IDENTIFICATION

PRODUCT CODE: DEC-12-AJAA-LA

PRODUCT NAME: FOCAL-12 LISTING

DATE CREATED: JANUARY 11, 1971

MAINTAINER: SOFTWARE SERVICES

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        1                       /FOCL12.37
        2                       /COPYRIGHT 1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
        3                       FMODE                    /********
        4                       FIXMRI FPOW=5000/PSEUDO-FLOATING POINT INSTRUCTIONS.
        5                       FIXMRI FADD=1000
        6                       FIXMRI FSUB=2000
        7                       FIXMRI FMUL=4000
        8                       FIXMRI FDIV=3000
        9                       FIXMRI FGET=0000
       10                       FIXMRI FPUT=6000
       11            7000       FNOR=7000
       12            0000       FEXT=0
       13            0000       FXIT=0
       14            4407       FINT=JMS I 7
       15            6101       SMP=6101
       16                       /MISCELLANEOUS ITEMS
       17            0001       *1
       18    0001    5403               JMP I .+2          /INTERRUPT PROCESSOR ENTRY .
       19    0002    0000       LWETMP, 0                  /********
       20    0003    2603                       INTRPT
       21    0004    0004       DDTJR,  DDTJR    /USED FOR DEBUGGING
       22    0005    0013       P13,    13       /CONSTANT
       23    0006    0100       C100,   100      /CONSTANT
       24            0000       T=00             /TEXT FIELD NO.
       25            0000       P=00             /PROGRAM FIELD NO.
       26            7000       CDF=7000         /(X=MEM) - OPR
       27    0007    6400               FPNT     /ADDRESS OF FLOATING POINT INTERPRETER, (LOC #7)
       28                       /AUTO-INDEX REGISTERS - (START OF SAVE BY QUAD)
       29    0010    0000       AXIN,   0        /STORAGE INDEX (LOC #10)
       30    0011    0000       XRT,    0        /EXTRA XR
       31    0012    0000       XRT2,   0        /EXTRA XR
       32    0013    3600       PDLXR,  BEGIN-1  /PUSHDOWN LIST INDEX REGISTER.
       33    0014    3117       FLTXR,  IOBUF-1  /XR FOR FLOATING POINT
       34    0015    0000       FLTXR2, 0        /EXTRA FOR F.P.
       35    0016    7402       TELSW,  HLT      /TELETYPE IN PROGRESS SWITCH
       36            0017       TEXTP=. /TEXT POINTERS (LOC #17)
       37    0017    3214       AXOUT,  FRSTX    /OUTPUT INDEX
       38    0020    0000       XCT,    0        /UNPACK SWITCH
       39    0021    0000       GTEM,   0        /UNPACK STORAGE
       40    0022    2407       PC,     FLTZER   /PROGRAM COUNTER
       41    0023    0000       THISLN, 0        /LINE POINTER FROM 'FINDLN'
       42    0024    0000       THISOP, 0        /CURRENT 'EVAL' OPERATION
       43    0025    0000       LASTLN, 0        /BACK POINTER FROM 'FINDLN'
       44    0026    0001       DEBGSW, 1        /DEBUG SWITCH ; NON-ZERO FOR LITERAL.
       45    0027    0000       PACKST, 0        /RUBOUT PROTECTION
       46    0030    0000       PT1,    0        /VARIABLE POINTER
       47    0031    3216       LASTV,  BUFBEG   /ADDRESS OF LAST VARIABLE
       48    0032    0000       T1,     0        /TEMPORARY REGISTER - MAIN
       49    0033    0000       T3,     0        /TEMP REGISTER FOR OUTPUT
       50    0034    0000       INBUF,  0        /KEYBOARD INPUT BUFFER
       51    0035    4617       BOTTOM, FEXP-1   /********/LAST LOCATION CURRENTLY AVAILABLE IN FIELD ZERO **
       52    0036    0000       INSUB,  0        /0= GETC; #0 = READC
       53    0037    0000       HINBUF, 0        /HIGH SPEED INPUT BUFFER
       54                       /PAGE ZERO OF THE
       55                       /FLOATING POINT ARITHMETIC INTERPRETER FOR FOCAL
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56            0240    *40
57    0140   :032    EX1,    0           /OPERAND STORAGE
58    0041   0000    AC1H,   0
59    0042   0000    AC1L,   0
60    0043   0000    OVER1,  0
61            0044    FLAC=,  /FLOATING ACCUMULATOR
62    0044   0000    EXP,    0       /F.A.
63    0045   0000    HORD,   0
64    0046   0000    LORD,   0
65    0047   0000    OVER2,  0
66    0050   0000    SIGNF,  0               /FLOATIN SIGN
67    0051   6605    MINSKI, ACMINS          /NEGATE FLAC SUBROUTINE
68    0052   2004    FISW,   2004            /OUTPUT FORMAT
69    0053   6724    INTEGER,FIX             /FIX FLAC
70           1345    GETSGN=TAD FLAC+1
71           5536    RETURN=JMP I EFUN3I
72    0054    *54
73           /VARIABLES   =   INITIALIZED FOR THE DIALOGUE
74    0054   0000    SORTCN, 0       /NUMBER IN TABLE FROM SORTC
75    0055   0000    LASTOP, 0       /LAST OPERATION FOR EVAL
76           0056    EFOP=,          /FUNCTION CODE.
77    0056   0000    ATSW,   0       /ASK-TYPE SWITCH
78    0057   7760    CNTR,   -20     /DELETE AND ERROR COUNTER(USED BY F.P. ALSO)
79           0060    STARTV=,        /=END FOR 8K
80    0060   3216    BUFR,   BUFBEG  /NEXT LOCATION IN BUFFER = LAST LOCATION OF TEXT.
81    0061   0000    GADD,   0           /********
82    0062   2414    XCTIN,  I33     /PACK SWITCH
83    0063   2676    OUTDEV, XOUTL   /POINTER TO OUT. SUB.   (OUTL)=FOR DEBUGGING
84    0064   2666    INDEV,  XI33    /POINTER TO IN. SUB.    (I33)=FOR DEBUGGING
85    0065   0001    NAGSW,  0001    /NOT ALL AND/OR GROUP SWITCH(4000=ONE;1=ALL;0=GROUP);(0000)=FOR TSS=8
86    0066   0215    CHAR,   215     /THE MOST IMPORTANT REGISTER
87    0067   0000    LINENO, 0000    /LINE NUMBER READ BY GETLN;(0400)=FOR TSS=8
88    0070   0005    GINC,   WORDS+2 /=6 FOR 4-WORD = CONSTANT
89    0071   0000    T2,     0       /TEMP REGISTER = FOR NEW INST. ROUTINES.
90           /FOR DEBUGGING, SET OUTL AND I33 INTO OUTDEV AND INDEV;
91           /ALSO PATCH THE ERROR ROUTINE = FOUR
92           /PATCHES PLUS TWO FOR THE HIGH SPEED READER.
93           0072    LIST6=, /INPUT LIST FOR "SFOUND".
94    0072   0214            214     /F.F.
95    0073   0207            207     /BELL
96           0074    LIST7=,
97    0074   0203            203     /CONTROL-C FOR DEBUGGING AND TSS8
98    0075   0337    P337,   337     /LEFT ARR
99    0076   0212    CLF,    212     /L.F.
100          0077    LIST3=, /EXCRETION LIST
101   0077   0215    CCR,    215     /LIST BRANCHER.
102   0100   7402    DMPSW,  HLT     /(SEARCH CHARACTER)=VARIABLE
103          /=0000 FOR TRACE ON.
104          /THE REST OF PAGE ZERO IS PURE TO THE MULTI-USER SYSTEM
105          0101    M100=,
106   0101   7700    P7700,  7700    /LEFT MASK
107   0102   0256    PER,    256     /PERIOD
108   0103   7701    M77,    -77     /EXTEND CODE TEST
109   0104   7600    P7600,  7600    /GROUP MASK
110   0105   7760    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   0260   C260,   260      /ASCII FOR ZERO
117    0114   7540   M240,   -240     /SPACE TEST
118    0115   7522   MPER,   -256     /PERIOD TEST
119    0116   7563   MCR,    -215     /C.R. TEST
120    0117   7775   MFLT,   -WORDS   /= -4 FOR 4-WORD
121    0120   7773   M5,     -5       /PAREN TEST
122    0121   7767   M11,    -11      /PAREN TEST
123    0122   0077   P77,    77       /RIGHT MASK
124    0123   0200   C200,   200      /CONSTANTS
125    0124   4000   P4000,  4000     /NAGSW TEST CONSTANT (FOR PDP-5)
126    0125   2032   FLARGP, FLARG    /DATA ADDRESS
127    0126   2157   PTCH,   CHIN     /GENERAL CHARACTER INPUT ROUTINE.
128    0127   5715   DOUBLE, MULT2    /MULTIPLY FLAC BY 2
129    0130   6000   FOUTPUT,FLOUTP   /FLOATING OUTPUT
130    0131   6200   FINPUT, FLINTP   /FLOATING INPUT
131    0132   3140   COMBUF, COMEIN   /COMMAND BUFFER START
132    0133   3206   CFRS,   FRST     /ADDRESS OF DUMMY LINE.
133    0134   3140   END,    COMEIN   /FIRST LOCATION USED IN 8K.
134    0135   3216   ENDT,   BUFBEG   /START OF STORAGE AREA **
135    0136   2021   EFUN3I, EFUN3    /FUNCTION RETURN
136    0137   2407   CFRSX,  FLTZER   /POINTER TO ZERO DATA
137
138
139                  /'FINPUT' USES CHAR AND GETC OR READC TO DEVELOP
140                  /A NUMBER WHICH IS THEN STORED VIA PT1.
141           0003   WORDS=3 /OR 4
142                  /NEW INSTRUCTIONS!
143           4540   PUSHJ=JMS I .    /RECURSIVE SUBROUTINE CALL
144    0140   0521           XPUSHJ
145           1413   POPA=TAD I PDLXR/RESTORE AC
146           5541   POPJ=JMP I .     /SUBROUTINE RETURN
147    0141   1565           XPOPJ
148           4542   PUSHA=JMS I .    /SAVE AC
149    0142   0477           XPUSHA
150           4543   PUSHF=JMS I .    /SAVE GROUP OF DATA
151    0143   0534           PD2
152           4544   POPF=JMS I .     /RESTORE GROUP
153    0144   0554           PD3
154           4545   GETC=JMS I .     /UNPACK A CHARACTER
155    0145   2274           UTRA
156           4546   PACKC=JMS I .    /PACK A CHARACTER
157    0146   2512           PACBUF
158           4547   SORTJ=JMS I .    /SORT AND BRANCH ON AC OR CHAR
159    0147   1312           SORTB
160           4550   SORTC=JMS I .    /SORT CHAR
161    0150   0721           XSORTC
162           4551   PRINTC=JMS I .   /PRINT AC OR CHAR
163    0151   2465           OUT
164           4552   READC=JMS I .    /READ DATA INTO CHAR AND PRINT IT
165    0152   2157   RDIV,   CHIN
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166             4553    PRNTLN=JMS I ,  /PRINT C(LINENO)
167    0153    2425         XPRNT
168             4554    GETLN=JMS I ,   /UNPACK AND FORM A LINENUMBER
169    0154    332          XGETLN
170             4555    FINDLN=JMS I ,  /SEARCH FOR A GIVEN LINE
171    0155    2244         XFIND
172             4556    ENDLN=JMS I ,   /INSERT LINE POINTERS
173    0156    2360         XENDLN
174             4557    RTL6=JMS I ,    /ROTATE LEFT SIX
175    0157    413          XRTL6
176             4560    SPNOR=JMS I ,   /IGNORE SPACES AND LEADING ZEROS
177    0160    1535         XSPNOR
178             4561    TESTN=JMS I ,   /PERIOD; OTHER; NUMBER
179    0161    1546         XTESTN
180             4562    TSTLPR=JMS I ,  /SKIP IF 5<SORTCN<= 11 (I.E. AN L-PAR)
181    0162    2037         LPRTST
182             4563    TSTGRP=JMS I ,  /SKIP IF G(AC) = G(LINENO)
183    0163    744          GRPTST
184             4564    TESTC=JMS I ,   /TERM; NUMBER; FUNCTION; LETTER- AND IGNORE SPACES.
185    0164    700          XTESTC
186             4565    DELETE=JMS I ,  /REMOVE OLD TEXT LINE
187    0165    2064    PSIN,    XDELETE
188             4566    ERROR2=JMS I ,  /EXCESS SOMETHING ERROR
189             4566    ERROR3=JMS I ,  /MISCELLANEOUS ERROR
190             4566    ERROR4=JMS I ,  /FORMAT ERROR
191    0166    2726         ERR2
192                     /USED BY 8K
193                     /FOCAL'S COMMAND/INPUT DRIVER
194             0167    *167                    /********
195    0167    0000    SUBS2,   0              /********
196    0170    0000    LESUB2,  0              /********
197    0171    0000    SUBS,    0              /********
198    0172    6163    LEFPUT,  LEPUT          /********
199    0173    0000    LESUBS,  0              /********
200    0174    7657    PWAIT,   WAIT           /********
201    0175    7672    PCLEAR,  CLEAR          /********
202    0176    3601         BEGIN   /BECOMES (RECOVR+1) **
203    0177    7610    START,   SKP CLA        /PROGRAM START FROM SELF
204    0200    5576         JMP I ,-2          /CONSOLE START; SW=200,
205    0201    1137         TAD CFRSX          /(PC) -> 0
206    0202    3022         DCA PC             /FOR COMMAND MODE
207    0203    7001         IAC                /USE ONE IN THE AC TO
208    0204    3100         DCA DMPSW          /INIT UNPACK AND TRACE SWITCH.
209    0205    3026         DCA DEBGSW         /ENABLE TRACE FOR INPUT OF (?),
210    0206    1226         TAD COMBOT         /PROTECT COMMAND BUFFER.
211    0207    3313         DCA POLXR          /NO PATCH TEST.
212    0210    1225         TAD CSTAR          /ANNOUNCE PRESENCE
213    0211    4551         PRINTC             /BY TYPING THE LEAD-IN CHARACTER
214    0212    1132    IBAR,    TAD COMBUF     /INITIALIZE COMMAND BUFFER
215    0213    3210         DCA AXIN           /FOR UNPACKING.
216    0214    3062         DCA XCTIN
217    0215    1132         TAD COMBUF         /RUBOUT PROTECTION
218    0216    3327         DCA PACKST
219    0217    4552    IGNOR,   READC          /READ COMMAND STRING
220    0220    4547         SORTJ
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221    2221   -073                      LIST7-1
222    2222   -474                      INLIST-LIST7
223    2223   4546             PACKC            /SAVE STRING CHARACTER.
224    2224   5217             JMP IGNOR
225    2225    252      CSTAR,  252              /ACKNOWLEDGE CHARACTER
226    2226   3220      COMBOT, COMEOUT+12       /END OF COMMAND BUFFER,LESS PROTECTION COUNT.
227                     /COMMAND/INPUT PROCESSOR
228    2227   4546      IRETN,  PACKC            /START TO PACK C.R.
229    2230   4546             PACKC            /FINISH C.R.
230    2231   1132             TAD COMBUF       /INITIALIZE "TEXTP"
231    2232   3017      GONE,   DCA AXOUT        /SETUP CURRENT LINE
232    2233   3020             DCA XCT
233    2234   4545             GETC             /READ FIRST CHARACTER.
234    2235   1335             TAD BOTTOM       /INIT PUSH-DOWN-LIST
235    2236   3013             DCA PDLXR
236    2237   4560             SPNOR            /IGNORE LEADING BLANKS
237    2240   4561             TESTN            /DOES THE LINE BEGIN WITH 1-9?
238    2241   5362             JMP GZERR        /PERIOD -ILLEGAL GROUP ZERO USAGE
239    2242   5271             JMP INPUTX       /NO
240    2243   2026             ISZ DEBGSW       /YES,DISABLE TRACE FOR REPACKING
241    2244   4554             GETLN            /READ THIS LINE NUMBER
242    2245   1124             TAD P4000        /TEST  FOR SINGLE LINE.
243    2246   1365             TAD NAGSW
244    2247   7640             SZA CLA
245    2250   4566             ERROR3           /ILLEGAL LINE NUMBER ON INPUT
246    2251   1060             TAD BUFR         /SET POINTERS
247    2252   3010             DCA AXIN
248    2253   3062             DCA XCTIN
249    2254   1067             TAD LINENO       /SAVE LINE #
250    2255   3410             DCA I AXIN       /(X-MEM)
251    2256   4560             SPNOR            /IGNORE SPACES AFTER LINE NUMBER
252    2257   7410             SKP
253    2260   4545             GETC             /READ 1ST AFTER LINENO TERMINATOR.
254    2261   4546      SRETN,  PACKC            /SAVE TEXT AND RESTORE DATA FIELD
255    2262   1366             TAD CHAR         /TEST FOR END OF INPUT STRING
256    2263   1116             TAD MCR
257    2264   7640             SZA CLA
258    2265   5260             JMP .-5
259    2266   4565             DELETE           /REMOVE OLD LINE. IF ANY.
260    2267   4556             ENDLN            /INSERT NEW LINE
261    2270   5177             JMP START        /POINTERS MUST BE REINITIALIZED
262    2271   4540      INPUTX, PUSHJ            /PROCESS IMMEDIATE COMMAND.
263    2272   -611                      PROC
264    2273   1422             TAD I PC         /CHECK NEXT LINE (X-MEM)
265    2274   7450             SNA              /END OF PROGRAM?
266    2275   5177             JMP START        /YES
267    2276   3022             DCA PC           /SAVE NEW LINE NO.
268    2277   1022             TAD PC           /START NEW LINE
269    2300   7001             IAC
270    2301   5232             JMP GONE         /PROCESS OTHER COMMANDS
271                    /TEXT LINE BUFFER FORMAT-
272                    /#1 I POINTER OR ZERO IN LAST
273                    /#2 I LINENO
274                    /#3 - #N+1 I TEXT
275                    /#N I C.R.
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276                          /LINE NUMBER FORMATION
277    0302  0000   XGETLN, 0                    /DEVELOP I.D. = "GETLN"
278    0303  4562           SPNOR                /IGNORE LEADING SPACES.
279    0304  1366           TAD CHAR             /"ALL" IS A SPECIAL ARGUMENT.
280    0305  1112           TAD MINUSA
281    0306  7650           SNA CLA
282    0307  5322           JMP TESTA
283    0310  3036           DCA INSUB            /CALL 'GETC' FROM 'INPUT' VIA 'DECON'
284    0311  4771           JMS I LCON           /(DECONV - IN FLOAT.)
285    0312  1047           TAD FLAC+3           /GROUP TOO LARGE?
286    0313  0372           AND P7740
287    0314  1046           TAD FLAC+2
288    0315  7640           SZA CLA
289    0316  4566           ERROR2               /GROUP NUMBER TOO LARGE
290    0317  1047           TAD FLAC+3
291    0320  4557           RTL6
292    0321  7004           RAL
293    0322  3067   TESTA,  DCA LINENO
294    0323  4561           TESTN                /TEST3
295    0324  4545           GETC                 /READ STEP NUMBER.
296    0325  4561           TESTN                /TEST4, OTHER
297    0326  5340           JMP GERR             /DOUBLE PERIODS
298    0327  5352           JMP GEXIT            /OTHER
299    0330  1054           TAD SORTCN           /NUMBER
300    0331  7106           RTL CLL
301    0332  1054           TAD SORTCN
302    0333  7004           RAL
303    0334  1067           TAD LINENO
304    0335  3067           DCA LINENO
305    0336  4545           GETC                 /READ SECOND STEP NUMBER.
306    0337  4561           TESTN                /TEST4, OTHER
307    0340  4566   GERR,   ERROR4               /DOUBLE PERIODS
308    0341  5352           JMP GEXIT            /OTHER
309    0342  1054           TAD SORTCN           /NUMBER
310    0343  1067           TAD LINENO
311    0344  3067           DCA LINENO
312    0345  4545           GETC                 /TEST FOR CORRECT TERMINATOR
313    0346  4561           TESTN                /CHECK SIZE
314    0347  5340           JMP GERR             /,
315    0350  7410           SKP
316    0351  4566           ERROR2               /TOO LARGE A LINE NUMBER.
317    0352  7100   GEXIT,  CLL                  /CLEAR LINK BIT
318    0353  1067           TAD LINENO           /TEST FOR GROUP NUMBER.
319    0354  0374           AND P7600
320    0355  7640           SZA CLA
321    0356  7020           CML
322    0357  1067           TAD LINENO
323    0360  0106           AND P177             /REPARE "NAGSW"
324    0361  7460           SNL SZA
325    0362  4566   GZERR,  ERROR2               /0,X = ERROR:ILLEGAL LINE NUMBER.
326    0363  7640           SZA CLA
327    0364  1373           TAD P2020
328    0365  7020           CML
329    0366  7004           RAL
330    0367  3065           DCA NAGSW
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331    0370  5722              JMP I XGETLN
332    0371  5670      LCCN,   DECONV
333    0372  7740      P7740,  7740
334    0373  2000      P2000,  2000
335                    /RANGE OF ACCEPTIBLE LINE NUMBERS = 1.21 TO 31.99
336                    /NAGSW:
337                    /GROUP=2000
338                    /LINE=4000
339                    /ALL=0001
340                    /LIST OF FUNCTION ADDRESSES. (NAMES ARE IN "FNTABL")
341            0374    FNTABF=.
342    0374  2016              XABS    /ABS      =ABSOLUTE VALUE
343    0375  2012              XSGN    /SGN      =SIGN PART
344    0376  1156              XINT    /ITR      =INTEGER PART
345    0377  7602              XDISP   /DIS      /********
346    0400  1145              XRAN    /RAN      =RANDOM NUMBER
347    0401  1341              XADC    /ADC      =READ ANALOG TO DIGITAL CONVERTER
348    0402  5000              ARTN    /ATN      =
349    0403  4620              FEXP    /EXP      =EXPONENTIAL FUNCTIONS
350    0404  5240              FLOG    /LOG      =
351    0405  5204              FSIN    /SIN      =TRIG FUNCTIONS
352    0406  5177              FCOS    /COS      =
353    0407  7400              XSQRT   /SQT      =SQUARE ROOT
354    0410  2725      PFNEW,  ERROR5  /NEW      =USER DEFINED FUNCTIONS
355    0411  2725      PFX,    ERROR5  /FX       /********
356    0412  2725      PFZ,    ERROR5  /FZ       /********
357    0413  0000      XRTL6,  0       /ROTATE AC LEFT SIX = "RTL6"
358    0414  7106              CLL RTL
359    0415  7006              RTL
360    0416  7006              RTL
361    0417  5613              JMP I XRTL6
362                    /RECURSIVE OPERATE, EXECUTE, OR CALL
363    0420  4554      DO,     GETLN           /EXECUTE ONE LINE, A GROUP,OR ALL
364    0421  1022              TAD PC          /SAVE ADDRESS
365    0422  4542              PUSHA           /OF CURRENT LINE
366    0423  4543              PUSHF           /SAVE REST OF THIS LINE
367    0424  0017                      TEXTP   /ADDRESS OF TEXT POINTERS
368    0425  4543      DGRP,   PUSHF           /SAVE NAGSW, CHAR, AND LINENO.
369    0426  0365                      NAGSW
370    0427  1365              TAD NAGSW       /CHECK DATA FROM GETLN.
371    0430  7710              SPA CLA         /SKIP IF GROUP OR ALL
372    0431  5263              JMP DOONE       /DO ONE LINE
373    0432  4555              FINDLN          /INIT FOR GROUP AND SET THISLN
374    0433  7000              NOP
375    0434  1023              TAD THISLN      /TEST FOR GOOD GROUP NUMBER.
376    0435  3011              DCA XRT
377    0436  1411              TAD I XRT       /(X=MEM)
378    0437  4563              TSTGRP
379    0440  4566              ERROR2          /NO SUCH GROUP NUMBER
380    0441  4541      DGRP1,  PUSHJ           /EXECUTE OBJECT LINE AND SET PC.
381    0442  0676                      PROCESS-2
382    0443  4544              POPF            /RESTORE THE DATA
383    0444  0365                      NAGSW
384    0445  1422              TAD I PC        /CHECK FOR END OF TEXT (X=MEM)
385    0446  7450              SNA
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386   0447  5271         JMP DCONT          /ALL DONE
387   0450  7001         IAC
388   0451  3030         DCA PT1            /SAVE POINTER TO LINENO
389   0452  1065         TAD NAGSW          /CHECK FOR GROUP
390   0453  7743         SMA SZA CLA
391   0454  5260         JMP .+4            /DO ALL
392   0455  1430         TAD I PT1          /TEST GROUP (X=MEM)
393   0456  4563         TSTGRP
394   0457  5271         JMP DCONT          /NOT IN GROUP
395   0460  1430         TAD I PT1          /READ NEXT LINE NO. (X=MEM)
396   0461  3067         DCA LINENO
397   0462  5225         JMP DGRP           /CONTINUE THE SUBROUTINE
398   0463  4555  DOONE, FINDLN             /FIND THE LINE
399   0464  4566         ERROR2             /NO SUCH LINE NUMBER
400   0465  4540         PUSHJ              /EXECUTE IT
401   0466  0610                  PROCESS
402   0467  4544         POPF               /RESTORE CHAR
403   0470  0065                  NAGSW
404   0471  4544  DCONT, POPF               /RESTORE TEXT POINTERS
405   0472  0017                  TEXTP
406   0473  1413         POPA               /RESTORE ADDRESS OF CURRENT LINE.
407   0474  3022         DCA PC
408   0475  5676         JMP I .+1          /CONTINUE PROCESSING THIS LINE.
409   0476  0611                  PROC
410               /PUSHDOWN LIST CONTROLS
411   0477  0000  XPUSHA, 0                 /PUSHDOWN THE AC = "PUSHA"
412   0500  3071         DCA T2             /BACKUP POINTER
413   0501  7040         CMA                /AND THEN
414   0502  4310         JMS PCHK           /CHECK CORE USAGE
415   0503  1071         TAD T2             /OK
416   0504  3413         DCA I PDLXR        /PUSH DOWN LIST POINTER
417   0505  7040         CMA                /BACKUP AGAIN
418   0506  4310         JMS PCHK
419   0507  5677         JMP I XPUSHA
420   0510  0000  PCHK,  0
421   0511  1013         TAD PDLXR          /INC IN AC
422   0512  3013         DCA PDLXR
423   0513  1013         TAD PDLXR
424   0514  7141         CIA CLL
425   0515  1031         TAD LASTV
426   0516  7630         SZL CLA
427   0517  4566         ERROR3             /STORAGE FILLED BY PUSH-DOWN LIST
428   0520  5710         JMP I PCHK
429   0521  0000  XPUSHJ, 0                 /RECURSIVE SUBROUTINE CALL = "PUSHJ"
430   0522  1721         TAD I XPUSHJ
431   0523  3071         DCA T2             /SAVE SUBR. ADDR.
432   0524  7040         CMA
433   0525  4310         JMS PCHK
434   0526  1321         TAD XPUSHJ
435   0527  7001         IAC
436   0530  3413         DCA I PDLXR        /SAVE RETURN
437   0531  7040         CMA
438   0532  4310         JMS PCHK
439   0533  5471         JMP I T2           /TRANSFER CONTROL
440   0534  0000  PD2,   0                  /SAVE A FLOATING POINT NUMBER = "PUSHF"
```

