ PC
1700  2767  1422          TAD I PC        /UNLESS IT IS ZERO, (X-MEM)
1701  2770  7450          SNA
1702  2771  5377          JMP .+6
1703  2772  3067          DCA LINENO
1704  2773  1101          TAD P7700       /PRINT ATSIGN
1705  2774  4551          PRINTC
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1726  3775  4551          PRINTC          /PRINT SPACE AGAIN AND
1727  3776  4553          PRNTLN          /PRINT LINE OF ERROR.
1728  3777  1077          TAD CCR
1729  3000  4551          PRINTC
1730  3001  1126          TAD PTCH        /RESET "READC"
1731  3002  3152          DCA RDIV        /IF AN ERROR OCCURS,
1732  3003  5177          JMP START       /INTERRUPT WILL BE RE-ENABLED SOON.
1733                /CHRACTER REMOVAL ROUTINE
1734  3004  1062  RUB1,   TAD XCTIN       /RUBOUT ONE LETTER
1735  3005  7640          SZA CLA
1736  3006  5214          JMP .+6
1737  3007  1010          TAD AXIN
1738  3010  7041          CIA
1739  3011  1027          TAD PACKST
1740  3012  7700          SMA CLA         /TEST NULL LINE
1741  3013  5641          JMP I RUB5
1742  3014  1251          TAD SPLAT       /FOR A RUBOUT ACKNOWLEDGEMENT
1743  3015  4551          PRINTC
1744  3016  1010          TAD AXIN
1745  3017  3071          DCA T2
1746  3020  7300          CDF T           /(X=MEM)
1747  3021  2062          ISZ XCTIN       /TEST HALF
1748  3022  5242          JMP RUB2
1749  3023  1471          TAD I T2        /"ADD" IS FULL.
1750  3024  3122          AND P77
1751  3025  1103          TAD M77
1752  3026  7640          SZA CLA         /TEST FOR EXTEND
1753  3027  5237          JMP RUB4
1754  3030  7040  RUB3,   CMA             /SET SWITCH
1755  3031  3062          DCA XCTIN
1756  3032  7040          CMA             /BACKUP POINTER
1757  3033  1010          TAD AXIN
1758  3034  3010          DCA AXIN
1759  3035  1471          TAD I T2        /RESET ADD
1760  3036  3101          AND P7700
1761  3037  3061  RUB4,   DCA QADD
1762  3040  5641          JMP I RUB5
1763  3041  2530  RUB5,   PACX
1764  3042  1471  RUB2,   TAD I T2        /CHECK FOR EXTENDED
1765  3043  3101          AND P7700
1766  3044  1006          TAD C100
1767  3045  7640          SZA CLA
1768  3046  5230          JMP RUB3
1769  3047  3471          DCA I T2        /SAVE CORRECTION
1770  3050  5231          JMP RUB3+1
1771  3051  0334  SPLAT,  334
1772                /SYMBOL TABLE TYPEOUT ROUTINE
1773  3052  1060  TDUMP,  TAD STARTV      /INIT POINTER FOR SYMBOL DUMP.(X=MEM)
1774  3053  3030          DCA PT1
1775  3054  1031          TAD LASTV       /TEST FOR END OF LIST
1776  3055  7041          CIA
1777  3056  1030          TAD PT1
1778  3057  7650          SNA CLA
1779  3060  5541          POPJ
1780  3061  1430          TAD I PT1       /GET THE VARIABLE
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1761  3062  3316          DCA OP+1          /((DCA I (4)=FOR(X=MEM))):SAVE NAME
1762  3063  1315          TAD OP            /SETUP UNPACK POINTERS
1763  3064  3017          DCA AXOUT
1764  3065  3020          DCA XCT
1765  3066  4545          GETC              /READ AND PRINT "XX("
1766  3067  4551          PRINTC
1767  3070  4545          GETC
1768  3071  4551          PRINTC
1769  3072  4545          GETC
1770  3073  4551          PRINTC
1771  3074  2030          ISZ PT1
1772  3075  1430          TAD I PT1         /PRINT SUBSCRIPT TO 99
1773  3076  4714          JMS I PRNT2
1774  3077  4545          GETC              /PRINT ")"
1775  3100  4551          PRINTC
1776  3101  2030          ISZ PT1
1777  3102  4407          FINT              /PICK UP VALUE
1778  3103  0430          FGET I PT1
1779  3104  7000          FXIT
1780  3105  4530          JMS I FOUTPUT     /PRINT VALUE
1781  3106  1077          TAD CCR
1782  3107  4551          PRINTC
1783  3110  1070          TAD CINC
1784  3111  1111          TAD M2
1785  3112  1030          TAD PT1
1786  3113  5253          JMP TDUMP+1
1787  3114  2442  PRNT2,  PRNT
1788  3115  3115  OP,     .                 / (X=MEM)
1789  3116  0000          0000              / (X=MEM)
1790  3117  5051          5051              /(THESE GO IN 10005 FOR X=MEM)
1791                      /OUTPUT CHARACTER BUFFER (ADDRESS IS A MULTIPLE OF 20)
1792        3120          IOBUF=3120
1793        3140          COMEIN=IOBUF+20 /COMMAND = INPUT BUFFER
1794        3206          COMEOUT=COMEIN+46
1795        3206          *COMEOUT
1796  3206  0000  FRST,   0         /TEXT POINTER
1797  3207  0000          0000      /DUMMY LINE NO,
1798  3210  0340          0340              /********
1799  3211  0617          0617      /FO
1800  3212  0301          0301      /CA
1801  3213  1455          1455              /********
1802  3214  6162  FRSTX,  6162              /********
1803  3215  7715          7715      /DUMMY C,R,
1804                      /TO SAVE TEXT ,SAVE C(BUFR), C(LASTV), AND C( FRST TO C(BUFR))
1805                      /WITH GOT=JR46,  THE TAPES MAY BE TOGETHER WITH
1806                      /THE SYMBOLIC DUMP LAST : FOCAL + FLOAT + DIALOG ,
1807                      /LOADING THE LAST SECTION MAY BE CONSIDERED OPTIONAL.
1808        3216          BUFBEG=.                  /TEXT BUFFER STARTS HERE,
1809        3600          *3600
1810  3600  2741  01,     RECOVR+1/STARTING ADDRESS
1811  3601  1200  BEGIN,  TAD 01  /INITIALIZE ANY 8=FAMILY COMPUTER,
1812  3602  3176          DCA START=1
1813  3603  7000          NOP/(IOPRESET)  /********
1814  3604  4575          JMS I   PCLEAR  /******** INITIALIZE POINT DISPLAY
1815  3605  7300          CLA CLL
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1816  3610  3414          DCA I FLTXR
1817  3611  3057          ISZ CNTR/INITIALIZED BY LOAD.
1818  3612  5206          JMP .-2 /CLEAR INPUT BUFFER
1819  3613  7200  T12,     CLA             /******** FIX UP DIAL I/O ROUTINES
1820  3614  6213          6213    /CIF CDF 10/********
1821  3615  3667          DCA I   G7775   /********
1822  3616  1262          TAD     G5772   /********
1823  3617  3670          DCA I   G7776   /********
1824  3620  1263          TAD     G5773   /********
1825  3621  3671          DCA I   G7777   /********
1826  3622  6201          6201    /CDF 0  /********
1827  3623  4666          JMS I   G7774   /********
1828  3624  3655          GBLOK           /********
1829  3625  6212          6212    /CIF 10 /********
1830  3626  4664          JMS I   G7200   /********
1831  3627  6211          6211    /CDF 10 /********
1832  3630  2400          2400            /********
1833  3631  6211          6211    /CDF 10 /********
1834  3632  7400          7400            /********
1835  3633  0400          400             /********
1836  3634  6212          6212    /CIF 10 /********
1837  3635  4667          JMS I   G7775   /******** WRITE MILDRED INTO UPPER
1838  3636  3651          RITEOU          /******** SOURCE WORKING AREA
1839  3637  6132          CLLR            /******** INITIALIZE CLOCK
1840  3640  6134          CLEN            /********
1841  3641  7240          CLA CMA         /********
1842  3642  6133          CLAB            /********
1843  3643  1261          TAD     G101    /********
1844  3644  6132          CLLR            /********
1845  3645  6135          CLSA            /********
1846  3646  7200          CLA             /********
1847  3647  6046          TLS             /********
1848  3650  6001          ION             /********
1849  3651  5650          JMP I   .+1     /********
1850  3652  2216          ERT             /******** ERASE ALL
1851  3653  0110  RITEOU,  110             /********
1852  3654  0030          30              /********
1853  3655  0076          76              /********
1854  3656  0002          2               /********
1855  3657  0100  GBLOK,   100             /********
1856  3660  0025          25              /********
1857  3661  0023          23              /********
1858  3662  0001          1               /********
1859  3663  0101  G101,    101             /********
1860  3664  5772  G5772,   5772            /********
1861  3665  5773  G5773,   5773            /********
1862  3666  7200  G7200,   7200            /********
1863  3667  7773  G7773,   7773            /********
1864  3670  7774  G7774,   7774            /********
1865  3671  7775  G7775,   7775            /********
1866  3672  7776  G7776,   7776            /********
1867  3673  7777  G7777,   7777            /********
1868        4620  *4600+20
1869  4620  1045  FEXP,    GETSGN                  /TAKE ABSOLUTE VALUE
1870  4621  7710          SPA CLA
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```
1871  4622  4724          JMS I NEGP
1872  4623  3433          DCA T3  /C(SIGN)=-1 IF I X2<0
1873  4624  4407          FINT
1874  4625  4313          FMUL LG2E
1875  4626  4675          FPUT I X2
1876  4627  0000          FEXT
1877  4630  4453          JMS I INTEGER   /TAKE INTEGER PART
1878  4631  3325          DCA FLAG2       /SAVE LOW ORDER DATA
1879  4632  4407          FINT
1880  4633  7000          FNOR
1881  4634  6676          FPUT I XSQ2
1882  4635  4675          FGET I X2
1883  4636  2676          FSUB I XSQ2
1884  4637  6675          FPUT I X2
1885  4640  4675          FMUL I X2
1886  4641  6676          FPUT I XSQ2
1887  4642  1310          FADD DF
1888  4643  6326          FPUT TEMP
1889  4644  0305          FGET CF
1890  4645  3326          FDIV TEMP
1891  4646  2675          FSUB I X2
1892  4647  1277          FADD AF
1893  4650  6326          FPUT TEMP
1894  4651  0302          FGET BF
1895  4652  4676          FMUL I XSQ2
1896  4653  1326          FADD TEMP
1897  4654  6326          FPUT TEMP
1898  4655  2675          FGET I X2
1899  4656  3326          FDIV TEMP
1900  4657  4321          FMUL TWO
1901  4660  1316          FADD ONE
1902  4661  0000          FEXT
1903  4662  1325          TAD FLAG2
1904  4663  1044          TAD FLAC
1905  4664  3044          DCA FLAC
1906  4665  2033          ISZ T3
1907  4666  5536          RETURN
1908  4667  4407          FINT
1909  4670  6675          FPUT I X2
1910  4671  0316          FGET ONE
1911  4672  3675          FDIV I X2
1912  4673  0000          FEXT
1913  4674  5536          RETURN
1914                /CONSTANTS FOR FEXP
1915  4675  5321  X2,     X
1916  4676  5325  XSQ2,   XSQR
1917  4677  0004  AF,     0004
1918  4700  2372          2372
1919  4701  1402          1402
1920  4702  7774  BF,     7774
1921  4703  2157          2157
1922  4704  5157          5157
1923  4705  0012  CF,     0012
1924  4706  5454          5454
1925  4707  0343          0343
```

```
      4710 0007   DF,    0007
      4711 2566          2566
      4712 5341          5341
      4713 0001   LG2E,  0001
      4714 2705          2705
      4715 2435          2435
      4716 0001   ONE,   0001
      4717 2000          2000
      4720 0000          0000
      4721 0002   TWO,   0002
      4722 2000          2000
      4723 0000          0000
      4724 5163   NEGP,  FNEG
      4725 0000   FLAG2, 0
      4726 0000   TEMP,  0
      4727 0000          0
      4730 0000          0
      4731 0000          0
                  /MAIN ALGORITHM FOR ARCTANGENT
      4732 4407   ARCALG, FINT
      4733 0675          FGET I X2
      4734 4675          FMUL I X2
      4735 6676          FPUT I XSQ2
      4736 4374          FMUL BET2
      4737 1371          FADD BET1
      4740 4676          FMUL I XSQ2
      4741 1366          FADD BETZ
      4742 6326          FPUT TEMP
      4743 0363          FGET ALF2
      4744 4676          FMUL I XSQ2
      4745 1360          FADD ALF1
      4746 4676          FMUL I XSQ2
      4747 1355          FADD ALFZ
      4750 4675          FMUL I X2
      4751 3326          FDIV TEMP
      4752 0000          FEXT
      4753 5754          JMP I .+1
      4754 5024                  ARCRTN
                  /CONSTANTS - FLOATING ARC TANGENT
      4755 0000   ALFZ,  0000
      4756 2437          2437
      4757 1643          1643
      4760 7777   ALF1,  7777
      4761 3304          3304
      4762 4434          4434
      4763 7773   ALF2,  7773
      4764 3306          3306
      4765 5454          5454
      4766 0000   BETZ,  0000
      4767 2437          2437
      4770 1646          1646
      4771 0000   BET1,  0000
      4772 2427          2427
      4773 2323          2323
      4774 7775   BET2,  7775
```

```
1981    4775  3427          3427
1982    4776  7052          7052
1983                /FLOATING POINT ARC TANGENT
1984          5200  *5200
1985    5200  1045  ARTN,   GETSGN          /TAKE ABSOLUTE VALUE
1986    5201  7710          SPA CLA
1987    5202  4363          JMS FNEG
1988    5203  3033          DCA T3
1989    5204  4407          FINT
1990    5205  6635          FPUT I X1
1991    5206  2637          FSUB I CON1
1992    5207  0000          FEXT
1993    5210  1045          GETSGN
1994    5211  7710          SPA CLA
1995    5212  5221          JMP GO            /LESS THAN ONE
1996    5213  4407          FINT
1997    5214  0637          FGET I CON1
1998    5215  3635          FDIV I X1
1999    5216  6635          FPUT I X1
2000    5217  0000          FEXT
2001    5220  7240          CLA CMA
2002    5221  3362  GO,     DCA FLAG1         /SIGN FLAG OF RESULT
2003    5222  5623          JMP I .+1         /CALL ALGORITHM
2004    5223  4732                ARCALG
2005    5224  2362  ARCRTN, ISZ FLAG1         /RETURN HERE
2006    5225  5634          JMP I EXIT1
2007    5226  4407          FINT
2008    5227  6635          FPUT I X1
2009    5230  0636          FGET I PI2
2010    5231  2635          FSUB I X1
2011    5232  0000          FEXT
2012    5233  5634          JMP I .+1
2013    5234  5301  EXIT1,  EXIT2
2014                /CONSTANTS FOR ARCTANGENT
2015    5235  5321  X1,     X
2016    5236  5315  PI2,    PIOT
2017    5237  4716  CON1,   ONE
2018    5240  1045  FLOG,   GETSGN  /FLOATING LOGARITHM
2019    5241  7450          SNA
2020    5242  4566          ERROR3            /ZERO ARGUEMENT FOR LOG
2021    5243  7710          SPA CLA
2022    5244  4566          ERROR4            /*
2023    5245  4407          FINT
2024    5246  6756          FPUT I TEM
2025    5247  2637          FSUB I CON1
2026    5250  0000          FEXT
2027    5251  1045          GETSGN
2028    5252  7450          SNA
2029    5253  5536          RETURN
2030    5254  7700          SMA CLA
2031    5255  5264          JMP STARTL
2032    5256  4407          FINT
2033    5257   637          FGET I CON1
2034    5260  3756          FDIV I TEM
2035    5261  6756          FPUT I TEM
```

```
[illegible]2 [illegible]          FEXT
5263 7240          CLA CMA
5264 3233 STARTL,  DCA T3
5265 1275          TAD P13
5266 3044          DCA FLAC
5267 7040          CMA
5270 1756          TAD I TEM
5271 3445          DCA FLAC+1
5272 3046          DCA FLAC+2
5273 3047          DCA FLAC+3
5274 7001          IAC
5275 3756          DCA I TEM
5276 4407          FINT
5277 4357          FMUL LOG2
5100 6635          FPUT I X1
5101 5756          FGET I TEM
5102 2637          FSUB I CON1
5103 6756          FPUT I TEM
5104 4353          FMUL LOG8
5105 1350          FADD LOG7
5106 4756          FMUL I TEM
5107 1345          FADD LOG6
5110 4756          FMUL I TEM
5111 1342          FADD LOG5
5112 4756          FMUL I TEM
5113 1337          FADD L4
5114 4756          FMUL I TEM
5115 1334          FADD L3
5116 4756          FMUL I TEM
5117 1331          FADD L2
5120 4756          FMUL I TEM
5121 1326          FADD L1
5122 4756          FMUL I TEM
5123 1635          FADD I X1
5124 0000          FEXT
5125 5634          JMP I EXIT1
5126 0000 L1,      0000
5127 3777          3777
5130 7742          7742
5131 7777 L2,      7777
5132 4000          4000
5133 4100          4100
5134 7777 L3,      7777
5135 2517          2517
5136 0310          0310
5137 7776 L4,      7776
5140 4113          4113
5141 7211          7211
               /LOGARITHM CONSTANTS
5142 7776 LOG5,    7776
5143 2535          2535
5144 3301          3301
5145 7775 LOG6,    7775
5146 [illegible]   [illegible]
5147 [illegible]   [illegible]771
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```
2091    5150  7774    LOG7,   7774
2092    5151  2236            2236
2093    5152  4334            4334
2094    5153  7771    LOG8,   7771
2095    5154  4544            4544
2096    5155  1735            1735
2097    5156  4726    TEM,    TEMP
2098    5157  0000    LOG2,   0
2099    5160  2613            2613
2100    5161  4414            4414
2101    5162  0000    FLAG1,  0
2102    5163  0000    FNEG,   0
2103    5164  4451            JMS I MINSKI
2104    5165  7240            CLA CMA
2105    5166  5763            JMP I FNEG
2106    5167  6213    LO,     6213    /CIF CDF 10/********
2107    5170  5126            JMP     XLO     /********
2108    5171  6213    LC,     6213    /CIF CDF 10/********
2109    5172  5130            JMP     XLC     /********
2110    5173  6213    LL,     6213    /CIF CDF 10/********
2111    5174  5132            JMP     XLL     /********
2112                  /FLOATING POINT SINE AND COSINE
2113
2114
2115
2116          5177    *5177
2117    5177  4407    FCOS,   FINT            /COS(X)=SIN(PI/2-X)
2118    5200  6321            FPUT X
2119    5201  0315            FGET PIOT
2120    5202  2321            FSUB X
2121    5203  0000            FEXT
2122    5204  1045    FSIN,   GETSGN
2123    5205  7740            SMA SZA CLA
2124    5206  5214            JMP MOD
2125    5207  1045            GETSGN
2126    5210  7700            SMA CLA
2127    5211  5536            RETURN          /YES SIN(0)=0
2128    5212  4451            JMS I MINSKI
2129    5213  7040            CMA             /NO;SIN(-X)=-SIN(X)
2130    5214  3033    MOD,    DCA T3
2131                  /REDUCE X MODULO 2 PI
2132    5215  4407            FINT
2133    5216  3305            FDIV TWOPI
2134    5217  6325            FPUT XSQR
2135    5220  0000            FEXT
2136    5221  4453            JMS I INTEGER
2137    5222  4407            FINT
2138    5223  7000            FNOR
2139    5224  6321            FPUT X
2140    5225  0325            FGET XSQR
2141    5226  2321            FSUB X
2142    5227  4305            FMUL TWOPI
2143    5230  6321            FPUT X
2144    5231  2311            FSUB PI         /X<PI?
2145    5232  0000            FEXT
```

