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. Ø1754
                    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
          0000      FEXT=0
          0000      FXIT=0
          4407      FINT=JMS I 7
          6101      SMP=6101
                    /MISCELLANEOUS ITEMS
          0001      *1
0001      5403              JMP I .+2       /INTERRUPT PROCESSOR ENTRY .
0002      0000      LWETMP, 0               /********
0003      2603                      INTRPT
0004      0004      DDTJR,  DDTJR   /USED FOR DEBUGGING
0005      0013      P13,    13      /CONSTANT
0006      0100      C100,   100     /CONSTANT
          0000      T=00            /TEXT FIELD NO.
          0000      P=00            /PROGRAM FIELD NO.
          7000      CDF=7000        /(X=MEM) - OPR
0007      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      3600      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  ; 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= GETC; #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,          .
                *44
FLAC=,          /FLOATING ACCUMULATOR
EXP,            0       /F.A.
HORD,           0
LORD,           0
OVER2,          .
SIGNF,          0               /FLOATIN SIGN
MINSKI, ACMINS          /NEGATE FLAC SUBROUTINE
FISW,   2004            /OUTPUT FORMAT
INTEGER,FIX             /FIX FLAC
GETSGN=TAD FLAC+1
RETURN=JMP I EFUN3I
                *54
                /VARIABLES    =   INITIALIZED FOR THE DIALOGUE
SORTCN, 0       /NUMBER IN TABLE FROM SORTC
LASTOP, 0       /LAST OPERATION FOR EVAL
                *56
EFOP=,          /FUNCTION CODE,
ATSW,   0       /ASK-TYPE SWITCH
CNTR,   -20     /DELETE AND ERROR COUNTER(USED BY F.P. ALSO)
                *60
STARTV=,        /=END FOR 8K
BUFR,   BUFBEG  /NEXT LOCATION IN BUFFER = LAST LOCATION OF TEXT.
QADD,   0               /********
XCTIN,  I33     /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.
                *72
LIST6=, /INPUT LIST FOR "SFOUND".
                214     /F.F.
                207     /BELL
                *74
LIST7=,
                203     /CONTROL=C FOR DEBUGGING AND TSS8
P337,           337     /LEFT ARR
CLF,    212     /L.F.
                *77
LIST3=, /EXCRETION LIST
CCR,    215     /LIST BRANCHER.
DMPSW,  HLT     /(SEARCH CHARACTER)=VARIABLE
                /=0000 FOR TRACE ON.
                /THE REST OF PAGE ZERO IS PURE TO THE MULTI-USER SYSTEM
                101
N100=,
P7700,  7700    /LEFT MASK
PER,    256     /PERIOD
M77,    -77     /EXTEND CODE TEST
P7600,  7600    /GROUP MASK
M20,    -20     /CONSTANT
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111     0106  177     P177,   177     /STEP MASK
112     0107  017     P17,    17      /BCD MASK
113     0110  277     P277,   277     /"?"
114     0111  7776    M2,     -2      /CONSTANT
115     0112  7477    MINUSA, -301    /CONSTANT
116     0113  260     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     534          PD2
152             4544  POPF=JMS I .    /RESTORE GROUP
153     0144     554          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     721          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             332            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             413            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             744            GRPTST
                4564    TESTC=JMS I ,   /TERM; NUMBER; FUNCTION; LETTER= AND IGNORE SPACES.
0164             700            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    LEFPUT, 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            3313            DCA PDLXR       /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            3310            DCA AXIN        /FOR UNPACKING.
0214            3362            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
0223 4546       PACKC           /SAVE STRING CHARACTER,
0224 5217       JMP IGNOR
0225  252 CSTAR, 252             /ACKNOWLEDGE CHARACTER
0226 3220 COMBOT, COMEOUT+12     /END OF COMMAND BUFFER,LESS PROTECTION COUNT.
                /COMMAND/INPUT PROCESSOR
0227 4546 IRETN, PACKC           /START TO PACK C.R.
0230 4546       PACKC           /FINISH C.R.
0231 1132       TAD COMBUF      /INITIALIZE "TEXTP"
0232 3017 GONE, DCA AXOUT       /SETUP CURRENT LINE
0233 3020       DCA XCT
0234 4545       GETC            /READ FIRST CHARACTER,
0235 1035       TAD BOTTOM      /INIT PUSH-DOWN-LIST
0236 3013       DCA PDLXR
0237 4560       SPNOR           /IGNORE LEADING BLANKS
0240 4561       TESTN           /DOES THE LINE BEGIN WITH 1-9?
0241 5362       JMP GZERR       /PERIOD =ILLEGAL GROUP ZERO USAGE
0242 5271       JMP INPUTX      /NO
0243 0026       ISZ DEBGSW      /YES,DISABLE TRACE FOR REPACKING
0244 4554       GETLN           /READ THIS LINE NUMBER
0245 1124       TAD P4000       /TEST  FOR SINGLE LINE,
0246 1065       TAD NAGSW
0247 7640       SZA CLA
0250 4566       ERROR3          /ILLEGAL LINE NUMBER ON INPUT
0251 1060       TAD BUFR        /SET POINTERS
0252 3010       DCA AXIN
0253 3062       DCA XCTIN
0254 1067       TAD LINENO      /SAVE LINE #
0255 3410       DCA I AXIN      /(X-MEM)
0256 4560       SPNOR           /IGNORE SPACES AFTER LINE NUMBER
0257 7410       SKP
0260 4545       GETC            /READ 1ST AFTER LINENO TERMINATOR,
0261 4546 SRETN, PACKC          /SAVE TEXT AND RESTORE DATA FIELD
0262 1066       TAD CHAR        /TEST FOR END OF INPUT STRING
0263 1116       TAD MCR
0264 7640       SZA CLA
0265 5260       JMP .-5
0266 4565       DELETE          /REMOVE OLD LINE, IF ANY,
0267 4556       ENDLN           /INSERT NEW LINE
0270 5177       JMP START       /POINTERS MUST BE REINITIALIZED
0271 4540 INPUTX, PUSHJ         /PROCESS IMMEDIATE COMMAND,
0272 0611                 PROC
0273 1422       TAD I PC        /CHECK NEXT LINE (X-MEM)
0274 7450       SNA             /END OF PROGRAM?
0275 5177       JMP START       /YES
0276 3022       DCA PC          /SAVE NEW LINE NO,
0277 1022       TAD PC          /START NEW LINE
0300 7001       IAC
0301 5232       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
```

```
                        JMP I XGETLN
                LCON,   DECONV
                P7740,  7740
                P2000,  2000
                /RANGE OF ACCEPTIBLE LINE NUMBERS = 1,01 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    7400            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    0365                    NAGSW
0427    1365            TAD NAGSW       /CHECK DATA FROM GETLN,
0430    7710            SPA CLA         /SKIP IF GROUP OR ALL
0431    5263            JMP DOONE       /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    1606                    PROCESS-2
0443    4544            POPF            /RESTORE THE DATA
0444    0365                    NAGSW
0445    1422            TAD I PC        /CHECK FOR END OF TEXT (X-MEM)
0446    7450            SNA
```

```
                                JMP DCONT       /ALL DONE
                                IAC
                                DCA PT1         /SAVE POINTER TO LINENO
                                TAD NAGSW       /CHECK FOR GROUP
                                SMA SZA CLA
                                JMP .+4         /DO ALL
                                TAD I PT1       /TEST GROUP (X=MEM)
                                TSTGRP
                                JMP DCONT       /NOT IN GROUP
                                TAD I PT1       /READ NEXT LINE NO. (X=MEM)
                                DCA LINENO
                                JMP DGRP        /CONTINUE THE SUBROUTINE
DOONE,          FINDLN          /FIND THE LINE
                ERROR2          /NO SUCH LINE NUMBER
                PUSHJ           /EXECUTE IT
                        PROCESS
                POPF            /RESTORE CHAR
                        NAGSW
DCONT,          POPF            /RESTORE TEXT POINTERS
                        TEXTP
                POPA            /RESTORE ADDRESS OF CURRENT LINE.
                DCA PC
                JMP I .+1       /CONTINUE PROCESSING THIS LINE.
                        PROC
/PUSHDOWN LIST CONTROLS
XPUSHA, 0                       /PUSHDOWN THE AC = "PUSHA"
                DCA T2          /BACKUP POINTER
                CMA             /AND THEN
                JMS PCHK        /CHECK CORE USAGE
                TAD T2          /OK
                DCA I PDLXR     /PUSH DOWN LIST POINTER
                CMA             /BACKUP AGAIN
                JMS PCHK
                JMP I XPUSHA
PCHK,           0
                TAD PDLXR       /INC IN AC
                DCA PDLXR
                TAD PDLXR
                CIA CLL
                TAD LASTV
                SZL CLA
                ERROR3          /STORAGE FILLED BY PUSH-DOWN LIST
                JMP I PCHK
XPUSHJ, 0                       /RECURSIVE SUBROUTINE CALL = "PUSHJ"
                TAD I XPUSHJ
                DCA T2          /SAVE SUBR. ADDR.
                CMA
                JMS PCHK
                TAD XPUSHJ
                IAC
                DCA I PDLXR     /SAVE RETURN
                CMA
                JMS PCHK
                JMP I T2        /TRANSFER CONTROL
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  3071            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  /I=SHORT
 477  0576  2725            ERROR5  /CR=DUMB
 478  0577  1065  FLIST1,    FINCR   /,=STANDARD FORMAT
 479  0600  0610            PROCESS /I=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  1374                    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 DO 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
```