```
441   0535   7240          CLA CMA        /COMPUTE VARIABLE ADDR
442   0536   1734          TAD I .-2
443   0537   3011          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   1365   FLIST1, FINCR  /.=STANDARD FORMAT
479   0600   0610          PROCESS /I=SET,PLUS ...
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 "I".
494   0616   0374                 GLIST=1
495   0617   5210          JMP PROCESS
```

```
496    2622    1266              TAD CHAR              /SAVE COMMAND CHARACTER
497    2621    0375              AND P337             /EXECUTE LOWER CASE ALSO
498    2622    4542              PUSHA
499    2623    4545              GETC                 /GO TO TERMINATOR
520    2624    4552              SORTC
521    2625    1374                       GLIST-1
502    2626    7410              SKP
503    2627    5223              JMP .-4
504    2630    1413              POPA
505    2631    4547              SORTJ                /GO DO COMMAND
506    2632    0773                       COMLST-1
507    2633    0165                       COMGO-COMLST
508    2634    4566              ERROR2               /ILLEGAL COMMAND
509            0614    COMMENTS=PC1    /ALSO IS CONTINUE
510
511
512                     /OUTPUT COMMAND TEXT
513    0635    4554    WRITE,    GETLN                /SET LINENO
514    0636    2026              ISZ DEBGSW           /DISABLE TRACE
515    0637    4555              FINDLN               /SEARCH FOR LINE NUMBER
516    0640    5267              JMP WTESTG           /NOT THERE OR GROUP
517    0641    1067              TAD LINENO
518    0642    7640              SZA CLA
519    0643    4553              PRNTLN               /PRINT LINE NUMBER AND A SPACE.
520    0644    4545              GETC
521    0645    4551              PRINTC               /PRINT TEXT OF A LINE.
522    0646    1066              TAD CHAR
523    0647    1116              TAD MCR
524    0650    7640              SZA CLA              /SKIP IF END OF LINE
525    0651    5244              JMP .-5
526    0652    1423              TAD I THISLN         /TEST FOR END OF TEXT (X-MEM)
527    0653    7450    WTEST2,   SNA
528    0654    5271              JMP WX-2             /EXIT;DO NEXT INDIRECT LINE.
529    0655    7001              IAC
530    0656    3030              DCA PT1              /SAVE POINTER TO LINENO OF NEXT
531    0657    1065              TAD NAGSW
532    0660    7700              SMA CLA
533    0661    1430              TAD I PT1            /(X-MEM)
534    0662    4563              TSTGRP               /TRY NEXT LINENO FOR GROUP.
535    0663    5273              JMP WX
536    0664    1430    WALL,     TAD I PT1            /SET LINENO (X-MEM)
537    0665    3067              DCA LINENO
538    0666    5237              JMP WRITE+2
539    0667    1023    WTESTG,   TAD THISLN           /INIT GROUP PRINTOUT
540    0670    5253              JMP WTEST2
541    0671    3026              DCA DEBGSW
542    0672    5541              POPJ
543    0673    1065    WX,       TAD NAGSW
544    0674    7750              SPA SNA CLA          /SKIP IF ALL
545    0675    5271              JMP WX-2
546    0676    4551              PRINTC               /PRINT C.R. AGAIN
547    0677    5264              JMP WALL
548    0700    0000    XTESTC,   0       /TEST THE NATURE OF THE NEXT ALPHANUMERIC = "TESTC"
549    0701    4560              SPNOR                /IGNORE SPACES
553    0702    4552              SORTC                /TEST THE VARIABLE TERMINATORS
```

```
551    7723    1771                        TERMS-1
552    7724    5742            JMP I XTESTC        /YES - SORTC IS SET
553    7725    1066            TAD CHAR            /NO
554    7726    2300            ISZ XTESTC
555    7727    1202            TAD MF
556    7710    7650            SNA CLA             /TEST FOR "F"
557    7711    5317            JMP XT3
558    7712    4561            TESTN
559    7713    5700            JMP I XTESTC        /,
560    7714    7410            SKP                 /OTHER
561    7715    5700            JMP I XTESTC        /NUMBER
562    7716    2300            ISZ XTESTC
563    7717    2300    XT3,    ISZ XTESTC          /RETURNS:T;N;F;A
564    7720    5700            JMP I XTESTC
565    7721    0000    XSORTC; 0       /SORT CHAR AGAINST TABLE - "SORTC"
566    7722    1721            TAD I XSORTC
567    7723    3012            DCA XRT2            /1ST ARG IS LIST-1
568    7724    1412            TAD I XRT2
569    7725    7510            SPA                 /LIST IS ENDED BY A NEGATIVE NUMBER
570    7726    5340            JMP SEXC            /2AND EXIT - NOT IN LIST
571    7727    7041            CIA
572    7730    1066            TAD CHAR
573    7731    7640            SZA CLA             /COMPARE
574    7732    5324            JMP .-6
575    7733    1721            TAD I XSORTC        /COMPUTE INCREMENT : 0 - N
576    7734    7040            CMA
577    7735    1012            TAD XRT2
578    7736    3054            DCA SORTCN
579    7737    7410            SKP                 /1ST EXIT - YES
580    7740    2321    SEXC,   ISZ XSORTC
581    7741    2321            ISZ XSORTC
582    7742    7300            CLA CLL
583    7743    5721            JMP I XSORTC
584    7744    0000    GRPTST; 0       /AC VS LINENO - "TSTGRP"
585    7745    0104            AND P7600
586    7746    7041            CIA
587    7747    3071            DCA T2
588    7750    1067            TAD LINENO
589    7751    0104            AND P7600
590    7752    1071            TAD T2
591    7753    7650            SNA CLA
592    7754    2344            ISZ GRPTST
593    7755    5744            JMP I GRPTST
594                    /INPUT FROM TEXT OR KEYBOARD;
595                    /IF BACK-ARROW, RESTART INPUT
596    7756    0000    INPUT,  0               /INPUT A CHARACTER
597    7757    1036            TAD INSUB           /NON-ZERO FOR KEYBOARD
598    7760    7640            SZA CLA
599    7761    5364            JMP .+3
600    7762    4545            GETC
601    7763    5756            JMP I INPUT
602    7764    4552            READC
603    7765    4547            SORTJ
604    7766    6776                    SPECIAL-1
605    7767    3402                    INFIX-SPECIAL
```

```
606    2770   5756              JMP I INPUT
607    2771   1435     ILIST,   IF1                 /,
628    2772   0615              PROCESS             /I
609    2773   0614              PC1                 /CR
610                                     /ENGLISH-FRENCH
611           774      COMLST=,           /COMMAND DECODING LIST
612    2774   323              323     /SET    = ORGANIZE
613    2775   306              306     /FOR    = QUAND
614    2776   311              311     /IF     = SI
615    2777   304              304     /DO     = FAIZ
616    1000   307              307     /GOTO   = VA
617    1001   303              303     /COMMENT= COMMENTE
618    1002   301              301     /ASK    = DEMANDE
619    1003   324              324     /TYPE   = TAPE
620    1004   317              317     /OUTPUT /********
621    1005   305              305     /ERASE  = BIFFE
622    1006   327              327     /WRITE  = INSCRIS
623    1007   315              315     /MODIFY = MODIFIE
624    1010   321              321     /QUIT   = ARRETE
625    1011   322              322     /RETURN = RETOURNE
626    1012   314              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           1241     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
```