```
2146  5233  1045          GETSGN
2147  5234  7710          SPA CLA
2148  5235  5244          JMP PCHECK      /YES
2149  5236  4427          FINT            /NO, SIN(X-PI)=-SIN(X)
2150  5237  6321          FPUT X
2151  5240  0000          FEXT
2152  5241  1033          TAD T3          /INVERT THE SIGN
2153  5242  7040          CMA
2154  5243  3033          DCA T3
2155  5244  4407  PCHECK, FINT            /X<PI/2?
2156  5245  0321          FGET X
2157  5246  2315          FSUB PIOT
2158  5247  0002          FEXT
2159  5250  1045          GETSGN
2160  5251  7710          SPA CLA
2161  5252  5260          JMP PALG        /YES
2162  5253  4407          FINT            /NO
2163  5254  0311          FGET PI         /SIN(X)=SIN(PI-X)
2164  5255  2321          FSUB X
2165  5256  6321          FPUT X
2166  5257  0000          FEXT
2167  5260  4407  PALG,   FINT
2168  5261  0321          FGET X
2169  5262  3315          FDIV PIOT
2170  5263  6321          FPUT X
2171  5264  4321          FMUL X
2172  5265  6325          FPUT XSQR
2173  5266  0331          FGET C9
2174  5267  4325          FMUL XSQR
2175  5270  1335          FADD C7
2176  5271  4325          FMUL XSQR
2177  5272  1341          FADD C5
2178  5273  4325          FMUL XSQR
2179  5274  1345          FADD C3
2180  5275  4325          FMUL XSQR
2181  5276  1315          FADD PIOT
2182  5277  4321          FMUL X
2183  5300  0000          FEXT
2184  5301  2033  EXIT2,  ISZ T3
2185  5302  5536          RETURN
2186  5303  4451          JMS I MINSKI
2187  5304  5536          RETURN
2188                      /CONSTANTS AND POINTERS
2189  5305  0003  TWOPI,  0003
2190  5306  3110          3110
2191  5307  3756          3756    /(3755) = FOR 4-WORD
2192  5310  3235          3235
2193  5311  0002  PI,     0002
2194  5312  3110          3110
2195  5313  3756          3756
2196  5314  3235          3235
2197  5315  0001  PIOT,   0001            /USED BY SINE AND COSINE
2198  5316  3110          3110
2199  5317  3756          3756
2200  5320  3235          3235
```

```
        5321 0000   X,      0000
        5322 0000           0000
        5323 0000           0000
        5324 0000           0000
        5325 0000   XSQR,   0000
        5326 0000           0000
        5327 0000           0000
        5330 0000           0000
                    /SINE CONSTANTS
        5331 7764   C9,     7764
        5332 2501           2501
        5333 7015           7015
        5334 1042           1042
        5335 7771   C7,     7771
        5336 5464           5464
        5337 5514           5514
        5340 6150           6150
        5341 7775   C5,     7775
        5342 2431           2431
        5343 5361           5361
        5344 4736           4736
        5345 0000   C3,     0000
        5346 5325           5325
        5347 0414           0414
        5350 3167           3167
                    /END OF EXTENDED FUNCTIONS.
                    /
                    /HANDLES O I, EXPRESSION
                    /SETS CLOCK ACCORDING TO EXPRESSION
                    /
        5351 4540   SETCLK, PUSHJ                   /********
        5352 1612           EVAL-1                  /********
        5353 4407           FINT                    /********
        5354 4375           FMUL    MHUNDRD         /********
        5355 0000           FEXT                    /********
        5356 6132           CLLR                    /********
        5357 6134           CLEN                    /********
        5360 4453           JMS I   INTEGER         /********
        5361 6133           CLAB                    /********
        5362 7200           CLA                     /********
        5363 1206           TAD     C100            /********
        5364 6132           CLLR                    /********
        5365 1123           TAD     C200            /********
        5366 6134           CLEN                    /********
        5367 1374           TAD     O4600           /********
        5370 6132           CLLR                    /********
        5371 7200           CLA                     /********
        5372 5773           JMP I   .+1             /********
        5373 0611           PROC                    /********
        5374 4600   O4600,  4600                    /********
        5375 0007   MHUNDRD,7147001O                /********
        5376 4730
        5377 1000
                    /PAGE 1 - INPUT/OUTPUT ROUTINES FOR THE FOCAL
                    /FLOATING POINT PACKAGE.
```

```
2254                    /IN THE COMMENTS BELOW:-
2255                    / F = NUMBER OF DIGITS TO BE OUTPUT      =FISW
2256                    / D = NUMBER OF DECIMAL PLACES           =DECP
2257                    / E = DECIMAL EXPONENT                   =BEXP
2258                    / P = NUMBER OF PLACES REMAINING TO BE
2259                    /     PRINTED BEFORE DECIMAL POINT
2260          5400      *5400
2261          0006      DIGITS=6        /NUMBER OF DECIMAL DIGITS OUT
2262    5400  0000      TGO,    0
2263    5401  3334              DCA SCOUNT      /SAVE MAX, NUMBER OF DIGITS AVAILABLE = *SET COUNTS*
2264    5402  1052              TAD FISW
2265    5403  4557              RTL6
2266    5404  0122              AND P77
2267    5405  3032              DCA T1
2268    5406  1032              TAD T1
2269    5407  7041              CIA             /NO, COMPUTE FIELD SIZES
2270    5410  7450              SNA
2271    5411  1326              TAD MD
2272    5412  3335              DCA FCOUNT
2273    5413  1052              TAD FISW        /(JMP FPRNT) = FOR NO ROUNDOIN,
2274    5414  7450              SNA             /FLOATING OUTPUT?
2275    5415  5241              JMP R6          /YES, ROUND OFF TO MAX.NO.  PLACES
2276    5416  0122              AND P77
2277    5417  3333              DCA DECP
2278    5420  1335              TAD FCOUNT
2279    5421  1333              TAD DECP
2280    5422  7510              SPA             / F-D > 0 ?
2281    5423  5230              JMP .+5         /YES
2282    5424  7240              CLA CMA         /NO,
2283    5425  1032              TAD T1
2284    5426  3333              DCA DECP        /MAKE D = F-1
2285    5427  7040              CMA
2286    5430  1033              TAD T3          /COMPARE DECIMAL EXPONENT
2287    5431  7500              SMA             / F-D > E?
2288    5432  7200              CLA             /NO, ROUND OFF TO F PLACES
2289    5433  1032              TAD T1          /YES
2290    5434  7510              SPA             / D+E < 0 ?
2291    5435  5263              JMP FPRNT+2     /YES, NO ROUNDING NEEDED, GO TO PRINT
2292    5436  1326              TAD MD          /NO, ROUND TO D+E PLACES,
2293    5437  7500              SMA             /TO A MAXIMUM OF D PLACES
2294    5440  7200              CLA
2295    5441  1327    R6,       TAD RND2        / *ROUND UP *
2296    5442  3071              DCA T2          /SAVE NUMBER+1 OF PLACES TO ROUND TO.
2297    5443  1731              TAD I BUFST
2298    5444  1071              TAD T2          /SET UP BUFFER ADDRESS AT WHICH
2299    5445  3336              DCA PLCE        /ROUNDING OFF SHOULD START
2300    5446  1071              TAD T2
2301    5447  7041              CIA             /SET UP COUNT OF MAXIMUM NUMBER
2302    5450  3071              DCA T2          /OF CARRIES ALLOWABLE
2303    5451  1325              TAD K5          /LITTLE EXTRA ON FIRST DIGIT,
2304    5452  2736    RET,      ISZ 1 PLCE      /ADD 1 TO DIGIT AT CURRENT POSITION
2305    5453  1736              TAD 1 PLCE
2306    5454  1330              TAD DM12
2307    5455  7710              SPA CLA         /CARRY REQUIRED?
2308    5456  5265              JMP FPRNT       /NO, GO TO OUTPUT
```

```
2309  5457  3736          DCA I PLCE      /YES, MAKE CURRENT DIGIT ZERO
2310  5460  2371          ISZ T2          /BEGINNING OF BUFFER REACHED?
2311  5461  5321          JMP DECR        /NO, DECREMENT BUFFER ADDRESS AND REPEAT
2312  5462  2736          ISZ I PLCE      /YES, SET MANTISSA TO 0.1
2313  5463  2033          ISZ T3          /COMPENSATE BY INCREMENTING EXPONENT
2314  5464  7200          CLA
2315  5465  1052  FPRNT,  TAD FISW        /AUTO-INDEX REGISTER ALREADY SET, = *PRINT*
2316  5466  7650          SNA CLA         / F = 0 ?
2317  5467  5356          JMP FLOUT       /YES, OUTPUT AS FLOATING NUMBER
2318  5470  1335          TAD FCOUNT
2319  5471  1033          TAD T3
2320  5472  7540          SMA SZA         / E > F ?
2321  5473  5355          JMP FLOUT+1     /YES,CONVERT TO E FORMAT
2322  5474  1333          TAD DECP
2323  5475  7500          SMA             / E < F-D ?
2324  5476  7200          CLA             /NO, TAKE P = E
2325  5477  7041          CIA             /YES, TAKE P = F-D
2326  5500  1033          TAD T3
2327  5501  7041          CIA
2328  5502  3032          DCA T1          /SET UP MINUS P
2329  5503  1033  BACK,   TAD T3          /PRINT DD.DDD
2330  5504  1032          TAD T1
2331  5505  7650          SNA CLA         / P = E ?
2332  5506  5343          JMP DIG         /YES, PRINT DIGIT
2333  5507  1032          TAD T1          /NO,
2334  5510  7001          IAC
2335  5511  7710          SPA CLA         / P > 1 ?
2336  5512  1105          TAD M20 /YES, TAKE SPACE (240-260)) OTHERWISE ZERO
2337  5513  4336  IN,     JMS OUTA        /PRINT CHARACTER
2338  5514  2032          ISZ T1          /P CHARACTERS PRINTED?
2339  5515  5303          JMP BACK        /NO
2340  5516  1102          TAD PER         /YES,
2341  5517  4551          PRINTC          /PRINT DECIMAL POINT
2342  5520  5303          JMP BACK
2343  5521  7040  DECR,   CMA             /BACKUP TO TOP OF BUFFER.
2344  5522  1336          TAD PLCE
2345  5523  3336          DCA PLCE
2346  5524  5252          JMP RET
2347  5525  0004  K5,     4
2348  5526  7772  MD,     -DIGITS
2349  5527  0007  RND2,   DIGITS-1
2350  5530  7766  OM12,   -12
2351  5531  6150  BUFST,  SADR
2352  5532  6154  OPUT,   OUTDG
2353  5533  0000  DECP,   0               /MODIFIABLE LOCATIONS
2354  5534  0000  SCOUNT,  0
2355  5535  0000  FCOUNT,  0
2356        5536  PLCE=,
2357  5536  0000  OUTA,   0               /MODIFIED REGISTERS.
2358  5537  4732          JMS I OPUT      /PRINT CHARACTER
2359  5540  2335          ISZ FCOUNT      /F CHARACTERS PRINTED?
2360  5541  5736          JMP I OUTA      /NO, RETURN
2361  5542  5600          JMP I TGO       /YES, NUMBER FINSHED
2362  5543  7040  DIG,    CMA
2363  5544  1033          TAD T3          /REDUCE E, BY 1
```

```
2364  5545  3033          DCA T3
2365  5546  2334          ISZ SCOUNT      /ARE ALL SIG. FIGS. USED?
2366  5547  5353          JMP .+4         /NO
2367  5550  7040          CMA             /YES,
2368  5551  3334          DCA SCOUNT      /RESET COUNT TO -1
2369  5552  5313          JMP IN          /AND LEAVE C(AC) = 0
2370  5553  1414          TAD I FLTXR     /TAKE NEXT DIGIT FROM BUFFER
2371  5554  5313          JMP IN
2372                /DO FLOATING OUTPUT
2373  5555  7200          CLA             /IF OUTPUT TOO LARGE,
2374  5556  4732    FLOUT, JMS I OPUT     /PRINT "0"
2375  5557  1102          TAD PER
2376  5560  4551          PRINTC          /PRINT "."
2377  5561  2200          ISZ TGO         /SECOND RETURN
2378  5562  1414          TAD I FLTXR     /TAKE NEXT DIGIT FROM BUFFER
2379  5563  4336          JMS OUTA        /PRINT IT
2380  5564  2334          ISZ SCOUNT      /TEST FOR END OF INPUT
2381  5565  5362          JMP .-3         /AND REPEAT
2382  5566  7040          CMA
2383  5567  3334          DCA SCOUNT      /OUTPUT EXTRA ZEROS.
2384  5570  5363          JMP .+5
2385  5571  0000    ABSOLV, 0
2386  5572  1045          TAD HORD
2387  5573  3050          DCA SIGNF
2388  5574  1045          TAD HORD
2389  5575  7710          SPA CLA
2390  5576  4451          JMS I MINSKI
2391  5577  5771          JMP I ABSOLV
2392                /DOUBLE PRECISION DECIMAL-BINARY
2393                /INPUT AND CONVERSION FOR + OR - XXX...
2394        5600    *5600
2395  5600  0000    DECONV, 0
2396  5601  3046          DCA LORD
2397  5602  3044          DCA EXP         /ZERO THE EXPONENT AND
2398  5603  3045          DCA HORD        /INITIALIZE FLOATING AC,
2399  5604  3047          DCA OVER2
2400  5605  3314          DCA DNUMBR
2401  5606  3050          DCA SIGNF
2402  5607  1066          TAD CHAR        /ALLOW KEYBOARD SIGN CHECKS,
2403  5610  1264          TAD MPLUS
2404  5611  7450          SNA
2405  5612  5220          JMP .+6         /+SIGN; GET NEXT
2406  5613  1111          TAD M2          /CHECK - SIGN
2407  5614  7640          SZA CLA
2408  5615  5221          JMP .+4
2409  5616  7040          CMA             /INIT SIGN CHECK TO POS.
2410  5617  3050          DCA SIGNF
2411  5620  4666          JMS I XINPUT    /GET NEXT
2412  5621  1066          TAD CHAR        /A SPACE PERHAPS?
2413  5622  1265          TAD MSPACE
2414  5623  7650          SNA CLA
2415  5624  5220          JMP .+4
2416  5625  4227          JMS DECON
2417  5626  5600          JMP I DECONV
2418  5627  0000    DECON,  0
```

```
2419  5630  1066          TAD CHAR        /TEST LEAD CHARACTER FOR TERMINATOR
2420  5631  1262          TAD MINE
2421  5632  7650          SNA CLA
2422  5633  5627          JMP I DECON     /E
2423  5634  4561          TESTN
2424  5635  5627          JMP I DECON     /.
2425  5636  5247          JMP DTST        /OTHER
2426  5637  1054          TAD SORTCN      /N
2427  5640  3313  DSAVE,  DCA DIGIT       /YES
2428  5641  4267          JMS MULT10      /REMAIN MUST BE 0 SINCE OVERFLOW IS CHECKED
2429  5642  2314          ISZ DNUMBR      /COUNT DIGITS
2430  5643  7640          SZA CLA
2431  5644  4566          ERROR2          /INPUT=OVERFLOW ERROR
2432  5645  4666          JMS I XINPUT
2433  5646  5230          JMP DECON+1     /CONTINUE
2434  5647  1066  DTST,   TAD CHAR        /ALLOW A-Z
2435  5650  1112          TAD MINUSA
2436  5651  7710          SPA CLA
2437  5652  5627          JMP I DECON
2438  5653  1066          TAD CHAR
2439  5654  1263          TAD MINUSZ
2440  5655  7740          SZA SMA CLA
2441  5656  5627          JMP I DECON     /USE SIX BITS OF ASCII
2442  5657  1066          TAD CHAR
2443  5660  0122          AND P77
2444  5661  5240          JMP DSAVE
2445  5662  7473  MINE,   =305    /(7532)= FOR AMPERSAND
2446  5663  7446  MINUSZ, =332
2447  5664  7525  MPLUS,  =253
2448  5665  7540  MSPACE, =240
2449  5666  0756  XINPUT, INPUT
2450  5667  0000  MULT10, 0       /ROUTINE TO MULTIPLY FLAC BY TEN (10)
2451  5670  1047          TAD OVER2
2452  5671  3043          DCA OVER1
2453  5672  1046          TAD LORD        /DOUBLE PRECISION WORD
2454  5673  3042          DCA AC1L        /BY TEN (DECIMAL)
2455  5674  1045          TAD HORD        /REMAIN=REMAINDER
2456  5675  3041          DCA AC1H
2457  5676  3312          DCA REMAIN      /CLEAR OVERFLOW WORD
2458  5677  4315          JMS MULT2       /CALL SUBROUTINE TO
2459  5700  4315          JMS MULT2       /MULTIPLY BY TWO
2460  5701  4333          JMS DUBLAD      /CALL DOUBLE ADD
2461  5702  4315          JMS MULT2
2462  5703  1313          TAD DIGIT       /ADD LAST DIGIT RECEIVED
2463  5704  3043          DCA OVER1
2464  5705  3042          DCA AC1L
2465  5706  3041          DCA AC1H
2466  5707  4333          JMS DUBLAD
2467  5710  1312          TAD REMAIN      /EXIT WITH REMAINDER
2468  5711  5667          JMP I MULT10    /IN AC
2469  5712  0000  REMAIN, 0
2470  5713  0000  DIGIT,  0       /STORAGE FOR DIGIT
2471  5714  0000  DNUMBR, 0       /#NUMBER OF DIGITS
2472  5715  4VC0  MULT2,  0       /MULTIPLY  OVER2, LORD, HORD BY 2
2473  5716  1047          TAD OVER2
```

```
2474  5717  7104          CLL RAL /CARRY INSERT BIT IS IN LINK
2475  5720  3047          DCA OVER2
2476  5721  1046          TAD LORD
2477  5722  7004          RAL
2478  5723  3046          DCA LORD
2479  5724  1045          TAD HORD
2480  5725  7004          RAL
2481  5726  3045          DCA HORD
2482  5727  1312          TAD REMAIN
2483  5730  7004          RAL
2484  5731  3312          DCA REMAIN
2485  5732  5715          JMP I MULT2
2486  5733  0000  DUBLAD, 0          /TRIPLE PRECISION ADDITION
2487  5734  7300          CLA CLL
2488  5735  1047          TAD OVER2
2489  5736  1043          TAD OVER1
2490  5737  3047          DCA OVER2
2491  5740  7004          RAL
2492  5741  1046          TAD LORD
2493  5742  1042          TAD AC1L
2494  5743  3046          DCA LORD
2495  5744  7004          RAL
2496  5745  1045          TAD HORD
2497  5746  1041          TAD AC1H
2498  5747  3045          DCA HORD
2499  5750  7004          RAL
2500  5751  1312          TAD REMAIN              /WITH OVERFLOW
2501  5752  3312          DCA REMAIN
2502  5753  5733          JMP I DUBLAD
2503  5754  0000  DIV1,   0          /SHIFT OPERAND RIGHT
2504  5755  7300          CLA CLL         /TRIPLE PRECISION
2505  5756  1041          TAD AC1H
2506  5757  7510          SPA
2507  5760  7120          CLL CML
2508  5761  7010          RAR
2509  5762  3041          DCA AC1H
2510  5763  1042          TAD AC1L
2511  5764  7010          RAR
2512  5765  3042          DCA AC1L
2513  5766  1043          TAD OVER1
2514  5767  7010          RAR
2515  5770  3043          DCA OVER1
2516  5771  2040          ISZ EX1
2517  5772  5754          JMP I DIV1
2518  5773  5754          JMP I DIV1
2519  5774  4566  FSSERR, ERROR4          /********(SUBSCRIPT ERROR FOR FILE VARIABLE-OR NOT DEFINED)
2520        6000  *6000
2521              /FLOATING OUTPUT CONVERSION ROUTINE
2522  6000  0000  FLOUTP, 0
2523  6001  7610          SKP CLA         /********/GETS RID OF 0 IN PRINTOUT
2524              LMODE
2525  6002  6377  OPTR,   6377            /********
2526              PMODE
2527  6003  1045          TAD HORD        /NUMBER>077
2528  6004  7700          SMA CLA
```