```
606  0770  5756            JMP I IMPUT
607  0771  1435  ILIST,    IF1             /,
608  0772  0613            PROCESS         /;
609  0773  0614            PC1             /CR
610                                 /ENGLISH-FRENCH
611        0774  COMLST=.           /COMMAND DECODING LIST
612  0774  0323            323     /SET    = ORGANIZE
613  0775  0306            306     /FOR    = QUAND
614  0776  0311            311     /IF     = SI
615  0777  0304            304     /DO     = FAIZ
616  1000  0307            307     /GOTO   = VA
617  1001  0303            303     /COMMENT= COMMENTE
618  1002  0301            301     /ASK    = DEMANDE
619  1003  0324            324     /TYPE   = TAPE
620  1004  0317            317     /OUTPUT /********
621  1005  0305            305     /ERASE  = BIFFE
622  1006  0327            327     /WRITE  = INSCRIS
623  1007  0315            315     /MODIFY = MODIFIE
624  1010  0321            321     /QUIT   = ARRETE
625  1011  0322            322     /RETURN = RETOURNE
626  1012  0314            314     /LIBR******
627             /THIS COMMAND LIST IS SPEED OPTIMIZED.
628
629
630             /CONDITIONAL TRANSFER PROCESS.
631  1013  4564  IF.        TESTC           /IGNORE SPACES AND TEST
632  1014  4637            JMS I IECALL    /T
633  1015  2013            ISZ PDLXR       /N=DUMP THE (EFOP)
634  1016  4640            JMS I IPART     /F=CHECK FOR PAREN MATCH
635  1017  1111            TAD M2          /A
636  1020  3032            DCA T1
637  1021  1045            TAD FLAC+1      /TEST =,0,+
638  1022  7510            SPA
639  1023  2032            ISZ T1          /N=TO   -1,-2,-3
640  1024  7750            SPA SNA CLA
641  1025  2032  IF3,      ISZ T1          /COUNT COMMAS
642  1026  7410            SKP
643  1027  5765            JMP I COMGO+4   /TRANSFER
644  1030  4547            SORTJ           /SEARCH TEXT UNTILL ,)C.R.
645  1031  1375                    TLIST=1
646  1032  7373                    ILIST=TLIST
647  1033  4545            GETC
648  1034  5230            JMP .-4
649  1035  4545  IF1.      GETC            /MOVE PAST COMMA
650  1036  5225            JMP IF3
651  1037  1601  IECALL,    ECALL
652  1040  2051  IPART,     PARTEST
653             /LOOP CONTROL STATEMENT
654        1041  SETT=.                   /SUBSET OF "FOR".
655  1041  4540  FOR,       PUSHJ           /LOOPS, ETC.
656  1042  1401                    GETARG  /LOOK FOR "=" NEXT
657  1043  4560            SPNOR           /IGNORE SPACES
658  1044  1066            TAD CHAR
659  1045  1335            TAD MEQ
660  1046  7440            SZA
```

```
1047  4566            ERROR4              /LEFT OF "=" IN ERROR: 'FOR' OR 'SET'
1050  1030            TAD PT1
1051  4542            PUSHA               /SAVE POINTER TO VARIABLE
1052  4540            PUSHJ
1053  1612                      EVAL-1    /GET INITIAL VALUE EXPRESSION
1054  1413            POPA
1055  3030            DCA PT1
1056  4407            FINT                /INITIALIZE NOW.
1057  6430            FPUT I PT1
1060  0000            FXIT
1061  4547            SORTJ               /TEST LAST CHAR FROM "EVAL"
1062  1375                      TLIST-1
1063  7201                      FLIST1-TLIST
1064  4566            ERROR4              /EXCESS R-PAR
1065  1030  FINCR,    TAD PT1             /SAVE VARIABLE ADDRESS *
1066  4542            PUSHA
1067  4540            PUSHJ               /EVALUATE THE INCREMENT,IF ANY.
1070  1612                      EVAL-1
1071  4547            SORTJ               /TEST TERMINATORS
1072  1375                      TLIST-1
1073  7176                      FLIST2-TLIST
1074  4566            ERROR4              /ILLEGAL TERMINATOR IN 'FOR'
1075  4543  FLIMIT,   PUSHF               /SAVE THE INCREMENT.    *
1076  2032                      FLARG
1077  4540            PUSHJ               /GET THE LIMIT(NO ERROR DETECTION AFTER LIMIT)
1100  1612                      EVAL-1
1101  4543  FCONT,    PUSHF               /SAVE THE LIMIT *
1102  2032                      FLARG
1103  4543            PUSHF               /SAVE TEXT OF OBJECT STATEMENTS
1104  0017                      TEXTP
1105  4540            PUSHJ               /DO THE OBJECT STATEMENTS
1106  0610                      PROCESS
1107  4544            POPF                /RESTORE REMAINING TEXT.
1110  0017                      TEXTP
1111  4544            POPF                /GET LIMIT
1112  2032                      FLARG
1113  4544            POPF                /GET INCREMENT
1114  7470                      ITER1
1115  1413            POPA                /GET VARIABLE ADDRESS
1116  3030            DCA PT1
1117  4407            FINT                /INCREMENT AND TEST
1120  5430            FGET I PT1          /LOAD THE VARIABLE
1121  1733            FADD I FINKP        /INCREMENT IT
1122  6430            FPUT I PT1          /CHANGE IT
1123  2525            FSUB I FLARGP       /TEST IT
1124  0000            FXIT
1125  1045            TAD FLAC+1
1126  7740            SMA SZA CLA
1127  5541            POPJ                /END OF LOOP
1130  1030            TAD PT1
1131  4542            PUSHA               /SAVE ADDRESS *
1132  4543            PUSHF               /SAVE INCREMENT AGAIN *
1133  7470  FINKP,              ITER1
1134  5301            JMP FCONT
1135  7503  MEQ,      -275
```

```
                        XCOM,   -254
                        FINFIN, PUSHF           /SET INCREMENT TO ONE.
                                        FLTONE
                                JMP FCONT
                                /
                                /SAME FRAN = JUST MOVED
                                /
                        RANO,   0000            /********
                                2000            /********
                                0000            /********
                        XRAN,   FINT            /********
                                FADD    RANO    /********
                                FMUL I  CRUDDY  /********
                                FPUT    RANO    /********
                                FXIT            /********
                                DCA     RANO    /********
                                DCA     FLAC    /********
                                JMP I   EFUN3I  /********
                        CRUDDY, RANMUL          /********
                                /TAKE THE INTEGER PART
                        XINT,   JMS I INTEGER   /(FIX)
                                CLA
                                JMP I EFUN3I
                                /COMMAND ROUTINE ADDRESSES
                        COMGO=.
                                SETT
                                FOR
                                IF
                                DO
                                GOTO            /(REFERENCED)
                                COMMENT
                                ASK
                                TYPE
                                OUTPUT          /********
                                ERASE
                                WRITE
                                MODIFY
                                START   /RETURN TO COMMAND MODE VIA 'QUIT'
                                RETRN
                                LTAPE           /********
                                /INPUT-OUTPUT STATEMENTS
                        ASK,    CLA CMA         /REMEMBER WHICH CALL.
                        TYPE,   DCA ATSW
                        TASK,   SORTJ           /SPECIAL CHAR? *****
                                        ALIST-1
                                        ATLIST=ALIST
                                ISZ ATSW        /TEST QUOTE SWITCH
                                JMP TYPE2
                                PUSHJ           /DO ASK; SETUP PT1
                                        GETARG
                                TAD CHAR        /SAVE IN-LINE CHARACTER.
                                PUSHA
                                TAD COL         /TYPE COLON
                                PRINTC          /(CLA)= TO SUPRESS ":"
                                ISZ INSUB       /INDICATE 'READC'
                                IAC             /POINT PAST CHAR
```

```
                4531            JMS I FINPUT    /READ DATA AND SAVE
                1413            POPA            /RE-TEST LAST TERMINATOR
                3066            DCA CHAR
                5230            JMP ASK         /CONTINUE PROCESSING
                4542    TYPE2,  PUSHJ           /DO TYPE
                1613                    EVAL
                4530            JMS I FOUTPUT   /PRINT
                5201            JMP TYPE
                2026    TQUOT,  ISZ DEBGSW      /DISABLE TRACE
                4545            GETC            /TYPE LITERALS
                4547            SORTJ
                1531                    TLIST2-1
                .645                    TLIST3-TLIST2
                4551            PRINTC
                5230            JMP TQUOT+1
                4545    TINTR,  GETC            /PASS PERCENT SIGN
                4554            GETLN           /READ FORMAT CONTROL: "X7,03"
                1067            TAD LINENO
                3052            DCA FISW        /SAVE FORMAT CODE
                5202            JMP TASK
                1077    TCRLF2, TAD CCR         /SPLAT=CR ALONE
                4463            JMS I OUTDEV
                7001            IAC             /NON-PRINTING DELAY FOR C.R. *****
                1077    TCRLF,  TAD CCR         /EXCLAMATION POINT=CR,LF.
                4551            PRINTC
                3026    TASK4,  DCA DEBGSW      /*
                4545            GETC            /*
                5202            JMP TASK
                0272    COL,    272             /":"
                                /IF DEBGSW=0 ! ENABLE FLIP-FLOP "DMPSW"
                                /       #0: DISABLE AND RETURN ALL"?" ! S.
                                /IF DMPSW = 0! TRACE ON, IF ENABLED
                                /       #0: TRACE OFF
                                /IF BOTH = 0 ! PRINT TRACE.
                                /SEARCH ROUTINES
                4554    MODIFY, GETLN           /READ LINE NO.
                4555            FINDLN          /LOOK IT UP NOW.
                4566            ERROR2          /NOT THERE = BAD COMMAND UNLESS ZERO.
                1060            TAD BUFR        /SET POINTERS
                3010            DCA AXIN        /FOR INPUT
                3062            DCA XCTIN
                1067            TAD LINENO      /COPY THE SAME LINE NUMBER.
                3410            DCA I AXIN      /(X-MEM)
                1010            TAD AXIN        /SAVE START OF NEW LINE
                3027            DCA PACKST
                4464    SCONT,  JMS I INDEV     /READ THE TELETYPE INPUT SILENTLY.
                3100            DCA LIST3+1     /SAVE SEARCH CHARACTER
                2026            ISZ DEBGSW      /NO BREAKS.
                4545    SCHAR,  GETC            /TYPE=TEST=F,F.
                4551            PRINTC          /PLAYBACK THE TEXT
                4547            SORTJ           /LOOK FOR MATCH
                .076                    LIST3-1
                1267                    LISTGO-LIST3
                4546            PACKC           /SAVE NEW LINE.
                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     037     /********
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   037,    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  1300           SBAR    /B.A. = RESTART
```