```
661    1047   4566             ERROR4          /LEFT OF "=" IN ERROR: 'FOR' OR 'SET'
662    1050   1030             TAD PT1
663    1051   4542             PUSHA           /SAVE POINTER TO VARIABLE
664    1052   4540             PUSHJ
665    1053   1612                     EVAL-1  /GET INITIAL VALUE EXPRESSION
666    1054   1413             POPA
667    1055   3030             DCA PT1
668    1056   4407             FINT            /INITIALIZE NOW.
669    1057   6430             FPUT I PT1
670    1260   0000             FXIT
671    1061   4547             SORTJ           /TEST LAST CHAR FROM "EVAL"
672    1062   1375                     TLIST-1
673    1063   7201                     FLIST1-TLIST
674    1064   4566             ERROR4          /EXCESS R-PAR
675    1065   1030    FINCR,   TAD PT1         /SAVE VARIABLE ADDRESS .
676    1066   4542             PUSHA
677    1067   4540             PUSHJ           /EVALUATE THE INCREMENT,IF ANY,
678    1070   1612                     EVAL-1
679    1071   4547             SORTJ           /TEST TERMINATORS
680    1072   1375                     TLIST-1
681    1073   7176                     FLIST2-TLIST
682    1074   4566             ERROR4          /ILLEGAL TERMINATOR IN 'FOR'
683    1075   4543    FLIMIT,  PUSHF           /SAVE THE INCREMENT.     .
684    1076   2032                     FLARG
685    1077   4540             PUSHJ           /GET THE LIMIT(NO ERROR DETECTION AFTER LIMIT)
686    1100   1612                     EVAL-1
687    1101   4543    FCONT,   PUSHF           /SAVE THE LIMIT .
688    1102   2032                     FLARG
689    1103   4543             PUSHF           /SAVE TEXT OF OBJECT STATEMENTS
690    1104   0017                     TEXTP
691    1105   4540             PUSHJ           /DO THE OBJECT STATEMENTS
692    1106   0610                     PROCESS
693    1107   4544             POPF            /RESTORE REMAINING TEXT.
694    1110   0017                     TEXTP
695    1111   4544             POPF            /GET LIMIT
696    1112   2032                     FLARG
697    1113   4544             POPF            /GET INCREMENT
698    1114   7470                     ITER1
699    1115   1413             POPA            /GET VARIABLE ADDRESS
700    1116   3030             DCA PT1
701    1117   4407             FINT            /INCREMENT AND TEST
702    1120   0430             FGET I PT1      /LOAD THE VARIABLE
703    1121   1733             FADD I FINKP    /INCREMENT IT
704    1122   6430             FPUT I PT1      /CHANGE IT
705    1123   2525             FSUB I FLARGP   /TEST IT
706    1124   0000             FXIT
707    1125   1045             TAD FLAC+1
708    1126   7740             SMA SZA CLA
709    1127   5541             POPJ            /END OF LOOP
710    1130   1030             TAD PT1
711    1131   4542             PUSHA           /SAVE ADDRESS .
712    1132   4543             PUSHF           /SAVE INCREMENT AGAIN .
713    1133   7470    FINKP,           ITER1
714    1134   5301             JMP FCONT
715    1135   7503    MEQ,     -275
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716     036  7524   MCOM,    -254
717     1137 4543   FINFIN, PUSHF              /SET INCREMENT TO ONE.
718     1140 2405            FLTONE
719     1141 5301            JMP FCONT
720
721                /SAME FRAN - JUST MOVED
722                /
723     1142 2200   RANO,    2200              /********
724     1143 2000            2000              /********
725     1144 2000            2000              /********
726     1145 4407   XRAN,    FINT              /********
727     1146 1342            FADD     RANO     /********
728     1147 4755            FMUL I   CRUDDY   /********
729     1150 6342            FPUT     RANO     /********
730     1151 2000            FXIT              /********
731     1152 3342            DCA      RANO     /********
732     1153 3044            DCA      FLAC     /********
733     1154 5536            JMP I    EFUN3I   /********
734     1155 6160   CRUDDY,  RANMUL            /********
735                /TAKE THE INTEGER PART
736     1156 4453   XINT,    JMS I INTEGER     /(FIX)
737     1157 7200            CLA
738     1160 5536            JMP I EFUN3I
739          1161   COMGO=.  /COMMAND ROUTINE ADDRESSES
740     1161 1041            SETT
741     1162 1041            FOR
742     1163 1013            IF
743     1164 0420            DO
744     1165 0603            GOTO              /(REFERENCED)
745     1166 0614            COMMENT
746     1167 1200            ASK
747     1170 1201            TYPE
748     1171 7706            OUTPUT            /********
749     1172 2206            ERASE
750     1173 0635            WRITE
751     1174 1254            MODIFY
752     1175 0177            START    /RETURN TO COMMAND MODE VIA 'QUIT'
753     1176 1563            RETRN
754     1177 6346            LTAPE             /********
755                /INPUT-OUTPUT STATEMENTS
756     1200 7240   ASK,     CLA CMA           /REMEMBER WHICH CALL.
757     1201 3056   TYPE,    DCA ATSW
758     1202 4547   TASK,    SORTJ             /SPECIAL CHAR? *****
759     1203 1367            ALIST=1
760     1204 1200            ATLIST=ALIST
761     1205 2056            ISZ ATSW          /TEST QUOTE SWITCH
762     1206 5223            JMP TYPE2
763     1207 4540            PUSHJ             /DO ASK; SETUP PT1
764     1210 1401            GETARG
765     1211 1066            TAD CHAR          /SAVE IN-LINE CHARACTER.
766     1212 4542            PUSHA
767     1213 1253            TAD COL           /TYPE COLON
768     1214 4551            PRINTC            /(CLA)= TO SUPRESS ":"
769     1215 2036            ISZ INSUB         /INDICATE 'READC'
770     1216 7001            IAC               /POINT PAST CHAR
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771     1217    4531            JMS I FINPUT    /READ DATA AND SAVE
772     1220    1413            POPA            /RE-TEST LAST TERMINATOR
773     1221    3066            DCA CHAR
774     1222    5230            JMP ASK         /CONTINUE PROCESSING
775     1223    4542    TYPE2,  PUSHJ           /DO TYPE
776     1224    1613                    EVAL
777     1225    4530            JMS I FOUTPUT   /PRINT
778     1226    5201            JMP TYPE
779     1227    2026    TQUOT,  ISZ DEBGSW      /DISABLE TRACE
780     1230    4545            GETC            /TYPE LITERALS
781     1231    4547            SORTJ
782     1232    1531                    TLIST2-1
783     1233    .645                    TLIST3-TLIST2
784     1234    4551            PRINTC
785     1235    5230            JMP TQUOT+1
786     1236    4545    TINTR,  GETC            /PASS PERCENT SIGN
787     1237    4554            GETLN           /READ FORMAT CONTROL: "%7.03"
788     1240    1067            TAD LINENO
789     1241    3052            DCA FISW        /SAVE FORMAT CODE
790     1242    5202            JMP TASK
791     1243    1077    TCRLF2, TAD CCR         /SPLAT=CR ALONE
792     1244    4463            JMS I OUTDEV
793     1245    7001            IAC             /NON-PRINTING DELAY FOR C.R. *****
794     1246    1077    TCRLF,  TAD CCR         /EXCLAMATION POINT=CR,LF.
795     1247    4551            PRINTC
796     1250    3026    TASK4,  DCA DEBGSW      /*
797     1251    4545            GETC            /*
798     1252    5202            JMP TASK
799     1253    0272    COL,    272             /"I"
800                     /IF DEBGSW=0 I ENABLE FLIP-FLOP "DMPSW"
801                     /        #0: DISABLE AND RETURN ALL"?" ! S.
802                     /IF DMPSW = 0: TRACE ON, IF ENABLED
803                     /        #0: TRACE OFF
804                     /IF BOTH = 0 I PRINT TRACE.
805                     /SEARCH ROUTINES
806     1254    4554    MODIFY, GETLN           /READ LINE NO,
807     1255    4555            FINDLN          /LOOK IT UP NOW.
808     1256    4566            ERROR2          /NOT THERE = BAD COMMAND UNLESS ZERO,
809     1257    1060            TAD BUFR        /SET POINTERS
810     1260    3010            DCA AXIN        /FOR INPUT
811     1261    3062            DCA XCTIN
812     1262    1067            TAD LINENO      /COPY THE SAME LINE NUMBER,
813     1263    3410            DCA I AXIN      /(X-MEM)
814     1264    1010            TAD AXIN        /SAVE START OF NEW LINE
815     1265    3027            DCA PACKST
816     1266    4464    SCONT,  JMS I INDEV     /READ THE TELETYPE INPUT SILENTLY,
817     1267    3100            DCA LIST3+1     /SAVE SEARCH CHARACTER
818     1270    2026            ISZ DEBGSW      /NO BREAKS,
819     1271    4545    SCHAR,  GETC            /TYPE+TEST=F.F.
820     1272    4551            PRINTC          /PLAYBACK THE TEXT
821     1273    4547            SORTJ           /LOOK FOR MATCH
822     1274    .076                    LIST3-1
823     1275    1267                    LISTGO-LIST3
824     1276    4546            PACKC           /SAVE NEW LINE,
825     1277    5271            JMP SCHAR
```

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826    1370   1062    SBAR,    TAD BUFR          /RESTART-B.A.
827    1301   7001             IAC
828    1302   3212             DCA AXIN          /SET POINTERS
829    1303   3762             DCA XCTIN
830    1304   4552    SFOUND,  READC             /READ FROM KEYBOARD
831    1305   4547             SORTJ             /TEST
832    1306   0271                      LIST6=1
833    1307   1267                      SRNLST=LIST6
834    1310   4546    SGOT,    PACKC             /PACK CHAR,
835    1311   5304             JMP SFOUND        /MORE
836    1312   0000    SORTB,   0        /SORT AND BRANCH ROUTINE, = "SORTJ"
837    1313   7450             SNA
838    1314   1066             TAD CHAR          /ASSUME CHAR IF AC=0
839    1315   7041             CIA
840    1316   3071             DCA T2            /SAVE SORT ITEM
841    1317   1712             TAD I SORTB       /FIRST ARG IS LIST LESS ONE
842    1320   2312             ISZ SORTB         /2AND IS INTRA-LIST LENGTH
843    1321   3012             DCA XRT2
844    1322   1412             TAD I XRT2
845    1323   7510             SPA               /**LISTS ENDED BY NEGATIVE NUMBERS**
846    1324   5336             JMP SEX           /READ EXIT
847    1325   1071             TAD T2            /FIND ADDRESS
848    1326   7640             SZA CLA
849    1327   5322             JMP .+5
850    1330   1012             TAD XRT2          /MATCH FOUND.
851    1331   1712             TAD I SORTB
852    1332   3071             DCA T2
853    1333   1471             TAD I T2
854    1334   3071             DCA T2            /DEBUG : AC = ADDRESS
855    1335   5471             JMP I T2
856    1336   2312    SEX,     ISZ SORTB         /MATCH NOT FOUND.
857    1337   7300             CLA CLL
858    1340   5712             JMP I SORTB       /RETURN TO CALLING SEQUENCE.
859                    /ANALOGUE TO DIGITAL CONVERSION FOR PDP-12
860    1341   4453    XADC,    JMS I INTEGER
861    1342   0360             AND      037       /********
862    1343   1357             TAD      OSAMP     /********
863    1344   3347             DCA      .+3       /********
864    1345   6002             IOF                /********
865    1346   6141             6141     /LINC     /********
866    1347   0100             0100     /SAM ?    /********
867    1350   0002             0002     /PDP      /********
868    1351   6001             ION                /********
869    1352   3045             DCA      FLAC+1    /********
870    1353   3046             DCA      FLAC+2    /********
871    1354   7326             CLA CLL CML RTL    /********
872    1355   3044             DCA      FLAC      /********
873    1356   5536             JMP I    EFUN3I    /********
874    1357   0100    OSAMP,   0100     /SAM 0    /********
875    1360   0037    037,     37                 /********
876           1361    SRNLST=,          /'MODIFY' CONTROL CHARACTER TABLE
877    1361   1271             SCHAR    /F.F. = CONTINUE
878    1362   1266             SCONT    /BELL = CHANGE SEARCH CHARACTER
879    1363   2740             RECOVR   /C.C. = BREAK
880    1364   1330             SBAR     /B.A. = RESTART
```

```
881    1365   :267                SCONT+1 /L.F. = FINISH THE LINE AS BEFORE.
882           1366         LISTGO=.
883    1366   .261                STETN   /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   .245                245     /%
887    1371   .242                242     /"
888    1372   .241                241     /!
889    1373   .243                243     /#
890    1374   .244                244     /$///
891           1375         GLIST=.
892    1375   .240                240     /SPACE
893           1376         TLIST=.
894    1376   .254                254     /,
895    1377   .273                273     /;
896    1400   .215                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   .453                 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   .101                 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
```

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936   1446  7341          CIA
937   1447  1331          TAD LASTV       /TEST FOR END OF LIST
938   1450  7752          SPA SNA CLA
939   1451  5264          JMP GS2         /END SEARCH
940   1452  1430          TAD I PT1       /GET TABLE ENTRY
941   1453  7241          CIA
942   1454  1061          TAD QADD
943   1455  7650          SNA CLA
944   1456  5312          JMP GFND1       /FOUND XX
945   1457  1230  GS4,    TAD PT1         /TRY NEXT ONE
946   1460  1372          TAD GINC
947   1461  5244          JMP GS3
948   1462  2051  PTEST,  PARTEST
949   1463  1601  GECALL, ECALL
950   1464  1331  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  0000          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  3202          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            /********
```

```
 991                                    /********
 992   1535   0000   XSPNOR, 0          /IGNORE LEADING SPACES - "SPNOR"
 993   1536   1066           TAD CHAR
 994   1537   1114           TAD M242
 995   1540   7640           SZA CLA
 996   1541   5735           JMP I XSPNOR
 997   1542   4545           GETC
 998   1543   5336           JMP XSPNOR+1
 999                                    /******** RECODING FOR SPACE
1000   1544   7506   M272,   -272       /********
1001   1545   0012   012,    12         /********
1002                                    /********
1003                                    /********
1004   1546   0000   XTESTN, 0          /RETURNS: ;; OTHER; NUMBER - "TESTN"
1005   1547   1066           TAD CHAR
1006   1550   1115           TAD MPER
1007   1551   7640           SZA CLA
1008   1552   2346           ISZ XTESTN
1009   1553   1066           TAD     CHAR    /******** RECODING FOR SPACE
1010   1554   1344           TAD     M272    /********
1011   1555   7100           CLL             /********
1012   1556   1345           TAD     012     /********
1013   1557   3054           DCA     SORTCN  /********
1014   1560   7430           SZL             /********
1015   1561   2346           ISZ     XTESTN  /********
1016   1562   5746           JMP I   XTESTN  /********
1017                                         /********
1018                  /EXIT FROM A "DO" SUBROUTINE
1019   1563   1137   RETRN,  TAD CFRSX     /(PC) => 0
1020   1564   3022           DCA PC
1021   1565   1413   XPOPJ,  TAD I PDLXR    /RECURSIVE EXIT - "POPJ"
1022   1566   3071           DCA T2
1023   1567   5471           JMP I T2
1024          1570   ATLIST=,              /ASK-TYPE CONTROL CHARACTER TABLE
1025   1570   1236           TINTR    /X - FORMAT DELIMITER
1026   1571   1227           TQUOT    /" - LITERAL DELIMITER
1027   1572   1246           TCRLF    /! - CARRIAGE RETURN AND LINE FEED
1028   1573   1243           TCRLF2   /# - CARRIAGE RETURN ONLY
1029   1574   3052           TDUMP    /$/- DUMP THE SYMBOL TABLE CONTENTS
1030   1575   1250           TASK4    /SP- TERMINATOR FOR NAMES
1031   1576   1250           TASK4    /, - TERMINATOR FOR EXPRESSIONS
1032   1577   0610           PROCESS /; - TERMINATOR FOR COMMANDS
1033   1600   0614           PC1      /C.R. - TERMINATOR FOR STRINGS
1034                  /$ - FOR 'TDUMP' TERMINATES THE COMMAND.
1035                  /EVALUATE AN EXPRESSION WHICH
1036                  /TERMINATES WITH AN R-PAR,; OR C.R. AND
1037                  /LEAVE THE RESULT IN FLAC AND IN FLARG.
1038   1601   0000   ECALL,  0        /RECURSIVE CALL TO "EVAL"
1039   1602   1054           TAD SORTCN        /SAVE 'SORTCN','LASTOP',AND 'EFOP'
1040   1603   4542           PUSHA
1041   1604   1055           TAD LASTOP
1042   1605   4542           PUSHA
1043   1606   1056           TAD EFOP          /SAVE FUNCTION CODE.
1044   1607   4542           PUSHA
1045   1610   1201           TAD ECALL         /RETURN TO CALLING
```

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1046    1511    4542            PUSHA           /ADDRESS AFTER NEXT POPJ
1047    1512    4545            GETC            /MOVE PAST EXTRA CHARACTER
1048    1513    3055    EVAL.   DCA LASTOP      /EVAUATION CONTROLLER (CHECKPOINT ?)
1049    1514    4564            TESTC           /TEST CHARACTER AND IGNORE SPACES
1050    1515    5227            JMP ETERM1      /TERMINATOR
1051    1516    5332            JMP ENUM        /NUMBER
1052    1517    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
```