```
2529  6005  1334          TAD SMSP        /PRINT "-" OR A SPACE.
2530  6006  1336          TAD SMIN
2531  6007  4551          PRINTC
2532  6010  4753          JMS I ABSOL2
2533  6011  3033  FG02,   DCA T3          /INITIALIZE DECIMAL EXPONENT
2534  6012  1344          TAD EXP         /IS EXP > TO 47
2535  6013  7510          SPA
2536  6014  5227          JMP FG03        /TOO LARGE!MULTIPLY BY 1/10.
2537  6015  7440          SZA
2538  6016  1341          TAD M4
2539  6017  7750          SPA SNA CLA
2540  6020  5234          JMP FG04
2541  6021  4407          FINT
2542  6022  4744          FMUL I PPTEN
2543  6023  6000          FEXT
2544  6024  7001          IAC
2545  6025  1033          TAD T3
2546  6026  5211          JMP FG02
2547  6027  4407  FG03,   FINT
2548  6030  4752          FMUL I TENPT
2549  6031  6000          FEXT
2550  6032  7040          CMA
2551  6033  5225          JMP .-6
2552  6034  3745  FG04,   DCA I DPT       /MULTIPLY BY TWO TO POSITION BIT0
2553  6035  3746          DCA I REPT      /CLEAR OVERFLOW WORD
2554  6036  1350          TAD SADR        /INIT BUFFER POINTER
2555  6037  3014          DCA FLTXR
2556  6040  1044          TAD EXP         /COMPUTE BITS IN 1ST DIGIT
2557  6041  7140          CMA CLL
2558  6042  3354          DCA OUTDG       /TEMP COUNT
2559  6043  1343          TAD DCOUNT      /SETUP COUNT OF TOTAL OUTPUT
2560  6044  3044          DCA EXP
2561  6045  4527          JMS I DOUBLE    /ROTATE OUT THE 1ST 4 BITS
2562  6046  2354          ISZ OUTDG
2563  6047  5245          JMP .-2
2564  6050  1746          TAD I REPT      /TEST FOR 10-15,0,1-9
2565  6051  7450          SNA
2566  6052  5270          JMP FG05        /IGNORE 1ST ZERO
2567  6053  1342          TAD FM12
2568  6054  7710          SPA CLA
2569  6055  5264          JMP .+7         /0-9
2570  6056  7001          IAC
2571  6057  3414          DCA I FLTXR     /OUTPUT A 1
2572  6060  2044          ISZ EXP         /COUNT THE DIGIT
2573  6061  1342          TAD FM12        /CORRECT REMAINDER
2574  6062  2033          ISZ T3          /BUMP DECIMAL EXPONENT
2575  6063  7000          NOP
2576  6064  1746          TAD I REPT      /COMPUTE RESULTANT OR SECOND DIGIT
2577  6065  2033          ISZ T3
2578  6066  7000          NOP
2579  6067  7410          SKP
2580  6070  4747  FG05,   JMS I M10PT     /IE. .672X10-6=.72,, ETC
2581  6071  3414          DCA I FLTXR
2582  6072  2044          ISZ EXP         /ALL DIGITS OUTPUT??
2583  6073  5270          JMP .-3         /NO; CONTINUE
```

```
2584  6074  1352          TAD SADR        /INIT BUFFER POINTER
2585  6075  3014          DCA FLTXR
2586  6076  1343          TAD DCOUNT
2587  6077  4751          JMS I ROUND     /OUTPUT MANTISSA
2588  6100  5600          JMP I FLOUTP    /FIXED POINT DONE
2589  6101  1333          TAD CHRT        /PRINT "E"
2590  6102  4551          PRINTC
2591                /OUTPUT THE EXPONENT
2592  6103  1033          TAD T3          /TAKE ABSOLUTE VALUE OF EXPONENT
2593  6104  7510          SPA
2594  6105  7041          CIA
2595  6106  3045          DCA HORD                /SAVE * POWER
2596  6107  1033          TAD T3          /PRINT SIGN
2597  6110  7700          SMA CLA
2598  6111  1111          TAD M2
2599  6112  1336          TAD SMIN
2600  6113  4551          PRINTC
2601  6114  1045          TAD HORD
2602  6115  2044          ISZ EXP
2603  6116  1337          TAD M144
2604  6117  7500          SMA
2605  6120  5315          JMP .+3
2606  6121  1340          TAD C144
2607  6122  3045          DCA HORD                /SAVE TENS AND UNITS
2608  6123  7040          CMA             /OUTPUT HUNDREDS
2609  6124  1044          TAD EXP
2610  6125  7440          SZA             /UNLESS ZERO
2611  6126  4354          JMS OUTDG
2612  6127  1045          TAD HORD        /PRINT TWO DIGITS
2613  6130  4732          JMS I PRNTI
2614  6131  5600          JMP I FLOUTP
2615  6132  2442  PRNTI,  PRNT
2616  6133  0305  CHRT,   305     /E  (0246) + FOR AMPERSAND
2617  6134  7763  SMSP,   240+255 /
2618  6135  0275  PEQ,    275
2619  6136  7255  SMIN,   255
2620  6137  7634  M144,   -144    /-100
2621  6140  0144  C144,   0144    /+100
2622  6141  7774  M4,     -4
2623  6142  7766  FM12,   -12
2624  6143  7771  DCOUNT, -DIGITS-1       /NUMBER OF DIGITS OUTPUT
2625  6144  6275  PPTEN,  PTEN    /IEI
2626  6145  5713  DPT,    DIGIT
2627  6146  5712  REPT,   REMAIN  /OVERFLOW FROM INTEGER MULTIPLY
2628  6147  5667  M10PT,  MULT10
2629  6150  7467  SADR,   BUFFER-1
2630  6151  5400  ROUND,  TGO     /ACTUAL OUTPUT ROUTINE
2631  6152  6271  TENPT,  TEN
2632  6153  5571  ABSOL2, ABSOLV
2633  6154  0000  OUTDG,  0       /OUTPUT ONE DIGIT
2634  6155  1113          TAD C260
2635  6156  4551          PRINTC
2636  6157  5754          JMP I OUTDG
2637  6160  7750  RANMUL, 7750!2333!5733  /********
      6161  2333
```

```
        6162  5733
        6163  1167   LEPUT,  TAD      SUBS2    /********* CALLS STORING ROUTINE FOR
        6164  3171           DCA      SUBS     /********* S FN(X)=
        6165  1170           TAD      LESUB2   /*********
        6166  3173           DCA      LESUBS   /*********
        6167  1002           TAD      LWETMP   /*********
        6170  6212           6212              /*********
        6171  4775           JMS I    STORIT   /*********
        6172  2407           ISZ I    7        /*********
        6173  5774           JMP I    .+1      /*********
        6174  6401           FPNT+1            /*********
        6175  2000   STORIT, ITSTOR            /*********
        6176  6213   LS,     6213     /CIF CDF 10/********* LIBRARY SAVE
        6177  5134           JMP      XLS      /*********
                     /USED BY 8K
                     /FLOATING POINT INPUT
              6200   *6200
        6200  0000   FLINTP, 0                 /IF C(AC) = 0, USE CHAR
        6201  7640           SZA CLA           /IF C(AC) NON-ZERO , GET NEXT
        6202  4706           JMS I XIN         /GET FIRST CHAR
        6203  1066           TAD CHAR          /IGNORE LEADING SPACES
        6204  1114           TAD M240
        6205  7650           SNA CLA
        6206  5202           JMP .-4
        6207  4702           JMS I DPCVPT      /READ FIRST DIGIT GROUP
        6210  1066           TAD CHAR          /AND SET "SIGNF"
        6211  1115           TAD MPER
        6212  7640           SZA CLA           /ENDED BY PERIOD?
        6213  5221           JMP FIGO1
        6214  4706           JMS I XIN         /YES, READ 2AND GROUP
        6215  3705           DCA I DPN
        6216  4703           JMS I DCONP
        6217  1705           TAD I DPN         /SAVE NUMBER OF DIGITS IN T3
        6220  7041           CMA IAC
        6221  3033   FIGO1,  DCA T3            /NO,
        6222  1310           TAD P43
        6223  3044           DCA EXP
        6224  4704           JMS I RESOL5
        6225  4707           JMS I INORM       /NORMALIZE FIRST, THEN
        6226  4407           FINT
        6227  6430           FPUT I PT1        /SAVE NUMBER
        6230  0000           FEXT
        6231  1066           TAD CHAR
        6232  1301           TAD MINUSE
        6233  7640           SZA CLA           /"E" READ IN?
        6234  5246           JMP ENDFI+3       /NO
        6235  4706           JMS I XIN         /YES, READ 3RD DIGIT GROUP
        6236  4702           JMS I DPCVPT      /I.E. CONVERT DECIMAL EXPONENT
        6237  4704           JMS I RESOL5
        6240  1047           TAD OVER2
        6241  1033           TAD T3            /C(SEXP)PLACES TO RIGHT
        6242  3033           DCA T3            /OF LAST DIGIT
                     /COMPENSATE FOR DECIMAL EXPONENTS
        6243  4407   ENDFI,  FINT              /RESTORE MANTISSA
        6244  6430           FGET I PT1
```

```
2692  6245  0040          FEXT
2693  6246  1033          TAD T3          /TEST DECIMAL EXPONENT
2694  6247  7450          SNA
2695  6250  5600          JMP I FLINTP    /FINISHED
2696  6251  7700          SMA CLA
2697  6252  5261          JMP FIG04
2698  6253  4407          FINT            /, IS TO THE LEFT!
2699  6254  4275          FMUL PTEN       /TIMES .1000
2700  6255  6431          FPUT I PT1
2701  6256  0000          FEXT
2702  6257  7001          IAC
2703  6260  5266          JMP .+6
2704  6261  4407  FIG04,  FINT            /, IS TO THE RIGHT!
2705  6262  4271          FMUL TEN        /MULTIPLY BY 10
2706  6263  6430          FPUT I PT1
2707  6264  0000          FEXT
2708  6265  7040          CMA
2709  6266  1033          TAD T3
2710  6267  3033          DCA T3
2711  6270  5246          JMP ENDFI+3
2712  6271  0004  TEN,     0004
2713  6272  2400          2400
2714  6273  0000          0000
2715  6274  0000          0000
2716  6275  7775  PTEN,    7775
2717  6276  3146          3146
2718  6277  3147          3147    /(3146) = FOR 4-WORD
2719  6300  3150          3150
2720  6301  7473  MINUSE;  =305    /(7532) = FOR AMPERSAND
2721  6302  5600  DPCVPT;  DECONV
2722  6303  5627  DCONP;   DECON
2723  6304  7173  RESOL5;  RESOLV
2724  6305  5714  DPN,     DNUMBR
2725  6306  0756  XIN,     INPUT
2726  6307  7335  INORM;   DNORM
2727  6310  0043  P43,     43
2728                /END OF FLOATING POINT INPUT
2729                /7 FREE
2730                /USED BY H.S. READER
2731
2732
2733
2734                /
2735                /CALLS LOADING ROUTINE FOR FILE
2736                /VARIABLES IN EXPRESSIONS; CALLED BY EFUN3!
2737                /
2738        6311    *6311                   /********
2739  6311  1066  FNUM,   TAD     CHAR      /********
2740  6312  3056          DCA     EFOP      /********
2741  6313  4545          GETC              /********
2742  6314  4550          SORTC             /********
2743  6315  1771          TERMS-1           /********
2744  6316  7410          SKP               /********
2745  6317  5313          JMP     .-4       /********
2746  6320  4562          TSTLPR            /********
```

```
2747  6321  4566                ERROR4          /********
2748  6322  4734                JMS I   PECALL  /********
2749  6323  4453                JMS I   INTEGER /********
2750  6324  3171                DCA     SUBS    /********
2751  6325  1345                TAD     HORD    /********
2752  6326  3173                DCA     LESUBS  /********
2753  6327  1413                POPA            /********
2754  6330  6212                6212            /******** FILE NO.
2755  6331  4733                JMS I   LOADIT  /********
2756  6332  5536                JMP I   EFUN3I  /********
2757  6333  1533    LOADIT, ITLOAD              /********
2758  6334  1601    PECALL, ECALL               /********
2759  6335  0000    PASS,   0
2760  6336  4545            GETC
2761  6337  1066            TAD     CHAR
2762  6340  4542            PUSHA
2763  6341  4545            GETC
2764  6342  4550            SORTC
2765  6343  1374            GLIST-1
2766  6344  5735            JMP I   PASS
2767  6345  5341            JMP     .+4
2768  6346  4335    LTAPE,  JMS     PASS
2769  6347  1066            TAD     CHAR    /********
2770  6350  1374            TAD     MINCOM  /********
2771  6351  7640            SZA CLA         /********
2772  6352  5357            JMP     LERR    /********
2773  6353  1413            POPA            /********
2774  6354  4547            SORTJ           /******** JMPS ON SUBCOMMAND OF LIBR XXXX
2775  6355  6365            LLIST-1         /********
2776  6356  7772            LGO-LLIST       /********
2777  6357  4566    LERR,   ERROR4          /********
2778  6360  5167    LGO,    LO              /********
2779  6361  5171            LC              /********
2780  6362  2572            LM              /********
2781  6363  5173            LL              /********
2782  6364  6176            LS              /********
2783  6365  6375            LG              /********
2784  6366  0317    LLIST,  317             /********
2785  6367  0303            303             /********
2786  6370  0315            315             /********
2787  6371  0314            314             /********
2788  6372  0323            323             /********
2789  6373  0307            307             /********
2790  6374  7524    MINCOM, -254            /********
2791  6375  6213    LG,     6213            /********
2792  6376  5136            JMP     XLG     /********
2793        6400    *6400
2794                        / FLOATING-POINT INTERPRETER FOR FOCAL.
2795  6400  0000    FPNT,   0
2796  6401  7300            CLA CLL
2797  6402  3047            DCA OVER2       /(NOP) = FOR 4-WORD
2798  6403  3043            DCA OVER1       /(NOP) = FOR 4-WORD.
2799  6404  1600            TAD I FPNT      /GET NEXT INSTRUCTION
2800  6405  7450            SNA
2801  6406  5600            JMP I FPNT      /FAST EXIT
```

```
6407 3264           DCA JUMP
6410 1264           TAD JUMP
6411 0123           AND C200       /GET PAGE BIT
6412 7650           SNA CLA        /PAGE ZERO?
6413 5216           JMP .+3        /YES
6414 1104           TAD P7600      /NO
6415 0200           AND FPNT       /C(FPNT)0-4 CONTAINS PAGE BITS
6416 3040           DCA ADDR
6417 1106           TAD P177       /GET 7 BIT ADDRESS
6420 0264           AND JUMP
6421 1040           TAD ADDR
6422 3040           DCA ADDR
6423 1265           TAD INDRCT     /INDIRECT BIT=1?
6424 0264           AND JUMP
6425 7650           SNA CLA
6426 5233           JMP LOOP01     /NO-GO ON
6427 1440           TAD I ADDR     /YES ,DEFER ,W/O AUTO-INDEX
6430 7450           SNA            /******** IF PT1 WAS ZERO, IT IS A
6431 5572           JMP I   LEFPUT /******** FILE VARIABLE
6432 3040           DCA ADDR
6433 2200  LOOP01,  ISZ FPNT
6434 7040           CMA
6435 1040           TAD ADDR
6436 3015           DCA FLTXR2
6437 1264           TAD JUMP       /GET COMMAND
6440 7106           CLL RTL
6441 7006           RTL
6442 0107           AND P17        /GET BITS 0-2;IE OPCODE
6443 7450           SNA
6444 5271           JMP FLGT
6445 1266           TAD TABLE      /LOOKUP IN TABLE
6446 3264           DCA JUMP
6447 1664           TAD I JUMP
6450 7450           SNA
6451 5267           JMP FLPT
6452 3264           DCA JUMP
6453 1306           TAD CEX1       /SAVE FLOATING ARGUEMENT,UNLESS'GET' OR 'PUT'
6454 3014           DCA FLTXR
6455 1117           TAD MFLT
6456 3057           DCA CNTR
6457 1415           TAD I FLTXR2
6460 3414           DCA I FLTXR
6461 2057           ISZ CNTR
6462 5257           JMP .-3
6463 5664           JMP I JUMP     /GO THERE
6464 0000  JUMP,    0
     0040  ADDR=EX1
6465 0400  INDRCT,  0400
6466 6575  TABLE,   ITABLE
6467 1305  FLPT,    TAD CEXP       /EXP TO (ADDR)
6470 5275           JMP .+5
6471 1305  FLGT,    TAD CEXP       /(ADDR) TO EXP
6472 3015           DCA FLTXR2
6473 7040           CMA
6474 1040           TAD ADDR
```