```
881  1365  1267          SCONT*1 /L.F. = FINISH THE LINE AS BEFORE.
882        1366  LISTGO=.
883  1366  1261          SETN    /C.R. = END THE LINE HERE AS IS.
884  1367  1312          SGOT    /CHAR = SEARCH CHARACTER
885        1370  ALIST=. / ASK/TYPE LIST OF CONTROLS.
886  1370  1245          245     /%
887  1371  1242          242     /"
888  1372  1241          241     /!
889  1373  1243          243     /#
890  1374  1244          244     /$///
891        1375  GLIST=.
892  1375  1240          240     /SPACE
893        1376  TLIST=.
894  1376  1254          254     /,
895  1377  1273          273     /;
896  1400  1215          215     /C.R.
897                      /THIS LIST IS ENDED BY 'TESTC'.
898                      /FIND OR ENTER A VARIABLE IN THE LIST.
899  1401  4564  GETARG, TESTC           /FIRST LETTER OF ARG
900  1402  7200  P7200,  7200            /******** LETS F THRU
901  1403  4566          ERROR4          /********
902  1404  7000          NOP             /********
903  1405  3062  GETVAR, DCA XCTIN        /PACK INTO ADD.
904  1406  4546          PACKC
905  1407  4545          GETC            /SECOND LETTER
906  1410  4550          SORTC           /TERMINATOR?
907  1411  1771                TERMS=1
908  1412  5224          JMP GSERCH      /YES
909  1413  1066          TAD CHAR        /NO
910  1414  0122          AND P77         /SAVE 2AND LETTER OF NAME
911  1415  1061          TAD QADD
912  1416  3061          DCA QADD
913  1417  4545          GETC            /IGNORE THE REST
914  1420  4550          SORTC
915  1421  1771                TERMS=1
916  1422  5224          JMP GSERCH
917  1423  5217          JMP .=4
918  1424  4562  GSERCH, TSTLPR          /LOOK FOR SUBSCRIPT VIA SORTCN
919  1425  5235          JMP GS1         /NOT SUBSCRIPTED BY L=PAR.
920  1426  1061          TAD QADD              /SAVE NAME
921  1427  3056          DCA EFOP        /FOR RECURSIVE AND ERROR CHECK
922  1430  4663          JMS I GECALL    /TO EVAL
923  1431  1413          POPA
924  1432  3061          DCA QADD              /RESTORE NAME
925  1433  4662          JMS I PTEST     /TEST PAREN MATCH, ETC.
926  1434  1453          JMS I INTEGER   /CONVERT TO 12=BIT NUMBER.
927  1435  3171  GS1,    DCA SUBS        /SAVE SUBSCRIPT
928  1436  1061          TAD     QADD    /******** LETS F THRU
929  1437  0101          AND     P7700   /********
930  1440  1202          TAD     P7200   /********
931  1441  7650          SNA CLA         /********
932  1442  5322          JMP     FFF     /********
933  1443  1060          TAD STARTV      /SEARCH FOR VARIABLE(CHANGE FOR X=MEM)
934  1444  3030  GS3,    DCA PT1
935  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 PDLXR
 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  0537          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]11  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  0000            FXIT
1100  1677  1125            TAD FLARGP
```

```
1161  1760  3030            DCA PT1
1162  1761  1024            TAD THISOP
1163  1762  1055            TAD LASTOP      /=0?
1164  1763  7650            SNA CLA
1165  1764  5541            POPJ            /EXIT "EVAL"
1166  1765  1413            POPA            /GET PRIOR OP
1167  1766  3055            DCA LASTOP
1168  1767  5255            JMP ETERM2      /COMPARE THIS OP
1169  1770  4562    EPAR,   TSTLPR          /TEST FOR SUB-EXPRESSION
1170  1771  7410            SKP
1171  1772  5366            JMP EPAR2       /GO EVALUATE EXPRESSION
1172  1773  1055            TAD LASTOP      /CONTINUE READING THE EXPRESSION
1173  1774  4542            PUSHA           /SAVE "LASTOP",
1174  1775  1030            TAD PT1
1175  1776  3320            DCA ,+2
1176  1777  4543            PUSHF           /SAVE LAST ARGUMENT
1177  1720  0000                    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  0044                    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  0044                    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  7000            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 EFUN3!.
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.
1770 5536                  JMP I EFUN3I
1771 6311          PFNUM,  FNUM                    /********
     1772          TERMS=.          /TERMINATOR TABLE FOR 'EVAL' AND 'GETVAR'
1772 0240                  240                     /SPACE  0
1773 0253                  253                     /+      1
1774 0255                  255                     /-      2
1775 0257                  257                     //      3
1776 0252                  252                     /*      4
1777 0336                  336                     /UP ARR 5
2000 0250                  250                     /(      6 L-PARS
2001 0333                  333                     /[      7
2002 0274                  274                     /<      10
2003 0251                  251                     /)      11 R-PARS
2004 0335                  335                     /]      12
2005 0276                  276                     />      13
2006 0254                  254                     /,      14
2007 0273                  273                     /;      15
2010 0215                  215                     /C.R.   16
2011 0275                  275          /= TO END GETARG FROM 'SET'
                   /TWO MINOR FUNCTIONS
2012 4543          XSGN,   PUSHF                   /TAKE SIGN*1 OF FLARG
2013 2405                           FLTONE
2014 4544                  POPF
2015 0044                           FLAC
2016 1233          XABS,   TAD FLARG+1             /TAKE ABSOLUTE VALUE OF FLAC
2017 7710                  SPA CLA                 /SKIP TO CONTINUE
2020 4451                  JMS I MINSKI            /NEGATE THE FLOATING AC
                   /CONTINUATION OF FUNCTION CALLS.
2021 4407          EFUN3,  FINT
2022 7000                  FNOR                    /NORMALIZE FUNCTION RETURN
2023 6232                  FPUT FLARG              /SAVE FUNCTION VALUE
2024 0000                  FXIT
2025 1125                  TAD FLARGP              /SET POINTER
2026 3030                  DCA PT1
2027 4251                  JMS PARTEST
2030 5631                  JMP I .+1               /FUNCTION RETURN IS OK
2031 1622                           OPNEXT

2032 0000          FLARG,  0        /DATA TEMPORARY STORAGE
2033 0000                  0
2034 0000                  0
2035 0000                  0
2036 0003          P3,     3
2037 0000          LPRTST, 0                       /SKIP IF LEFT PAREN. = 'TSTLPR'
2040 1054                  TAD SORTCN
2041 1121                  TAD M11
2042 7700                  SMA CLA
2043 5637                  JMP I LPRTST
2044 1054                  TAD SORTCN
2045 1120                  TAD M5
2046 7740                  SMA SZA CLA
2047 2237                  ISZ LPRTST
2050 5637                  JMP I LPRTST
2051 0000          PARTEST,0                       /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 T           /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  1060          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  1013          TAD AXIN
1275  2150  1057          TAD CNTR
1276  2151  3013          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-MEM)
1318  2221  1060  ERV,    TAD STARTV      /ERASE VARIABLES **
1319  2222  3031          DCA LASTV
1320  2223  5177          JMP START       /POINTERS MAY BE DIFFERENT NOW,
```