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1101    1720    3030            DCA PT1
1102    1721    1024            TAD THISOP
1103    1722    1055            TAD LASTOP          /=07
1104    1723    7652            SNA CLA
1105    1724    5541            POPJ                /EXIT "EVAL"
1106    1725    1413            POPA                /GET PRIOR OP
1107    1726    3055            DCA LASTOP
1108    1727    5255            JMP ETERM2          /COMPARE THIS OP
1109    1710    4562    EPAR,   TSTLPR              /TEST FOR SUB-EXPRESSION
1110    1711    7410            SKP
1111    1712    5366            JMP EPAR2           /GO EVALUATE EXPRESSION
1112    1713    1055            TAD LASTOP          /CONTINUE READING THE EXPRESSION
1113    1714    4542            PUSHA               /SAVE "LASTOP",
1114    1715    1030            TAD PT1
1115    1716    3320            DCA .+2
1116    1717    4543            PUSHF               /SAVE LAST ARGUMENT
1117    1720    .000            00
1118    1721    1024            TAD THISOP          /MORE TO COME
1119    1722    3055            DCA LASTOP
1120    1723    4545    ARGNXT; GETC                /READ 1ST CHAR OF AN ARG.
1121    1724    4564            TESTC               /DO SPECIAL CHECK
1122    1725    5364            JMP ELPAR           /COULD BE LEFT PAREN
1123    1726    5332            JMP ENUM            /N
1124    1727    5343            JMP EFUN            /F
1125    1730    5220            JMP OPNEXT-2        /L
1126    1731    0430    OPTABL; FGET I PT1          /BASE FOR OPERATION COMPUTATION
1127    1732    4543    ENUM,   PUSHF               /TO PROCESS A NUMBER,SAVE AC
1128    1733    0044            FLAC
1129    1734    1125            TAD FLARGP          /SET POINTER AS FOR A VARIABLE,
1130    1735    3030            DCA PT1
1131    1736    3036            DCA INSUB           /POINT TO 'GETC' AND USE CHAR
1132    1737    4531            JMS I FINPUT        /READ TEXT NUMBER => (PT1)
1133    1740    4544            POPF                /RESTORE THE AC
1134    1741    0044            FLAC
1135    1742    5222            JMP OPNEXT          /CONTINUE
1136    1743    3056    EFUN,   DCA EFOP            /SET CODE
1137    1744    4545            GETC                /READ FUNCTION NAME.(1,2,OR 3 LETTERS)
1138    1745    4564            TESTC               /******** SEPARATES FILE BECAUSE F DIGIT
1139    1746    5355            JMP     EFUN2       /********
1140    1747    5771            JMP I   PFNUM       /********
1141    1750    7200            NOP                 /********
1142    1751    1056            TAD     EFOP        /********
1143    1752    7104            CLL RAL             /MISH-MASH HASH CODE
1144    1753    1066            TAD CHAR
1145    1754    5343            JMP EFUN
1146    1755    4562    EFUN2,  TSTLPR
1147    1756    4566            ERROR4              /MUST BE FOLLOWED BY PARENS TO SET ARGUMENT
1148    1757    4201            JMS ECALL           /CALL "EVAL" TO COMPUTE ARGUMENT
1149    1760    1413            POPA                /BRANCH ON FUNCTION CODE;RETURN VIA EFUN3I.
1150    1761    4547            SORTJ
1151    1762    2166                    FNTABL-1
1152    1763    6205                    FNTABF=FNTABL
1153    1764    4562    ELPAR,  TSTLPR              /LEFT PAREN OR FELL THROUGH FUNCTION TABLE
1154    1765    4566            ERROR4              /DOUBLE OPERATORS OR ILLEGAL FUNCTION NAME;
1155    1766    4201    EPAR2,  JMS ECALL           /EVALUATE NESTED EXPRESSION
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```
1156    1757    2013            ISZ PDLXR              /DUMP EXTRA ARG.
1157    1777    5536            JMP I EFUN3!
1158    1771    6311    PFNUM,  FNUM           /********
1159            1772    TERMS=.         /TERMINATOR TABLE FOR 'EVAL' AND 'GETVAR'
1160    1772    0240            240            /SPACE    0
1161    1773    0253            253            /*        1
1162    1774    0255            255            /-        2
1163    1775    0257            257            //        3
1164    1776    0252            252            /*        4
1165    1777    0336            336            /UP ARR   5
1166    2000    0250            250            /(        6 L-PARS
1167    2001    0333            333            /[        7
1168    2002    0274            274            /<        10
1169    2003    0251            251            /)        11 R-PARS
1170    2004    0335            335            /]        12
1171    2005    0276            276            />        13
1172    2006    0254            254            /,        14
1173    2007    0273            273            /!        15
1174    2010    0215            215            /C.R.     16
1175    2011    0275            275    /= TO END GETARG FROM 'SET'
1176                    /TWO MINOR FUNCTIONS
1177    2012    4543    XSGN,   PUSHF                  /TAKE SIGN*1 OF FLARG
1178    2013    2405            FLTONE
1179    2014    4544            POPF
1180    2015    0044            FLAC
1181    2016    1233    XABS,   TAD FLARG+1           /TAKE ABSOLUTE VALUE OF FLAC
1182    2017    7710            SPA CLA                /SKIP TO CONTINUE
1183    2020    4451            JMS I MINSKI           /NEGATE THE FLOATING AC
1184                    /CONTINUATION OF FUNCTION CALLS.
1185    2021    4407    EFUN3,  FINT
1186    2022    7000            FNOR                   /NORMALIZE FUNCTION RETURN
1187    2023    6232            FPUT FLARG             /SAVE FUNCTION VALUE
1188    2024    0000            FXIT
1189    2025    1125            TAD FLARGP             /SET POINTER
1190    2026    3030            DCA PT1
1191    2027    4251            JMS PARTEST
1192    2030    5631            JMP I .+1              /FUNCTION RETURN IS OK
1193    2031    1622            OPNEXT
1194
1195    2032    0000    FLARG,  0          /DATA TEMPORARY STORAGE
1196    2033    0000            0
1197    2034    0000            0
1198    2035    0000            0
1199    2036    0003    P3,     3
1200    2037    0000    LPRTST, 0                      /SKIP IF LEFT PAREN, = 'TSTLPR'
1201    2040    1054            TAD SORTCN
1202    2041    1121            TAD M11
1203    2042    7700            SMA CLA
1204    2043    5637            JMP I LPRTST
1205    2044    1054            TAD SORTCN
1206    2045    1120            TAD M5
1207    2046    7740            SMA SZA CLA
1208    2047    2237            ISZ LPRTST
1209    2050    5637            JMP I LPRTST
1210    2051    0000    PARTEST,0                      /TEST THE PAREN MATCHINGS
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1211    2252    1413            POPA                    /RESTORE LAST OPERATION
1212    2253    3255            DCA LASTOP
1213    2254    1236            TAD P3          .       /+3 TO COMPARE CODES
1214    2255    1413            POPA                    /GET LAST PAREN CODE.
1215    2256    7241            CIA                     /CHECK FOR PAREN MATCH.
1216    2257    1254            TAD SORTCN              /(STILL SET FROM THE LAST "EVAL")
1217    2260    7640            SZA CLA                 /SKIP IF MATCH
1218    2261    4566            ERROR4                  /PAREN ERROR
1219    2262    4545            GETC                    /MOVE PAST R-PAR
1220    2263    5651            JMP I PARTEST
1221                    /THE DELETE A LINE ROUTINE
1222    2264    0000    XDELETE,0               /UNCHAIN A LINE AND RECOVER THE SPACE.
1223    2265    6302            IOF                     /PROTECT POINTER CHANGES FROM INTERRUPTIONS
1224    2266    4555            FINDLN                  /SETS "THISLN" AND "LASTLN".
1225    2267    5664            JMP I XDELETE           /ALREADY GONE
1226    2270    2026            ISZ DEBGSW              /DISABLE TRACE
1227    2271    4545            GETC                    /MEASURE LENGTH
1228    2272    1066            TAD CHAR
1229    2273    1116            TAD MCR
1230    2274    7640            SZA CLA
1231    2275    5271            JMP .-4
1232    2276    1017            TAD AXOUT               /SAVE LAST ADDRESS
1233    2277    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      37   3212            DCA XRT2
1267    2147   1057            TAD CNTR              /CORRECT END OF BUFFER POINTER,
1268    2141   1360            TAD BUFR
1269    2142   3360            DCA BUFR
1270    2143   1310            TAD AXIN              /COMPUTE COUNT
1271    2144   7340            CMA
1272    2145   1012            TAD XRT2
1273    2146   3032            DCA T1
1274    2147   1310            TAD AXIN
1275    2150   1057            TAD CNTR
1276    2151   3310            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,
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1321    2224   4554   ERL,    GETLN           /ERASE LINES.
1322    2225   1060           TAD BUFR         /PROTECT REST OF TEXT.
1323    2226   3317           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   3022           DCA XCT
1369    2273   5644           JMP I XFIND
1370    2274   0000   UTRA,   0                /UNPACK CHARACTER. = "GETC"
1371    2275   4330           JMS GET1
1372    2276   7710   UTE,    SPA CLA          /NORM & EXTEND
1373    2277   1006           TAD C100         /300-337 & 340-376
1374    2300   1357           TAD M137         /240-276 & 200-236
1375    2301   1066           TAD CHAR
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1376    2302   7450            SNA
1377    2303   5316            JMP UTX           /"?" FOUND
1378    2304   1275            TAD P337
1379    2305   3366    UTQ,    DCA CHAR
1380    2306   1026            TAD DEBGSW
1381    2307   1100            TAD DMPSW
1382    2310   7650            SNA CLA           /PRINT ONLY IF BOTH ARE ZERO.
1383    2311   4551            PRINTC
1384    2312   5674            JMP I UTRA
1385    2313   4330    EXTR,   JMS GET1
1386    2314   7040            CMA
1387    2315   5276            JMP UTE
1388    2316   1026    UTX,    TAD DEBGSW        /TEST FOR TRACE-ENABLED
1389    2317   7640            SZA CLA
1390    2320   5326            JMP .+6
1391    2321   1100            TAD DMPSW         /FLIP THE TRACE FLOP
1392    2322   7650            SNA CLA
1393    2323   7001            IAC
1394    2324   3100            DCA DMPSW
1395    2325   5275            JMP UTRA+1        /GET NEXT CHARACTER INSTEAD.
1396    2326   1110            TAD P277          /TRACE DISABLED - RETURN "?"
1397    2327   5305            JMP UTQ
1398    2330   0000    GET1,   0                 /UNPACK 6-BITS
1399    2331   2020            ISZ XCT           /STARTS=0
1400    2332   5345            JMP GET3
1401    2333   1021            TAD GTEM
1402    2334   0122    GEND,   AND P77
1403    2335   3066            DCA CHAR          /SAVE
1404    2336   1066            TAD CHAR
1405    2337   1103            TAD M77
1406    2340   7650            SNA CLA
1407    2341   5313            JMP EXTR          /EXTENDED
1408    2342   1066            TAD CHAR
1409    2343   1356            TAD M40
1410    2344   5730            JMP I GET1
1411    2345   1417    GET3,   TAD I AXOUT       /(X-MEM)
1412    2346   3021            DCA GTEM
1413    2347   7040            CMA
1414    2350   3020            DCA XCT
1415    2351   1021            TAD GTEM
1416    2352   7112            RTR CLL
1417    2353   7012            RTR
1418    2354   7012            RTR
1419    2355   5334            JMP GEND
1420    2356   7740    M40,    -40
1421    2357   7641    M137,   -137
1422    2360   0000    XENDLN, 0        /TERMINATE THE BUFFERED LINE - "ENDLN"
1423    2361   7000            CDF T            /(X-MEM)
1424    2362   1425            TAD I LASTLN     /SAVE OLD POINTER
1425    2363   3460            DCA I BUFR
1426    2364   1060            TAD BUFR         /POINT TO NEW LAST LINE
1427    2365   3425            DCA I LASTLN
1428    2366   1061            TAD QADD                  /CHECK FOR EXTRA INFO
1429    2367   7440            SZA
1430    2370   3410            DCA I AXIN
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1431    2371    1213            TAD AXIN        /COMPUTE NEW END OF BUFFER
1432    2372    7001            IAC
1433    2373    3063            DCA BUFR
1434    2374    1063            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    1253            TASK4   /"
1439    2420     614            PC1     /C.R. = AUTOMATIC QUOTE MATCH
1440            2401    INFIX=. /DATA CONTROL CHARACTERS
1441    2401    6202            FLINTP*2        /LEFT ARROW     = KILL
1442    2402     757            INPUT+1         /RUBOUT         = IGNORE
1443    2403     757            INPUT+1         /L.F.          = IGNORE
1444    2404    6252            ENDFI*5         /ALT MODE       = EXIT
1445    2405    0201    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            2032    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   1233           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   2500   1076           TAD CLF
1506   2501   5274           JMP OUTX-1
1507   2502   0000   PACBUF, 0              /PACK A CHARACTER = "PACKC"
1508   2503   1110           TAD P277
1509   2504   7041           CIA
1510   2505   1066           TAD CHAR
1511   2506   7450           SNA            /CHANGE 277 TO 337
1512   2507   1352           TAD P40
1513   2510   1101           TAD M100
1514   2511   7450           SNA            /TEST FOR RUBOUT.
1515   2512   5755           JMP I RUBIT
1516   2513   1353           TAD P377
1517   2514   3071           DCA T2         /SAVE INPUT ITEM
1518   2515   1071           TAD T2         /SO THAT QUESTION DOESN'T MAKE
1519   2516   0354           AND C140       /CHAR LOOK LIKE A LEFT=ARROW
1520   2517   1356           TAD M140
1521   2520   7440           SZA            /DATA WORD.
1522   2521   1354           TAD C140
1523   2522   7650           SNA CLA
1524   2523   5332           JMP ESCA       /340=377 AND 200=237
1525   2524   1071   PA1,    TAD T2         /240=337
1526   2525   0122           AND P77
1527   2526   7440           SZA            /IGNORE 300
1528   2527   4335           JMS PCK1
1529   2530   7000   PACX,   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   1313           TAD PDLXR      /CHECK FOR OVERFLOW
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1541     2544     7141              CMA IAC CLL
1542     2545     3005              TA, P13                /RESERVATIONS FOR PUSH-DOWN LIST
1543     2546     1712              TAD AXIN
1544     2547     7620              SNL CLA
1545     2550     5735              JMP I PCK1
1546     2551     4566              ERROR2                 /FULL BUFFER
1547     2552     0040     P40,     40
1548     2553     0377     P377,    377
1549     2554     0140     C140,    140
1550     2555     3004     RUBIT,   RUB1
1551     2556     7640     M140,    -140
1552     2557     4557     ROT,     RTL6     /(EAE)
1553     2560     3361              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     1466              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 8K
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     6341              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
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1596        4  3265            DCA  OPTRI
1597     2625  6031     KINT,   KSF                  /CHECK FOR KEYBOARD FIRST
1598     2626  5246            JMP EXIT
1599     2627  6336            KRB                  /READ BUFFER AND CLEAR FLAG TO FETCH NEXT
1600     2630   106            AND P177             /IGNORE BLANK AND L-T AND PARITY BIT.
1601     2631  7450            SNA
1602     2632  5246            JMP EXIT
1603     2633  1123            TAD C200
1604     2634  3262            DCA SIN
1605     2635  1262            TAD SIN
1606     2636  1202            TAD MBREAK           /MANUAL STOP?
1607     2637  7650            SNA CLA
1608     2640  5340            JMP RECOVR
1609     2641  1034            TAD INBUF            /ANY SPACE?
1610     2642  7640            SZA CLA
1611     2643  4566            ERROR2               /WILL WAIT FOR OUTPUT BUFFER
1612     2644  1262            TAD SIN
1613     2645  3034            DCA INBUF            /SAVE INPUT
1614     2646  6131     EXIT,   CLSK                 /********
1615     2647  5253            JMP      NOCLK       /********
1616     2650  6135            CLSA                 /********
1617     2651  7200            CLA                  /********
1618     2652  3261            DCA      CLKFLG      /********
1619
1620                    /KW12 CLOCK INTERRUPT ROUTINE
1621                    /
1622     2653  6244     NOCLK,  RMF
1623     2654  1201            TAD SAVLK
1624     2655  7104            RAL CLL
1625     2656  1200            TAD SAVAC
1626     2657  6001            ION
1627     2660  5400     EXITJ,  JMP I 0              /MODIFIED FOR PDP-5
1628     2661  0000     CLKFLG; 0                    /******** SET TO 0 EVERY INTERRUPT
1629     2662  0000     SIN,    0
1630     2663  3120     OPTR0,  IOBUF    /OUTPUT POINTERS
1631     2664  3120     OPTRO,  IOBUF    /VARS
1632     2665  3120     OPTRI,  IOBUF
1633     2666  0000     X133,   0                    /VIA (INDEV)
1634     2667  1034            TAD INBUF            /ANY INPUT?
1635     2670  7450            SNA                  /******** REFRESH SCOPE WHILE WAITING
1636     2671  4574            JMS I   PWAIT        /******** FOR INPUT
1637     2672  3276            DCA XOUTL
1638     2673  3034            DCA INBUF            /CLEAR INPUT BUFFER
1639     2674  1276            TAD XOUTL
1640     2675  5666            JMP I X133
1641     2676  0000     XOUTL,  0                    /VIA (OUTDEV)
1642     2677  3266            DCA X133             /SAVE CURRENT CHARACTER.
1643     2700  6001            ION                  /BE SURE INTERRUPT IS ON.
1644     2701  1664            TAD I OPTRO          /ANY ROOM?
1645     2702  7640            SZA CLA              /A CHARACTER IS NON-ZERO
1646     2703  4574            JMS I   PWAIT        /******** REFRESH SCOPE
1647     2704  6002            IOF
1648     2705  1016            TAD TELSW            /IN PROGRESS?
1649     2706  7640            SZA CLA
1650     2707  5314            JMP .+5
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1651    2710    1266            TAD X133            /NO
1652    2711    6346            TLS                 /TYPE CHARACTER,
1653    2712    3316            DCA TELSW            /SET IN-PROGRESS FLAG,
1654    2713    5323            JMP .+12            /RETURN
1655    2714    1266            TAD X133            /SEND DATA
1656    2715    3664            DCA I 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
                                                    /ERROR CALLED FROM A TABLE
1665    2725    3326    ERROR5: DCA .+1             /LIMIT EXCEEDED
1666    2726    0000    ERR2,   0                   /COMPUTE CALLING ADDRESS (ALSO "SPACE")
1667    2727    7240            CLA CMA             /AND USE IT AS ERROR NUMBER,
1668    2730    1326            TAD ERR2            /SAVE ERROR CODE,
1669    2731    3067            DCA LINENO          /              (JMP,+4) = FOR DEBUGGING
1670    2732    6001            ION                 /WAIT FOR OUTPUT TO FINISH
1671    2733    1016            TAD TELSW
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 P7720           /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   2775  4551              PRINTC          /PRINT SPACE AGAIN AND
1727   2776  4553              PRNTLN          /PRINT LINE OF ERROR.
1708   2777  1077              TAD CCR
1709   3000  4551              PRINTC
1710   3001  1126              TAD PTCH        /RESET "READC"
1711   3002  3152              DCA RDIV        /IF AN ERROR OCCURS.
1712   3003  5177              JMP START       /INTERRUPT WILL BE RE-ENABLED SOON.
1713                   /CHRACTER REMOVAL ROUTINE
1714   3004  1062      RUB1,   TAD XCTIN       /RUBOUT ONE LETTER
1715   3005  7640              SZA CLA
1716   3006  5214              JMP .+6
1717   3007  1010              TAD AXIN
1718   3010  7041              CIA
1719   3011  1027              TAD PACKST
1720   3012  7720              SMA CLA         /TEST NULL LINE
1721   3013  5641              JMP I RUB5
1722   3014  1251              TAD SPLAT       /FOR A RUBOUT ACKNOWLEDGEMENT
1723   3015  4551              PRINTC
1724   3016  1010              TAD AXIN
1725   3017  3071              DCA T2
1726   3020  7000              CDF T           /(X=MEM)
1727   3021  2062              ISZ XCTIN       /TEST HALF
1728   3022  5242              JMP RUB2
1729   3023  2122              TAD I T2        /"ADD" IS FULL.
1730   3024  0122              AND P77
1731   3025  1103              TAD M77
1732   3026  7640              SZA CLA         /TEST FOR EXTEND
1733   3027  5237              JMP RUB4
1734   3030  7040      RUB3.   CMA             /SET SWITCH
1735   3031  3062              DCA XCTIN
1736   3032  7040              CMA             /BACKUP POINTER
1737   3033  1010              TAD AXIN
1738   3034  3010              DCA AXIN
1739   3035  1471              TAD I T2        /RESET ADD
1740   3036  0101              AND P7700
1741   3037  3061      RUB4.   DCA QADD
1742   3040  5641              JMP I RUB5
1743   3041  2530      RUB5.   PACX
1744   3042  1471      RUB2.   TAD I T2        /CHECK FOR EXTENDED
1745   3043  0101              AND P7700
1746   3044  1006              TAD C100
1747   3045  7640              SZA CLA
1748   3046  5230              JMP RUB3
1749   3047  3471              DCA I T2        /SAVE CORRECTION
1750   3050  5231              JMP RUB3+1
1751   3051  0334      SPLAT,  334
1752                   /SYMBOL TABLE TYPEOUT ROUTINE
1753   3052  1060      TDUMP,  TAD STARTV      /INIT POINTER FOR SYMBOL DUMP.(X=MEM)
1754   3053  3030              DCA PT1
1755   3054  1031              TAD LASTV       /TEST FOR END OF LIST
1756   3055  7041              CIA
1757   3056  1030              TAD PT1
1758   3057  7650              SNA CLA
1759   3060  5541              POPJ
1760   3061  1430              TAD I PT1       /GET THE VARIABLE
```