```
2857  6475  3014          DCA FLTXR       /SAVE 'FROM' ADDRESS
2858  6476  1117          TAD MFLT        /3 OR 4 WORDS
2859  6477  3057          DCA CNTR
2860  6500  1414          TAD I FLTXR
2861  6501  3415          DCA I FLTXR2
2862  6502  2057          ISZ CNTR
2863  6503  5300          JMP .-3
2864  6504  5201          JMP FPNT+1
2865  6505  0043  CEXP,    EXP-1
2866  6506  0037  CEX1,    EX1-1
2867  6507  4767  FLSU,    JMS I OPMINS    /FSUB-2 - NEGATE THE OPERAND
2868  6510  4772  FLAD,    JMS I ALGN      /FLAD-1 - FIRST ALIGN EXPONENTS
2869  6511  5201          JMP FPNT+1      /RETURN IF NO ALIGNMENT IS POSSIBLE
2870  6512  4774          JMS I RAR2      /TRIPLE PRECISION ADDDITION
2871  6513  4773          JMS I RAR1      /SINCE BITS ARE SHIFTED
2872  6514  4775          JMS I TRAD      /RIGHT
2873  6515  4771  NORF,    JMS I NORM      /NORMALIZE THE RESULT
2874  6516  5201          JMP FPNT+1      /HINT:USE 700X FOR FUNCTIONS.
2875                /INTERPRETIVE POWER
2876  6517  1045  FLEX,    TAD HORD        /ZERO?
2877  6520  7200          CLA             /CROCK****
2878  6521  5327          JMP .+6
2879  6522  3044  ZERO,    DCA EXP         /YES
2880  6523  3045          DCA HORD
2881  6524  3046          DCA LORD
2882  6525  3047          DCA OVER2
2883  6526  5201          JMP FPNT+1
2884  6527  4543          PUSHF           /AC TO A * POWER
2885  6530  0044                FLAC
2886  6531  4543          PUSHF           /SETUP ARGUMENT ( THE EXPONENT)
2887  6532  0040                EX1
2888  6533  4544          POPF
2889  6534  0044                FLAC
2890  6535  4453          JMS I INTEGER   /ONLY POSITIVE, INTEGER  EXPONENTS
2891  6536  7510          SPA
2892  6537  5344          JMP .+5         /(COULD DIVIDE)
2893  6540  7040          CMA
2894  6541  3264          DCA JUMP        /TEMP STORAGE
2895  6542  3043          DCA OVER1       /(NOP) - FOR 4-WORD
2896  6543  1045          TAD HORD
2897  6544  7640          SZA CLA
2898  6545  4566          ERROR2          /TOO LARGE OR NEGATIVE EXPONENT
2899  6546  4543          PUSHF           /INITIALIZE TO ONE.
2900  6547  2405                FLTONE
2901  6550  4544          POPF
2902  6551  0044                FLAC
2903  6552  4544          POPF
2904  6553  7470                ITER1
2905  6554  5362          JMP .+6
2906  6555  4543          PUSHF
2907  6556  7470                ITER1
2908  6557  4544          POPF
2909  6560  0040                EX1
2910  6561  4770          JMS I MULT      /"MULT"
2911  6562  2264          ISZ JUMP
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6563  5355           JMP .-6
6564  5201           JMP FPNT+1
6565  4770  FLMY,    JMS I MULT      /MULTIPLY
6566  5201           JMP FPNT+1
6567  7153  OPMINS,  MINUS2
6570  7004  MULT,    DMULT
6571  7335  NORM,    DNORM
6572  6623  ALGN,    ALIGN
6573  5754  RAR1,    DIV1
6574  6757  RAR2,    DIV2
6575  5733  TRAD,    DUBLAD
      6575  ITABLE=.-1
6576  6510           FLAD
6577  6507           FLSU
6600  7107           FLDV
6601  6565           FLMY
6602  6517           FLEX
6603  0000           0000
6604  6515           NORF
6605  0000  ACMINS,  0          /ROUTINE TO  COMPLEMENT FLAC - VIA "MINSKI"
6606  7200           CLA                /********(IS THIS CLA NECESSARY)
6607  1047           TAD        OVER2   /******** RECODING FOR SPACE
6610  7161           CLL CML CIA        /********
6611  3047           DCA        OVER2   /********
6612  7004           RAL                /********
6613  1046           TAD        LORD    /********
6614  7061           CML CIA            /********
6615  3046           DCA        LORD    /********
6616  7004           RAL                /********
6617  1045           TAD        HORD    /********
6620  7061           CML CIA            /********
6621  3045           DCA        HORD    /********
6622  5605           JMP I      ACMINS
6623  0000  ALIGN,   0          /SUBROUTINE TO ALIGN
6624  1045           TAD HORD           /BINARY POINTS
6625  7450           SNA
6626  1046           TAD LORD           /IS MANTISSA ZERO?
6627  7650           SNA CLA
6630  5311           JMP NOX1           /YES, RESULT=OPERAND
6631  1041           TAD AC1H           /NO,IS OPERAND ZERO?
6632  7450           SNA
6633  1042           TAD AC1L
6634  7450           SNA
6635  1043           TAD OVER1
6636  7650           SNA CLA
6637  5623           JMP I ALIGN        /YES, EXIT,
6640  1040           TAD EX1
6641  7041           CMA IAC
6642  1044           TAD EXP
6643  7450           SNA                /ARE EXPONENTS EQUAL?
6644  5273           JMP ADONE          /YES
6645  3205           DCA ACMINS
6646  1205           TAD ACMINS
6647  7500           SMA                /NO
6650  7041           CIA                /NEGATE AND
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2967  6651  3322          DCA AMOUNT      /SAVE THE DIFFERENCE
2968  6652  1322          TAD AMOUNT
2969  6653  1336          TAD TEST2
2970  6654  7710          SPA CLA         /CAN THE EXPONENTS BE ALIGNED?
2971  6655  5275          JMP NOX         /NO, USE LARGER OF THE TWO.
2972  6656  1235          TAD ACMINS      /YES, SHIFT THE SMALLER
2973  6657  7700          SMA CLA
2974  6660  5265          JMP ASHFT
2975  6661  4357          JMS DIV2
2976  6662  2322          ISZ AMOUNT
2977  6663  5261          JMP .-2
2978  6664  5273          JMP ADONE
2979  6665  7040  ASHFT,   CMA
2980  6666  1043          TAD EX1
2981  6667  3040          DCA EX1
2982  6670  4723          JMS I TAG1
2983  6671  2322          ISZ AMOUNT
2984  6672  5270          JMP .-2
2985  6673  2223  ADONE,   ISZ ALIGN
2986  6674  5623          JMP I ALIGN
2987  6675  1040  NOX,     TAD EX1         /MISSION IMPOSSIBLE!
2988  6676  7700          SMA CLA         /CHECK FOR SIGN DIFFERENCE
2989  6677  5304          JMP NOX2
2990  6700  1044          TAD EXP
2991  6701  7700          SMA CLA
2992  6702  5623          JMP I ALIGN     /-+
2993  6703  5306          JMP .+3         /--
2994  6704  1044  NOX2,    TAD EXP
2995  6705  7700          SMA CLA
2996  6706  1205          TAD ACMINS      /TEMP STORAGE OF DIFFERENCE, BOTH POS EXP OR BOTH NEG.
2997  6707  7740          SMA SZA CLA
2998  6710  5623          JMP I ALIGN     /OK (+-)
2999  6711  1040  NOX1,    TAD EX1         /USE LARGER
3000  6712  3044          DCA EXP
3001  6713  1041          TAD AC1H
3002  6714  3045          DCA HORD
3003  6715  1042          TAD AC1L
3004  6716  3046          DCA LORD
3005  6717  1043          TAD OVER1
3006  6720  3047          DCA OVER2
3007  6721  5623          JMP I ALIGN
3008  6722  0000  AMOUNT,  0
3009  6723  5754  TAG1,    DIV1
3010                /LEAVE 12 BIT ANSWER IN AC UPON RETURN
3011                /LEAVE FLAC AS AN INTEGER.
3012  6724  0000  FIX,     0               /VIA (INTEGER)
3013  6725  4751          JMS I ABSOL
3014  6726  1044          TAD EXP         /TEST FOR FRACTION
3015  6727  7750          SPA SNA CLA
3016  6730  5353          JMP FIXM        /DOUBLE CHECK FOR MINUS ONE.
3017  6731  7001          IAC
3018  6732  3043          DCA OVER1
3019  6733  1350          TAD P27         /INIT ALIGNMENT
3020  6734  3040          DCA EX1
3021  6735  4223          JMS ALIGN       /DO THE ALIGNMENT TO AN INTEGER
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3022  6736  0027  TEST2,  0027              /ALREADY DONE? (43)=FOR 4=WORD
3023  6737  2047          ISZ OVER2
3024  6740  5344          JMP .+4
3025  6741  2046          ISZ LORD
3026  6742  7410          SKP
3027  6743  2045          ISZ HORD
3028  6744  3047          DCA OVER2         /CLEAR THE FRACTION
3029  6745  4752          JMS I RESOL
3030  6746  1046          TAD LORD          /EXIT WITH LOW ORDER RESULT IN AC.
3031  6747  5724          JMP I FIX
3032  6750  0027  B27,     27
3033  6751  5571  ABSOL,   ABSOLV
3034  6752  7173  RESOL,   RESOLV
3035  6753  3044  FIXM,    DCA EXP           /CLEAR EXPONENT
3036  6754  3045          DCA HORD
3037  6755  3046          DCA LORD
3038  6756  5344          JMP TEST2+6
3039  6757  0000  DIV2,    0         /SHIFT FLAC RIGHT
3040  6760  7300          CLA CLL
3041  6761  1045          TAD HORD
3042  6762  7510          SPA
3043  6763  7020          CML
3044  6764  7010          RAR
3045  6765  3045          DCA HORD
3046  6766  1046          TAD LORD
3047  6767  7010          RAR
3048  6770  3046          DCA LORD
3049  6771  1047          TAD OVER2
3050  6772  7010          RAR
3051  6773  3047          DCA OVER2
3052  6774  2044          ISZ EXP
3053  6775  5757          JMP I DIV2
3054  6776  5757          JMP I DIV2
3055        6777  SPECIAL=.         /INPUT CHARACTERS
3056  6777  0337          337       /LEFT ARROW
3057  7000  0377          377       /RUBOUT
3058  7001  0212          212       /L.F.
3059  7002  0375          375       /ALT MODE
3060  7003  7777          -1
3061              /(A+B*C)*(D+E+F)=A*D,A*E,B*D,B*E
3062  7004  0000  DMULT,  0         /N= PRECISION MULTIPLY WITH
3063  7005  7001          IAC       /PRODUCT IN TRIPLE PRECISION
3064  7006  1040          TAD EX1 /ADD EXPONENTS+1
3065  7007  4324          JMS SIGN          /AND DETERMINE SIGN OF RESULT
3066  7010  7710          SPA CLA
3067  7011  4353          JMS MINUS2
3068  7012  3301          DCA DATUM-1       /INITIALIZE RESULT
3069  7013  3300          DCA DATUM-2
3070  7014  3277          DCA DATUM-3
3071  7015  3276          DCA DATUM-4
3072  7016  1045          TAD A             /A*D
3073  7017  3751          SAVE              /STORE IN MP2
3074  7020  1041          TAD D             /SINGLE PRECISION MULTIPLY
3075  7021  4752          MULTY
3076  7022  0002          2                 /ACCUMULATE START[illegible] IN #2 DATA WORD
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3077  7023  1042          TAD E           /A*E
3078  7024  4752          MULTY
3079  7025  0003          3
3080  7026  1046          TAD B           /B*D
3081  7027  3751          SAVE
3082  7030  1041          TAD D
3083  7031  4752          MULTY
3084  7032  0003          3
3085  7033  1042          TAD E           /B*E
3086  7034  4752          MULTY
3087  7035  0004          4
3088  7036  5263  DMULT4, JMP DMDONE       /(DCA DATUM-5)-FOR 4-WORD
3089  7037  3274          DCA DATUM-6
3090  7040  1043          TAD F           /A*F
3091  7041  3751          SAVE
3092  7042  1045          TAD A
3093  7043  4752          MULTY
3094  7044  0004          4
3095  7045  1046          TAD B           /B*F
3096  7046  4752          MULTY
3097  7047  0005          5
3098  7050  1047          TAD C           /C*D
3099  7051  3751          SAVE
3100  7052  1041          TAD D
3101  7053  4752          MULTY
3102  7054  0004          4
3103  7055  1042          TAD E           /C*E
3104  7056  4752          MULTY
3105  7057  0005          5
3106  7060  1043          TAD F           /C*F
3107  7061  4752          MULTY
3108  7062  0006          6
3109  7063  1301  DMDONE, TAD DATUM-1     /COPY RESULT
3110  7064  3045          DCA HORD
3111  7065  1300          TAD DATUM-2
3112  7066  3046          DCA LORD
3113  7067  1277          TAD DATUM-3
3114  7070  3047          DCA OVER2
3115  7071  4301          JMS MULDIV
3116  7072  3047          DCA OVER2       /(NOP) - FOR 4-WORD
3117  7073  5604          JMP I DMULT
3118        7102  DATUM=.+6       /INTERMEDIATE STORAGE
3119  7074  0000          0/#6-LOW ORDER RESULT
3120  7075  0000          0/#5
3121  7076  0000          0/#4
3122  7077  0000          0/#3
3123  7100  0000          0/#2
3124                      /#1-HIGH ORDER RESULT
3125  7101  0003  MULDIV, 0       /TERMINATE MULTIPLY AND DIVIDE,
3126  7102  2050          ISZ SIGNF               /CORRECT FOR SIGN
3127  7103  4451          JMS I MINSKI
3128  7104  4747          JMS I NORMF     /SHIFT LEFT
3129  7105  7000          NOP             /*
3130  7106  5701          JMP I MULDIV
3131  7107  1041  FLDV,   TAD AC1W        /41DIVIDE
```

```
3132  7110  7650          SNA CLA
3133  7111  4566          ERROR2          /DIVISION BY ZERO
3134  7112  1040          TAD EX1         /SUBTRACT EXPONENTS+1
3135  7113  7041          CMA IAC
3136  7114  7001          IAC
3137  7115  4324          JMS SIGN        /SET UP SIGNS
3138  7116  7700          SMA CLA
3139  7117  4353          JMS MINUS2      /NEGATE DIVISOR
3140  7120  4750          JMS I DIVIDE    /DIVIDE
3141  7121  4301          JMS MULDIV
3142  7122  5723          JMP I .+1
3143  7123  6401                FPNT+1
3144                /THIS SUBROUTINE PREPARES MULTIPLY AND DIVIDE
3145                /FOR ANY COMBINATION OF SIGNED ARGUMENTS AND FOR ZERO,
3146                /THE RESULT OF EITHER IS ZERO IF FLAC = 0,
3147                /RESULT OF MULTIPLY IS ZERO IF EITHER IS ZERO;
3148                /DIVISION BY ZERO IS CHECKED BEFORE THIS
3149                /ROUTINE IS CALLED.
3150                /THE CALLING AC CONTAINS AN UPDATE VALUE FOR THE
3151                /EXPONENT, THE RETURNING AC CONTAINS THE SIGN OF
3152                /THE ARGUMENT FOR FURTHER TESTING BY EACH ROUTINE.
3153  7124  0000    SIGN,   0               /TEST AND SAVE SIGN OF RESULT
3154  7125  1044          TAD EXP /COMPUTE NEW EXPONENT FOR MUL*DIV.
3155  7126  3044          DCA EXP
3156  7127  1124          TAD P4000       /LOAD 4000 TO XOR THE SIGN BITS.
3157  7130  0045          AND HORD
3158  7131  1041          TAD AC1H
3159  7132  7700          SMA CLA         /RESULT MAY BE ZERO
3160  7133  7040          CMA
3161  7134  3050          DCA SIGNF
3162  7135  1045          TAD HORD
3163  7136  7450          SNA
3164  7137  5746          JMP I REVIT     /ANSWER IS ZERO.
3165  7140  7710          SPA CLA         /TAKE ABSOLUTE VALUE OF FLAC
3166  7141  4451          JMS I MINSKI
3167  7142  1041          TAD AC1H
3168  7143  7450          SNA             /RESULT OF EITHER MAY BE ZERO
3169  7144  5746          JMP I REVIT
3170  7145  5724          JMP I SIGN
3171                /SIGN OF RESULT = SIGNF
3172                /*=*1
3173                /*=0
3174  7146  6522    REVIT,  ZERO
3175  7147  7335    NORMF,  DNORM
3176  7150  7261    DIVIDE, DURDIV
3177        3751    SAVE=DCA I .
3178  7151  7256          MP2
3179        4752    MULTY=JMS I .
3180  7152  7200          MP4
3181        0045    A=FLAC+1
3182        0046    B=FLAC+2
3183        0047    C=FLAC+3
3184        0041    D=AC1H
3185        0042    E=AC1L
3186        0043    F=OVER1
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3187  7153  0000  MINUS2, 0        /NEGATE OPERAND
3188  7154  7300        CLA CLL          /TRIPLE PRECISION
3189  7155  1043        TAD OVER1
3190  7156  7041        CMA IAC
3191  7157  3043        DCA OVER1
3192  7160  1042        TAD AC1L
3193  7161  7040        CMA
3194  7162  7430        SZL
3195  7163  7101        IAC CLL
3196  7164  3042        DCA AC1L
3197  7165  1041        TAD AC1H
3198  7166  7040        CMA
3199  7167  7430        SZL
3200  7170  7101        IAC CLL
3201  7171  3041        DCA AC1H
3202  7172  5753        JMP I MINUS2
3203  7173  0000  RESOLV, 0
3204  7174  1050        TAD  SIGNF
3205  7175  7710        SPA CLA
3206  7176  4451        JMS I MINSKI
3207  7177  5773        JMP I RESOLV
3208        7200  *7200
3209  7200  0000  MP4,    0        /SINGLE PRECISION, UNSIGNED MULTIPLY = "MULTY"
3210  7201  7450        SNA      /NO RESULT ADDED IF ZERO
3211  7202  5600        JMP I MP4
3212                    /FOR EAE INSERT THE FOLLOWING!
3213                    /7203  3206  DCA .+3
3214                    /7204  1256  TAD MP2
3215                    /7205  7425  MQL MUY
3216                    /7206  0000  0
3217                    /7207  3253  DCA MP5
3218                    /7210  7501  MQA
3219                    /7211  3255  DCA MP3
3220                    /7212  5227  JMP .+15
3221  7203  3254        DCA MP1          /12 BITS BY 12 BITS
3222  7204  3253        DCA MP5
3223  7205  1257        TAD THIR
3224  7206  3255        DCA MP3
3225  7207  7100        CLL
3226  7210  1254  MP6,  TAD MP1
3227  7211  7010        RAR
3228  7212  3254        DCA MP1
3229  7213  1253        TAD MP5
3230  7214  7420        SNL
3231  7215  5220        JMP .+3
3232  7216  7100        CLL
3233  7217  1256        TAD MP2
3234  7220  7010        RAR
3235  7221  3253        DCA MP5 /SAVE HIGH ORDER RESULT
3236  7222  2255        ISZ MP3
3237  7223  5210        JMP MP6
3238  7224  1254        TAD MP1 /CORRECT LOW ORDER RESULT
3239  7225  7010        RAR
3240  7226  3255        DCA MP3
3241  7227  1600        TAD I MP4        /PICKUP SCALE FACTOR
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3242  7230  7041        CIA
3243  7231  1252        TAD DATUMA      /COMPUTE ADDRESS
3244  7232  3254        DCA MP1         /TEMP
3245  7233  1255        TAD MP3         /LOW ORDER PART
3246  7234  7100        CLL
3247  7235  1654        TAD I MP1       /ACCUMULATE
3248  7236  3654        DCA I MP1
3249  7237  2254        ISZ MP1
3250  7240  7004        RAL
3251  7241  1253        TAD MP5
3252  7242  1654        TAD I MP1
3253  7243  3654        DCA I MP1
3254  7244  7420        SNL
3255  7245  5640        JMP I MP4       /NO CARRY
3256  7246  2254        ISZ MP1
3257  7247  2654        ISZ I MP1
3258  7250  5630        JMP I MP4       /EXIT
3259  7251  5246        JMP .-3         /CARRY AGAIN
3260                    /////
3261  7252  7102  DATUMA, DATUM
3262  7253  0000  MP5,    0             /PRODUCT
3263  7254  0000  MP1,    0             /MULTIPLIER
3264  7255  0000  MP3,    0
3265  7256  0000  MP2,    0             /MULTIPLICAND
3266  7257  7764  THIR,   -14     /12 BITS
3267  7260  7751  MIF,    -27           /(-43) - FOR 4-WORD(=7735)
3268  7261  0000  DUBDIV, 0       /2 OR 3  PRECISION DIVIDE
3269  7262  3200        DCA MP4
3270  7263  3254        DCA MP1
3271  7264  1260        TAD MIF         /INIT BIT COUNTER
3272  7265  3255        DCA MP3
3273  7266  7410        SKP
3274  7267  4527  DV3,   JMS I DOUBLE   /SHIFT FLAC LEFT
3275  7270  7100        CLL
3276  7271  1042        TAD AC1L        /COMBINE ONE POSITION AND (4-WORD)
3277  7272  1046        TAD LORD
3278  7273  3256        DCA MP2         /SAVE RESULT
3279  7274  7004        RAL
3280  7275  1045        TAD HORD        /ADD OVERFLOW
3281  7276  1041        TAD AC1H
3282  7277  7420        SNL             /SKIP IF OVERFLOW
3283  7300  5304        JMP .+4
3284  7301  3045        DCA HORD        /UPDATE FLAC
3285  7302  1256        TAD MP2
3286  7303  3046        DCA LORD
3287  7304  7200        CLA             /CLEAR ACCUMULATOR
3288  7305  1254        TAD MP1         /SAVE OVERFLOW BITS CIRCULARLY
3289  7306  7004        RAL
3290  7307  3254        DCA MP1
3291  7310  1200        TAD MP4
3292  7311  7004        RAL
3293  7312  3200        DCA MP4
3294  7313  2255        ISZ MP3         /TEST FOR END OF DIVIDE
3295  7314  5267        JMP DV3
3296  7315  1254        TAD MP1         /LOAD RESULTS
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```
3297  7316  3046          DCA LORD
3298  7317  1200          TAD MP4
3299  7320  3045          DCA HORD
3300  7321  5661          JMP I DUBDIV    /(NOP)
3301  7322  7004          RAL             /EXTRA FOR 4-WORD
3302  7323  3335          DCA DNORM
3303  7324  2255          ISZ MP3         /TEST FOR END OF DIVIDE
3304  7325  5267          JMP DV3
3305  7326  1335          TAD DNORM
3306  7327  3045          DCA HORD
3307  7330  1200          TAD MP4
3308  7331  3046          DCA LORD
3309  7332  1254          TAD MP1
3310  7333  3047          DCA OVER2
3311  7334  5661          JMP I DUBDIV
3312  7335  .000    DNORM, 0       /SUBROUTINE TO NORMALIZE FLAC
3313  7336  4775          JMS I ABSOL3
3314  7337  4366          JMS TEST4
3315  7340  1045          TAD HORD
3316  7341  7450          SNA             /IS MANTISSA=0?
3317  7342  1047          TAD OVER2
3318  7343  7450          SNA
3319  7344  1046          TAD LORD
3320  7345  7650          SNA CLA
3321  7346  5363          JMP EXIT3       /YES
3322  7347  1045          TAD HORD
3323  7350  7104          RAL CLL
3324  7351  7710          SPA CLA         /WILL SHIFT BE TOO FAR?
3325  7352  5360          JMP .+6
3326  7353  4527          JMS I DOUBLE
3327  7354  7140          CMA CLL
3328  7355  1044          TAD EXP
3329  7356  3044          DCA EXP
3330  7357  5347          JMP .-10
3331  7360  4776          JMS I RESOL3
3332  7361  4366          JMS TEST4       /DON'T LEAVE 4000
3333  7362  5735          JMP I DNORM
3334  7363  3044    EXIT3, DCA EXP        /SET TO ZERO
3335  7364  5735          JMP I DNORM     /RETURN
3336  7365  6757    XRAR2, DIV2
3337  7366  .000    TEST4, 0
3338  7367  1045          TAD HORD        /TEST FOR 4000
3339  7370  7510          SPA
3340  7371  7041          CIA
3341  7372  7710          SPA CLA
3342  7373  4765          JMS I XRAR2     /SHIFT BACK
3343  7374  5766          JMP I TEST4
3344  7375  5571    ABSOL3, ABSOLV
3345  7376  7173    RESOL3, RESOLV
3346        7400    *7400
3347                /PAGE 18
3348                      /FLOATING SQUARE ROOT FUNCTION
3349  7400  4437    XSQRT, FINT
3350  7401  6274          FPUT FPAC1      /VALUE
3351  7402  .000          FEXT            /NEWTON'S METHOD IS USED
```