```
1321  2224  4554  ERL,   GETLN           /ERASE LINES.
1322  2225  1060         TAD BUFR        /PROTECT REST OF TEXT.
1323  2226  3310         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  2322  7450          SNA
1377  2323  5316          JMP UTX         /"?" FOUND
1378  2324  1075          TAD P337
1379  2325  3066  UTQ,    DCA CHAR
1380  2326  1026          TAD DEBGSW
1381  2327  1100          TAD DMPSW
1382  2330  7650          SNA CLA         /PRINT ONLY IF BOTH ARE ZERO.
1383  2331  4551          PRINTC
1384  2332  5674          JMP I UTRA
1385  2333  4330  EXTR,   JMS GET1
1386  2334  7040          CMA
1387  2335  5276          JMP UTE
1388  2336  1026  UTX,    TAD DEBGSW      /TEST FOR TRACE-ENABLED
1389  2337  7640          SZA CLA
1390  2340  5326          JMP .+6
1391  2341  1100          TAD DMPSW       /FLIP THE TRACE FLOP
1392  2342  7650          SNA CLA
1393  2343  7001          IAC
1394  2344  3100          DCA DMPSW
1395  2345  5275          JMP UTRA+1      /GET NEXT CHARACTER INSTEAD.
1396  2346  1110          TAD P277        /TRACE DISABLED = RETURN "?"
1397  2347  5305          JMP UTQ
1398  2350  0000  GET1,   0               /UNPACK 6-BITS
1399  2351  2020          ISZ XCT         /STARTS=0
1400  2352  5345          JMP GET3
1401  2353  1021          TAD GTEM
1402  2354  7122  GEND,   AND P77
1403  2355  3066          DCA CHAR        /SAVE
1404  2356  1066          TAD CHAR
1405  2357  1103          TAD M77
1406  2360  7650          SNA CLA
1407  2361  5313          JMP EXTR        /EXTENDED
1408  2362  1066          TAD CHAR
1409  2363  1356          TAD M40
1410  2364  5730          JMP I GET1
1411  2365  1417  GET3,   TAD I AXOUT     /(X-MEM)
1412  2366  3021          DCA GTEM
1413  2367  7040          CMA
1414  2370  3020          DCA XCT
1415  2371  1021          TAD GTEM
1416  2372  7112          RTR CLL
1417  2373  7012          RTR
1418  2374  7012          RTR
1419  2375  5334          JMP GEND
1420  2376  7740  M40,    -40
1421  2377  7641  M137,   -137
1422  2400  0000  XENDLN, 0       /TERMINATE THE BUFFERED LINE = "ENDLN"
1423  2401  7000          CDF T           /(X-MEM)
1424  2402  1425          TAD I LASTLN    /SAVE OLD POINTER
1425  2403  3460          DCA I BUFR
1426  2404  1060          TAD BUFR        /POINT TO NEW LAST LINE
1427  2405  3425          DCA I LASTLN
1428  2406  1061          TAD QADD                /CHECK FOR EXTRA INFO
1429  2407  7440          SZA
1430  2410  3410          DCA I AXIN
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1431  2371  1310          TAD AXIN        /COMPUTE NEW END OF BUFFER
1432  2372  7001          IAC
1433  2373  3060          DCA BUFR
1434  2374  1060          TAD STARTV      /RESET VARIABLE LIST (X-MEM)
1435  2375  3031          DCA LASTV
1436  2376  5760          JMP I XENDLN
1437        2377    TLIST3=.          /LITERAL TERMINATORS
1438  2377  1251          TASK4   /"
1439  2400  0614          PC1     /C.R. = AUTOMATIC QUOTE MATCH
1440        2401    INFIX=.           /DATA CONTROL CHARACTERS
1441  2401  6202          FLINTP+2        /LEFT ARROW     = KILL
1442  2402  0757          INPUT+1         /RUBOUT         = IGNORE
1443  2403  0757          INPUT+1         /L.F.           = IGNORE
1444  2404  6250          ENDFI+5         /ALT MODE       = EXIT
1445  2405  0001    FLTONE, 0001    /(NO RELATIVE REFERENCES)
1446  2406  2000          2000
1447  2407  0000    FLTZER, 0000
1448  2410  0000          0000
1449  2411  0000          0000
1450  2412  0000          0000
1451  2413  7766    M12,    -12     /DECIMAL CONVERSION FACTOR FOR "PRNT"
1452  2414  0000    I33,    0               /NO-INTERRUPT INPUT ROUTINE
1453  2415  6031          KSF
1454  2416  5215          JMP .-1
1455  2417  6036          KRB
1456  2420  0106          AND P177        /IGNORE PARITY BIT
1457  2421  7450          SNA
1458  2422  5215          JMP .-5
1459  2423  1123          TAD C200
1460  2424  5614          JMP I I33
1461  2425  0000    XPRNT,  0       /PRINT A LINE NUMBER = "PRNTLN"
1462  2426  1067          TAD LINENO
1463  2427  4557          RTL6
1464  2430  0122          AND P77
1465  2431  4242          JMS PRNT        /TWO DIGIT "PART" NUMBER
1466  2432  1102          TAD PER
1467  2433  4551          PRINTC          /PERIOD FOR SEPARATION
1468  2434  1067          TAD LINENO
1469  2435  4242          JMS PRNT        /TWO DIGIT "STEP" NUMBER.
1470  2436  1356          TAD M140
1471  2437  3066          DCA CHAR        /SAVE SPACE IN CHAR.
1472  2440  4551          PRINTC          /PRINT TRAILING SPACE
1473  2441  5625          JMP I XPRNT
1474        0032    VAL=T1
1475  2442  0000    PRNT,   0       /PRINT TWO DECIMAL DIGITS
1476  2443  0106          AND P177
1477  2444  3032          DCA VAL
1478  2445  1113          TAD C260
1479  2446  3033          DCA T3
1480  2447  5252          JMP .+3
1481  2450  2033          ISZ T3
1482  2451  3032    XYZ,    DCA VAL
1483  2452  1032          TAD VAL
1484  2453  1213          TAD M12
1485  2454  7500          SMA
```

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1486  2455  5253          JMP XYZ-1
1487  2456  7200          CLA
1488  2457  1033          TAD T3
1489  2460  4551          PRINTC
1490  2461  1032          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  2520  1076          TAD CLF
1506  2521  5274          JMP OUTX-1
1507  2522  0000  PACBUF,  0                   /PACK A CHARACTER = "PACKC"
1508  2523  1110          TAD P277
1509  2524  7041          CIA
1510  2525  1066          TAD CHAR
1511  2526  7450          SNA                 /CHANGE 277 TO 337
1512  2527  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,    CDF 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  1710          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  3061          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
```

```
       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
   263Ø  1106             AND P177            /IGNORE BLANK AND L-T AND PARITY BIT.
   2631  745Ø             SNA
   2632  5246             JMP EXIT
   2633  1123             TAD C2ØØ
   2634  3262             DCA SIN
   2635  1262             TAD SIN
   2636  1222             TAD MBREAK          /MANUAL STOP?
   2637  765Ø             SNA CLA
   264Ø  534Ø             JMP RECOVR
   2641  1Ø34             TAD INBUF           /ANY SPACE?
   2642  764Ø             SZA CLA
   2643  4566             ERROR2              /WILL WAIT FOR OUTPUT BUFFER
   2644  1262             TAD SIN
   2645  3Ø34             DCA INBUF           /SAVE INPUT
   2646  6131   EXIT,     CLSK                /********
   2647  5253             JMP     NOCLK       /********
   265Ø  6135             CLSA                /********
   2651  72ØØ             CLA                 /********
   2652  3261             DCA     CLKFLG      /********
                /
                /KW12 CLOCK INTERRUPT ROUTINE
                /
   2653  6244   NOCLK,    RMF
   2654  1201             TAD SAVLK
   2655  7104             RAL CLL
   2656  12ØØ             TAD SAVAC
   2657  6ØØ1             ION
   266Ø  54ØØ   EXITJ,    JMP I Ø             /MODIFIED FOR PDP-5
   2661  ØØØØ   CLKFLG,   Ø                   /******** SET TO Ø EVERY INTERRUPT
   2662  ØØØØ   SIN,      Ø
   2663  312Ø   OPTRØ,    IOBUF     /OUTPUT POINTERS
   2664  312Ø   OPTRO,    IOBUF     /VARS
   2665  312Ø   OPTRI,    IOBUF
   2666  ØØØØ   XI33,     Ø                   /VIA (INDEV)
   2667  1Ø34             TAD INBUF           /ANY INPUT?
   267Ø  745Ø             SNA                 /******** REFRESH SCOPE WHILE WAITING
   2671  4574             JMS I   PWAIT       /******** FOR INPUT
   2672  3276             DCA XOUTL
   2673  3Ø34             DCA INBUF           /CLEAR INPUT BUFFER
   2674  1276             TAD XOUTL
   2675  5666             JMP I XI33
   2676  ØØØØ   XOUTL,    Ø                   /VIA (OUTDEV)
   2677  3266             DCA XI33            /SAVE CURRENT CHARACTER.
   27ØØ  6ØØ1             ION                 /BE SURE INTERRUPT IS ON.
   27Ø1  1664             TAD I OPTRO         /ANY ROOM?
   27Ø2  764Ø             SZA CLA             /A CHARACTER IS NON-ZERO
   27Ø3  4574             JMS I   PWAIT       /******** REFRESH SCOPE
   27Ø4  6ØØ2             IOF
   27Ø5  1Ø16             TAD TELSW           /IN PROGRESS?
   27Ø6  764Ø             SZA CLA
   27Ø7  5314             JMP .+5
```

```
1651  2710  1266          TAD XI33        /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 XI33        /SEND DATA
1656  2715  3664          DCA I OPTRO
1657  2716  1264          TAD OPTRO       /SET POINTERS
1658  2717  7001          IAC
1659  2720  0107          AND P17
1660  2721  1263          TAD OPTR0
1661  2722  3264          DCA OPTRO
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 OPTRI
1692  2757  1263          TAD OPTR0
1693  2760  3264          DCA OPTRO
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  7000          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  7101          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  3023          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  1430          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 GINC
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 ODT=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  3636  3414          DCA I FLTXR
1817  3637  3057          ISZ CNTR/INITIALIZED BY LOAD.
1818  3640  5236          JMP .-2 /CLEAR INPUT BUFFER
1819  3641  7200  T12,     CLA             /******** FIX UP DIAL I/O ROUTINES
1820  3642  6213          6213    /CIF CDF 10/********
1821  3643  3667          DCA I   G7775   /********
1822  3644  1262          TAD     G5772   /********
1823  3645  3670          DCA I   G7776   /********
1824  3646  1263          TAD     G5773   /********
1825  3647  3671          DCA I   G7777   /********
1826  3650  6201          6201    /CDF 0  /********
1827  3651  4666          JMS I   G7774   /********
1828  3652  3655          GBLOK           /********
1829  3653  6212          6212    /CIF 10 /********
1830  3654  4664          JMS I   G7200   /********
1831  3655  6211          6211    /CDF 10 /********
1832  3656  2400          2400            /********
1833  3657  6211          6211    /CDF 10 /********
1834  3660  7400          7400            /********
1835  3661  0400          400             /********
1836  3662  6212          6212    /CIF 10 /********
1837  3663  4667          JMS I   G7775   /******** WRITE MILDRED INTO UPPER
1838  3664  3651          RITEOU          /******** SOURCE WORKING AREA
1839  3665  6132          CLLR            /******** INITIALIZE CLOCK
1840  3666  6134          CLEN            /********
1841  3667  7240          CLA CMA         /********
1842  3670  6133          CLAB            /********
1843  3671  1261          TAD     G101    /********
1844  3672  6132          CLLR            /********
1845  3673  6135          CLSA            /********
1846  3674  7200          CLA             /********
1847  3675  6046          TLS             /********
1848  3676  6001          ION             /********
1849  3677  5650          JMP I   .+1     /********
1850  3700  2216          ERT             /******** ERASE ALL
1851  3701  0110  RITEOU, 110             /********
1852  3702  0030          30              /********
1853  3703  0076          76              /********
1854  3704  0002          2               /********
1855  3705  0100  GBLOK,  100             /********
1856  3706  0025          25              /********
1857  3707  0023          23              /********
1858  3710  0001          1               /********
1859  3711  0101  G101,   101             /********
1860  3712  5772  G5772,  5772            /********
1861  3713  5773  G5773,  5773            /********
1862  3714  7200  G7200,  7200            /********
1863  3715  7773  G7773,  7773            /********
1864  3716  7774  G7774,  7774            /********
1865  3717  7775  G7775,  7775            /********
1866  3720  7776  G7776,  7776            /********
1867  3721  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  3033          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  7300          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  0675          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
```

```
1926    4710  0007    OF,     0007
1927    4711  2566            2566
1928    4712  5341            5341
1929    4713  0001    LG2E,   0001
1930    4714  2705            2705
1931    4715  2435            2435
1932    4716  0001    ONE,    0001
1933    4717  2000            2000
1934    4720  0000            0000
1935    4721  0002    TWO,    0002
1936    4722  2000            2000
1937    4723  0000            0000
1938    4724  5163    NEGP,   FNEG
1939    4725  0000    FLAG2,  0
1940    4726  0000    TEMP,   0
1941    4727  0000            0
1942    4730  0000            0
1943    4731  0000            0
1944                  /MAIN ALGORITHM FOR ARCTANGENT
1945    4732  4407    ARCALG, FINT
1946    4733  0675            FGET I X2
1947    4734  4675            FMUL I X2
1948    4735  6676            FPUT I XSQ2
1949    4736  4374            FMUL BET2
1950    4737  1371            FADD BET1
1951    4740  4676            FMUL I XSQ2
1952    4741  1366            FADD BET2
1953    4742  6326            FPUT TEMP
1954    4743  0363            FGET ALF2
1955    4744  4676            FMUL I XSQ2
1956    4745  1360            FADD ALF1
1957    4746  4676            FMUL I XSQ2
1958    4747  1355            FADD ALF2
1959    4750  4675            FMUL I X2
1960    4751  3326            FDIV TEMP
1961    4752  0000            FEXT
1962    4753  5754            JMP I ,+1
1963    4754  5024                ARCRTN
1964                  /CONSTANTS = FLOATING ARC TANGENT
1965    4755  0000    ALF2,   0000
1966    4756  2437            2437
1967    4757  1643            1643
1968    4760  7777    ALF1,   7777
1969    4761  3304            3304
1970    4762  4434            4434
1971    4763  7773    ALF2,   7773
1972    4764  3306            3306
1973    4765  5454            5454
1974    4766  0000    BET2,   0000
1975    4767  2437            2437
1976    4770  1646            1646
1977    4771  0000    BET1,   0020
1978    4772  2427            2427
1979    4773  2323            2323
1980    4774  7775    BET2,   7775
```

```
1981    4775  3427          3427
1982    4776  7452          7452
1983                  /FLOATING POINT ARC TANGENT
1984          5000    *5000
1985    5000  1045    ARTN,   GETSGN          /TAKE ABSOLUTE VALUE
1986    5001  7710            SPA CLA
1987    5002  4363            JMS FNEG
1988    5003  3033            DCA T3
1989    5004  4407            FINT
1990    5005  6635            FPUT I X1
1991    5006  2637            FSUB I CON1
1992    5007  0000            FEXT
1993    5010  1045            GETSGN
1994    5011  7710            SPA CLA
1995    5012  5221            JMP GO          /LESS THAN ONE
1996    5013  4407            FINT
1997    5014  0637            FGET I CON1
1998    5015  3635            FDIV I X1
1999    5016  6635            FPUT I X1
2000    5017  0000            FEXT
2001    5020  7240            CLA CMA
2002    5021  3362    GO,     DCA FLAG1       /SIGN FLAG OF RESULT
2003    5022  5623            JMP I .+1       /CALL ALGORITHM
2004    5023  4732                  ARCALG
2005    5024  2362    ARCRTN, ISZ FLAG1       /RETURN HERE
2006    5025  5634            JMP I EXIT1
2007    5026  4407            FINT
2008    5027  6635            FPUT I X1
2009    5030  0636            FGET I PI2
2010    5031  2635            FSUB I X1
2011    5032  0000            FEXT
2012    5033  5634            JMP I .+1
2013    5034  5301    EXIT1,  EXIT2
2014                  /CONSTANTS FOR ARCTANGENT
2015    5035  5321    X1,     X
2016    5036  5315    PI2,    PIOT
2017    5037  4716    CON1,   ONE
2018    5040  1045    FLOG,   GETSGN  /FLOATING LOGARITHM
2019    5041  7450            SNA
2020    5042  4566            ERROR3          /ZERO ARGUEMENT FOR LOG
2021    5043  7710            SPA CLA
2022    5044  4566            ERROR4          /*
2023    5045  4407            FINT
2024    5046  6756            FPUT I TEM
2025    5047  2637            FSUB I CON1
2026    5050  0000            FEXT
2027    5051  1045            GETSGN
2028    5052  7450            SNA
2029    5053  5536            RETURN
2030    5054  7700            SMA CLA
2031    5055  5264            JMP STARTL
2032    5056  4407            FINT
2033    5057  0637            FGET I CON1
2034    5060  3756            FDIV I TEM
2035    5061  6756            FPUT I TEM
```

```
2036  5062  7040          FEXT
2037  5063  7240          CLA CMA
2038  5064  3033  STARTL, DCA T3
2039  5065  1035          TAD P13
2040  5066  3044          DCA FLAC
2041  5067  7040          CMA
2042  5070  1756          TAD I TEM
2043  5071  3045          DCA FLAC+1
2044  5072  3046          DCA FLAC+2
2045  5073  3047          DCA FLAC+3
2046  5074  7001          IAC
2047  5075  3756          DCA I TEM
2048  5076  4407          FINT
2049  5077  4357          FMUL LOG2
2050  5100  6635          FPUT I X1
2051  5101  1756          FGET I TEM
2052  5102  2637          FSUB I CON1
2053  5103  6756          FPUT I TEM
2054  5104  4353          FMUL LOG8
2055  5105  1350          FADD LOG7
2056  5106  4756          FMUL I TEM
2057  5107  1345          FADD LOG6
2058  5110  4756          FMUL I TEM
2059  5111  1342          FADD LOG5
2060  5112  4756          FMUL I TEM
2061  5113  1337          FADD L4
2062  5114  4756          FMUL I TEM
2063  5115  1334          FADD L3
2064  5116  4756          FMUL I TEM
2065  5117  1331          FADD L2
2066  5120  4756          FMUL I TEM
2067  5121  1326          FADD L1
2068  5122  4756          FMUL I TEM
2069  5123  1635          FADD I X1
2070  5124  0000          FEXT
2071  5125  5634          JMP I EXIT1
2072  5126  0000  L1,     0000
2073  5127  3777          3777
2074  5130  7742          7742
2075  5131  7777  L2,     7777
2076  5132  4000          4000
2077  5133  4100          4100
2078  5134  7777  L3,     7777
2079  5135  2517          2517
2080  5136  0310          0310
2081  5137  7776  L4,     7776
2082  5140  4113          4113
2083  5141  7211          7211
2084                /LOGARITHM CONSTANTS
2085  5142  7776  LOG5,   7776
2086  5143  2535          2535
2087  5144  3301          3301
2088  5145  7775  LOG6,   7775
2089  5146  4746          4746
2090  5147  7771          7771
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2091    5150  7774    LOG7,   7774
2092    5151  2236            2236
2093    5152  4304            4304
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  1345          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  1006           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,71470010                /********
5376  4700
5377  1000
             /PAGE 1 - INPUT/OUTPUT ROUTINES FOR THE FOCAL
             /FLOATING POINT PACKAGE.
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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 ROUNDGIN.
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 I PLCE      /ADD 1 TO DIGIT AT CURRENT POSITION
2305    5453  1736              TAD I PLCE
2306    5454  1330              TAD OM12
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                /DOURLE 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 =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  0000  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 # IN PRINTOUT
2524              LMODE
2525  6002  6377  OPTR,   6377            /********
2526              PMODE
2527  6003  1045          TAD HORD        /NUMBER>077
2528  6004  7700          SMA CLA
```