```
1761    3262   3316            DCA OP+1         /(DCA I (4)=FOR(X=MEM))ISAVE NAME
1762    3263   1315            TAD OP           /SETUP UNPACK POINTERS
1763    3264   3217            DCA AXOUT
1764    3265   3023            DCA XCT
1765    3266   4545            GETC             /READ AND PRINT "XX("
1766    3267   4551            PRINTC
1767    3270   4545            GETC
1768    3271   4551            PRINTC
1769    3272   4545            GETC
1770    3273   4551            PRINTC
1771    3274   2030            ISZ PT1
1772    3275   1430            TAD I PT1        /PRINT SUBSCRIPT TO 99
1773    3276   4714            JMS I PRNT2
1774    3277   4545            GETC             /PRINT ")"
1775    3100   4551            PRINTC
1776    3101   2030            ISZ PT1
1777    3102   4407            FINT             /PICK UP VALUE
1778    3103   0430            FGET I PT1
1779    3104   0000            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 I FOCAL + FLOAT + DIALOG ,
1807                   /LOADING THE LAST SECTION MAY BE CONSIDERED OPTIONAL.
1808           3216   BUFREG=,                  /TEXT BUFFER STARTS HERE,
1809           3600   *3600
1810    3600   2741   01,      RECOVR+1/STARTING ADDRESS
1811    3601   1200   BEGIN,   TAD 01 /INITIALIZE ANY B=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      76  3414             DCA I FLTXR
1817    3437  2057             ISZ CNTR/INITIALIZED BY LOAD.
1818    3417  5206             JMP .-2 /CLEAR INPUT BUFFER
1819    3411  7200    T12,     CLA              /******** FIX UP DIAL I/O ROUTINES
1820    3412  6213             6213    /CIF CDF 10/********
1821    3613  3667             DCA I   G7775   /********
1822    3614  1262             TAD     G5772   /********
1823    3615  3670             DCA I   G7776   /********
1824    3616  1263             TAD     G5773   /********
1825    3617  3671             DCA I   G7777   /********
1826    3620  6201             6201    /CDF 0  /********
1827    3621  4666             JMS I   G7774   /********
1828    3622  3655             GBLOK           /********
1829    3623  6212             6212    /CIF 10 /********
1830    3624  4664             JMS I   G7200   /********
1831    3625  6211             6211    /CDF 10 /********
1832    3626  2400             2400            /********
1833    3627  6211             6211    /CDF 10 /********
1834    3632  7400             7400            /********
1835    3631  7400             400             /********
1836    3632  6212             6212    /CIF 10 /********
1837    3633  4667             JMS I   G7775   /******** WRITE MILDRED INTO UPPER
1838    3634  3651             RITEOU          /******** SOURCE WORKING AREA
1839    3635  6132             CLLR            /******** INITIALIZE CLOCK
1840    3636  6134             CLEN            /********
1841    3637  7240             CLA CMA         /********
1842    3640  6133             CLAB            /********
1843    3641  1261             TAD     G101    /********
1844    3642  6132             CLLR            /********
1845    3643  6135             CLSA            /********
1846    3644  7200             CLA             /********
1847    3645  6046             TLS             /********
1848    3646  6001             ION             /********
1849    3647  5650             JMP I   .+1     /********
1850    3650  2216             ERT             /******** ERASE ALL
1851    3651  0110    RITEOU,  110             /********
1852    3652  0030             30              /********
1853    3653  0076             76              /********
1854    3654  0002             2               /********
1855    3655  0100    GBLOK,   100             /********
1856    3656  0025             25              /********
1857    3657  0023             23              /********
1858    3660  0001             1               /********
1859    3661  0101    G101,    101             /********
1860    3662  5772    G5772,   5772            /********
1861    3663  5773    G5773,   5773            /********
1862    3664  7200    G7200,   7200            /********
1863    3665  7773    G7773,   7773            /********
1864    3666  7774    G7774,   7774            /********
1865    3667  7775    G7775,   7775            /********
1866    3670  7776    G7776,   7776            /********
1867    3671  7777    G7777,   7777            /********
1868          4620    *4600*20
1869    4620  1045    FEXP,    GETSGN                   /TAKE ABSOLUTE VALUE
1870    4621  7710             SPA CLA
```

```
1871    4622    4724            JMS I NEGP
1872    4623    3433            DCA T3   /C(SIGN)=-1 IF I X2<0
1873    4624    4407            FINT
1874    4625    4313            FMUL LG2E
1875    4626    6675            FPUT I X2
1876    4627    0000            FEXT
1877    4630    4453            JMS I INTEGER    /TAKE INTEGER PART
1878    4631    3325            DCA FLAG2        /SAVE LOW ORDER DATA
1879    4632    4407            FINT
1880    4633    7000            FNOR
1881    4634    6676            FPUT I XSQ2
1882    4635    0675            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    0325            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
```

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1926   4710   007    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 BETZ
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 ALFZ
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   ALFZ,  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   BETZ,  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
```

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1981    4775   3427                    3427
1982    4776   7452                    7452
1983                   /FLOATING POINT ARC TANGENT
1984           5200    *5200
1985    5200   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
```

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2036    5262   7200              FEXT
2037    5263   7240              CLA CMA
2038    5264   3233    STARTL:   DCA T3
2039    5265   1205              TAD P13
2040    5266   3044              DCA FLAC
2041    5267   7240              CMA
2042    5270   1756              TAD I TEM
2043    5271   3445              DCA FLAC+1
2044    5272   3046              DCA FLAC+2
2045    5273   3047              DCA FLAC+3
2046    5274   7001              IAC
2047    5275   3756              DCA I TEM
2048    5276   4407              FINT
2049    5277   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   3771              3771
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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    4427            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
```

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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   0300           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
```

```
2201    5321    340     X,      2000
2202    5322    000             0000
2203    5723    000             0000
2204    5324    000             0000
2205    5325    000     XSQR,   0000
2206    5326    000             0000
2207    5327    000             0000
2208    5332    000             0000
2209                    /SINE CONSTANTS
2210    5331    7764    C9,     7764
2211    5332    2501            2501
2212    5333    7015            7015
2213    5334    1042            1042
2214    5335    7771    C7,     7771
2215    5336    5464            5464
2216    5337    5514            5514
2217    5340    6150            6150
2218    5341    7775    C5,     7775
2219    5342    2431            2431
2220    5343    5361            5361
2221    5344    4736            4736
2222    5345    0000    C3,     0000
2223    5346    5325            5325
2224    5347    0414            0414
2225    5350    3167            3167
2226                    /END OF EXTENDED FUNCTIONS.
2227                    /
2228                    /HANDLES O I, EXPRESSION
2229                    /SETS CLOCK ACCORDING TO EXPRESSION
2230                    /
2231    5351    4540    SETCLK: PUSHJ               /********
2232    5352    1612            EVAL=1              /********
2233    5353    4407            FINT               /********
2234    5354    4375            FMUL     MHUNDRD    /********
2235    5355    0000            FEXT               /********
2236    5356    6132            CLLR               /********
2237    5357    6134            CLEN               /********
2238    5360    4453            JMS I    INTEGER    /********
2239    5361    6133            CLAB               /********
2240    5362    7200            CLA                /********
2241    5363    1006            TAD      C100       /********
2242    5364    6132            CLLR               /********
2243    5365    1123            TAD      C200       /********
2244    5366    6134            CLEN               /********
2245    5367    1374            TAD      04600      /********
2246    5370    6132            CLLR               /********
2247    5371    7200            CLA                /********
2248    5372    5773            JMP I    .+1        /********
2249    5373    0611            PROC               /********
2250    5374    4600    04600,  4600               /********
2251    5375    0007    MHUNDRD,71470010           /********
        5376    4700
        5377    0000
2252                    /PAGE 1 = INPUT/OUTPUT ROUTINES FOR THE FOCAL
2253                    /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
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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 Ø.1
2313    5463    2533            ISZ T3          /COMPENSATE BY INCREMENTING EXPONENT
2314    5464    7200            CLA
2315    5465    1Ø52    FPRNT,  TAD FISW        /AUTO-INDEX REGISTER ALREADY SET, - -PRINT-
2316    5466    7650            SNA CLA         / F = Ø ?
2317    5467    5356            JMP FLOUT       /YES, OUTPUT AS FLOATING NUMBER
2318    5470    1335            TAD FCOUNT
2319    5471    1Ø33            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    1Ø33            TAD T3
2327    5501    7041            CIA
2328    5502    3032            DCA T1          /SET UP MINUS P
2329    5503    1Ø33    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    1Ø32            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    2Ø32            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,   Ø               /MODIFIABLE LOCATIONS
2354    5534    0000    SCOUNT, Ø
2355    5535    0000    FCOUNT, Ø
2356            5536    PLCE-,
2357    5536    0000    OUTA,   2               /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    5620            JMP I TGO       /YES, NUMBER FINSHED
2362    5543    7040    DIG,    CMA
2363    5544    1Ø33            TAD T3          /REDUCE E, BY 1
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2364    5545    3933            DCA T3
2365    5546    2334            ISZ SCOUNT      /ARE ALL SIG. FIGS, USED?
2366    5547    5353            JMP .+4         /NO
2367    5550    7040            CMA             /YES,
2368    5551    3334            DCA SCOUNT      /RESET COUNT TO -1
2369    5552    5313            JMP IN          /AND LEAVE C(AC) = 0
2370    5553    1414            TAD I FLTXR     /TAKE NEXT DIGIT FROM BUFFER
2371    5554    5313            JMP IN
2372                    /DO FLOATING OUTPUT
2373    5555    7200            CLA             /IF OUTPUT TOO LARGE,
2374    5556    4732    FLOUT,  JMS I OPUT      /PRINT "0"
2375    5557    1102            TAD PER
2376    5560    4551            PRINTC          /PRINT "."
2377    5561    2200            ISZ TGO         /SECOND RETURN
2378    5562    1414            TAD I FLTXR     /TAKE NEXT DIGIT FROM BUFFER
2379    5563    4336            JMS OUTA        /PRINT IT
2380    5564    2334            ISZ SCOUNT      /TEST FOR END OF INPUT
2381    5565    5362            JMP .-3         /AND REPEAT
2382    5566    7040            CMA
2383    5567    3334            DCA SCOUNT      /OUTPUT EXTRA ZEROS,
2384    5570    5363            JMP .-5
2385    5571    0000    ABSOLV, 0
2386    5572    1045            TAD HORD
2387    5573    3050            DCA SIGNF
2388    5574    1045            TAD HORD
2389    5575    7710            SPA CLA
2390    5576    4451            JMS I MINSKI
2391    5577    5771            JMP I ABSOLV
2392                    /DOUBLE PRECISION DECIMAL-BINARY
2393                    /INPUT AND CONVERSION FOR + OR - XXX...
2394            5600    *5600
2395    5600    0000    DECONV, 0
2396    5601    3046            DCA LORD
2397    5602    3044            DCA EXP         /ZERO THE EXPONENT AND
2398    5603    3045            DCA HORD        /INITIALIZE FLOATING AC,
2399    5604    3047            DCA OVER2
2400    5605    3314            DCA DNUMBR
2401    5606    3050            DCA SIGNF
2402    5607    1066            TAD CHAR        /ALLOW KEYBOARD SIGN CHECKS,
2403    5610    1264            TAD MPLUS
2404    5611    7450            SNA
2405    5612    5220            JMP .+6         /+SIGN, GET NEXT
2406    5613    1111            TAD M2          /CHECK - SIGN
2407    5614    7640            SZA CLA
2408    5615    5221            JMP .+4
2409    5616    7040            CMA             /INIT SIGN CHECK TO POS,
2410    5617    3050            DCA SIGNF
2411    5620    4666            JMS I XINPUT    /GET NEXT
2412    5621    1066            TAD CHAR        /A SPACE PERHAPS?
2413    5622    1265            TAD MSPACE
2414    5623    7650            SNA CLA
2415    5624    5220            JMP .-4
2416    5625    4227            JMS DECON
2417    5626    5600            JMP I DECONV
2418    5627    0000    DECON,  0
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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   0300   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
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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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                                                    /PRINT "-" OR A SPACE.
2529      6005   1334            TAD SMSP
2530      6006   1336            TAD SMIN
2531      6007   4551            PRINTC
2532      6010   4753            JMS I ABSOL2       /INITIALIZE DECIMAL EXPONENT
2533      6011   3033    FG02,   DCA T3             /IS EXP 0 TO 4?
2534      6012   1344            TAD EXP
2535      6013   7510            SPA                /TOO LARGE:MULTIPLY BY 1/10.
2536      6014   5227            JMP FG03
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   .000            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            /MULTIPLY BY TWO TO POSITION BIT0
2552      6034   3745    FG04,   DCA I DPT          /CLEAR OVERFLOW WORD
2553      6035   3746            DCA I REPT         /INIT BUFFER POINTER
2554      6036   1350            TAD SADR
2555      6037   3014            DCA FLTXR          /COMPUTE BITS IN 1ST DIGIT
2556      6040   1044            TAD EXP
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   7200            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
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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  5630          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  5630          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, 7750|2333|5733 /********
        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     LWETMP     /********
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   0430            FGET I PT1
```

```
2692      245   040              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 FIGO4
2698     6253  4407              FINT                /, IS TO THE LEFT!
2699     6254  4275              FMUL PTEN           /TIMES .1000
2700     6255  6432           v  FPUT I PT1
2701     6256  0000              FEXT
2702     6257  7001              IAC
2703     6260  5266              JMP .+6
2704     6261  4407   FIGO4,     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  3256              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    1045            TAD     HORD    /********
2752    6326    3173            DCA     LESUBS  /********
2753    6327    1413            POPA            /******** FILE NO.
2754    6330    6212            6212            /********
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            /******** JMPS ON SUBCOMMAND OF LIBR XXXX
2774    6354    4547            SORTJ           /********
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
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
```

/ FLOATING-POINT INTERPRETER FOR FOCAL.