```
3352  7403  1045          GETSGN
3353  7404  7710          SPA CLA
3354  7405  4566          ERROR2          /NUMBER IS NEGATIVE-IMAGINARY ROOTS
3355  7406  1044          TAD EXP         /LINK IS -0 FROM FINT
3356  7407  7510          SPA             /MATCH THE SIGN WITH LINK BIT
3357  7410  7020          CML
3358  7411  7010          RAR
3359  7412  3270          DCA ITER1       /MAKE FIRST APPROXIMATION
3360  7413  7430          SZL             /TEST LSB OF EXP
3361  7414  2270          ISZ ITER1
3362  7415  7000  07000,  NOP             /********
3363  7416  1267          TAD SQCON1
3364  7417  3271          DCA ITER1+1
3365  7420  3272          DCA ITER1+2
3366  7421  3273          DCA ITER1+3
3367  7422  1275          TAD FPAC1+1
3368  7423  7450          SNA
3369  7424  1276          TAD FPAC1+2
3370  7425  7650          SNA CLA
3371  7426  5265          JMP SQEND       /NUMBER=0
3372  7427  4407  CLCU,   FINT
3373  7430  6274          FGET FPAC1
3374  7431  3270          FDIV ITER1
3375  7432  1270          FADD ITER1
3376  7433  6000          FEXT
3377  7434  7240          CLA CMA
3378  7435  1044          TAD EXP
3379  7436  3044          DCA EXP
3380  7437  1044          TAD EXP
3381  7440  7041          CMA IAC
3382  7441  1270          TAD ITER1
3383  7442  7640          SZA CLA         /ARE EXPONENTS EQUAL?
3384  7443  5261          JMP ROOTGO      /NO
3385  7444  1045          TAD HORD        /ARE HIGH-ORDER MANTISSAS EQUAL?
3386  7445  7041          CMA IAC
3387  7446  1271          TAD ITER1+1
3388  7447  7640          SZA CLA
3389  7450  5261          JMP ROOTGO      /NO
3390  7451  1046          TAD LORD
3391  7452  7041          CMA IAC
3392  7453  1272          TAD ITER1+2     /DO LOW-ORDER MANTISSAS AGREE
3393  7454  7500          SMA
3394  7455  7041          CMA IAC         /WITHIN ONE BIT?
3395  7456  7001          IAC
3396  7457  7700          SMA CLA
3397  7460  5536          RETURN
3398  7461  4407  ROOTGO, FINT
3399  7462  6270          FPUT ITER1
3400  7463  6000          FEXT
3401  7464  5227          JMP CLCU
3402  7465  3044  SQEND,  DCA EXP
3403  7466  5536          RETURN
3404  7467  3015  SQCON1, 3015
3405        7470  BUFFER=.
3406  7470  0000  ITER1,  0
```

```
        7471    0000            0
        7472    0000            0
        7473    0000            0
        7474    0000    FPAC1,  0
        7475    0000            0
        7476    0000            0
        7477    7503            BUFFER+13               /ADDRESS OF NEXT FREE LOCATION IN 10-DIGIT VERSION,
                                        /*7503          /********
        7500    0000    SCOPOU, 0                       /******** OUTPUT ROUTINE FOR SCOPE
        7501    0106            AND     P177            /******** STORES CHARS IN FLD1, LOCS 400-777
        7502    1367            TAD     07763           /********
        7503    7440            SZA                     /********
        7504    5310            JMP     NOCRLF          /********
        7505    3364    CRLF,   DCA     NCOLS           /********
        7506    2365            ISZ     NFEEDS          /********
        7507    5321            JMP     ITSOK           /********
        7510    1371    NOCRLF, TAD     07655           /********
        7511    7100            CLL                     /********
        7512    1006            TAD     C100            /********
        7513    7420            SNL                     /********
        7514    7610            SKP CLA                 /********
        7515    1361            TAD     NLINES          /********
        7516    7450            SNA                     /********
        7517    5700            JMP I   SCOPOU          /********
        7520    2364            ISZ     NCOLS           /********
        7521    6002    ITSOK,  IOF                     /********
        7522    6141            LINC                    /********
                        LMODE                           /********
        7523    0644            LDF 4                   /********
        7524    1362            STH I   OPTR            /********
        7525    0011            CLR                     /********
        7526    0002            PDP                     /********
                        PMODE                           /********
        7527    6201            6201                    /********
        7530    2366            ISZ     NCHARS          /********
        7531    1366            TAD     NCHARS          /********
        7532    1215            TAD     07000           /********
        7533    7710            SPA CLA                 /********
        7534    1361            TAD     NLINES          /********
        7535    1365            TAD     NFEEDS          /********
        7536    7710            SPA CLA                 /********
        7537    5356            JMP     NOHANG          /********
        7540    1366            TAD     NCHARS          /********
        7541    6213            6213                    /******** TOO MANY LINES/CHARS DISPLAYED
        7542    4020            JMS     WAITER          /******** HANG ON DISPLAY UNTIL SOMETHING IS TYPED
        7543    6031            KSF                     /********
        7544    5343            JMP     .-4             /********
        7545    6034            KRS                     /********
        7546    1372            TAD     07566           /********
        7547    7650            SNA CLA                 /********
        7550    6032            KCC                     /******** IGNORE LINE FEED
        7551    1370            TAD     06377           /********
        7552    3774            DCA I   PPTR            /******** CLEAR
        7553    3366            DCA     NCHARS          /******** THE
        7554    3365            DCA     NFEEDS          /******** CHARACTER
```

```
3462  7555  3364          DCA     NCOLS   /******** DISPLAY
3463  7556  6001  NOHANG, ION             /********
3464  7557  1364          TAD     NCOLS   /********
3465  7560  1373          TAD     07716   /********
3466  7561  7740  NLINES, SMA SZA CLA     /********
3467  7562  5305          JMP     CRLF    /********
3468  7563  5700          JMP I   SCOPOU  /********
3469  7564  0000  NCOLS,  0               /********
3470  7565  0000  NFEEDS, 0               /********
3471  7566  0000  NCHARS, 0               /********
3472  7567  7763  07763,  7763
3473  7570  6377  06377,  6377
3474  7571  7655  07655,  7655            /********
3475  7572  7566  07566,  7566            /********
3476  7573  7716  07716,  7716            /********
3477  7574  6002  PPTR,   OPTR            /********
3478        7576  *7576                   /********
3479              /
3480              /FDIS FUNCTION - STORES 2 WORDS
3481              /PER CALL IN 2200 THRU 5777 IN FLD1
3482              /
3483  7576  4453  CALLIN, JMS I   INTEGER /********
3484  7577  6213          6213            /********
3485  7600  5601          JMP I   .+1     /********
3486  7601  2071          INCALL          /********
3487  7602  4407  XDISP,  FINT            /********
3488  7603  4251          FMUL    FORHUN  /********
3489  7604  0000          FEXT    /********
3490  7605  4453          JMS I   INTEGER /********
3491  7606  7510          SPA     /********
3492  7607  7041          CIA     /********
3493  7610  3350          DCA     STEMP   /********
3494  7611  1066          TAD     CHAR    /********
3495  7612  1256          TAD     MMCOM   /********
3496  7613  7640          SZA CLA /********
3497  7614  4566          ERROR3  /********
3498  7615  4540          PUSHJ   /********
3499  7616  1612          EVAL=1  /********
3500  7617  4407          FINT    /********
3501  7620  4253          FMUL    FIVHUN  /********
3502  7621  0000          FEXT    /********
3503  7622  4453          JMS I   INTEGER /********
3504  7623  3351          DCA     STEMP2  /********
3505  7624  1271          TAD     SPTR
3506  7625  1247          TAD     MLIMIT
3507  7626  7650          SNA CLA
3508  7627  4566          ERROR3
3509  7630  6002          IOF     /********
3510  7631  6211          6211    /CDF 10 /********
3511  7632  7350          CLA CLL CMA RAR
3512  7633  0350          AND     STEMP
3513  7634  3671          DCA I   SPTR    /********
3514  7635  2271          ISZ     SPTR    /********
3515  7636  1351          TAD     STEMP2  /********
3516  7637  1250          TAD     07400   /********
```

```
3517    7642  3671          DCA I   SPTR    /********
3518    7641  2271          ISZ     SPTR    /********
3519    7642  7240          CLA CMA         /********
3520    7643  3671          DCA I   SPTR    /********
3521    7644  6201          6201    /CDF 0  /********
3522    7645  6001          ION             /********
3523    7646  5536          JMP I   EFUN3]  /********
3524    7647  2002    MLIMIT; -5776         /(-LAST LOC OF DISP POINTS-1)
3525    7650  7400    074000; 7400          /********
3526    7651   011    FORHUN; 11;2700       /********
        7652  2700
3527    7653   011    FIVHUN; 11;377010     /********
        7654  3770
        7655  1000
3528    7656  7524    MMCOM;  -254          /********
3529                    /
3530                    /JMS WAIT IS EQUIVALENT
3531                    /TO JMP .-2 WITH A REFRESH OF
3532                    /THE DISPLAY ON THE WAY
3533                    /
3534    7657  0000    WAIT;   0             /********
3535    7660  7346            CLA CLL CMA RTL /********
3536    7661  1257            TAD     WAIT    /********
3537    7662  3257            DCA     WAIT    /********
3538    7663  6002            IOF             /********
3539    7664  1732            TAD I   PNCHARS /********
3540    7665  6213            6213    /CIF CDF 10/********
3541    7666  4020            JMS     WAITER  /********
3542    7667  6001            ION             /********
3543    7670  5657            JMP I   WAIT    /********
3544    7671  1000    SPTR;   1000            /********
3545    7672  0000    CLEAR;  0               /******** CLEAR POINTS FROM THE SCOPE
3546    7673  1304            TAD     ODISSP  /********
3547    7674  3271            DCA     SPTR    /********
3548    7675  6002            IOF             /********
3549    7676  6211            6211    /CDF 10 /********
3550    7677  7240            CLA CMA         /********
3551    7700  3671            DCA I   SPTR    /********
3552    7701  6201            6201    /CDF 0  /********
3553    7702  6001            ION             /********
3554    7703  5672            JMP I   CLEAR   /********
3555    7704  2200    ODISSP; 2200            /********(FORST LOC OF DISP POINTS)
3556    7705  6335    PPASS;  PASS
3557    7706  4705    OUTPUT; JMS I   PPASS
3558    7707  1413            POPA    /******** JUMPS ON SUBCOMMAND OF OUTPUT XXX
3559    7710  4547            SORTJ   /********
3560    7711  7721            OLIST-1 /********
3561    7712  7772            OGO-OLIST/********
3562    7713  4566    OERROR; ERROR3  /********
3563    7714  7752    OGO,    OC      /********
3564    7715  7761            OD      /********
3565    7716  7753            OE      /********
3566    7717  7763            OS      /********
3567    7720  7771            OT      /********
3568    7721  7734            OI      /********
```

```
3569  7722  303   CLIST,  303      /********
3570  7723  304           304      /********
3571  7724  305           305      /********
3572  7725  323           323      /********
3573  7726  324           324      /********
3574  7727  311           311      /********
3575  7730  6377  006377,  6377     /********
3576  7731  0611  OEXIT,   PROC              /********
3577  7732  7566  PNCHARS, NCHARS            /********
3578  7733  6002  POPTR,   OPTR              /********
3579  7734  1066  OI,      TAD      CHAR     /********
3580  7735  1256           TAD      MMCOM    /********
3581  7736  7650           SNA CLA           /********
3582  7737  5746           JMP I    PSETCLK  /******** 0 1; EXPRESSION
3583  7740  2745           ISZ I    PCLKFLG  /********
3584  7741  1745           TAD I    PCLKFLG  /********
3585  7742  7640           SZA CLA           /********
3586  7743  4257           JMS      WAIT     /********
3587  7744  5731           JMP I    OEXIT
3588  7745  2661  PCLKFLG, CLKFLG            /********
3589  7746  5351  PSETCLK, SETCLK            /********
3590        7750  *7750                      /********
3591  7750  0000  STEMP,   0                 /********
3592  7751  0000  STEMP2,  0                 /********
3593  7752  4575  OC,      JMS I    PCLEAR   /********
3594  7753  3732  OE,      DCA I    PNCHARS  /********
3595  7754  1330           TAD      006377   /********
3596  7755  3733           DCA I    POPTR    /********
3597  7756  3777           DCA I    PNFEEDS  /********
3598  7757  3776           DCA I    PNCOLS   /********
3599  7760  5731           JMP I    OEXIT    /********
3600  7761  7000  OD,      NOP       /********
3601  7762  4257           JMS      WAIT     /********
3602  7763  6002  OS,      IOF       /********
3603  7764  6141           6141     /LINC    /********
3604  7765  0004           0004     /ESF     /********
3605  7766  0002           0002     /PDP     /********
3606  7767  6001           ION               /********
3607  7770  1375           TAD      PSCOPOU  /******** SET OUTDEV TO SCOPOU
3608  7771  1374  OT,      TAD      PXOUTL   /******** SET OUTDEV TO XOUTL
3609  7772  3063           DCA      OUTDEV   /********
3610  7773  5731           JMP I    OEXIT    /********
3611  7774  2676  PXOUTL,  XOUTL    /********
3612  7775  4602  PSCOPOU, SCOPOU-XOUTL     /********
3613  7776  7564  PNCOLS,  NCOLS             /********
3614  7777  7565  PNFEEDS, NFEEDS            /********
3615        0001  FIELD 1              /********
```

```
2002  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2102  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2202  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2302  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2402  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2502  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2602  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2702  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1002  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1102  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1202  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1302  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1402  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1502  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1602  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1702  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2002  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2102  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2202  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2302  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2402  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2502  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2602  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2702  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3002  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3102  11111111  11111111  00000000  00000000  00000000  00000000  00000000  00000000

3202  00000011  11111100  00000000  00000000  00000000  00000000  00000000  00000000
3302  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

3402
3502

3602  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000
3702  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000
```

```
4000
4100
4200
4300
4400
4500
4600  00000000  00000000  11111111  11111111  11111111  11111111  11111111  11111111
4700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

5000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111001
5200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
5700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111000

6000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110
6400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
6700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

7000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
7100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
7200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
7300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110
7400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
7500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111011
7600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
```

```
              ØØØ1    *1                    /********
      ØØØ1    ØØØØ    XQ,                   /********
      ØØØ2    Ø4ØØ    Ø256,     4ØØ         /(REFERENCED AS LOC 2)
      ØØØ3    Ø2ØØ    Ø2ØØ,     2ØØ         /(REFERENBED AS LOC 3)
      ØØØ4     125    Ø85,      125         /(REFERENCED AS LOC 4)
      ØØØ5    ØØØØ    GAMMA,    Ø           /********
      ØØØ6    ØØØØ    CHRCNT,   Ø           /********
      ØØØ7    Ø36Ø    Ø36Ø,     36Ø         /********
              ØØ1Ø    *1Ø                   /********
      ØØ1Ø    ØØØØ    XR1,      Ø           /********
      ØØ11    ØØØØ    BLK2,     Ø           /UNIT
      ØØ12    ØØØØ              Ø           /ADDRESS
      ØØ13    ØØØØ              Ø           /BLOCK NUMBER
      ØØ14    ØØØ1              1           /NUMBER OF BLOCKS
      ØØ15    Ø76Ø    Ø76Ø,     76Ø         /********
      ØØ16    ØØØØ    ALPHA,    Ø           /********
      ØØ17    ØØØØ    BETA,     Ø           /********
              ØØ2Ø    *2Ø                   /********
                      /
                      /ENTERED WITH NO. CHARS IN AC; REFRESH
                      /FOR CHARS AND POINTS
                      /
      ØØ2Ø    ØØØØ    WAITER, Ø                       /********
      ØØ21    745Ø            SNA                     /********
      ØØ22    5Ø61            JMP     NOASCII         /********
      ØØ23    7Ø4Ø            CMA                     /********
      ØØ24    3ØØ6            DCA     CHRCNT          /********
      ØØ25    1Ø76            TAD     Ø4377           /********
      ØØ26    3ØØ5            DCA     GAMMA           /********
      ØØ27    1ØØ7            TAD     Ø36Ø            /********
      ØØ3Ø    3Ø77            DCA     Y               /********
      ØØ31    3ØØ1            DCA     XQ              /********
      ØØ32    6141            LINC                    /********
                      LMODE
      ØØ33    1325    CHRLUP; LDH I GAMMA             /********
      ØØ34    Ø45Ø            AZE                     /********
      ØØ35    6Ø45            JMP GOODY               /********
      ØØ36    2Ø77            ADD Y                   /********
      ØØ37    2Ø15            ADD Ø76Ø                /********
      ØØ4Ø    156Ø            BCL I                   /********
      ØØ41    7ØØØ            7ØØØ                    /********
      ØØ42    4Ø77            STC Y                   /********
      ØØ43    4ØØ1            STC XQ                  /********
      ØØ44    6Ø56            JMP CHREND              /********
      ØØ45     241    GOODY,  ROL 1                   /********
      ØØ46    2ØØ3            ADD Ø2ØØ                /********
      ØØ47    4Ø16            STC ALPHA               /********
      ØØ5Ø    2Ø77            ADD Y                   /********
      ØØ51    1756            DSC ALPHA               /********
      ØØ52    1776            DSC I ALPHA             /********
      ØØ53     221            XSK I XQ                /********
      ØØ54     221            XSK I XQ                /********
      ØØ55     Ø11            CLR                     /********
      ØØ56     226    CHREND; XSK I CHRCNT            /********
      ØØ57    6Ø33            JMP CHRLUP              /******** ONE TIME PER CHAR
```