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2529  6005  1334          TAD SMSP        /PRINT "-" OR A SPACE.
2530  6006  1336          TAD SMIN
2531  6007  4551          FPRNTC
2532  6010  4753          JMS I ABSOL2
2533  6011  3033  FG02,   DCA T3          /INITIALIZE DECIMAL EXPONENT
2534  6012  1044          TAD EXP         /IS EXP 0 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  0000          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  0000          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  0255    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, 7750123331733  /********
      6161  2333
```

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                6162  5733
2638            6163  1167    LEPUT,  TAD     SUBS2   /******** CALLS STORING ROUTINE FOR
2639            6164  3171            DCA     SUBS    /******** S FN(X)=
2640            6165  1170            TAD     LESUB2  /********
2641            6166  3173            DCA     LESUBS  /********
2642            6167  1002            TAD     LWEIMP  /********
2643            6170  6212            6212            /********
2644            6171  4775            JMS I   STORIT  /********
2645            6172  2407            ISZ I   7       /********
2646            6173  5774            JMP I   .+1     /********
2647            6174  6401            FPNT+1          /********
2648            6175  2000    STORIT, ITSTOR          /********
2649            6176  6213    LS,     6213    /CIF CDF 10/******** LIBRARY SAVE
2650            6177  5134            JMP     XLS     /********
2651                          /USED BY 8K
2652                          /FLOATING POINT INPUT
2653                  6200    *6200
2654            6200  0000    FLINTP, 0               /IF C(AC) = 0, USE CHAR
2655            6201  7640            SZA CLA         /IF C(AC) NON-ZERO , GET NEXT
2656            6202  4706            JMS I XIN       /GET FIRST CHAR
2657            6203  1066            TAD CHAR        /IGNORE LEADING SPACES
2658            6204  1114            TAD M240
2659            6205  7650            SNA CLA
2660            6206  5202            JMP .-4
2661            6207  4702            JMS I DPCVPT    /READ FIRST DIGIT GROUP
2662            6210  1066            TAD CHAR        /AND SET "SIGNF"
2663            6211  1115            TAD MPER
2664            6212  7640            SZA CLA         /ENDED BY PERIOD?
2665            6213  5221            JMP FIGO1
2666            6214  4706            JMS I XIN       /YES, READ 2AND GROUP
2667            6215  3705            DCA I DPN
2668            6216  4703            JMS I DCONP
2669            6217  1705            TAD I DPN       /SAVE NUMBER OF DIGITS IN T3
2670            6220  7041            CMA IAC
2671            6221  3033    FIGO1,  DCA T3          /NO,
2672            6222  1310            TAD P43
2673            6223  3044            DCA EXP
2674            6224  4704            JMS I RESOL5
2675            6225  4707            JMS I INORM     /NORMALIZE FIRST, THEN
2676            6226  4407            FINT
2677            6227  6430            FPUT I PT1      /SAVE NUMBER
2678            6230  0000            FEXT
2679            6231  1066            TAD CHAR
2680            6232  1301            TAD MINUSE
2681            6233  7640            SZA CLA         /"E" READ IN?
2682            6234  5246            JMP ENDFI+3     /NO
2683            6235  4706            JMS I XIN       /YES, READ 3RD DIGIT GROUP
2684            6236  4702            JMS I DPCVPT    /I.E. CONVERT DECIMAL EXPONENT
2685            6237  4704            JMS I RESOL5
2686            6240  1047            TAD OVER2
2687            6241  1033            TAD T3          /C(SEXP)PLACES TO RIGHT
2688            6242  3033            DCA T3          /OF LAST DIGIT
2689                          /COMPENSATE FOR DECIMAL EXPONENTS
2690            6243  4407    ENDFI,  FINT            /RESTORE MANTISSA
2691            6244  6430            FGET I PT1
```

```
2692  6245  0000          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
```

```
2802  6407  3264          DCA JUMP
2803  6410  1264          TAD JUMP
2804  6411  0123          AND C200        /GET PAGE BIT
2805  6412  7650          SNA CLA         /PAGE ZERO?
2806  6413  5216          JMP .+3         /YES
2807  6414  1104          TAD P7600       /NO
2808  6415  0200          AND FPNT        /C(FPNT)0-4 CONTAINS PAGE BITS
2809  6416  3040          DCA ADDR
2810  6417  1106          TAD P177        /GET 7 BIT ADDRESS
2811  6420  0264          AND JUMP
2812  6421  1040          TAD ADDR
2813  6422  3040          DCA ADDR
2814  6423  1265          TAD INDRCT      /INDIRECT BIT=1?
2815  6424  0264          AND JUMP
2816  6425  7650          SNA CLA
2817  6426  5233          JMP LOOP01      /NO-GO ON
2818  6427  1440          TAD I ADDR      /YES ,DEFER ,W/O AUTO-INDEX
2819  6430  7450          SNA             /******** IF PT1 WAS ZERO, IT IS A
2820  6431  5572          JMP I   LEFPUT  /******** FILE VARIABLE
2821  6432  3040          DCA ADDR
2822  6433  2200  LOOP01, ISZ FPNT
2823  6434  7040          CMA
2824  6435  1040          TAD ADDR
2825  6436  3015          DCA FLTXR2
2826  6437  1264          TAD JUMP        /GET COMMAND
2827  6440  7106          CLL RTL
2828  6441  7006          RTL
2829  6442  0107          AND P17         /GET BITS 0-2;IE OPCODE
2830  6443  7450          SNA
2831  6444  5271          JMP FLGT
2832  6445  1266          TAD TABLE       /LOOKUP IN TABLE
2833  6446  3264          DCA JUMP
2834  6447  1664          TAD I JUMP
2835  6450  7450          SNA
2836  6451  5267          JMP FLPT
2837  6452  3264          DCA JUMP
2838  6453  1306          TAD CEX1        /SAVE FLOATING ARGUEMENT,UNLESS'GET' OR 'PUT'
2839  6454  3014          DCA FLTXR
2840  6455  1117          TAD MFLT
2841  6456  3057          DCA CNTR
2842  6457  1415          TAD I FLTXR2
2843  6460  3414          DCA I FLTXR
2844  6461  2057          ISZ CNTR
2845  6462  5257          JMP .-3
2846  6463  5664          JMP I JUMP      /GO THERE
2847  6464  0000  JUMP,   0
2848        0040  ADDR=EX1
2849  6465  0400  INDRCT, 0400
2850  6466  6575  TABLE,  ITABLE
2851  6467  1305  FLPT,   TAD CEXP       /EXP TO (ADDR)
2852  6470  5275          JMP .+5
2853  6471  1305  FLGT,   TAD CEXP       /(ADDR) TO EXP
2854  6472  3015          DCA FLTXR2
2855  6473  7040          CMA
2856  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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2912  6563  5355          JMP .+6
2913  6564  5201          JMP FPNT+1
2914  6565  4770  FLMY,   JMS I MULT      /MULTIPLY
2915  6566  5201          JMP FPNT+1
2916  6567  7153  OPMINS, MINUS2
2917  6570  7004  MULT,   DMULT
2918  6571  7335  NORM,   DNORM
2919  6572  6623  ALGN,   ALIGN
2920  6573  5754  RAR1,   DIV1
2921  6574  6757  RAR2,   DIV2
2922  6575  5733  TRAD,   DUBLAD
2923        6575  ITABLE=.+1
2924  6576  6510          FLAD
2925  6577  6507          FLSU
2926  6600  7107          FLDV
2927  6601  6565          FLMY
2928  6602  6517          FLEX
2929  6603  0000          0000
2930  6604  6515          NORF
2931  6605  0000  ACMINS, 0          /ROUTINE TO  COMPLEMENT FLAC = VIA "MINSKI"
2932  6606  7200          CLA             /********(IS THIS CLA NECESSARY)
2933  6607  1047          TAD     OVER2   /******** RECODING FOR SPACE
2934  6610  7161          CLL CML CIA     /********
2935  6611  3047          DCA     OVER2   /********
2936  6612  7004          RAL             /********
2937  6613  1046          TAD     LORD    /********
2938  6614  7061          CML CIA         /********
2939  6615  3046          DCA     LORD    /********
2940  6616  7004          RAL             /********
2941  6617  1045          TAD     HORD    /********
2942  6620  7061          CML CIA         /********
2943  6621  3045          DCA     HORD    /********
2944  6622  5605          JMP I   ACMINS
2945  6623  0000  ALIGN,  0          /SUBROUTINE TO ALIGN
2946  6624  1045          TAD HORD        /BINARY POINTS
2947  6625  7450          SNA
2948  6626  1046          TAD LORD        /IS MANTISSA ZERO?
2949  6627  7650          SNA CLA
2950  6630  5311          JMP NOX1        /YES, RESULT=OPERAND
2951  6631  1041          TAD AC1H        /NO,IS OPERAND ZERO?
2952  6632  7450          SNA
2953  6633  1042          TAD AC1L
2954  6634  7450          SNA
2955  6635  1043          TAD OVER1
2956  6636  7650          SNA CLA
2957  6637  5623          JMP I ALIGN     /YES, EXIT.
2958  6640  1040          TAD EX1
2959  6641  7041          CMA IAC
2960  6642  1044          TAD EXP
2961  6643  7450          SNA             /ARE EXPONENTS EQUAL?
2962  6644  5273          JMP ADONE       /YES
2963  6645  3205          DCA ACMINS
2964  6646  1205          TAD ACMINS
2965  6647  7500          SMA             /NO
2966  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  1040          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          TA  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  0000  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 AC1H        /41DIVIDE
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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, OURDIV
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  5600          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  0000  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  0000  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  0000          FEXT            /NEWTON'S METHOD IS USED
```

```
3352  7403  1345          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
7472  0000
7473  0000
7474  0000    FRAC1,  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  5340            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  1350          AND     STEMP
3513  7634  3671          DCA I   SPTR    /********
3514  7635  2271          ISZ     SPTR    /********
3515  7636  1351          TAD     STEMP2  /********
3516  7637  1250          TAD     07400   /********
```