```
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    4772    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   027    TEST2,   0027              /ALREADY DONEI (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   1346            TAD LORD          /EXIT WITH LOW ORDER RESULT IN AC.
3031    6747   5724            JMP I FIX
3032    6750   0027   P27,     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    7214   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    70     0002            2                 /ACCUMULATE START    IN #2 DATA WORD
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3077    7123    1042            TAD E           /A*E
3078    7124    4752            MULTY
3079    7125    0003            3
3080    7126    1046            TAD B           /B*D
3081    7127    3751            SAVE
3082    7130    1241            TAD D
3083    7131    4752            MULTY
3084    7132    0003            3
3085    7133    1042            TAD E           /B*E
3086    7134    4752            MULTY
3087    7135    0004            4
3088    7136    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    1241            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    1000            0/#6-LOW ORDER RESULT
3120    7075    0002            0/#5
3121    7076    1000            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    2250            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          /4IDIVIDE
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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  0345        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    1343            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    7341                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    5630                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  1290        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  1290        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   XSORT,  FINT
3350    7401  6274        FPUT FPAC1        /VALUE
3351    7402  0000        FEXT             /NEWTON'S METHOD IS USED
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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   0274           FGET FPAC1
3374    7431   3270           FDIV ITER1
3375    7432   1270           FADD ITER1
3376    7433   0000           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   0000           FEXT
3401    7464   5227           JMP CLCU
3402    7465   3344   SQEND,  DCA EXP
3403    7466   5536           RETURN
3404    7467   3015   SQCON1, 3015
3405           7470   BUFFER=.
3406    7472   0000   ITER1,  0
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```
3427    7471    7000                    ,
3428    7472    0000
3429    7473    000                     A
3410    7474    0020    FDAL1,  0
3411    7475    0000            0
3412    7476    0000            C
3413    7477    7503            BUFFER+13       /ADDRESS OF NEXT FREE LOCATION IN 10-DIGIT VERSION.
3414                            /=7503  /********
3415    7520    0000    SCOPOU; 0               /******** OUTPUT ROUTINE FOR SCOPE
3416    7501    0106            AND     P177    /******** STORES CHARS IN FLD1, LOCS 400-777
3417    7502    1367            TAD     07763   /********
3418    7503    7440            SZA             /********
3419    7504    5310            JMP     NOCRLF  /********
3420    7505    3364    CRLF,   DCA     NCOLS   /********
3421    7506    2365            ISZ     NFEEDS  /********
3422    7507    5321            JMP     ITSOK   /********
3423    7510    1371    NOCRLF; TAD     07655   /********
3424    7511    7100            CLL             /********
3425    7512    1006            TAD     C100    /********
3426    7513    7420            SNL             /********
3427    7514    7610            SKP CLA         /********
3428    7515    1361            TAD     NLINES  /********
3429    7516    7450            SNA             /********
3430    7517    5700            JMP I   SCOPOU  /********
3431    7520    2364            ISZ     NCOLS   /********
3432    7521    6002    ITSOK,  IOF             /********
3433    7522    6141            LINC            /********
3434                    LMODE                   /********
3435    7523    0644            LDF 4           /********
3436    7524    1362            STH I   OPTR    /********
3437    7525    0011            CLR             /********
3438    7526    0002            PDP             /********
3439                    PMODE                   /********
3440    7527    6201            6201            /********
3441    7530    2366            ISZ     NCHARS  /********
3442    7531    1366            TAD     NCHARS  /********
3443    7532    1215            TAD     07000   /********
3444    7533    7710            SPA CLA         /********
3445    7534    1361            TAD     NLINES  /********
3446    7535    1365            TAD     NFEEDS  /********
3447    7536    7710            SPA CLA         /********
3448    7537    5356            JMP     NOHANG  /********
3449    7540    1366            TAD     NCHARS  /********
3450    7541    6213            6213            /******** TOO MANY LINES/CHARS DISPLAYED
3451    7542    4020            JMS     WAITER  /******** HANG ON DISPLAY UNTIL SOMETHING IS TYPED
3452    7543    6031            KSF             /********
3453    7544    5343            JMP     .-4     /********
3454    7545    6034            KRS             /********
3455    7546    1372            TAD     07566   /********
3456    7547    7650            SNA CLA         /********
3457    7550    6032            KCC             /******** IGNORE LINE FEED
3458    7551    1370            TAD     06377   /********
3459    7552    3774            DCA I   PPTR    /******** CLEAR
3460    7553    3366            DCA     NCHARS  /******** THE
3461    7554    3365            DCA     NFEEDS  /******** CHARACTER
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3462    7555   3364              DCA    NCOLS    /******** DISPLAY
3463    7556   6001    NOHANG,   ION             /********
3464    7557   1364              TAD    NCOLS    /********
3465    7560   1373              TAD    07716    /********
3466    7561   7740    NLINES,   SMA SZA CLA     /********
3467    7562   5305              JMP    CRLF     /********
3468    7563   5700              JMP I  SCOPOU   /********
3469    7564   0000    NCOLS,    0               /********
3470    7565   0000    NFEEDS,   0               /********
3471    7566   0000    NCHARS,   0               /********
3472    7567   7763    07763,    7763
3473    7570   6377    06377,    6377
3474    7571   7655    07655,    7655             /********
3475    7572   7566    07566,    7566             /********
3476    7573   7716    07716,    7716             /********
3477    7574   6002    PPTR,     OPTR             /********
3478           7576              *7576            /********
3479                   /
3480                   /FDIS FUNCTION - STORES 2 WORDS
3481                   /PER CALL IN 2200 THRU 5777 IN FLD1
3482                   /
3483    7576   4453    CALLIN,   JMS I  INTEGER /********
3484    7577   6213              6213            /********
3485    7600   5601              JMP I  .+1      /********
3486    7601   2071              INCALL          /********
3487    7602   4407    XDISP,    FINT            /********
3488    7603   4251              FMUL   FORHUN   /********
3489    7604   0000              FEXT            /********
3490    7605   4453              JMS I  INTEGER /********
3491    7606   7510              SPA             /********
3492    7607   7041              CIA             /********
3493    7610   3350              DCA    STEMP    /********
3494    7611   1066              TAD    CHAR     /********
3495    7612   1256              TAD    MMCOM    /********
3496    7613   7640              SZA CLA /********
3497    7614   4566              ERROR3 /********
3498    7615   4540              PUSHJ  /********
3499    7616   1612              EVAL-1 /********
3500    7617   4407              FINT   /********
3501    7620   4253              FMUL   FIVHUN /********
3502    7621   0000              FEXT   /********
3503    7622   4453              JMS I  INTEGER /********
3504    7623   3351              DCA    STEMP2 /********
3505    7624   1271              TAD    SPTR
3506    7625   1247              TAD    MLIMIT
3507    7626   7650              SNA CLA
3508    7627   4566              ERROR3
3509    7630   6002              IOF             /********
3510    7631   6211              6211   /CDF 10 /********
3511    7632   7350              CLA CLL CMA RAR
3512    7633   0350              AND    STEMP
3513    7634   3671              DCA I  SPTR     /********
3514    7635   2271              ISZ    SPTR     /********
3515    7636   1351              TAD    STEMP2 /********
3516    7637   1250              TAD    07400    /********
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3517    7640   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   .011   FORHUN, 11;2700        /********
        7652   2700
3527    7653   .011   FIVHUN, 11;377010      /********
        7654   3770
        7655   .000
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   .000   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   .020   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     /********
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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  21111111  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


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  00030000  00000000

3200  00000011  11111100  00000000  00000000  00300000  00000000  00000000  00000000
3300  00000000  10000000  00300000  00000000  00000300  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  0000000  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                301     *1                      /********
3617    0001    0000    XQ,                     /********
3618    0002    0400    D256,   400             /(REFERENCED AS LOC 2)
3619    0003    0200    0200,   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    0360,   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    0760,   760             /********
3631    0016    0000    ALPHA,  0               /********
3632    0017    0000    BETA,   0               /********
3633            0020    *20                     /********
3634                    /
3635                    /ENTERED WITH NO. CHARS IN AC; 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     0360    /********
3646    0030    3077            DCA     Y       /********
3647    0031    3001            DCA     XQ      /********
3648    0032    6141            LINC            /********
3649                    LMODE
3650    0033    1325    CHRLUP, LDH I GAMMA     /********
3651    0034    0450            AZE             /********
3652    0035    6045            JMP GOODY       /********
3653    0036    2077            ADD Y           /********
3654    0037    2015            ADD 0760        /********
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 0200        /********
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   467              SKP           /********
3672    0061   6141    NOASCII,LINC           /********
3673    0062   0077             SET I BETA    /********
3674    0063   2200             2200          /********
3675    0064   0645             LDF 5         /********
3676    0065   6102             JMP SUBR      /********
3677    0066   0077             SET I BETA    /********
3678    0067   2000             2000          /********
3679    0070   0646             LDF 6         /********
3680    0071   6102             JMP SUBR      /********
3681    0072   0002    WEXIT,   PDP           /********
3682                   PMODE
3683    0073   6203             6203    /CIF CDF 0     /********
3684    0074   7200             CLA           /********
3685    0075   5420             JMP I    WAITER /********
3686    0076   4377    04377,   4377    /********
3687    0077   0000    Y,       0       /********
3688    0100   0171    PSUBS,   SUBS    /********
3689    0101   0173    PLESUBS,LESUBS   /********
3690                   LMODE                  /********
3691    0102   0056    SUBR,    SET ALPHA     /******** DISPLAYS POINTS
3692    0103   0000             0000          /********
3693    0104   0415             KST           /********
3694    0105   0467             SKP           /********
3695    0106   6072             JMP WEXIT     /********
3696    0107   0500             IOB           /********
3697    0110   6041             TSF           /********
3698    0111   0467             SKP           /********
3699    0112   6072             JMP WEXIT     /********
3700    0113   1017             LDA BETA      /********
3701    0114   0467             SKP           /********
3702    0115   1037    WAITLP,  LDA I BETA    /********
3703    0116   0451             APO           /********
3704    0117   6072             JMP WEXIT     /********
3705    0120   4005             STC GAMMA     /********
3706    0121   1037             LDA I BETA    /********
3707    0122   0145             DIS GAMMA     /********
3708    0123   0217             XSK BETA      /********
3709    0124   6115             JMP WAITLP    /********
3710    0125   6016             JMP ALPHA     /********
3711                   PMODE                  /********
3712    0126   5527    XLO,     JMP I    ,+1  /********
3713    0127   1431             LOPEN         /********
3714    0130   5531    XLC,     JMP I    ,+1  /********
3715    0131   1520             LCLOSE        /********
3716    0132   5533    XLL,     JMP I    ,+1  /********
3717    0133   1203             LLOAD         /********
3718    0134   5535    XLS,     JMP I    ,+1  /********
3719    0135   1233             LSAVE         /********
3720    0136   5537    XLG,     JMP I    ,+1  /********
3721    0137   1202             LCHAIN        /********
3722    0140   7774    X7774,   7774
3723    0141   7775    X7775,   7775
3724    0142   1171    PLNUM,   LNUM
3725    0143   1000    PGETRHS,GETRHS
```

```
3726    0144   1160    PLOMILD,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        307717732
        0233    7732
3770    0234    3077        307717706
        0235    7706
3771    0236    4177        417717741
        0237    7741
3772    0240    4477        447713044
        0241    3044
3773    0242    4276     V. 427610376
        0243    0376
3774    0244    4477        447713146
        0245    3146
3775    0246    5121        512114651
        0247    4651
3776    0250    4040        404014077
        0251    4077
3777    0252    0177        217717701
        0253    7701
3778    0254    0176        017617402
        0255    7402
3779    0256    0677        067717701
        0257    7701
3780    0260    1463        146316314
        0261    6314
3781    0262    0770        077017007
        0263    7007
3782    0264    4543        454316151
        0265    6151
3783    0266    4177        417710000
        0267    0000
3784    0270    1020        102010204
        0271    0204
3785    0272    0000        000017741
        0273    7741
3786    0274    2000        200012076
        0275    2076
3787    0276    1604        160410404
        0277    0404
3788    0300    0000        000010000
        0301    0000
3789    0302    7500        750010000
        0303    0000
3790    0304    7000        700010070
        0305    0070
3791    0306    7624        762412476
        0307    2476
3792    0310    5721        572114671
        0311    4671
3793    0312    6661        666114333
        0313    4333
3794    0314    5166        516610526
        0315    0526
3795    0316    7000        700010000
        0317    0000
3796    0320    3600        360010041
```

```
          0321    041
3797      0322    4100              4100;0036
          0323    .036
3798      0324    2050              2050;0050
          0325    .050
3799      0326    .404              0404;0437
          0327    .437
3800      0330    .500              0500;0006
          0331    .306
3801      0332    .404              0404;0404
          0333    .404
3802      0334    0001              0001;0000
          0335    .000
3803      0336    0601              0601;4030
          0337    4030
3804      0340    4536              4536;3651
          0341    3651
3805      0342    2101              2101;0177
          0343    .177
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    .651
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    .000
3815      0366    4601              4601;0000
          0367    .000
3816      0370    1000              1000;4224
          0371    4224
3817      0372    1212              1212;1212
          0373    1212
3818      0374    2442              2442;0010
          0375    .010
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  0324            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   7120            CLL
3907    1111   1323            TAD     010
3908    1112   3333            DCA     CGET
3909    1113   7420            SNL
3910    1114   5330            JMP     RHSERR
3911    1115   1371            TAD     LNUM
3912    1116   7106            CLL RTL
3913    1117   7104            CLL RAL
3914    1120   1333            TAD     CGET
3915    1121   5302            JMP     PLLP4
3916    1122   1171     PLNAME, LNAME-1
3917    1123   0010     010,    10
3918    1124   0077     077,    77
3919    1125   7710     07710,  7710
3920    1126   7770     07770,  7770
3921    1127   7774     07774,  7774
3922    1130   6203     RHSERR, 6203            /RIGHT HAND SIDE ERROR
3923    1131   5732            JMP I   .+1
3924    1132   6357            LERR
3925    1133   0000     CGET,   0               /INTERFACE WITH FIELD ZERO
3926    1134   6203            6203            /       JMS CGET
3927    1135   5736            JMP I   .+1     /       JMP <COMMA>
3928    1136   2564            CGETX           /       JMP <CARRET OR SEMICOLON>
3929    1137   1354     CGETRET,TAD     07524   /       JMP <OTHER(CHAR IS IN AC)>
3930    1140   7450            SNA
3931    1141   5733            JMP I   CGET
3932    1142   2333            ISZ     CGET
3933    1143   1355            TAD     07761
3934    1144   7450            SNA
3935    1145   5733            JMP I   CGET
3936    1146   1356            TAD     056
3937    1147   7450            SNA
```

```
3938    1150    5733            JMP I   CGET
3939    1151    1357            TAD     0215
3940    1152    2333            ISZ     CGET
3941    1153    5733            JMP I   CGET
3942    1154    7524    07524,  7524
3943    1155    7761    07761,  7761
3944    1156    0056    056,    56
3945    1157    0215    0215,   215
3946                    /
3947                    /BRINGS MILDRED INTO CORE
3948                    /
3949    1160    0000    LDMILD; 0
3950    1161    6002            IOF
3951    1162    4540            JMS I   X7774
3952    1163    1165            MLDBLK
3953    1164    5760            JMP I   LDMILD
3954    1165    0110    MLDBLK; 110
3955    1166    0030            30
3956    1167    0076            76
3957    1170    0002            2
3958            1171    *1171
3959    1171    0000    LNUM,   0       /-------
3960    1172    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   P6LNAM
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   P5LNAM
3979    1217    3326            DCA     FILSTRT
3980    1220    4540            JMS I   X7774
3981    1221    1324            LSBLK
3982    1222    7353            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  1304            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     O360
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     MODEND
4029    1272  3201            DCA     MVPTR
4030    1273  4305            JMS     MOVMOV
4031    1274  5266            JMP     MOOLUP
4032    1275  1323    MODEND, 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
```

```
4243    1310    1631              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    FILSTRT,0
4058    1327    0004    LLENGTH,4
4059    1330    1331    PTBL,     .+1
4060    1331    0035              BOTTOM
4061    1332    0410              PFNEW
4062    1333    0411              PFX
4063    1334    0412              PFZ
4064    1335    0060              BUFR
4065    1336    0031              LASTV
4066    1337    0013              POLXR
4067    1340    3206              FRST
4068    1341    0000              0
4069                    /
4070                    /USES MILDREDS LOOKUP
4071                    /
4072    1342    0000    LUKUP,    0
4073    1343    6141              6141    /LINC
4074    1344    0606              0606    /LIF 6
4075    1345    1020              1020    /LDA I
4076    1346    1171              LNUM
4077    1347    6020              6020    /JMP 20
4078    1350    7354              FILERR&1777+6000
4079    1351    0002              0002    /POP
4080    1352    7200              CLA
4081    1353    5742              JMP I   LUKUP
4082    1354    0002    FILERR,   0002    /POP
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   6324              JMP     24
4102    1374   7354              JMP     FILERR  /NOT ENUF ROOM; SHOULD NOT HAPPEN
4103    1375   7002      ENREPL, PDP
4104                             PMODE
4105    1376   7200              CLA
4106    1377   5761              JMP I   REPLACE
4107           1400      *1400
4108    1400   7524      MINCMA, -254
4109    1401   7066      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   4372      LOPEN,  JMS     COMSUB  /LIBRARY OPEN
4142    1432   4622              JMS I   PGETC
4143    1433   5236              JMP     .+3
4144    1434   7300              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   5252              JMP     ITSSS
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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   PLOWILD
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
```

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4208    1526  6002            IOF
4209    1527  4562            JMS I   PFINISH
4210    1530  7347            CLA CLL IAC RTL
4211    1531  4562            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  1156            DCA     PFILTAB
```

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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)
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4318   1675   7622          S`_ CLA /SUBSCRIPT IS TOO LONG
4319   1676   5177          JMP     FERROR
4320   1677   2156          ISZ     MYTEMP
4321   1700   1556          TAD I   MYTEMP
4322   1701   3011          DCA     BLK2
4323   1702   2156          ISZ     MYTEMP
4324   1703   1556          TAD I   MYTEMP   /STARTING TBLK
4325   1704   1013          TAD     BLK2+2
4326   1705   3013          DCA     BLK2+2   /ABSOLUTE TBLK
4327   1706   4351          JMS     CHECK
4328   1707   7307          CLA CLL IAC RTL
4329   1710   4351          JMS     CHECK
4330   1711   1161          TAD     SWITCH   /ALTERNATE THE BUFFERS
4331   1712   7650          SNA CLA
4332   1713   7307          CLA CLL IAC RTL
4333   1714   3161          DCA     SWITCH
4334   1715   6002          IOF
4335   1716   1161          TAD     SWITCH
4336   1717   4560          JMS I   PFINISH
4337   1720   1161          TAD     SWITCH
4338   1721   1163          TAD     PB1FLG
4339   1722   3010          DCA     XR1
4340   1723   7201          CLA IAC
4341   1724   3410          DCA I   XR1
4342   1725   1011          TAD     BLK2
4343   1726   3410          DCA I   XR1
4344   1727   1410          TAD I   XR1
4345   1730   3012          DCA     BLK2+1
4346   1731   1013          TAD     BLK2+2
4347   1732   3410          DCA I   XR1
4348   1733   4540          JMS I   X7774    /READ IT IN
4349   1734   0011          BLK2
4350   1735   1161          TAD     SWITCH   /THE VARIABLE IS IN MEMORY
4351   1736   7106   ITSAGO: CLL RTL
4352   1737   7006          RTL
4353   1740   7006          RTL
4354   1741   1173          TAD     06000
4355   1742   1151          TAD     LOSS
4356   1743   3151          DCA     LOSS
4357   1744   7346          CLA CLL CMA RTL
4358   1745   1010          TAD     XR1
4359   1746   3150          DCA     HISS
4360   1747   6001          ION
4361   1750   5600          JMP I   COMMON
4362   1751   0000   CHECK: 0
4363   1752   3162          DCA     SWTMP
4364   1753   1162          TAD     SWTMP
4365   1754   1163          TAD     PB1FLG
4366   1755   3010          DCA     XR1
4367   1756   1410          TAD I   XR1
4368   1757   7650          SNA CLA
4369   1760   5751          JMP I   CHECK
4370   1761   1410          TAD I   XR1
4371   1762   7341          CIA
4372   1763   1011          TAD     BLK2
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4373    1764    7643            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    7360          X CMA CML
4433    2055    7010            RAR
4434    2056    3551            DCA I   LOSS
4435    2057    2151            ISZ     LOSS
4436    2060    1165            TAD     MYAC2
4437    2061    7700            SMA CLA
4438    2062    7344            CLA CLL CMA RAL
4439    2063    7001            IAC
4440    2064    3551    UZERST: DCA I   LOSS
4441    2065    5272            JMP     CRETST
4442    2066    6203    URETST: 6203
4443    2067    5670            JMP I   .+1
4444    2070    7576            CALLIN
4445    2071    3551    INCALL: DCA I   LOSS
4446    2072    7240    CRETST: CLA CMA
4447    2073    3550            DCA I   HISS
4448    2074    6203            6203
4449    2075    5620            JMP I   ITSTOR