```
3671  0060  0467          SKP                 /********
3672  0061  6141  NOASCII, LINC              /********
3673  0062  0077          SET I BETA          /********
3674  0063  2200          2200                /********
3675  0064  0645          LDF 5               /********
3676  0065  6102          JMP SUBR            /********
3677  0066  0077          SET I BETA          /********
3678  0067  2000          2000                /********
3679  0070  0646          LDF 6               /********
3680  0071  6102          JMP SUBR            /********
3681  0072  0002  WEXIT,  PDP                 /********
3682                      PMODE
3683  0073  6203          6203    /CIF CDF 0  /********
3684  0074  7200          CLA                 /********
3685  0075  5420          JMP I   WAITER      /********
3686  0076  4377  04377,   4377    /********
3687  0077  0000  Y,       0       /********
3688  0100  0171  PSUBS,   SUBS    /********
3689  0101  0173  PLESUBS, LESUBS  /********
3690                      LMODE               /********
3691  0102  0056  SUBR,    SET ALPHA           /******** DISPLAYS POINTS
3692  0103  0000          0000                /********
3693  0104  0415          KST                 /********
3694  0105  0467          SKP                 /********
3695  0106  6072          JMP WEXIT           /********
3696  0107  0500          IOB                 /********
3697  0110  6041          TSF                 /********
3698  0111  0467          SKP                 /********
3699  0112  6072          JMP WEXIT           /********
3700  0113  1017          LDA BETA            /********
3701  0114  0467          SKP                 /********
3702  0115  1037  WAITLP, LDA I BETA          /********
3703  0116  0451          APO                 /********
3704  0117  6072          JMP WEXIT           /********
3705  0120  4005          STC GAMMA           /********
3706  0121  1037          LDA I BETA          /********
3707  0122  0145          DIS GAMMA           /********
3708  0123  0217          XSK BETA            /********
3709  0124  6115          JMP WAITLP          /********
3710  0125  6016          JMP ALPHA           /********
3711                      PMODE               /********
3712  0126  5527  XLO,     JMP I   .+1         /********
3713  0127  1431          LOPEN               /********
3714  0130  5531  XLC,     JMP I   .+1         /********
3715  0131  1520          LCLOSE              /********
3716  0132  5533  XLL,     JMP I   .+1         /********
3717  0133  1203          LLOAD               /********
3718  0134  5535  XLS,     JMP I   .+1         /********
3719  0135  1233          LSAVE               /********
3720  0136  5537  XLG,     JMP I   .+1         /********
3721  0137  1202          LCHAIN              /********
3722  0140  7774  X7774,   7774
3723  0141  7775  X7775,   7775
3724  0142  1171  PLNUM,   LNUM
3725  0143  1000  PGETRHS, GETRHS
```

```
0144  1160    PLOMILD,LOMILD
0145  1177    P5LNAM, LNAME+5
0146  1200    P6LNAM, LNAME+6
0147  0000    CHFLAG, 0
0150  0000    HISS,   0
0151  0000    LOSS,   0
0152  2135    PFILTAB,FILTAB
0153  1342    PLOOKUP,LUKUP
0154  1600    PCOMMON,COMMON
0155  1361    PREPLAC,REPLACE
0156  0000    MYTEMP, 0
0157  0000    MYTMP2, 0
0160  2076    PFINISH,FINISH
0161  0000    SWITCH, 0
0162  0000    SWTMP,  0
0163  2124    PB1FLG, B1FLG+1
0164  0000    MYAC1,  0
0165  0000    MYAC2,  0
0166  0000    MYAC3,  0
0167  0044    P1FLAC, FLAC
0170  0045    P2FLAC, FLAC+1
0171  0046    P3FLAC, FLAC+2
0172  7764    07764,  7764
0173  6000    06000,  6000
0174  7420    07420,  7420
      0177    *177
0177  6203    FERROR, 6203
0200  5601            JMP I   .+1
0201  5774            FSSERR
      0202    *202
      0200    CHARTAB=.-2
0202  4477            4477;7744
0203  7744
0204  5177            5177;2651
0205  2651
0206  4136            4136;2241
0207  2241
0210  4177            4177;3641
0211  3641
0212  4577            4577;4145
0213  4145
0214  4477            4477;4044
0215  4044
0216  4136            4136;2645
0217  2645
0220  1077            1077;7710
0221  7710
0222  7741            7741;0041
0223  0041
0224  4142            4142;4076
0225  4076
0226  1077            1077;4324
0227  4324
0230  0177            0177;0301
0231  0301
```

3769	0232	3077	3077;7737
	0233	7737	
3770	0234	3077	3077;7706
	0235	7706	
3771	0236	4177	4177;7741
	0237	7741	
3772	0240	4477	4477;3044
	0241	3044	
3773	0242	4276	4276;0376
	0243	0376	
3774	0244	4477	4477;3146
	0245	3146	
3775	0246	5121	5121;4651
	0247	4651	
3776	0250	4040	4040;4077
	0251	4077	
3777	0252	2177	2177;7701
	0253	7701	
3778	0254	0176	0176;7402
	0255	7402	
3779	0256	2677	2677;7701
	0257	7701	
3780	0260	1463	1463;6314
	0261	6314	
3781	0262	0770	0770;7007
	0263	7007	
3782	0264	4543	4543;6151
	0265	6151	
3783	0266	4177	4177;0000
	0267	0000	
3784	0270	1020	1020;0204
	0271	0204	
3785	0272	0000	0000;7741
	0273	7741	
3786	0274	2000	2000;2076
	0275	2076	
3787	0276	1604	1604;0404
	0277	0404	
3788	0300	0000	0000;0000
	0301	0000	
3789	0302	7500	7500;0000
	0303	0000	
3790	0304	7000	7000;0070
	0305	0070	
3791	0306	7624	7624;2476
	0307	2476	
3792	0310	5721	5721;4671
	0311	4671	
3793	0312	6661	6661;4333
	0313	4333	
3794	0314	5166	5166;0526
	0315	0526	
3795	0316	7000	7000;0000
	0317	0000	
3796	0320	3600	3600;0041

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                0321  0341
3797            0322  4100            4100;0036
                0323  0036
3798            0324  2050            2050;0050
                0325  0050
3799            0326  0404            0404;0437
                0327  0437
3800            0330  0500            0500;0006
                0331  0006
3801            0332  0404            0404;0404
                0333  0404
3802            0334  0001            0001;0000
                0335  0000
3803            0336  0601            0601;4030
                0337  4030
3804            0340  4536            4536;3651
                0341  3651
3805            0342  2101            2101;0177
                0343  0177
3806            0344  4523            4523;2151
                0345  2151
3807            0346  4122            4122;2651
                0347  2651
3808            0350  2414            2414;0477
                0351  0477
3809            0352  5172            5172;0651
                0353  0651
3810            0354  1506            1506;4225
                0355  4225
3811            0356  4443            4443;6050
                0357  6050
3812            0360  5126            5126;2651
                0361  2651
3813            0362  5122            5122;3651
                0363  3651
3814            0364  2200            2200;0000
                0365  0000
3815            0366  4601            4601;0000
                0367  0000
3816            0370  1000            1000;4224
                0371  4224
3817            0372  1212            1212;1212
                0373  1212
3818            0374  2442            2442;0010
                0375  0010
3819            0376  4020            4020;2055
                0377  2055
3820                          /400-777 ARE CHARACTER DISPLAY AREA
3821                    1000  *1000
3822                          /
3823                          /GET RIGHT HAND SIDE - USED IN
3824                          /PROCESSING OF COMMANDS (LIBR) WHICH NEED
3825                          /A FILE NAME; EXPECTS THE FORM FILE, UNIT
3826                          /
3827            1000  0000    GETRHS; 0
```

```
3828  1001  3675          DCA I   PLEFLAG
3829  1002  1322          TAD     PLNAME
3830  1003  3011          DCA     BLK2
3831  1004  1326          TAD     07770
3832  1005  3012          DCA     BLK2+1
3833  1006  1324  PLLP1,  TAD     077
3834  1007  3411          DCA I   BLK2
3835  1010  2012          ISZ     BLK2+1
3836  1011  5206          JMP     PLLP1
3837  1012  1322          TAD     PLNAME
3838  1013  3011          DCA     BLK2
3839  1014  1326          TAD     07770
3840  1015  3012          DCA     BLK2+1
3841  1016  4333  PLLP2,  JMS     CGET
3842  1017  5236          JMP     IGOTIT
3843  1020  5330          JMP     RHSERR
3844  1021  1324          AND     077
3845  1022  1277          TAD     M43
3846  1023  7450          SNA
3847  1024  5261          JMP     NUMSGN
3848  1025  1300          TAD     PP43
3849  1026  3411          DCA I   BLK2
3850  1027  2012          ISZ     BLK2+1
3851  1030  5216          JMP     PLLP2
3852  1031  4333          JMS     CGET
3853  1032  5236          JMP     IGOTIT
3854  1033  5330          JMP     RHSERR
3855  1034  7200          CLA
3856  1035  5231          JMP     .+4
3857  1036  1322  IGOTIT, TAD     PLNAME
3858  1037  3011          DCA     BLK2
3859  1040  1327          TAD     07774
3860  1041  3012          DCA     BLK2+1
3861  1042  1322          TAD     PLNAME
3862  1043  3013          DCA     BLK2+2
3863  1044  1411  PLLP3,  TAD I   BLK2
3864  1045  7106          CLL RTL
3865  1046  7006          RTL
3866  1047  7006          RTL
3867  1050  1411          TAD I   BLK2
3868  1051  3413          DCA I   BLK2+2
3869  1052  2012          ISZ     BLK2+1
3870  1053  5244          JMP     PLLP3
3871  1054  7326          CLA CLL CML RTL
3872  1055  3376          DCA     LNAME+4
3873  1056  4301  MORNUM, JMS     OCTNUM
3874  1057  5600          JMP I   GETRHS
3875  1060  5330          JMP     RHSERR
3876                      /
3877                      /SCAN OFF THE NUMBER = SET THE FLAG
3878                      /WHICH SAYS IT WAS A NUMBER
3879                      /
3880  1061  1012  NUMSGN, TAD     BLK2+1
3881  1062  1323          TAD     010
3882  1063  7650          SNA CLA
```

```
3883  1064  4301          JMS     OCTNUM
3884  1065  5330          JMP     RHSERR
3885  1066  1371          TAD     LNUM
3886  1067  3545          DCA I   P5LNAM
3887  1070  1276          TAD     FLAGJ
3888  1071  3675          DCA I   PLEFLAG
3889  1072  7240          CLA CMA
3890  1073  3546          DCA I   P6LNAM
3891  1074  5256          JMP     MORNUM
3892  1075  1462  PLEFLAG,LEFLAG
3893  1076  5265  FLAGJ,  LEFLAG+3&177+5200
3894  1077  7735  M43,    -43
3895  1100  0043  PP43,   43
3896  1101  0000  OCTNUM, 0
3897                /
3898                /SUBR TO GEN AN OCTAL NUMBER
3899                /
3900  1102  3371  PLLP4,  DCA     LNUM
3901  1103  4333          JMS     CGET
3902  1104  2301          ISZ     OCTNUM
3903  1105  5701          JMP I   OCTNUM
3904  1106  1324          AND     077
3905  1107  1325          TAD     07710
3906  1110  7100          CLL
3907  1111  1323          TAD     010
3908  1112  3333          DCA     CGET
3909  1113  7420          SNL
3910  1114  5330          JMP     RHSERR
3911  1115  1371          TAD     LNUM
3912  1116  7106          CLL RTL
3913  1117  7104          CLL RAL
3914  1120  1333          TAD     CGET
3915  1121  5302          JMP     PLLP4
3916  1122  1171  PLNAME, LNAME=1
3917  1123  0010  010,    10
3918  1124  0077  077,    77
3919  1125  7710  07710,  7710
3920  1126  7770  07770,  7770
3921  1127  7774  07774,  7774
3922  1130  6203  RHSERR, 6203          /RIGHT HAND SIDE ERROR
3923  1131  5732          JMP I   .+1
3924  1132  6357          LERR
3925  1133  0000  CGET,   0             /INTERFACE WITH FIELD ZERO
3926  1134  6203          6203          /       JMS CGET
3927  1135  5736          JMP I   .+1   /       JMP <COMMA>
3928  1136  2564          CGETX         /       JMP <CARRET OR SEMICOLON>
3929  1137  1354  CGETRET,TAD     07524 /       JMP <OTHER(CHAR IS IN AC)>
3930  1140  7450          SNA
3931  1141  5733          JMP I   CGET
3932  1142  2333          ISZ     CGET
3933  1143  1355          TAD     07761
3934  1144  7450          SNA
3935  1145  5733          JMP I   CGET
3936  1146  1356          TAD     056
3937  1147  7450          SNA
```

```
3938  1150  5733          JMP I   CGET
3939  1151  1357          TAD     0215
3940  1152  2333          ISZ     CGET
3941  1153  5733          JMP I   CGET
3942  1154  7524    07524, 7524
3943  1155  7761    07761, 7761
3944  1156  0056    056,   56
3945  1157  0215    0215.  215
3946                /
3947                /BRINGS MILDRED INTO CORE
3948                /
3949  1160  0000    LDMILD, 0
3950  1161  6002          IOF
3951  1162  4540          JMS I   X7774
3952  1163  1165          MLDBLK
3953  1164  5760          JMP I   LDMILD
3954  1165  0110    MLDBLK, 110
3955  1166  0030          30
3956  1167  0076          76
3957  1170  0002          2
3958        1171    *1171
3959  1171  0000    LNUM,   0       /-------
3960  1172  0200    LNAME,  0;0;0;0;0
      1173  0000
      1174  0000
      1175  0000
      1176  0000
      1177  0000
3961  1200  0000    MVCTR,  0
3962  1201  0000    MVPTR,  0       /-------(REFERENCED AS A BLOCK)
3963  1202  7240    LCHAIN, CLA CMA
3964                /
3965                /LIBRARY LOAD
3966                /
3967  1203  3147    LLOAD,  DCA     CHFLAG
3968  1204  4543          JMS I   PGETRHS
3969  1205  4544          JMS I   PLDMILD
3970  1206  4342          JMS     LUKUP
3971  1207  1546          TAD I   PSLNAM
3972  1210  7041          CIA
3973  1211  1327          TAD     LLENGTH
3974  1212  7640          SZA CLA
3975  1213  5356          JMP     FILERR+2
3976  1214  1542          TAD I   PLNUM
3977  1215  3324          DCA     LSBLK
3978  1216  1545          TAD I   PSLNAM
3979  1217  3326          DCA     FILSTRT
3980  1220  4540          JMS I   X7774
3981  1221  1324          LSBLK
3982  1222  7350          CLA CLL CMA RAR
3983  1223  3010          DCA     XR1
3984  1224  1410          TAD I   XR1
3985  1225  1174          TAD     07420   /FIRST WD MUST BE 0360
3986  1226  7640          SZA CLA
3987  1227  5356          JMP     FILERR+2
```

```
3988  1230  1324          TAD     LOADJ
3989  1231  4262          JMS     MOO
3990  1232  5254          JMP     XGETOUT
3991                      /
3992                      /LIBRARY SAVE
3993                      /
3994  1233  3147  LSAVE,  DCA     CHFLAG
3995  1234  4543          JMS I   PGETRHS
3996  1235  4544          JMS I   PLDMILD
3997  1236  1327          TAD     LLENGTH
3998  1237  3546          DCA I   PSLNAM
3999  1240  4361          JMS     REPLACE
4000  1241  1542          TAD I   PLNUM
4001  1242  3324          DCA     LSBLK
4002  1243  1545          TAD I   PSLNAM
4003  1244  3326          DCA     FILSTRT
4004  1245  7350          CLA CLL CMA RAR
4005  1246  3010          DCA     XR1
4006  1247  1007          TAD     0360
4007  1250  3410          DCA I   XR1
4008  1251  4262          JMS     MOO
4009  1252  4541          JMS I   X7775
4010  1253  1324          LSBLK
4011  1254  6203  XGETOUT,6203
4012  1255  6001          ION
4013  1256  2147          ISZ     CHFLAG
4014  1257  5722          JMP I   PSTART
4015  1260  5661          JMP I   .+1
4016  1261  0603          GOTO
4017                      /
4018                      /THE WORDS ARE READ/WRITTEN FROM LOC 4000
4019                      /OF FLD11 THIS ROUTINE MOVES THEM THERE
4020                      /
4021  1262  0000  MOO,    0
4022  1263  3306          DCA     DEJUMP
4023  1264  1330          TAD     PTBL
4024  1265  3200          DCA     MVCTR
4025  1266  1600  MOOLUP, TAD I   MVCTR
4026  1267  2200          ISZ     MVCTR
4027  1270  7450          SNA
4028  1271  5275          JMP     MOOEND
4029  1272  3201          DCA     MVPTR
4030  1273  4305          JMS     MOVMOV
4031  1274  5266          JMP     MOOLUP
4032  1275  1323  MOOEND, TAD     MVCNT
4033  1276  3200          DCA     MVCTR
4034  1277  2201          ISZ     MVPTR
4035  1300  4305          JMS     MOVMOV
4036  1301  2200          ISZ     MVCTR
4037  1302  5277          JMP     .-3
4038  1303  5662          JMP I   MOO
4039  1304  5314  LOADJ,  JMP     NOTSAV
4040  1305  0000  MOVMOV, 0
4041  1306  7402  DEJUMP, HLT
```

```
4043  1310  1671          TAD I   MVPTR
4044  1311  6211          6211
4045  1312  3417          DCA I   XR1
4046  1313  5745          JMP I   MOVMOV
4047  1314  6211  NOTSAV, 6211
4048  1315  1417          TAD I   XR1
4049  1316  6201          6201
4050  1317  3601          DCA I   MVPTR
4051  1320  6211          6211
4052  1321  5705          JMP I   MOVMOV
4053  1322  0177  PSTART, START
4054  1323  6366  MVCNT,  FRST-FEXP
4055  1324  0000  LSBLK,  0
4056  1325  0030          30      /*14000
4057  1326  0000  FILSTRT,0
4058  1327  0004  LLENGTH,4
4059  1330  1331  PTBL,   .+1
4060  1331  0035          BOTTOM
4061  1332  0410          PFNEW
4062  1333  0411          PFX
4063  1334  0412          PFZ
4064  1335  0060          BUFR
4065  1336  0031          LASTV
4066  1337  0013          POLXR
4067  1340  3206          FRST
4068  1341  0000          0
4069                /
4070                /USES MILDREDS LOOKUP
4071                /
4072  1342  0000  LUKUP,  0
4073  1343  6141          6141    /LINC
4074  1344  0606          0606    /LIF 6
4075  1345  1020          1020    /LDA I
4076  1346  1171          LNUM
4077  1347  6020          6020    /JMP 20
4078  1350  7354          FILERR&1777+6000
4079  1351  0002          0002    /PDP
4080  1352  7200          CLA
4081  1353  5742          JMP I   LUKUP
4082  1354  0002  FILERR, 0002    /PDP
4083  1355  7200          CLA
4084  1356  6203          6203    /CIF CDF 0
4085  1357  5760          JMP I   .+1
4086  1360  2571          ERRFIL
4087                /
4088                /USES MILDREDS REPLACE
4089                /
4090  1361  0000  REPLACE,0
4091  1362  6141          LINC
4092                      LMODE
4093  1363  0606          LIF     6
4094  1364  1020          LDA I
4095  1365  1171          LNUM
4096  1366  6022          JMP     22
4097  1367  7372          JMP     SAMEN   /ALREADY THERE
```

```
4098    1372  7354            JMP     FILERR  /NOT ENUF ROOM
4099    1373  7375            JMP     ENREPL
4100    1374  0626    SAMEN,  LIF     6
4101    1375  6024            JMP     24
4102    1376  7354            JMP     FILERR  /NOT ENUF ROOM; SHOULD NOT HAPPEN
4103    1377  0002    ENREPL, PDP
4104                          PMODE
4105    1400  7200            CLA
4106    1401  5761            JMP I   REPLACE
4107          1400    *1400
4108    1400  7524    MINCMA, *254
4109    1401  0066    PCHAR,  CHAR
4110    1402  3157    LMAKE,  DCA     MYTMP2  /LIBRARY MAKE
4111    1403  6201            6201
4112    1404  1601            TAD I   PCHAR
4113    1405  6211            6211
4114    1406  1200            TAD     MINCMA
4115    1407  7640            SZA CLA
4116    1410  5623            JMP I   PRHSERR
4117    1411  4543            JMS I   PGETRHS
4118    1412  4544            JMS I   PLDMILO
4119    1413  1157            TAD     MYTMP2
4120    1414  3546            DCA I   P6LNAM
4121    1415  4555            JMS I   PREPLAC
4122    1416  6203    LXIT,   6203
4123    1417  6001            ION
4124    1420  5621            JMP I   PPROC
4125    1421  0611    PPROC,  PROC
4126    1422  1133    PGETC,  CGET
4127    1423  1130    PRHSERR,RHSERR
4128    1424  7510    07510,  7510
4129    1425  0010    0010,   10
4130    1426  7455    MCS,    -323
4131    1427  0012    CSMCI,  323-311
4132    1430  0003    CIMCF,  311-306
4133                  /FILTAB ENTRY * TYPE
4134                  /               LENGTH
4135                  /               UNIT
4136                  /               FIRST BLOCK
4137                  /WHERE TYPE     0 =     UNDEFINED
4138                  /               1 =     UNSIGNED(1 WD)
4139                  /               2 =     SIGNED(2 WD)
4140                  /               3 =     FLOATING POINT(3 WD)
4141    1431  4302    LOPEN,  JMS     COMSUB  /LIBRARY OPEN
4142    1432  4022            JMS I   PGETC
4143    1433  5236            JMP     .+3
4144    1434  7000            NOP
4145    1435  5257            JMP     ERXIT
4146    1436  4306            JMS     GETCX
4147    1437  1226            TAD     MCS
4148    1440  7450            SNA
4149    1441  5251            JMP     ITSSS
4150    1442  1227            TAD     CSMCI
4151    1443  7450            SNA
4152    1444  5252            JMP     ITBI
```