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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   EFUN3I  /********
3524  7647  2002    MLIMIT, -5776         /(-LAST LOC OF DISP POINTS-1)
3525  7650  7400    07400,  7400          /********
3526  7651  0011    FORHUN, 11;2700       /********
      7652  2700
3527  7653  0011    FIVHUN, 11;3770;0     /********
      7654  3770
      7655  0000
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   OLIST,  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  /******** O I, 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  01111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2402  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

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  11111111

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  00000000  00000000  02000000  00000000  00000000  00000000

3200  00000011  11111100  00000000  00000000  00000000  00000000  00000000  00000000
3300  00000000  00000000  00000000  00000000  00000000  00000000  00000000  00000000

3400
3500

3600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000
3700  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
```

```
3616            0001    *1              /********
3617    0001    0000    XQ,             /********
3618    0002    0400    D256,   400     /(REFERENCED AS LOC 2)
3619    0003    0200    D200,   200     /(REFERENBED AS LOC 3)
3620    0004    0125    D85,    125     /(REFERENCED AS LOC 4)
3621    0005    0000    GAMMA,  0       /********
3622    0006    0000    CHRCNT, 0       /********
3623    0007    0360    D360,   360     /********
3624            0010    *10             /********
3625    0010    0000    XR1,    0       /********
3626    0011    0000    BLK2,   0       /UNIT
3627    0012    0000            0       /ADDRESS
3628    0013    0000            0       /BLOCK NUMBER
3629    0014    0001            1       /NUMBER OF BLOCKS
3630    0015    0760    D760,   760     /********
3631    0016    0000    ALPHA,  0       /********
3632    0017    0000    BETA,   0       /********
3633            0020    *20             /********
3634                    /
3635                    /ENTERED WITH NO. CHARS IN ACI REFRESH
3636                    /FOR CHARS AND POINTS
3637                    /
3638    0020    0000    WAITER, 0               /********
3639    0021    7450            SNA             /********
3640    0022    5061            JMP     NOASCII /********
3641    0023    7040            CMA             /********
3642    0024    3006            DCA     CHRCNT  /********
3643    0025    1076            TAD     04377   /********
3644    0026    3005            DCA     GAMMA   /********
3645    0027    1007            TAD     D360    /********
3646    0030    3077            DCA     Y       /********
3647    0031    3001            DCA     XQ      /********
3648    0032    6141            LINC            /********
3649                    LMODE
3650    0033    1325    CHRLUP, LDW I GAMMA     /********
3651    0034    0450            AZE             /********
3652    0035    6045            JMP GOODY       /********
3653    0036    2077            ADD Y           /********
3654    0037    2015            ADD D760        /********
3655    0040    1560            BCL I           /********
3656    0041    7000            7000            /********
3657    0042    4077            STC Y           /********
3658    0043    4001            STC XQ          /********
3659    0044    6056            JMP CHREND      /********
3660    0045    0241    GOODY,  ROL 1           /********
3661    0046    2003            ADD D200        /********
3662    0047    4016            STC ALPHA       /********
3663    0050    2077            ADD Y           /********
3664    0051    1756            DSC ALPHA       /********
3665    0052    1776            DSC I ALPHA     /********
3666    0053    0221            XSK I XQ        /********
3667    0054    0221            XSK I XQ        /********
3668    0055    0011            CLR             /********
3669    0056    0226    CHREND, XSK I CHRCNT    /********
3670    0057    6033            JMP CHRLUP      /******** ONE TIME PER CHAR
```

```
3671  0060  6467          SKP                 /********
3672  0061  6141  NOASCII, LINC               /********
3673  0062  1077          SET I BETA          /********
3674  0063  2200          2200                /********
3675  0064  1645          LDF 5               /********
3676  0065  6102          JMP SUBR            /********
3677  0066  1077          SET I BETA          /********
3678  0067  2000          2000                /********
3679  0070  1646          LDF 6               /********
3680  0071  6102          JMP SUBR            /********
3681  0072  6002  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  6415          KST                 /********
3694  0105  6467          SKP                 /********
3695  0106  6072          JMP WEXIT           /********
3696  0107  6500          IOB                 /********
3697  0110  6041          TSF                 /********
3698  0111  6467          SKP                 /********
3699  0112  6072          JMP WEXIT           /********
3700  0113  1017          LDA BETA            /********
3701  0114  6467          SKP                 /********
3702  0115  1037  WAITLP, LDA I BETA          /********
3703  0116  6451          APO                 /********
3704  0117  6072          JMP WEXIT           /********
3705  0120  4005          STC GAMMA           /********
3706  0121  1037          LDA I BETA          /********
3707  0122  6145          DIS GAMMA           /********
3708  0123  6217          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
```