4450    2076    7000    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    ^000    B1UNIT;  0
4484    2127    .334             34
4485    2130    .000    B1BLK,   0
4486    2131    :000    B2FLG,   0
4487    2132    L030    B2UNIT,  0
4488    2133    4335             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; 0,0,0,0,0,0,0,0,0
        2136    0000
        2137    0000
        2140    0000
        2141    0000
        2142    0000
        2143    0000
        2144    0000
4499    2145    0000            0,0,0,0,0,0,0,0,0
        2146    0000
        2147    0000
        2150    0000
        2151    0000
        2152    0000
        2153    0000
        2154    0000
4500    2155    0000            0,0,0,0,0,0,0,0,0
        2156    0000
        2157    0000
        2160    0000
        2161    0000
        2162    0000
        2163    0000
        2164    0000
4501    2165    0000            0,0,0,0,0,0,0,0,0
        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

0600
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   11100000
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   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

Symbol	Value	Symbol	Value	Symbol	Value	Symbol	Value
A	145	C140	2554	D256	0002	EFUN3I	2136
ABSOL	6751	C144	6140	D85	0004	ELPAP	1764
ABSOL2	6153	C220	2123	DATUM	7102	END	7134
ABSOL3	7375	C260	0113	DATUMA	7252	ENDFI	6243
ABSOLV	5571	C3	5345	DCONP	6303	ENDLN	4556
AC1H	041	C5	5341	DCONT	0471	ENDT	0135
AC1L	042	C7	5335	DCOUNT	6143	ENREPL	1375
ACMINS	6605	C9	5331	DDTJR	0004	ENUM	1732
ADDR	340	CALLIN	7576	DEBGSW	0026	EPAR	1710
ADONE	6673	CCR	0077	DECON	5627	EPAR2	1766
AF	4677	CDF	7000	DECONV	5600	ERASE	2226
ALF1	4760	CEX1	6506	DECP	5533	ERG	2227
ALF2	4763	CEXP	6505	DECR	5521	ERL	2224
ALF3	4755	CF	4705	DEJUMP	1306	ERR2	2726
ALGN	6572	CFRS	0133	DELETE	4565	ERRFIL	2571
ALIGN	6623	CFRSX	0137	DF	4710	ERROR2	4566
ALIST	1370	CGET	1133	DGRP	0425	ERROR3	4566
ALPHA	316	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	017	COMLST	0774	DSAVE	5640	FCOUNT	5535
BET3	4766	COMMEN	0614	DTST	5647	FEND3	2267
BF	4702	COMMON	1600	DUBDIV	7261	FERROR	0177
BLK2	011	COMSUB	1502	DUBLAD	5733	FEXP	4620
BLOCK	2121	CON1	5037	DV3	7267	FEXT	0020
BOTTOM	035	CRETLD	1554	E	0042	FFF	1522
BUFBEG	3216	CRETST	2072	ECALL	1601	FG02	6011
BUFFER	7470	CRLF	7505	ECHOLS	1624	FG03	6027
BUFR	060	CRUDDY	1155	EFOP	0056	FG04	6034
BUFST	5531	CSMCI	1427	EFUN	1743	FG05	6070
C	047	CSTAR	0225	EFUN2	1755	FIG01	6221
C100	036	D	0041	EFUN3	2021	FIG04	6261

Symbol	Addr	Symbol	Addr	Symbol	Addr	Symbol	Addr
FI??R	1354	FRETLD	1537	IF	??13	LESURS	2173
FIISTR	1326	FRETST	2014	IF1	1035	LG	6375
FIITAB	2135	FRST	3206	IF3	1025	LG2E	4713
FINCR	1765	FRSTX	3214	IGNOR	0217	LGO	6360
FINDLN	4555	FSIN	5204	IGOTIT	1036	LINENO	2067
FINDN	2250	FSSERR	5774	ILIST	0771	LIST3	2077
FINFIN	1137	FXIT	0000	IN	5513	LIST6	2072
FINISH	2376	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	1432
FLAC	0344	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	0125	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	7151
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	2002
FLTONE	2435	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
FNFG	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	M22	0175
FOR	1941	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	6141
FPNT	6400	IBAR	0212	LERR	6357	M40	2356
FPRNT	5465	IECALL	1037	LESUR2	0170	M43	1077

M5	120	NAGSW	2065	OD	7761	P7600	0134
M77	173	NCHARS	7566	ODISSP	7704	P77	0122
MBREAK	2642	NCOLS	7564	OE	7753	P7700	0121
MCOM	1136	NEGP	4724	OERROR	7713	P7740	0372
MCR	116	NFEEDS	7565	OEXIT	7731	PA1	2524
MCS	1426	NLINES	7561	OGO	7714	PACBUF	2502
MD	5526	NOASCI	0061	OI	7734	PACKC	4546
MEQ	1135	NOCLK	2653	OLIST	7722	PACKST	2027
MF	1632	NOCRLF	7513	OM12	5530	PACX	2530
MFIT	117	NOHANG	7556	ONE	4716	PALG	5260
MHUNDR	5375	NORF	6515	OO10	1425	PARTES	2051
MIF	7260	NORM	6571	OO6377	7730	PASS	6335
MINCMA	1420	NORMF	7147	OP	3115	PB1FLG	0163
MINCOM	6374	NORMLE	2031	OPMINS	6567	PC	2022
MINE	5662	NOTSAV	1314	OPNEXT	1622	PC1	0614
MINSKI	0051	NOX	6675	OPTABL	1731	PCHAR	1401
MINUS2	7153	NOX1	6711	OPTR	6002	PCHECK	5244
MINUSA	1112	NOX2	6704	OPTRV	2663	PCHK	0510
MINUSE	6301	NUMSGN	1061	OPTRI	2665	PCK1	2535
MINUSZ	5663	O1	3600	OPTRO	2664	PCLEAR	0175
MLOBLK	1165	O10	1123	OPUT	5532	PCLKFL	7745
MLIMIT	7647	O12	1545	OS	7763	PCOMMO	0154
MMCOM	7656	O200	0003	OSAMP	1357	PD2	0534
MOD	5214	O215	1157	OT	7771	PD3	0554
MODIFY	1254	O27	1570	OUT	2465	PDLXR	0013
MOO	1262	O360	0007	OUTA	5536	PECALL	6334
MODEND	1275	O37	1360	OUTCR	2476	PEQ	6135
MODLUP	1266	O4377	0076	OUTDEV	0063	PER	2102
MORNUM	1056	O4600	5374	OUTDG	6154	PFILTA	0152
MOVMOV	1305	O56	1156	OUTPUT	7706	PFINIS	0160
MP1	7254	O6000	0173	OUTX	2475	PFNEW	0410
MP2	7256	O6377	7570	OVER1	0043	PFNUM	1771
MP3	7255	O7	1776	OVER2	0047	PFX	0411
MP4	7200	O7200	7415	P	0000	PFZ	0412
MP5	7253	O7400	7650	P13	0005	PGETC	1422
MP6	7210	O7420	0174	P17	0107	PGETRH	0143
MPPR	115	O7472	1501	P177	0106	PI	5311
MPLUS	5664	O7510	1424	P1FLAC	0167	PI2	5036
MSPACE	5665	O7524	1154	P2000	0373	PIOT	5315
MULDIV	7101	O7566	7572	P27	6750	PLCE	5536
MULT	6570	O760	0015	P277	0110	PLOMIL	0144
MULT10	5667	O7655	7571	P2FLAC	0170	PLEFLA	1075
MULT2	5715	O77	1124	P3	2036	PLESUB	0101
MULTY	4752	O7710	1125	P337	0075	PLLP1	1006
MVCNT	1323	O7716	7573	P377	2553	PLLP2	1016
MVCTR	1200	O7761	1155	P3FLAC	0171	PLLP3	1044
MVPTR	1201	O7763	7567	P40	2552	PLLP4	1102
MYAC1	164	O7764	0172	P4000	0124	PLNAME	1122
MYAC2	165	O7770	1126	P43	6310	PLNUM	0142
MYAC3	166	O7774	1127	P5LNAM	0145	PLOOKU	7153
MYTEMP	156	OC	7752	P6LNAM	0146	PNCHAR	7732
MYTMP2	157	OCTNUM	1101	P7200	1402	PNCOLS	7776

Symbol	Value	Symbol	Value	Symbol	Value	Symbol	Value
ENDC	7777	RET	5452	SRNLST	?61	TYPE	1271
POPJ	1413	RETRN	1563	START	0177	TYPE2	1223
POFF	4544	RETURN	5536	STARTL	5064	URETST	2066
POPJ	5541	REVIT	7146	STARTV	0060	UTE	2276
POPTR	7733	RHSERR	1132	STEMP	7750	UTO	2305
PP43	1172	RITEOU	3651	STEMP2	7751	UTRA	2274
PPASS	7705	RND2	5527	STOKOK	2044	UTX	2316
PPECC	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	7155	RUB1	3304	SUBS2	0167	WAITLP	0115
PRHSER	1423	RUB2	3042	SWITCH	0161	WALL	7664
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	611	SAMEN	1372	T3	0033	WX	7673
PROCES	610	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	1100	SCONT	1266	TCRLF2	1243	XABS	2016
PTI	1030	SCOPOU	7500	TDUMP	3052	XADC	1341
PTBL	1330	SCOUNT	5534	TELSW	0016	XCT	0020
PTCH	0126	SETCLK	5351	TEM	5156	XCTIN	0062
PTFN	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	3302
PWAIT	0174	SIGN	7124	TEST4	7366	XGETOU	1254
PXOUTL	7774	SIGNF	0050	TESTA	0322	XI33	2666
QADD	0061	SIN	2662	TESTC	4564	XIN	6306
R6	5441	SMIN	6136	TESTN	4561	XINPUT	5666
RANMUL	6160	SMP	6101	TEXTP	0017	XINT	1156
RANO	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	0354	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

```
          YR*       311
          YR*2      312
          YR*.6     413
          XSGN      0312
          XS*RTC    721
          XS*NDR    1535
          XS*2      4676
          XS*R      5325
          XSQRT     7432
          XT3       717
          XTFSTC    700
          XTFSTN    1546
          YVF       2451
          V         377
          PERS      6522
```

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 40 SECONDS

4K CORE USED

A	12	3092	3191#											
ABSOL	3	3233#												
ABSOL2	2532	2632#												
ABSOL3	3313	3344#												
ABSOLV	2385#	2391	2632	3033	3344									
AC1H	58#	2456	2465	2497	2525	2529	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	2829	2812	2813	2818	2821	2824	2848#	2856						
ADONE	2962	2978	2985#											
AF	1892	1917#												
ALF1	1956	1968#												
ALF2	1954	1971#												
ALFZ	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	4320	4323
	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		

BUFST	2297	2351#											
	3298	3183#											
C102	23#	1373	1746	2241	3425								
C140	1519	1522	1549#										
C144	2606	2621#											
C200	1244	1459	1603	1676	2243	2874							
C260	1116#	1478	1491	2634									
C3	2179	2222#											
C5	2177	2218#											
C7	2175	2214#											
C9	2173	2210#											
CALLIN	3483#	4444	794	1500	1503	1728	1761						
CCR	171#	791	1423	1529	1685	1726							
CDF	26#	1241											
CEX1	2833	2866#											
CEXP	2851	2853	2865#										
CF	1889	1923#	1244	1317	1345	1347							
CFRS	132#	1236	966	1019	1060								
CFRSX	136#	205	3901	3908	3914	3925#	3931	3932	3935	3938	3940	3941	4126
CGET	3841	3852											
CGETRE	1565	3929#											
CGETX	1561#	3928	279	489	496	522	553	572	658	765	773	838	909	993
CHAR	86#	255	1144	1228	1284	1311	1375	1379	1403	1404	1408	1471	1496	1510
	1205	1309	2412	2419	2434	2438	2442	2657	2662	2679	2739	2761	2769	3494
	1562	2402											
	3579	4109											
CHARTA	3756#												
CHECK	4327	4329	4362#	4369	4374	4380							
CHFLAG	3729#	3967	3994	4013									
CHIN	127	165	1282#	1287	1289								
CHRCNT	3622#	3642	3669										
CHREND	3659	3669#											
CHRLUP	3650#	3670											
CHRT	2589	2616#											
CIMCF	4132#	4153											
CLCU	3372#	3401											
CLEAR	231	3545#	3554										
CLF	99#	1505	3588										
CLKFLG	1618	1628#		1263	1267	1275	1680	1687	1817	2841	2844	2859	2862
CNTR	78#	1235	1254										
COL	767	799#											
COMBOT	210	226#											
COMBUF	131#	214	217	230									
COMEIN	131	133	1793#	1794									
COMEOU	226	1794#	1795										
COMGO	507	643	739#										
COMLST	506	507	611#										
COMMEN	509#	745											
COMMON	3734	4257#	4310	4361									
COMSUB	4141	4185#	4198	4202	2033	2052							
CON1	1991	1997	2017#	2025									
CRETLD	4231	4238#											
CRETST	4441	4446#											

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CRLF          ●#    3467
CRUDDY        728    734#
CSMCI        4131#   4150
CSTAR         212    225#
D            3074    3282    3102    3184#
D256         3619#
D85          3627#
DATUM        3068    3369    3070    3071    3069    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       2420    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
F            3077    3085    3103    3185#
ECALL         651     949    1038#   1045    1148    1155    2758
ECHOLS       1257#   1286
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Symbol	References
FFOP	76# 921 1043 1136 1142 2740
FFUN	152 1124 1136# 1145
FFUN2	1139 1146#
FFUN3	135 1155#
FFUN3I	71 135# 733 738 873 1157 2756 3523
FLPAR	1072 1122 1153#
FND	133#
FNDFI	1444 2682 2690# 2711
FNOLN	172# 260
FNDT	134# 1315
FNREPL	4099 4103#
FNUM	1051 1123 1127#
FPAR	1086 1109#
FPAR2	1111 1155#
ERASE	749 1307#
ERG	1324# 1333
ERL	1309 1321#
ERR2	191 1666# 1668
ERRFIL	1566# 4086
ERROR2	188# 289 316 325 379 399 485 508 808 1546 1611 2431 2898 3133 3354
ERROR3	189# 245 427 955 1314 2020 3497 3508 3562
ERROR4	190# 307 661 674 682 901 1059 1075 1147 1154 1218 1566 2022 2519 2747 2777
ERROR5	354 355 356 477 1665#
ERT	1315# 1850
ERV	1318# 1330
ERVX	1308 1334#
ERXIT	4145 4163# 4194 4206
ESCA	1524 1531#
ETERM	1065 1076#
ETERM1	1050 1060#
ETERM2	1082# 1108
ETERMN	1056 1073#
EVAL	665 678 686 776 1048# 1568 2232 3499 2848 2866 2887 2939 2958 2980 2981 2987 2999 3020 3064 3134
EX1	57# 2516
EXIT	1598 1602 1614#
EXIT1	2006 2013# 2071
EXIT2	2013 2184#
EXIT3	3321 3334#
EXITJ	1627#
EXP	62# 2397 2534 2556 2560 2572 2582 2602 2609 2673 2865 2879 2960 2990 2994 3400 3014 3035 3052 3154 3155 3328 3329 3334 3355 3378 3379 3380 3402
FXTR	1385# 1407
F	3090 3106 3186#
FCONT	687# 714 719
FCOS	352 2117#
FCOUNT	2272 2278 2318 2355# 2359
FEND3	1357 1365#
FERROR	3752# 4269 4302 4319
FEXP	51 349 1869# 4054
FEXT	12# 1876 1902 1912 1961 1992 2000 2011 2026 2036 2070 2121 2135 2145

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                  2158    2166    2183    2235    2543    2549   2678    2692    2721    2727    3351    3376    3
         3489    3522
FFF       932     980#
FG02     2533#    2546
FG03     2536     2547#
FG04     2543     2552#
FG05     2566     2580#
FIG01    2665     2671#
FIG04    2697     2704#
FILERR   3975     3987    4078    4082#   4098    4172
FILSTR   3979     4003    4057#
FILTAB   3732     4498#
FINCR     478      675#
FINDLN    170#     373     398     484     515     877    1224
FINDN    1349#    1362
FINFIN    476      717#
FINISH   3738     4450#   4455    4468
FINKP     703      713#
FINPUT    130#     771    1132
FINT       14#     668     701     726     965    1096    1185    1777    1873    1879    1978    1945    1989    1996
         2007     2023    2232    2048    2117    2132    2137    2149    2155    2162    2167    2233    2541    2547
         2676     2690    2698    2704    3349    3372    3398    3487    3500
FISW       68#     789    2264    2273    2315
FIVHUN   3501     3527#
FIX        69     3012#   3031
FIXH     3016     3035#
FLAC       61#      70     285     287     290     637     727     732     869     870     872    1095    1128    1134
         1180     1904    1935    2040    2043    2044    2045    2885    2889    2902    3181    3182    3183    3745
         3746     3747
FLAD     2868#    2924
FLAG1    2002     2005    2101#
FLAG2    1878     1903    1939#
FLAGJ    3887     3893#
FLARG     126      684     688     696    1181    1187    1195#
FLARGP    126#     705    1098    1100    1129    1149
FLOV     2926     3131#
FLEX     2876#    2928
FLGT     2831     2853#
FLIMIT    475      683#
FLINTP    130     1441    2654#   2695
FLIST1    478#     673
FLIST2    475#     681
FLMY     2914#    2927
FLOG      350     2018#
FLOP     1091     1097#
FLOUT    2317     2321    2374#
FLOUTP    129     2522#   2588    2614
FLPT     2836     2851#
FLSU     2867#    2925
FLTONE    718     1178    1445#   2900
FLTXR      33#    1816    2370    2378    2555    2571    2581    2585    2839    2843    2857    2860
FLTXR2     34#    2825    2842    2854    2861
FLTZER     43      136    1447#
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FM12	2567	2573	2623#												
FNEG	1938	1987	2112#	2185											
FNOR	11#	1186	1880	2138											
FNTABF	341#	1152													
FNTABL	1151	1152	1290#												
FNUM	1158	2739#													
FOR	655#	741													
FORHUN	3488	3526#													
FOUTPU	129#	777	1780												
FPAC1	3350	3367	3369	3373	3410#										
FPNT	27	2647	2795#	2799	2801	2878	2822	2864	2869	2874	2883	2913	2915	3143	
FPRNT	2291	2308	2315#												
FRETLD	4225#														
FRETST	4430#														
FRST	132	1796#	4254	4267											
FRSTX	37	1802#													
FSIN	351	2122#													
FSSERR	2519#	3754													
FXIT	13#	670	706	730	968	1099	1188	1779							
G101	1843	1859#													
G5772	1822	1860#													
G5773	1824	1861#													
G7200	1830	1862#													
G7773	1863#														
G7774	1827	1864#													
G7775	1821	1837	1865#												
G7776	1823	1866#													
G7777	1825	1867#													
GAMMA	3621#	3644	3650	3705	3707										
GBLOK	1828	1855#													
GECALL	922	949#													
GEND	1402#	1419													
GERR	297	307#	314												
GET1	1371	1385	1398#	1410											
GET3	1400	1411#													
GETARG	656	764	899#												
GETC	154#	233	253	295	305	312	488	499	520	600	647	649	782	786	
	797	819	905	913	997	1047	1120	1137	1219	1227	1561	1765	1767	1769	
	1774	2741	2760	2763											
GETCX	4146	4186	4189	4248#	4252										
GETLN	168#	241	363	483	513	787	806	1321							
GETRHS	3725	3827#	3874												
GETSGN	70#	1869	1985	1993	2018	2027	2122	2125	2146	2159	3352				
GETVAR	903#	1054													
GEXIT	298	308	317#												
GFND1	944	970#													
GINC	88#	946	957	1783											
GLIST	494	501	891#	2765											
GO	1995	2002#													
GONE	231#	270													
GOODY	3652	3660#													
GOTO	483#	744	4016												
GRPTST	183	584#	592	593											