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4153  1445  1230          TAD     CIMCF
4154  1446  7640          SZA CLA
4155  1447  5623          JMP I   PRMSERR
4156  1450  7001  ITSFF,  IAC
4157  1451  7001  ITSSS,  IAC
4158  1452  7001  ITSII,  IAC
4159  1453  3157          DCA     MYTMP2
4160  1454  4622          JMS I   PGETC
4161  1455  5261          JMP     .+4
4162  1456  7000          NOP
4163  1457  7200  ERXIT,  CLA
4164  1460  5623          JMP I   PRMSERR
4165  1461  4543          JMS I   PGETRHS
4166  1462  0000  LEFLAG,  0       /(OR JMP .+3 IF GETRHS GOT A #)
4167  1463  4544          JMS I   PLOMILD
4168  1464  4553          JMS I   PLOOKUP
4169  1465  1157          TAD     MYTMP2
4170  1466  3556          DCA I   MYTEMP
4171  1467  2156          ISZ     MYTEMP
4172  1470  1546          TAD I   P6LNAM
4173  1471  3556          DCA I   MYTEMP
4174  1472  2156          ISZ     MYTEMP
4175  1473  1542          TAD I   PLNUM
4176  1474  3556          DCA I   MYTEMP
4177  1475  2156          ISZ     MYTEMP
4178  1476  1545          TAD I   P5LNAM
4179  1477  3556          DCA I   MYTEMP
4180  1500  5216          JMP     LXIT
4181  1501  7472  07472,  7472
4182                      /
4183                      /SCANS OFF FN AND LEAVES POINTER IN MYTEMP
4184                      /
4185  1502  0000  COMSUB,  0
4186  1503  4366          JMS     GETCX
4187  1504  1301          TAD     07472
4188  1505  7650          SNA CLA         /F
4189  1506  4366          JMS     GETCX
4190  1507  1224          TAD     07510
4191  1510  7100          CLL
4192  1511  1225          TAD     0010
4193  1512  7420          SNL
4194  1513  5257          JMP     ERXIT
4195  1514  7106          CLL RTL
4196  1515  1152          TAD     PFILTAB
4197  1516  3156          DCA     MYTEMP
4198  1517  5702          JMP I   COMSUB
4199                      /
4200                      /LIBRARY CLOSE
4201                      /
4202  1520  4302  LCLOSE,  JMS     COMSUB
4203  1521  4622          JMS I   PGETC
4204  1522  5623          JMP I   PRMSERR
4205  1523  7410          SKP
4206  1524  5257          JMP     ERXIT
4207  1525  3556          DCA I   MYTEMP
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       1526  6002              IOF
       1527  4560              JMS I   PFINISH
       1530  7307              CLA CLL IAC RTL
       1531  4560              JMS I   PFINISH
       1532  5216              JMP     LXIT
                       /
                       /FILE VARIABLE LOADER
                       /
       1533  0000      ITLOAD; 0
       1534  4554              JMS I   PCOMMON
                       /
                       /VARIABLE IS NOW IN MEMORY! LOSS
                       /POINT AT IT; ONE OF THE FOLLOWING 3 CHOICES WILL BE TAKEN, ACCORDING
                       /TO TYPE
                       /
       1535  5346              JMP     IRETLD
       1536  5341              JMP     SRETLD
       1537  1551      FRETLD; TAD I   LOSS
       1540  2151              ISZ     LOSS
       1541  3164      SRETLD; DCA     MYAC1
       1542  1551              TAD I   LOSS
       1543  3165              DCA     MYAC2
       1544  2151              ISZ     LOSS
       1545  5354              JMP     CRETLD
       1546  1370      IRETLD; TAD     O27
       1547  3164              DCA     MYAC1
       1550  1551              TAD I   LOSS
       1551  7710              SPA CLA
       1552  7040              CMA
       1553  3165              DCA     MYAC2
       1554  1551      CRETLD; TAD I   LOSS
       1555  3166              DCA     MYAC3
       1556  6203              6203
       1557  1164              TAD     MYAC1
       1560  3567              DCA I   P1FLAC
       1561  1165              TAD     MYAC2
       1562  3570              DCA I   P2FLAC
       1563  1166              TAD     MYAC3
       1564  3571              DCA I   P3FLAC
       1565  5733              JMP I   ITLOAD
       1566  0000      GETCX,  0
       1567  4622              JMS I   PGETC
       1570  0027      O27,    27
       1571  5623              JMP I   PRHSERR
       1572  5766              JMP I   GETCX
             1600      *1600
                       /
                       /SUBSCRIPTING FOR FILE VAIABLES
                       /ENTER WITH FILE NO. IN AC
       1600  0000      COMMON; 0
       1601  0376              AND     O7
       1602  7106              CLL RTL
       1603  1152              TAD     PFILTAB
       1604  1156              [illegible]
```

```
4263  1606  3150          DCA     HISS
4264  1607  1500          TAD I   PSUBS   /SUBSCRIPTS
4265  1610  3151          DCA     LOSS
4266  1611  6211          6211
4267  1612  1556          TAD I   MYTEMP
4268  1613  7650          SNA CLA
4269  1614  5177          JMP     FERROR
4270  1615  1556          TAD I   MYTEMP
4271  1616  3011          DCA     BLK2
4272  1617  1411          TAD I   BLK2    /(REFERENCES LOCS 2,3,4)
4273  1620  3011          DCA     BLK2
4274  1621  3013          DCA     BLK2+2
4275  1622  1011  PREDIV, TAD     BLK2    /DIVIDES BY NO. ENTRIES/BLOCK
4276  1623  7141          CLL CIA
4277  1624  1150          TAD     HISS
4278  1625  7420          SNL
4279  1626  5232          JMP     DIVDIV
4280  1627  3150          DCA     HISS
4281  1630  2013          ISZ     BLK2+2
4282  1631  5222          JMP     PREDIV
4283  1632  7200  DIVDIV, CLA
4284  1633  1172          TAD     07764
4285  1634  3012          DCA     BLK2+1  /LOW ORDER SUBSCRIPT, THEN POINTER
4286  1635  1151  DIVLUP, TAD     LOSS
4287  1636  7104          CLL RAL
4288  1637  3151          DCA     LOSS
4289  1640  1150          TAD     HISS
4290  1641  7004          RAL
4291  1642  3150          DCA     HISS
4292  1643  1011          TAD     BLK2
4293  1644  7141          CLL CIA
4294  1645  1150          TAD     HISS
4295  1646  7430          SZL
4296  1647  3150          DCA     HISS
4297  1650  7200          CLA
4298  1651  1013          TAD     BLK2+2
4299  1652  7004          RAL
4300  1653  3013          DCA     BLK2+2
4301  1654  7430          SZL
4302  1655  5177          JMP     FERROR
4303  1656  2012          ISZ     BLK2+1
4304  1657  5235          JMP     DIVLUP
4305  1660  1556          TAD I   MYTEMP
4306  1661  2156          ISZ     MYTEMP
4307  1662  7041          CIA
4308  1663  3012          DCA     BLK2+1
4309  1664  7410          SKP
4310  1665  2200          ISZ     COMMON  /SETS UP COMMON XIT ACCORDING TO FILE TYPE
4311  1666  1150          TAD     HISS
4312  1667  2012          ISZ     BLK2+1  /TBLK (RELATIVE) IS IN BLK2+2
4313  1670  5265          JMP     .+3
4314  1671  3151          DCA     LOSS
4315  1672  1013          TAD     BLK2+2
4316  1673  7140          CLL CMA
4317  1674  1556          TAD I   MYTEMP /(THE LENGTH)
```

```
4318  1675  7622          S[illegible] CLA /SUBSCRIPT IS TOO LONG
4319  1676  5177          JMP     FERROR
4320  1677  2156          ISZ     MYTEMP
4321  1700  1556          TAD I   MYTEMP
4322  1701  3011          DCA     BLK2
4323  1702  2156          ISZ     MYTEMP
4324  1703  1556          TAD I   MYTEMP  /STARTING TBLK
4325  1704  1013          TAD     BLK2+2
4326  1705  3013          DCA     BLK2+2  /ABSOLUTE TBLK
4327  1706  4351          JMS     CHECK
4328  1707  7307          CLA CLL IAC RTL
4329  1710  4351          JMS     CHECK
4330  1711  1161          TAD     SWITCH  /ALTERNATE THE BUFFERS
4331  1712  7650          SNA CLA
4332  1713  7307          CLA CLL IAC RTL
4333  1714  3161          DCA     SWITCH
4334  1715  6002          IOF
4335  1716  1161          TAD     SWITCH
4336  1717  4560          JMS I   PFINISH
4337  1720  1161          TAD     SWITCH
4338  1721  1163          TAD     PB1FLG
4339  1722  3010          DCA     XR1
4340  1723  7201          CLA IAC
4341  1724  3410          DCA I   XR1
4342  1725  1011          TAD     BLK2
4343  1726  3410          DCA I   XR1
4344  1727  1410          TAD I   XR1
4345  1730  3012          DCA     BLK2+1
4346  1731  1013          TAD     BLK2+2
4347  1732  3410          DCA I   XR1
4348  1733  4540          JMS I   X7774   /READ IT IN
4349  1734  0011          BLK2
4350  1735  1161          TAD     SWITCH  /THE VARIABLE IS IN MEMORY
4351  1736  7106  ITSAGO; CLL RTL
4352  1737  7006          RTL
4353  1740  7006          RTL
4354  1741  1173          TAD     06000
4355  1742  1151          TAD     LOSS
4356  1743  3151          DCA     LOSS
4357  1744  7346          CLA CLL CMA RTL
4358  1745  1010          TAD     XR1
4359  1746  3150          DCA     HISS
4360  1747  6001          ION
4361  1750  5600          JMP I   COMMON
4362  1751  0000  CHECK,  0
4363  1752  3162          DCA     SWTMP
4364  1753  1162          TAD     SWTMP
4365  1754  1163          TAD     PB1FLG
4366  1755  3010          DCA     XR1
4367  1756  1410          TAD I   XR1
4368  1757  7650          SNA CLA
4369  1760  5751          JMP I   CHECK
4370  1761  1410          TAD I   XR1
4371  1762  7341          CIA
4372  1763  1011          TAD     BLK2
```

```
4373    1764  7640          SZA CLA
4374    1765  5751          JMP I   CHECK
4375    1766  2010          ISZ     XR1
4376    1767  1410          TAD I   XR1
4377    1770  7041          CIA
4378    1771  1413          TAD     BLK2+2
4379    1772  7640          SZA CLA
4380    1773  5751          JMP I   CHECK
4381    1774  1162          TAD     SWTMP
4382    1775  5336          JMP     ITSAGO  /BLK IS IN MEMORY ALREADY
4383    1776  0007    07,   7
4384          2000    *2000
4385                  /
4386                  /FILE VARIABLE STORER
4387                  /
4388    2000  0000    ITSTOR, 0
4389    2001  3010          DCA     XR1
4390    2002  1567          TAD I   P1FLAC
4391    2003  3164          DCA     MYAC1
4392    2004  1570          TAD I   P2FLAC
4393    2005  3165          DCA     MYAC2
4394    2006  1571          TAD I   P3FLAC
4395    2007  3166          DCA     MYAC3
4396    2010  1010          TAD     XR1
4397    2011  4554          JMS I   PCOMMON /BLK IS IN MEMORY; LOSS POINTS AT IT
4398    2012  5266          JMP     URETST
4399    2013  5224          JMP     SRETST
4400    2014  1164    FRETST, TAD     MYAC1
4401    2015  3551          DCA I   LOSS
4402    2016  2151          ISZ     LOSS
4403    2017  1165          TAD     MYAC2
4404    2020  3551          DCA I   LOSS
4405    2021  2151          ISZ     LOSS
4406    2022  1166          TAD     MYAC3
4407    2023  5271          JMP     INCALL
4408    2024  1164    SRETST, TAD     MYAC1
4409    2025  7450          SNA
4410    2026  5244          JMP     STOKOK
4411    2027  7700          SMA CLA
4412    2030  5251          JMP     STOOBG  /MUST BE LESS THAN MAGN. 1
4413    2031  7100    NORMLE, CLL
4414    2032  1165          TAD     MYAC2
4415    2033  7510          SPA
4416    2034  7020          CML
4417    2035  7010          RAR
4418    2036  3165          DCA     MYAC2
4419    2037  1166          TAD     MYAC3
4420    2040  7010          RAR
4421    2041  3166          DCA     MYAC3
4422    2042  2164          ISZ     MYAC1
4423    2043  5231          JMP     NORMLE
4424    2044  1165    STOKOK, TAD     MYAC2
4425    2045  3551          DCA I   LOSS
4426    2046  2151          ISZ     LOSS
4427    2047  1166          TAD     MYAC3
```

```
4428  2050  5271          JMP     INCALL
4429  2051  1165  STOOBG, TAD     MYAC2
4430  2052  7120          CLL CML
4431  2053  7700          SMA CLA
4432  2054  7360          CMA CML
4433  2055  7010          RAR
4434  2056  3551          DCA I   LOSS
4435  2057  2151          ISZ     LOSS
4436  2060  1165          TAD     MYAC2
4437  2061  7700          SMA CLA
4438  2062  7344          CLA CLL CMA RAL
4439  2063  7001          IAC
4440  2064  3551  UZERST, DCA I   LOSS
4441  2065  5272          JMP     CRETST
4442  2066  6203  URETST, 6203
4443  2067  5670          JMP I   .+1
4444  2070  7576          CALLIN
4445  2071  3551  INCALL, DCA I   LOSS
4446  2072  7240  CRETST, CLA CMA
4447  2073  3550          DCA I   HISS
4448  2074  6203          6203
4449  2075  5620          JMP I   ITSTOR
4450  2076  0000  FINISH, 0
4451  2077  1163          TAD     PB1FLG
4452  2100  3010          DCA     XR1
4453  2101  1410          TAD I   XR1
4454  2102  7700          SMA CLA
4455  2103  5676          JMP I   FINISH
4456  2104  1010          TAD     XR1
4457  2105  3321          DCA     BLOCK
4458  2106  7201          CLA IAC
4459  2107  3721          DCA I   BLOCK
4460  2110  1410          TAD I   XR1
4461  2111  3321          DCA     BLOCK
4462  2112  1410          TAD I   XR1
4463  2113  3322          DCA     BLOCK+1
4464  2114  1410          TAD I   XR1
4465  2115  3323          DCA     BLOCK+2
4466  2116  4541          JMS I   X7775
4467  2117  2121          BLOCK
4468  2120  5676          JMP I   FINISH
4469  2121  0000  BLOCK, 0       /UNIT
4470  2122  0000          0       /ADDRESS/256
4471  2123  0000          0       /BLOCKNUM
4472  2124  0001          1       /BLOCKCOUNT
4473                      /
4474                      /BXFLG=0 IF THE BUFFER IS FREE
4475                      /     =+ IF THE BUFFER IS OCCUPIED
4476                      /     =- IF OCCUPIED AND SOMETHING HAS
4477                      /      CHANGED; IE MUST BE WRITTEN OUT
4478                      /BXBLK CONTAINS THE TBLK WHICH IS IN THE BUFFER
4479                      /PB1FLG POINTS TO B1FLG; ADDIGNS SWITCH MAKES
4480                      /IT POINT AT B2FLG
4481                      /
```

```
4483  2126  0000  B1UNIT; 0
4484  2127  0034        34
4485  2130  0000  B1BLK;  0
4486  2131  0000  B2FLG;  0
4487  2132  0000  B2UNIT; 0
4488  2133  0035        35
4489  2134  0000  B2BLK;  0
4490              /
4491              /FILE DEFINITIONS = 4 WORDS APIECE
4492              /=TYPE (1,2,3=U,S,F; 0 FOR UNDEFINED)
4493              /=LENGTH (7777 IF #)
4494              /=UNIT
4495              /=FIRST BLOCK
4496              /
4497
4498  2135  0000  FILTAB; 0,0,0,0,0,0,0,0
      2136  0000
      2137  0000
      2140  0000
      2141  0000
      2142  0000
      2143  0000
      2144  0000
4499  2145  0000        0,0,0,0,0,0,0,0
      2146  0000
      2147  0000
      2150  0000
      2151  0000
      2152  0000
      2153  0000
      2154  0000
4500  2155  0000        0,0,0,0,0,0,0,0
      2156  0000
      2157  0000
      2160  0000
      2161  0000
      2162  0000
      2163  0000
      2164  0000
4501  2165  0000        0,0,0,0,0,0,0,0
      2166  0000
      2167  0000
      2170  0000
      2171  0000
      2172  0000
      2173  0000
      2174  0000
4502              .
```

```
/000  01111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
/100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111001
/200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
/300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
/400
/500
/600
/700

1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100000
1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111000
2200
2300
2400
2500
2600
2700