```
3726  0144  1160    PLDMILD,LDMILD
3727  0145  1177    P5LNAM, LNAME+5
3728  0146  1200    P6LNAM, LNAME+6
3729  0147  0000    CHFLAG, 0
3730  0150  0000    HISS,   0
3731  0151  0000    LOSS,   0
3732  0152  2135    PFILTAB,FILTAB
3733  0153  1342    PLOOKUP,LUKUP
3734  0154  1600    PCOMMON,COMMON
3735  0155  1361    PREPLAC,REPLACE
3736  0156  0000    MYTEMP, 0
3737  0157  0000    MYTMP2, 0
3738  0160  2076    PFINISH,FINISH
3739  0161  0000    SWITCH, 0
3740  0162  0000    SWTMP,  0
3741  0163  2124    PB1FLG, B1FLG=1
3742  0164  0000    MYAC1,  0
3743  0165  0000    MYAC2,  0
3744  0166  0000    MYAC3,  0
3745  0167  0044    P1FLAC, FLAC
3746  0170  0045    P2FLAC, FLAC+1
3747  0171  0046    P3FLAC, FLAC+2
3748  0172  7764    07764,  7764
3749  0173  6000    06000,  6000
3750  0174  7420    07420,  7420
3751        0177    *177
3752  0177  6203    FERROR, 6203
3753  0200  5601            JMP I   .+1
3754  0201  5774            FSSERR
3755        0202    *202
3756        0200    CHARTAB=.-2
3757  0202  4477            4477;7744
      0203  7744
3758  0204  5177            5177;2651
      0205  2651
3759  0206  4136            4136;2241
      0207  2241
3760  0210  4177            4177;3641
      0211  3641
3761  0212  4577            4577;4145
      0213  4145
3762  0214  4477            4477;4044
      0215  4044
3763  0216  4136            4136;2645
      0217  2645
3764  0220  1077            1077;7710
      0221  7710
3765  0222  7741            7741;0041
      0223  0041
3766  0224  4142            4142;4076
      0225  4076
3767  0226  1077            1077;4324
      0227  4324
3768  0230  0177            0177;0301
      0231  0301
```

3769	0232	3077	3077;7732
	0233	7732	
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	0677	0677;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   0041
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*38177+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  0324          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
```

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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  0000    LNAME,  0;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   PGLNAM
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   P6LNAM
3999  1240  4361          JMS     REPLACE
4000  1241  1542          TAD I   PLNUM
4001  1242  3324          DCA     LSBLK
4002  1243  1545          TAD I   P5LNAM
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 FLD1; 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  1621          TAD I   MVPTR
4044  1311  6211          6211
4045  1312  3410          DCA I   XR1
4046  1313  5705          JMP I   MOVMOV
4047  1314  6211  NOTSAV, 6211
4048  1315  1410          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  FILSTR, 0
4058  1327  0004  LLENGTH,4
4059  1330  1331  PTBL,   .+1
4060  1331  0035          BOTTOM
4061  1332  3410          PFNEW
4062  1333  0411          PFX
4063  1334  0412          PFZ
4064  1335  0060          BUFR
4065  1336  0031          LASTV
4066  1337  0013          PDLXR
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
```

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4098    1372  7354            JMP     FILERR  /NOT ENUF ROOM
4099    1371  7375            JMP     ENREPL
4100    1372  1636    SAMEN,  LIF     6
4101    1373  6024            JMP     24
4102    1374  7354            JMP     FILERR  /NOT ENUF ROOM! SHOULD NOT HAPPEN
4103    1375  0002    ENREPL, PDP
4104                    PMODE
4105    1376  7200            CLA
4106    1377  5761            JMP I   REPLACE
4107          1400    *1400
4108    1400  7524    MINCMA, -254
4109    1401  1066    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   PLDMILD
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  4622            JMS I   PGETC
4143    1433  5236            JMP     .+3
4144    1434  7000            NOP
4145    1435  5257            JMP     ERXIT
4146    1436  4366            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  7552            SPA     CLA
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4153  1445  1230          TAD     CIMCF
4154  1446  7640          SZA CLA
4155  1447  5623          JMP I   PRHSERR
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   PRHSERR
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   PRHSERR
4205  1523  7410          SKP
4206  1524  5257          JMP     ERXIT
4207  1525  3556          DCA I   MYTEMP
```

```
4208  1526  6002          IOF
4209  1527  4560          JMS I   PFINISH
4210  1530  7307          CLA CLL IAC RTL
4211  1531  4560          JMS I   PFINISH
4212  1532  5216          JMP     LXIT
4213                /
4214                /FILE VARIABLE LOADER
4215                /
4216  1533  0000    ITLOAD, 0
4217  1534  4554          JMS I   PCOMMON
4218                /
4219                /VARIABLE IS NOW IN MEMORY! LOSS
4220                /POINT AT IT! ONE OF THE FOLLOWING 3 CHOICES WILL BE TAKEN, ACCORDING
4221                /TO TYPE
4222                /
4223  1535  5346          JMP     IRETLD
4224  1536  5341          JMP     SRETLD
4225  1537  1551    FRETLD, TAD I   LOSS
4226  1540  2151          ISZ     LOSS
4227  1541  3164    SRETLD, DCA     MYAC1
4228  1542  1551          TAD I   LOSS
4229  1543  3165          DCA     MYAC2
4230  1544  2151          ISZ     LOSS
4231  1545  5354          JMP     CRETLD
4232  1546  1370    IRETLD, TAD     027
4233  1547  3164          DCA     MYAC1
4234  1550  1551          TAD I   LOSS
4235  1551  7710          SPA CLA
4236  1552  7040          CMA
4237  1553  3165          DCA     MYAC2
4238  1554  1551    CRETLD, TAD I   LOSS
4239  1555  3166          DCA     MYAC3
4240  1556  6203          6203
4241  1557  1164          TAD     MYAC1
4242  1560  3567          DCA I   P1FLAC
4243  1561  1165          TAD     MYAC2
4244  1562  3570          DCA I   P2FLAC
4245  1563  1166          TAD     MYAC3
4246  1564  3571          DCA I   P3FLAC
4247  1565  5733          JMP I   ITLOAD
4248  1566  0000    GETCX,  0
4249  1567  4622          JMS I   PGETC
4250  1570  0027    027,    27
4251  1571  5623          JMP I   PRHSERR
4252  1572  5766          JMP I   GETCX
4253        1600    *1600
4254                /
4255                /SUBSCRIPTING FOR FILE VAIABLES
4256                /ENTER WITH FILE NO, IN AC
4257  1600  0000    COMMON, 0
4258  1601  0376          AND     07
4259  1602  7106          CLL RTL
4260  1603  1152          TAD     PFILTAB
4261  1604  1166          DCA     MYAC3
```

```
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  7041          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  1013          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
```

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4428  2050  5271            JMP     INCALL
4429  2051  1165  STOOBG,   TAD     MYAC2
4430  2052  7120            CLL CML
4431  2053  7700            SMA CLA
4432  2054  7060            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  5600            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              .
```

```
2000  01111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111001
2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2400
2500
2600
2700

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	2123	DATUM	7102	END	2134
ABSOL3	7375	C260	0113	DATUMA	7252	ENDFI	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	2206
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	0035	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	0006	D	0041	EFUN3	2021	FIGO4	6261