3000
3100
3200
3300
3400
3500
3600
3700
```

```
4000
4100

4200
4300

4400
4500

4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100

7200
7300

7400
7500

7600
7700
```

```
A        0045    C140     2554    D256     0002    EFUN3I   2136
ABSOL    6751    C144     6140    D85      0004    ELPAP    1764
ABSOL2   6153    C220     0123    DATJM    7102    END      7134
ABSOL3   7375    C240     0113    DATUMA   7252    ENDF1    6243
ABSOLV   5571    C3       5345    DCONP    6303    ENDLN    4556
ACIH     0041    C5       5341    DCONT    0471    ENDT     2135
ACIL     0042    C7       5335    DCOUNT   6143    ENREPL   1375
ACMINS   6605    C9       5331    DDTJR    0004    ENUM     1732
ADDR     0040    CALLIN   7576    DEBGSW   0026    EPAR     1710
ADONE    6673    CCR      0077    DECON    5627    EPAR2    1766
AF       4677    CDF      7000    DECONV   5600    ERASE    2226
ALF1     4760    CEX1     6506    DECP     5533    ERG      2227
ALF2     4763    CEXP     6505    DECR     5521    ERL      2224
ALF3     4755    CF       4705    DEJUMP   1306    ERR2     2726
ALGN     6572    CFRS     0133    DELETE   4565    ERRFIL   2571
ALIGN    6623    CFRSX    0137    DF       4710    ERROR2   4566
ALIST    1370    CGET     1133    DGRP     0425    ERROR3   4566
ALPHA    0016    CGETRE   1137    DGRP1    0441    ERROR4   4566
AMOUNT   6722    CGETX    2564    DIG      5543    ERROR5   2725
ARCALG   4732    CHAR     0066    DIGIT    5713    ERT      2216
ARCRTN   5024    CHARTA   0200    DIGITS   0006    ERV      2221
ARGNXT   1723    CHECK    1751    DIV1     5754    ERVX     2241
ARTN     5000    CHFLAG   0147    DIV2     6757    ERXIT    1457
ASHFT    6665    CHIN     2157    DIVDIV   1632    ESCA     2532
ASK      1200    CHRCNT   0006    DIVIDE   7150    ETERM    1647
ATLIST   1570    CHREND   0056    DIVLUP   1635    ETERM1   1627
ATSW     0056    CHRLUP   0033    DMDONE   7063    ETERM2   1655
AXIN     0010    CHRT     6133    DMPSW    0100    ETERMN   1644
AXOUT    0017    CIMCF    1430    DMULT    7004    EVAL     1613
B        0046    CLCU     7427    DMULT4   7036    EX1      0040
B1BLK    2130    CLEAR    7672    DNORM    7335    EXIT     2646
B1FLG    2125    CLF      0076    DNUMBR   5714    EXIT1    5034
B1UNIT   2126    CLKFLG   2661    DO       0420    EXIT2    5301
B2BLK    2134    CNTR     0057    DOK      2113    EXIT3    7363
B2FLG    2131    COL      1253    DONE     2131    EXITJ    2660
B2UNIT   2132    COMBOT   0226    DOONE    0463    EXP      0044
BACK     5503    COMBUF   0132    DOUBLE   0127    EXTR     2313
BEGIN    3601    COMEIN   3140    DPCVPT   6302    F        0043
BET1     4771    COMEOU   3206    DPN      6305    FCONT    1101
BET2     4774    COMGO    1161    DPT      6145    FCOS     5177
BETA     0017    COMLST   0774    DSAVE    5640    FCOUNT   5535
BET3     4766    COMMEN   0614    DTST     5647    FEND3    2267
BF       4702    COMMON   1600    DUBDIV   7261    FERROR   0177
BLK2     0011    COMSUB   1502    DUBLAD   5733    FEXP     4620
BLOCK    2121    CON1     5037    DV3      7267    FEXT     0000
BOTTOM   0335    CRETLD   1554    E        0042    FFF      1522
BUFBEG   3216    CRETST   2072    ECALL    1601    FGO2     6011
BUFFER   7473    CRLF     7505    ECHOLS   1624    FGO3     6027
BUFR     0060    CRUDDY   1155    EFOP     0056    FGO4     6034
BUFST    5531    CSMCI    1427    EFUN     1743    FGO5     6070
C        0047    CSTAR    0225    EFUN2    1755    FIGO1    6221
C100     0036    D        0041    EFUN3    2021    FIGO4    6261
```

```
FI[illegible]R   1354    FRETLD  1537    IF      [illegible]13    LESUBS  2173
FINSTR  1326    FRETST  2014    IF1     1035    LG      6375
FINTAB  2135    FRST    3206    IF3     1025    LG2E    4713
FINCR   1765    FRSTX   3214    IGNOR   0217    LGO     6366
FINDLN  4555    FSIN    5204    IGOTIT  1036    LINENO  2067
FINDV   2253    FSSERR  5774    ILIST   0771    LIST3   2077
FINFIN  1137    FXIT    0000    IN      5513    LIST6   2072
FINISH  2276    G101    3661    INBUF   0034    LIST7   2074
FINKP   1133    G5772   3662    INCALL  2071    LISTGO  1366
FINPUT  1131    G5773   3663    INDEV   0064    LL      5173
FINT    4427    G7200   3664    INDRCT  6465    LLENGT  1327
FISW    1052    G7773   3665    INFIX   2401    LLIST   6366
FIVHUN  7653    G7774   3666    INLIST  0570    LLOAD   1273
FIX     6724    G7775   3667    INORM   6307    LM      2572
FIXM    6753    G7776   3670    INPUT   0756    LMAKE   1432
FLAC    1044    G7777   3671    INPUTX  0271    LNAME   1172
FLAD    6510    GAMMA   2005    INSUB   0036    LNUM    1171
FLAG1   5162    GBLOK   3655    INTEGE  0053    LO      5167
FLAG2   4725    GECALL  1463    INTRPT  2603    LOADIT  6333
FLAGJ   1076    GEND    2334    IOBUF   3120    LOADJ   1304
FLARG   2032    GERR    0340    IPART   1040    LOG2    5157
FLARGP  1125    GET1    2330    IRETLD  1546    LOG5    5142
FLOV    7107    GET3    2345    IRETN   0227    LOG6    5145
FLEX    6517    GETARG  1401    ITABLE  6575    LOG7    5150
FLGT    6471    GETC    4545    ITER1   7470    LOG8    5153
FLIMIT  1075    GETCX   1566    ITLOAD  1533    LOOP01  6433
FLINTP  6200    GETLN   4554    ITSAGO  1736    LOPEN   1431
FLIST1  1577    GETRHS  1000    ITSFF   1450    LORD    0046
FLIST2  1574    GETSGN  1045    ITSII   1452    LOSS    0151
FLMY    6565    GETVAR  1405    ITSOK   7521    LPRTST  2037
FLOG    5040    GEXIT   0352    ITSSS   1451    LS      6176
FLOP    1674    GFND1   1510    ITSTOR  2000    LSAVE   1233
FLOUT   5556    GINC    0070    JUMP    6464    LSBLK   1324
FLOUTP  6000    GLIST   1375    K5      5525    LTAPE   6346
FLPT    6467    GO      5021    KINT    2625    LUKUP   1342
FLSU    6507    GONE    0232    L1      5126    LWETMP  0002
FLTONE  2435    GOODY   0045    L2      5131    LXIT    1416
FLTXR   1014    GOTO    0603    L3      5134    M100    0121
FLTXR2  1015    GRPTST  0744    L4      5137    M10PT   6147
FLTZER  2407    GS1     1435    LASTLN  0025    M11     0121
FM12    6142    GS2     1464    LASTOP  0055    M12     2413
FNFG    5163    GS3     1444    LASTV   0031    M137    2357
FNOR    7000    GS4     1457    LC      5171    M140    2556
FNTABF  1374    GSERCH  1424    LCHAIN  1202    M144    6137
FNTABL  2167    GTEM    0021    LCLOSE  1520    M2      0111
FNUM    6311    GZERR   0362    LCON    0371    M22     0125
FOR     1941    HINBUF  0037    LDMILD  1160    M240    0114
FORHUN  7651    HISS    0150    LEFLAG  1462    M260    1534
FOUTPU  1133    HORD    0045    LEFPUT  0172    M272    1544
FPAC1   7474    I33     2414    LEPUT   6163    M4      6141
FPNT    6400    IBAR    0212    LERR    6357    M40     2356
FPRNT   5465    IECALL  1037    LESUB2  0170    M43     1077
```

```
%5      120
%77     123
%BREAK  2642
%COM    1136
%CR     116
%CS     1426
%D      5526
%E0     1135
%F      1602
%FIT    117
%HUNDR  5375
%IF     7260
%INCMA  1420
%INCOM  6374
%INE    5662
%INSKI  2051
%INUS2  7153
%INUSA  2112
%INUSE  6301
%INUSZ  5663
%LOALK  1165
%LIMIT  7647
%MCOM   7656
%OO     5214
%OOIFY  1254
%OO     1262
%OOEND  1275
%OOLUP  1266
%ORNUM  1056
%OVMOV  1305
%P1     7254
%P2     7256
%P3     7255
%P4     7200
%P5     7253
%P6     7210
%PPR    115
%PLUS   5664
%SPACE  5665
%UIOIV  7101
%UIT    6570
%UIT10  5667
%UIT2   5715
%UITY   4752
%VCNT   1323
%VCTR   1200
%VPTR   1201
%YAC1   164
%YAC2   165
%YAC3   166
%YTEMP  156
%YTMP2  157
AACSW   0065
ACHARS  7566
ACOLS   7564
AEGP    4724
AFEEDS  7565
ALINES  7561
AOASCI  0061
AOCLK   2653
AOCRLF  7513
AOHANG  7556
AORF    6515
AORM    6571
AORMF   7147
AORMLE  2031
AOTSAV  1314
AOX     6675
AOX1    6711
AOX2    6704
AUMSGN  1061
B1      3600
B10     1123
B12     1545
B200    0003
B215    1157
B27     1570
B360    0007
B37     1360
B4377   0076
B4600   5374
B56     1156
B6000   0173
B6377   7570
B7      1776
B7200   7415
B7400   7650
B7420   0174
B7472   1501
B7510   1424
B7524   1154
B7566   7572
B760    0015
B7655   7571
B77     1124
B7710   1125
B7716   7573
B7761   1155
B7763   7567
B7764   0172
B7770   1126
B7774   1127
BC      7752
BCTNUM  1101
BD      7761
BDISSP  7704
BE      7753
BERROR  7713
BEXIT   7731
BGO     7714
BI      7734
BLIST   7722
BM12    5530
BNE     4716
B0010   1425
B006377 7730
BP      3115
BPMINS  6567
BPNEXT  1622
BPTABL  1731
BPTR    6002
BPTRV   2663
BPTRI   2665
BPTRO   2664
BPUT    5532
BS      7763
BSAMP   1357
BT      7771
BUT     2465
BUTA    5536
BUTCR   2476
BUTDEV  0063
BUTDG   6154
BUTPUT  7706
BUTX    2475
BVER1   0043
BVER2   0047
BP      0000
BP13    0005
BP17    0107
BP177   0106
BP1FLAC 0167
BP2000  0373
BP27    6750
BP277   0110
BP2FLAC 0170
BP3     2036
BP337   0075
BP377   2553
BP3FLAC 0171
BP40    2552
BP400C  0124
BP43    6310
BPLNAM  0145
BP6LNAM 0146
BP7200  1402
BP7600  0134
BP77    0122
BP7700  0121
BP7740  0372
BPA1    2524
BPACBUF 2502
BPACKC  4546
BPACKST 0027
BPACX   2530
BPALG   5260
BPARTES 2051
BPASS   6335
BPB1FLG 0163
BPC     0022
BPC1    0614
BPCHAR  1401
BPCHECK 5244
BPCHK   0510
BPCK1   2535
BPCLEAR 0175
BPCLKFL 7745
BPCOMMD 0154
BPD2    0534
BPD3    0554
BPDLXR  0013
BPECALL 6334
BPEQ    6135
BPER    0102
BPFILTA 0152
BPFINIS 0160
BPFNEW  0410
BPFNUM  1771
BPFX    0411
BPFZ    0412
BPGETC  1422
BPGETRH 0143
BPI     5311
BPI2    5036
BPIOT   5315
BPLCE   5536
BPLOMIL 0144
BPLEFLA 1075
BPLESUB 0101
BPLLP1  1006
BPLLP2  1016
BPLLP3  1044
BPLLP4  1102
BPLNAME 1122
BPLNUM  0142
BPLOOKU 0153
BPNCHAR 7732
BPNCOLS 7776
```

P[illegible]C	7777	RET	5452	SRNLST	[illegible]61	TYPE	1221
POPA	1413	RETRN	1563	START	0177	TYPE2	1223
POPF	4544	RETURN	5536	STARTL	5064	URETST	2066
POPJ	5541	REVIT	7146	STARTV	0060	UTE	2276
POPTR	7733	RHSERR	1132	STEMP	7750	UTQ	2305
PP43	1170	RITEOU	3651	STEMP2	7751	UTRA	2274
PPASS	7705	RND2	5527	STOKOK	2044	UTX	2316
PPROC	1421	ROOTGO	7461	STOOBG	2051	UZERST	2064
PPTEN	6144	ROT	2557	STORIT	6175	VAL	0032
PPTR	7574	ROUND	6151	SUBR	0102	WAIT	7657
PRECIV	1622	RTL6	4557	SUBS	0171	WAITER	0020
PREPLA	0155	RUB1	3004	SUBS2	0167	WAITLP	0115
PRUSER	1423	RUB2	3042	SWITCH	0161	WALL	0664
PRINTC	4551	RUB3	3030	SWTMP	0162	WEXIT	0072
PRNT	2442	RUB4	3037	T	0000	WORDS	0003
PRNT2	3114	RUB5	3041	T1	0032	WRITE	0635
PRNTI	6132	RUBIT	2555	T12	3611	WTEST2	0653
PRNTLV	4553	SADR	6150	T2	0071	WTESTG	0667
PROC	0611	SAMEN	1372	T3	0033	WX	0673
PROCES	0610	SAVAC	2600	TABLE	6466	X	5321
PSCOPO	7775	SAVE	3751	TAG1	6723	X1	5035
PSETCL	7746	SAVLK	2601	TASK	1202	X2	4675
PSIN	0165	SBAR	1300	TASK4	1250	X7774	0140
PSTART	1322	SCHAR	1271	TCRLF	1246	X7775	0141
PSUBS	0100	SCONT	1266	TCRLF2	1243	XABS	2016
PT1	0030	SCOPOU	7500	TDUMP	3052	XADC	1341
PTBL	1330	SCOUNT	5534	TELSW	0016	XCT	0020
PTCH	0126	SETCLK	5351	TEM	5156	XCTIN	0062
PTEN	6275	SETT	1041	TEMP	4726	XDELET	2064
PTEST	1462	SEX	1336	TEN	6271	XDISP	7602
PUSHA	4542	SEXC	0740	TENPT	6152	XENDLN	2360
PUSHP	4543	SFOUND	1304	TERMS	1772	XFIND	2244
PUSHJ	4540	SGOT	1310	TEST2	6736	XGETLN	3302
PWAIT	0174	SIGN	7124	TEST4	7366	XGETOU	1254
PXOUTL	7774	SIGNF	0050	TESTA	0322	XI33	2666
QADD	0061	SIN	2662	TESTC	4564	XIN	6306
Q6	5441	SMIN	6136	TESTN	4561	XINPUT	5666
RANMUL	6160	SMP	6101	TEXTP	0017	XINT	1156
RAND	1142	SMSP	6134	TGO	5400	XLC	0130
RAR1	6573	SORTB	1312	THIR	7257	XLG	0136
RAR2	6574	SORTC	4550	THISLN	0023	XLL	0132
RDIV	0152	SORTCN	0054	THISOP	0024	XLO	0126
READC	4552	SORTJ	4547	TINTR	1236	XLS	0134
RECOVR	2740	SPECIA	6777	TLIST	1376	XOUTL	2676
RECOVX	2761	SPLAT	3051	TLIST2	1532	XPOPJ	1565
REMAIN	5712	SPNOR	4560	TLIST3	2377	XPRNT	2425
REPLAC	1361	SPTR	7671	TQUOT	1227	XPUSHA	0477
REPT	6146	SQCON1	7467	TRAD	6575	XPUSHJ	0521
RESOL	6752	SQEND	7465	TSTGRP	4563	XQ	0001
RESOL3	7376	SRETLD	1541	TSTLPR	4562	XR1	0010
RESOL5	6304	SRETN	0261	TWO	4721	XRAN	1145
RESOLV	7173	SRETST	2024	TWOPI	5305	XRAR2	7365

```
        XR*      311
        XR*2     312
        XR*.4    413
        XSGN    2312
        XSORTC   721
        XSPNOR  1535
        XS2     4676
        XS3     5325
        XSORT   7432
        XT3      717
        XTESTC   700
        XTESTN  1546
        XV#     2451
        Y        377
        ZERO    6522
```

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 40 SECONDS

4K CORE USED

```
L3        2[illegible]63   2278#
L4        2[illegible]61   2081#
LASTLN      43#    1243    1346    1359    1424    1427    1123    1107    1112    1119    1212
LASTOP      75#    1341    1348    1364    1087    1092    1319    1335    1435    1755    4065
LASTV       47#     425     937     950     956     958
LC        2108#    2779
LCHAIN    3721     3963#
LCLOSE    3715     42[illegible]2#
LCON       234      332#
LDMILD    3726     3949#   3953
LEFLAG    3892     3893    4166#
LEFPUT     198#    2820
LEPUT      198     2638#
LERR      2772     2777#   3924
LESUB2     196#     984    2640
LESUBS     199#    2641    2752    3689
LG        2783     2791#
LG2E      1874     1929#
LGO       2776     2778#
LINENO      87#     249     293     303     304     310     311     318     322     396     517     537     588     788
           812     1332    1351    1462    1468    1669    1677    1703
LIST3      100#     817     822     823
LIST6       93#     832     833
LIST7       96#     221     222
LISTGO     823      882#
LL        2110#    2781
LLENGT    3973     3997    4058#
LLIST     2775     2776    2784#
LLOAD     3717     3967#
LM        1567#    2780
LMAKE     1572     4110#
LNAME     3727     3728    3872    3916    3960#   4076    4095
LNUM      3724     3885    3900    3911    3959#
LO        2106#    2778
LOADIT    2755     2757#
LOADJ     3988     4039#
LOG2      2049     2098#
LOG5      2059     2085#
LOG6      2057     2088#
LOG7      2055     2091#
LOG8      2054     2094#
LOOP01    2817     2822#
LOPEN     3713     4141#
LORD        64#    2396    2453    2476    2478    2492    2494    2881    2937    2939    2948    3004    3025    3030
          3037     3046    3048    3112    3277    3286    3297    3308    3319    3390
LOSS      3731#    4225    4226    4228    4230    4234    4238    4265    4286    4288    4314    4355    4356    4401
          4402     4404    4405    4425    4426    4434    4435    4442    4445
LPRTST     181     1200#   1204    1208    1209
LS        2649#    2782
LSAVE     3719     3994#
LSBLK     3977     3981    4001    4010    4055#
LTAPE      754     2768#
LUKUP     3733     3970    4072#   4081
```

```
MP6         3226#   3237
MPER         118#   1276    2463
MPLUS       2403    2447#
MSPACE      2413    2446#
MULDIV      3115    3125#   3130    3141
MULT        2910    2914    2917#
MULT10      2428    2457#   2468    2628
MULT2        128    2458    2459    2461    2472#   2485
MULTY       3075    3078    3083    3086    3093    3096    3101    3104    3107    3179#
MVCNT       4032    4054#
MVCTR       3961#   4024    4025    4026    4033    4036
MVPTR       3962#   4029    4034    4043    4050
MYAC1       3742#   4227    4233    4241    4391    4400    4408    4422
MYAC2       3743#   4229    4237    4243    4393    4403    4414    4418    4424    4429    4436
MYAC3       3744#   4239    4245    4395    4406    4419    4421    4427
MYTEMP      3736#   4170    4171    4173    4174    4176    4177    4179    4197    4207    4261    4267    4270    4305
            4326    4317    4320    4321    4323    4324
MYTMP2      3737#   4110    4119    4159    4169
NAGSW         85#    243     330     369     370     393     389     403     531     543    1326
NCHARS      3441    3442    3449    3460    3471#   3577
NCOLS       3420    3431    3462    3464    3469#   3613
NEGP        1871    1938#
NFEEDS      3421    3446    3461    3470#   3614
NLINES      3428    3445    3466#
NOASCI      3640    3672#
NOCLK       1615    1622#
NOCRLF      3419    3423#
NOHANG      3448    3463#
NORF        2873#   2930
NORM        2873    2918#
NORMF       3128    3175#
NORMLE      4413#   4423
NOTSAV      4039    4047#
NOX         2971    2987#
NOX1        2950    2999#
NOX2        2989    2994#
NUMSGN      3847    3880#
O1          1810#   1811
O10         3881    3907    3917#
O12         1001#   1012
O200        3619#   3661
O215        3939    3945#
O27         4232    4250#
O363        3623#   3645    4006
O37          861     875#
O4377       3643    3686#
O4600       2245    2259#
O56         3936    3944#
O6000       3749#   4354
O6377       3458    3473#
O7          4258    4383#
O7000       3362#   3443
O7400       3516    3525#
```