FI[illegible]R	1354	FRETLD	1537	IF	[illegible]13	LESURS	2173
FIISTR	1326	FRETST	2014	IF1	1035	LG	6375
FIITAB	2135	FRST	3206	IF3	1025	LG2E	4713
FINCR	1465	FRSTX	3214	IGNOR	0217	LGO	6363
FINDLN	4555	FSIN	5204	IGOTIT	1036	LINENO	2067
FINDN	2253	FSSERR	5774	ILIST	0771	LIST3	2077
FINFIN	1137	FXIT	0000	IN	5513	LIST6	2072
FINISH	2076	G101	3661	INBUF	0034	LIST7	2074
FINKP	1133	G5772	3662	INCALL	2071	LISTGO	1366
FINPUT	0131	G5773	3663	INDEV	0064	LL	5173
FINT	4407	G7200	3664	INDRCT	6465	LLENGT	1327
FISW	0052	G7773	3665	INFIX	2401	LLIST	6366
FIVHUN	7653	G7774	3666	INLIST	0570	LLOAD	1203
FIX	6724	G7775	3667	INORM	6307	LM	2572
FIXM	6753	G7776	3670	INPUT	0756	LMAKE	1402
FLAC	2044	G7777	3671	INPUTX	0271	LNAME	1172
FLAD	6510	GAMMA	0005	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	2125	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	0577	GETRHS	1000	ITSFF	1450	LORD	0046
FLIST2	0574	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	2405	GOODY	0045	L2	5131	LXIT	1416
FLTXR	0014	GOTO	0603	L3	5134	M100	0101
FLTXR2	0015	GRPTST	0744	L4	5137	M10PT	6147
FLTZER	2407	GS1	1435	LASTLN	0025	M11	0121
FM12	6142	GS2	1464	LASTOP	0055	M12	2413
FNEG	5163	GS3	1444	LASTV	0031	M137	2357
FNOR	7000	GS4	1457	LC	5171	M140	2556
FNTABF	0374	GSERCH	1424	LCHAIN	1202	M144	6137
FNTABL	2167	GTEM	0021	LCLOSE	1520	M2	0111
FNUM	6311	GZERR	0362	LCON	0371	M20	0105
FOR	1041	HINBUF	0037	LDMILD	1160	M240	0114
FORHUN	7651	HISS	0150	LEFLAG	1462	M260	1534
FOUTPU	0133	HORD	0045	LEFPUT	0172	M272	1544
FPAC1	7474	I33	2414	LEPUT	6163	M4	5141
FPNT	6400	IBAR	0212	LERR	6357	M40	2356
FPRNT	5465	IECALL	1037	LESUR2	0170	M43	1077

```
%5      120
%77     123
%BREAK  2642
%COM    1136
%CR      116
%CS     1426
%D      5526
%EQ     1135
%F      7602
%FIT     117
%HUNDR  5375
%IF     7260
%INCMA  1420
%INCOM  6374
%INE    5662
%INSKI  5051
%INUS2  7153
%INUSA  7112
%INUSE  6301
%INUSZ  5663
%LOALK  1165
%LIMIT  7647
%MCOM   7656
%OD     5214
%ODIFY  1254
%OO     1262
%OOEND  1275
%OOLUP  1266
%ORNUM  1056
%OVMOV  1305
%P1     7254
%P2     7256
%P3     7255
%P4     7200
%P5     7253
%P6     7210
%PER    7115
%PLUS   5664
%SPACE  5665
%UIDIV  7101
%ULT    6570
%ULT10  5667
%ULT2   5715
%ULTY   4752
%VCNT   1323
%VCTR   1200
%VPTR   1201
%YAC1    164
%YAC2    165
%YAC3    166
%YTEMP   156
%YTMP2   157
NAGSW   0065
NCHARS  7566
NCOLS   7564
NEGP    4724
NFEEDS  7565
NLINES  7561
NOASCI  0061
NOCLK   2653
NOCRLF  7513
NOHANG  7556
NORF    6515
NORM    6571
NORMF   7147
NORMLE  2031
NOTSAV  1314
NOX     6675
NOX1    6711
NOX2    6704
NUMSGN  1061
O1      3600
O10     1123
O12     1545
O200    0003
O215    1157
O27     1570
O360    0007
O37     1360
O4377   0076
O4600   5374
O56     1156
O6000   0173
O6377   7570
O7      1776
O7000   7415
O7400   7650
O7420   0174
O7472   1501
O7510   1424
O7524   1154
O7566   7572
O760    0015
O7655   7571
O77     1124
O7710   1125
O7716   7573
O7761   1155
O7763   7567
O7764   0172
O7770   1126
O7774   1127
OC      7752
OCTNUM  1101
OD      7761
ODISSP  7704
OE      7753
OERROR  7713
OEXIT   7731
OGO     7714
OI      7734
OLIST   7722
OM12    5530
ONE     4716
OO10    1425
OO6377  7730
OP      3115
OPMINS  6567
OPNEXT  1622
OPTABL  1731
OPTR    6002
OPTRV   2663
OPTRI   2665
OPTRO   2664
OPUT    5532
OS      7763
OSAMP   1357
OT      7771
OUT     2465
OUTA    5536
OUTCR   2476
OUTDEV  0063
OUTDG   6154
OUTPUT  7706
OUTX    2475
OVER1   0043
OVER2   0047
P       0000
P13     0005
P17     0107
P177    0106
P1FLAC  0167
P2000   0373
P27     6750
P277    0110
P2FLAC  0170
P3      2036
P337    0075
P377    2553
P3FLAC  0171
P40     2552
P400C   0124
P43     6310
P5LNAM  0145
P6LNAM  0146
P7200   1402
P7600   0134
P77     0122
P7700   0121
P7740   0372
PA1     2524
PACBUF  2502
PACKC   4546
PACKST  0027
PACX    2530
PALG    5260
PARTES  2051
PASS    6335
PB1FLG  0163
PC      0022
PC1     0614
PCHAR   1401
PCHECK  5244
PCHK    0510
PCK1    2535
PCLEAR  0175
PCLKFL  7745
PCOMMO  0154
PD2     0534
PD3     0554
PDLXR   0013
PECALL  6334
PEQ     6135
PER     0102
PFILTA  0152
PFINIS  0160
PFNEW   0410
PFNUM   1771
PFX     0411
PFZ     0412
PGETC   1422
PGETRH  0143
PI      5311
PI2     5036
PIOT    5315
PLCE    5536
PLOMIL  0144
PLEFLA  1075
PLESUB  0101
PLLP1   1006
PLLP2   1016
PLLP3   1044
PLLP4   1102
PLNAME  1122
PLNUM   0142
PLOOKU  0153
PNCHAR  7732
PNCOLS  7776
```

P[illegible]	7777	RET	5452	SRNLST	[illegible]61	TYPE	1271
POP1	1413	RETRN	1563	START	0177	TYPE2	1223
POPF	4544	RETURN	5536	STARTL	5064	URETST	2066
POPL	5541	REVIT	7146	STARTV	0060	UTE	2276
POPTR	7733	RHSERR	1130	STEMP	7750	UTQ	2305
PP43	1100	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
PREDIV	1622	RTL6	4557	SUBS	0171	WAITER	0020
PREPLA	0155	RUB1	3004	SUBS2	0167	WAITLP	0115
PRHSER	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
PRNTLN	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
PUSHF	4543	SFOUND	1304	TERMS	1772	XFIND	2244
PUSHJ	4540	SGOT	1310	TEST2	6736	XGETLN	0302
PWAIT	0174	SIGN	7124	TEST4	7366	XGETOU	1254
PXOUTL	7774	SIGNF	0050	TESTA	0322	XI33	2666
QADD	0061	SIN	2662	TESTC	4564	XIN	6306
R6	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*.6    413
        xSQ.     2312
        xSQRTC   721
        xSPLQR   1535
        xSQ2     4676
        xSQR     5325
        xSQRT    7432
        xT3      717
        xTESTC   700
        xTESTN   1546
        xYF      2451
        Y        3377
        ZERO     6522


ERRORS DETECTED: 3

LINKS GENERATED: 3

RUN-TIME:  40 SECONDS

4K CORE USED
```

```
A          [illegible]2   3092    3181#
ABSOL      [illegible]3   3033#
ABSOL2     2532    2632#
ABSOL3     3313    3344#
ABSOLV     2385#   2391    2632    3033    3344
AC1H         58#   2456    2465    2497    2505    2509    2951    3001    3131    3158    3167    3184    3197    3201
           3281
AC1L         59#   2454    2464    2493    2510    2512    2953    3003    3185    3192    3196    3276
ACMINS       67    2931#   2944    2963    2964    2972    2996
ADDR       2809    2812    2813    2818    2821    2824    2848#   2856
ADONE      2962    2978    2985#
AF         1892    1917#
ALF1       1956    1968#
ALF2       1954    1971#
ALF3       1958    1965#
ALGN       2868    2919#
ALIGN      2919    2945#   2957    2985    2986    2992    2998    3007    3021
ALIST       759     760     885#
ALPHA      3631#   3662    3664    3665    3691    3710
AMOUNT     2967    2968    2976    2983    3008#
ARCALG     1945#   2004
ARCRTN     1963    2005#
ARGNXT     1068    1120#
ARTN        348    1985#
ASHFT      2974    2979#
ASK         746     756#    774
ATLIST      760    1024#
ATSW         77#    757     761
AXIN         29#    215     247     250     810     813     814     828    1270    1274    1276    1323    1430    1431
           1538    1543    1683    1686    1717    1724    1737    1738
AXOUT        37#    231     1232    1367    1411    1763
B          3080    3095    3182#
B1BLK      4485#
B1FLG      3741    4482#
B1UNIT     4483#
B2BLK      4489#
B2FLG      4486#
B2UNIT     4487#
BACK       2329#   2339    2342
BEGIN        32     202    1811#
BET1       1950    1977#
BET2       1949    1980#
BETA       3632#   3673    3677    3700    3702    3706    3708
BETZ       1952    1974#
BF         1894    1920#
BLK2       3626#   3830    3832    3834    3835    3838    3840    3849    3850    3858    3860    3862    3863    3867
           3868    3869    3880    4271    4272    4273    4274    4275    4281    4285    4292    4298    4300    4303
           4308    4312    4315    4322    4325    4326    4342    4345    4346    4349    4372    4378
BLOCK      4457    4459    4461    4463    4465    4467    4469#
BOTTOM       51#    234    4060
BUFBEG       47     80     134    1808#
BUFFER     2629    3405#   3413
BUFR         80#    246     809     826    1268    1269    1316    1322    1425    1426    1433    4064
```

```
CRLF      [illegible]#  3467
CRUDDY      728         734#
CSMCI      4131#        4150
CSTAR       212         225#
D          3074         3082     3100     3184#
D256       3618#
D85        3622#
DATUM      3068         3069     3070     3071     3089     3179     3111     3113     3118#    3261
DATUMA     3243         3261#
DCONP      2668         2722#
DCONT       386          394      434#
DCOUNT     2559         2586     2624#
DDTJR        21#          21
DEBGSW       44#          209      240      514      541      779      796      818      1226     1380     1388
DECON      2416         2418#    2422     2424     2433     2437     2441     2722
DECONV      332         2395#    2417     2721
DECP       2277         2279     2284     2322     2353#
DECR       2311         2343#
DEJUMP     4022         4041#
DELETE      186#         259     1324
DF         1887         1926#
DGRP        368#         397
DGRP1       380#
DIG        2332         2362#
DIGIT      2427         2462     2470#    2626
DIGITS     2261#        2348     2349     2624
DIV1       2503#        2517     2518     2920     3009
DIV2       2921         2975     3039#    3053     3054     3336
DIVDIV     4279         4283#
DIVIDE     3140         3176#
DIVLUP     4286#        4304
DMDONE     3088         3109#
DMPSW       172#         208     1381     1391     1394
DMULT      2917         3062#    3117
DMULT4     3088#
DNORM      2726         2918     3175     3302     3305     3312#    3333     3335
DNUMBR     2400         2429     2471#    2724
DO          363#         743
DOK        1245#        1258
DONE       1248         1260#
DOONE       372          398#
DOUBLE      128#        2561     3274     3326
DPCVPT     2661         2684     2721#
DPN        2667         2669     2724#
DPT        2552         2626#
DSAVE      2427#        2444
DTST       2425         2434#
DUBDIV     3176         3268#    3300     3311
DUBLAD     2460         2466     2486#    2502     2922
DV3        3274#        3295     3304
E          3077         3085     3103     3185#
ECALL       651          949     1038#    1045     1148     1155     2758
ECHOLS     1057#        1286
```

```
MP6         3226#   3237
MPER         118#   1226    2663
MPLUS       2423    2447#
MSPACE      2413    2448#
MULDIV      3115    3125#   3130    3141
MULT        2910    2914    2917#
MULT10      2428    2457#   2468    2628
MULT2        128    2458    2459    2461    2472#   2485
MULTY       3275    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#
O360        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#
```