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GS1      919   927#
GS2      939   950#
GS3      934=  947
GS4      945*  976
GSERCH   978   916    918#
GTEM     39*   1401   1412   1415
GZERR    238   325#
HINBUF   53#
HISS     3733# 4263   4277   4280   4289   4291   4294   4296   4311   4359   4447
HORD     63#   983    2386   2388   2398   2455   2479   2481   2496   2498   2527   2595   2601   2607
               2612   2751   2876   2880   2896   2941   2943   2946   3002   3027   3036   3041   3045   3110
               3157   3162   3280   3284   3299   3306   3315   3322   3338   3385
I33      82    1452#  1460
IBAR     214#  472
IECALL   632   651#
IF       631#  742
IF1      637   649#
IF3      641#  650
IGNOR    219#  224    473
IGOTIT   3842  3853   3857#
ILIST    637#  646
IN       2337# 2369   2371
INBUF    50#   1609   1613   1634   1638   1689
INCALL   3486  4437   4428   4445#
INDEV    84#   816    1283
INDRCT   2814  2849#
INFIX    605   1440#
INLIST   222   470#
INORM    2675  2726#
INPUT    596#  601    606    1442   1443   2449   2725
INPUTX   239   262#
INSUB    52#   283    597    769    1131
INTEGE   69#   736    860    926    1569   1877   2136   2238   2749   2890   3483   3490   3523
INTRPT   20    1579#
IOBUF    33    1630   1631   1632   1792#  1793
IPART    634   652#
IRETLD   4223  4232#
IRETN    228#  474
ITABLE   2850  2923#
ITER1    698   713    2904   2907   3359   3361   3364   3365   3366   3374   3375   3382   3387   3392
         3399  3426#
ITLOAD   2757  4216#  4247
ITSAGO   4351# 4382
ITSFF    4156#
ITSII    4152  4158#
ITSOK    3422  3432#
ITSSS    4149  4157#
ITSTOR   2648  4388#  4449
JUMP     2802  2803   2811   2815   2826   2833   2834   2837   2846   2847#  2894   2911
K5       2303  2347#
KINT     1583  1588   1597#
L1       2367  2372#
L2       2765  2875#
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Symbol										
L3	2263	2278#								
L4	2261	2481#								
LASTLN	43#	1243	1346	1359	1424	1427	1103	1107	1112	1119	1212
LASTOP	75#	1341	1248	1384	1387	1392	1319	1335	1435	1755	4265
LASTV	17#	425	937	950	956	958				
LC	2128#	2779								
LCHAIN	3721	3963#								
LCLOSE	3715	4202#								
LCON	234	332#								
LDMILD	3726	3949#	3953							
LEFLAG	3892	3893	4166#							
LEFPUT	198#	2820								
LEPUT	198	2638#	3924							
LERR	2772	2777#	2640							
LESUB2	196#	984	2752	3689						
LESUBS	199#	2641								
LG	2783	2791#								
LG2E	1874	1929#								
LGO	2776	2778#	293	303	304	310	311	318	322	396	517	537	588	788
LINENO	87#	249	1351	1462	1468	1669	1677	1703			
	812	1332	822	823						
LIST3	103#	817	833							
LIST6	93#	832	222							
LIST7	96#	221								
LISTGO	823	882#								
LL	2110#	2781								
LLENGT	3973	3997	4258#							
LLIST	2775	2776	2784#							
LLOAD	3717	3967#								
LM	1567#	2780								
LMAKE	1572	4110#	3872	3916	3960#	4076	4095			
LNAME	3727	3728	3900	3911	3959#					
LNUM	3724	3885								
LO	2106#	2778								
LOADIT	2755	2757#								
LOADJ	3988	4039#								
LOG2	2049	2098#								
LOG5	2059	2085#								
LOG6	2057	2088#								
LOG7	2055	2091#								
LOG8	2054	2094#								
LOOPC1	2817	2822#	2453	2476	2478	2492	2494	2881	2937	2939	2948	3004	3025	3030
LOPEN	3713	4141#	3048	3112	3277	3286	3297	3308	3319	3390	4314	4355	4356	4401
LORD	64#	2396	4226	4228	4230	4234	4238	4265	4286	4288	
	3037	3046	4435	4425	4426	4434	4435	4442	4445		
LOSS	3731#	4225	1204	1208	1209					
	4402	4404								
LPRTST	181	1200#								
LS	2649#	2782								
LSAVE	3719	3994#	4001	4010	4055#					
LSBLK	3977	3981	4072#	4081						
LTAPE	754	2768#								
LUKUP	3733	3970								

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LWETMP    19#    982   2642
LXIT    4122#   4160   4212
M100     1.5#   1513
M10PT    2583   2628#
M11      122#   1379   1079   1202
M12     1451#   1484
M137     1374   1421#
M143     1473   1520   1551#
M144     2603   2620#
M2       114#    635   1062   1784   2426   2598
M20      110#   1679   2336
M240     117#    994   2658
M260     990#
M272    1000#   1010
M4       2538   2622#
M40      1409   1420#
M43      3845   3894#
M5       121#   1206
M77      108#   1405   1731
MBREAK  1578#   1606
MCOM     716#
MCR      119#    256    490    523   1229   1497
MCS     4130#   4147
MD       2271   2292   2348#
MEQ       659    715#
MF       481#    555
MFLT     120#    445    447    453    463   2840   2858
MHUNOR   2234   2251#
MIF     3267#   3271
MINCMA  4108#   4114
MINCOM   2770   2790#
MINE     2420   2445#
MINSKI    67#   1183   2103   2128   2186   2390   3127   3166   3206
MINUS2   2916   3067   3139   3187#   3202
MINUSA   115#    280   1312   2435
MINUSE   2680   2720#
MINUSZ   2439   2446#
MLDBLK   3952   3954#
MLIMIT   3506   3524#
MMCOM    3495   3528#   3580
MOD      2124   2130#
MODIFY    751    806#
MOO      3989   4008   4021#   4038
MOOEND   4028   4032#
MOOLUP  4025#   4331
MORNUM  3873#   3891
MOVMOV   4030   4035   4040#   4046   4052
MP1      3221   3226   3228   3238   3244   3247   3248   3249   3252   3253   3256   3257   3263#   3270
         3288   3290   3296   3309
MP2      3178   3233   3265#   3278   3285
MP3      3224   3236   3240   3245   3264#   3272   3294   3303
MP4      3180   3209#   3211   3241   3255   3258   3269   3291   3293   3298   3327
MP5      3222   3229   3235   3251   3262#
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MP6      3226#   3237
MPER      118#   1276    2663
MPLUS    2403    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    3075    3078    3083    3086    3093    3096    3101    3104    3107    3179#
MVCNT    4032    4054#
MVCTR    3961#   4024    4025    4026    4033    4036
MVPTR    3962#   4029    4034    4043    4050
MYAC1    3742#   4227    4233    4241    4391    4400    4408    4422
MYAC2    3743#   4229    4237    4243    4393    4423    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
         4306    4317    4320    4321    4323    4324
MYTMP2   3737#   4110    4119    4159    4169
NAGSW      85#    243     330     369     370     383     389     403     531     543    1326
NCHARS   3441    3442    3449    3460    3471#   3577
NCOLS    3420    3431    3462    3464    3469#   3613
NEGP     1871    1938#
NFEEDS   3421    3446    3461    3470#   3614
NLINES   3428    3445    3466#
NOASCI   3640    3672#
NOCLK    1615    1622#
NOCRLF   3419    3423#
NOHANG   3448    3463#
NORF     2873#   2930
NORM     2873    2918#
NORMF    3128    3175#
NORMLE   4413#   4423
NOTSAV   4039    4047#
NOX      2971    2987#
NOX1     2950    2999#
NOX2     2989    2994#
NUMSGN   3847    3880#
O1       1810#   1811
O10      3881    3907    3917#
O12      1001#   1012
O200     3619#   3661
O215     3939    3945#
O27      4232    4250#
O363     3623#   3645    4006
O37       861     875#
O4377    3643    3686#
O4620    2245    2250#
O56      3936    3944#
O6000    3749#   4354
O6377    3458    3473#
O7       4258    4383#
O7000    3362#   3443
O7400    3516    3525#
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07420	50*	3985											
07472	1814	4157											
07510	4128#	4190											
07524	3929	3942#											
07566	3455	3475#											
07607	3633#	3654											
07655	3423	3474*											
077	3833	3844	3904	3918#									
07712	3905	3919#											
07716	3465	3476#											
07761	3933	3943#											
07763	3417	3472#											
07764	3748#	4284											
07770	3831	3839	3920#										
07774	3859	3921#											
OC	3563	3593#											
OCTNUM	3873	3883	3896#	3902	3903								
OD	3564	3600#											
ODISSP	3546	3555#											
OE	3565	3594#											
OERROR	3562#												
OEXIT	3576#	3587	3599	3610									
OGO	3561	3563#											
OI	3568	3579#											
OLIST	3560	3561	3569#										
OM12	2336	2350#											
ONE	1901	1910	1932#	2017									
OO10	4129#	4192											
OO6377	3575#	3595											
OP	1761	1762	1788#										
OPMINS	2867	2916#											
OPNEXT	1055#	1125	1135	1193									
OPTABL	1290	1126#											
OPTR	2525#	3436	3477	3578									
OPTR0	1595	1630#	1660	1682	1690	1692							
OPTRI	1586	1591	1592	1596	1632#	1691							
OPTRO	1631#	1644	1656	1657	1661	1693							
OPUT	2352#	2358	2374										
OS	3566	3602#											
OSAMP	862	874#											
OT	3567	3608#											
OUT	163	1494#	1502										
OUTA	2337	2357#	2360	2379									
OUTCR	1499	1503#											
OUTDEV	83#	792	1501	1504	3609								
OUTDG	2352	2558	2562	2611	2633#	2636							
OUTPUT	748	3557#											
OUTX	1502#	1506											
OVER1	67#	2452	2463	2489	2513	2515	2798	2895	2955	3005	3018	3186	3189	3191
OVER2	65#	2399	2451	2473	2475	2488	2490	2686	2797	2882	2933	2935	3006	3023
	3028	3049	3051	3114	3116	3310	3317							
P	25#	1529											
P13	22#	951	1542	2039									

P17	112#	1574	1659	2029									
P177	111#	323	1456	1476	1600	2810	3416						
P1FLAC	3745#	4242	4390										
P2030	327	334#											
P27	3319	3332#											
P277	113#	1396	1578										
P2FLAC	3746#	4244	4392										
P3	1199#	1213											
P337	98#	497	1378										
P377	1516	1548#											
P3FLAC	3747#	4246	4394										
P40	1512	1547#											
P400Z	125#	242	3156										
P43	2672	2727#											
P5LNAM	3727#	3886	3978	4002	4178								
P6LNAM	3728#	3890	3971	3998	4120	4172							
P7200	900#	930											
P7600	109#	319	585	589	2807								
P77	123#	910	1402	1464	1526	1531	1730	2266	2276	2443			
P7700	106#	929	1696	1704	1740	1745							
P7740	286	333#											
PA1	1525#	1533											
PACBUF	157	1507#	1530										
PACKC	156#	223	228	229	254	824	834	904					
PACKST	45#	218	815	1719									
PACX	1529#	1743											
PALG	2161	2167#											
PARTES	652	948	1191	1210#	1220								
PASS	2759#	2766	2768	3556									
PB1FLG	3741#	4338	4365	4451									
PC	40#	206	264	267	268	364	384	407	487	1020	1699	1700	
PC1	480	492#	509	609	1033	1439							
PCHAR	4109#	4112											
PCHECK	2148	2155#											
PCHK	414	418	420#	428	433	438	446	454					
PCK1	1528	1532	1534#	1545	1556								
PCLEAR	201#	1814	3593										
PCLKFL	3583	3584	3588#										
PCOMMO	3734#	4217	4397										
PD2	151	440#	444	455									
PD3	153	458#	460	461	469								
PDLXR	32#	145	211	235	416	421	422	423	436	450	465	633	953	1021
	1156	1540	4066										
PECALL	2748	2758#											
PEQ	2618#												
PER	107#	1466	2340	2375									
PFILTA	3732#	4196	4260										
PFINIS	3738#	4209	4211	4336									
PFNEW	354#	4061											
PFNUM	1140	1158#											
PFX	355#	4062											
PFZ	356#	4063											
PGETC	4126#	4142	4160	4203	4249								

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PGETRH    ●5#    3968   3995   4117   4165
PI        2144   2163   2193#
PI2       2009   2016#
PIOT      2116   2119   2157   2169   2181   2197#
PLCE      2299   2304   2305   2309   2312   2344   2345   2356#
PLUMIL    3726#  3969   3996   4118   4167
PLEFLA    3828   3888   3892#
PLESUB    3689#  4262
PLLP1     3833#  3836
PLLP2     3841#  3851
PLLP3     3863#  3870
PLLP4     3900#  3915
PLNAME    3829   3837   3857   3861   3916#
PLNUM     3724#  3976   4020   4175
PLOOKU    3733#  4168
PNCHAR    3539   3577#  3594
PNCOLS    3598   3613#
PNFEED    3597   3614#
POPA      145#   436    504    666    699    772    923    1106   1149   1211   1214   2753   2773   3558
POPF      152#   382    402    404    693    695    697    1094   1133   1179   2888   2901   2903   2908
POPJ      146#   492    542    709    969    979    987    1105   1336   1759
POPTR     3578#  3596
PP43      3848   3895#
PPASS     3556#  3557
PPROC     4124   4125#
PPTEN     2542   2625#
PPTR      3459   3477#
PREDIV    4275#  4282
PREPLA    3735#  4121
PRHSER    4116   4127#  4155   4164   4204   4251
PRINTC    162#   213    521    546    768    784    795    820    1288   1383   1467   1472   1489   1492
          1697   1705   1706   1709   1723   1766   1768   1770   1775   1782   2341   2376   2531   2590
          2600   2635
PRNT      1465   1469   1475#  1493   1787   2615
PRNT2     1773   1787#
PRNTI     2613   2615#
PRNTLN    166#   519    1698   1707
PROC      263    409    489#   2249   3576   4125
PROCES    381    401    479    488#   495    678    692    1032
PSCOPO    3607   3612#
PSETCL    3582   3589#
PSIN      187#
PSTART    4014   4053#
PSUBS     3688#  4264
PT1       46#    388    392    395    530    533    536    662    667    669    675    700    702    704
          710    934    935    940    945    960    961    963    964    967    970    977    978    982
          1061   1101   1114   1126   1130   1190   1754   1757   1760   1771   1772   1776   1778   1785
          2677   2691   2700   2706
PTBL      4023   4059#
PTCH      127#   1710
PTEN      2625   2699   2716#
PTEST     925    948#
PUSHA     148#   365    498    663    676    711    766    1040   1042   1044   1046   1113   2762
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PUSHF    150*   366    368    983    637    689    712    717    1116   1127   1177   2884   2886   2899
         2975
PUSHJ    143=   262    740    400    655    644    677    685    691    763    775    1053   1567   2231
         3499
PWAIT    233=   1636   1646
PXOUTL   3628   3611#
QADD     81*    911    912    920    924    928    942    959    981    1428   1537   1539   1553   1741
Q6       2275   2295#
RANMUL   734    2637#
RANO     723*   727    729    731
RAR1     2871   2920#
RAR2     2873   2921#
RDIV     165#   1711
READC    164#   219    602    830
RECOVR   471    879    1648   1676#  1810
RECOVX   1694#
REMAIN   2457   2467   2469#  2482   2484   2500   2501   2627
REPLAC   3735   3999   4090#  4106
REPT     2553   2564   2576   2627#
RESOL    3029   3334#
RESOL3   3331   3345#
RESOL5   2674   2685   2723#
RESOLV   2723   3034   3203#  3207   3345
RET      2304#  2346
RETRN    753    1019#
RETURN   71#    1907   1913   2029   2127   2185   2187   3397   3403
REVIT    3164   3169   3174#
RHSERR   3843   3854   3875   3884   3910   3922#  4127
RITEOU   1838   1851#
RND2     2295   2349#
ROOTGO   3384   3389   3398#
ROT      1536   1552#
ROUND    2587   2630#
RTL6     174#   291    1463   1552   2265
RUB1     1552   1714#
RUB2     1728   1744#
RUB3     1734#  1748   1750
RUB4     1733   1741#
RUB5     1721   1742   1743#
RUBIT    1515   1550#
SADR     2351   2554   2584   2629#
SAMEN    4097   4100#
SAVAC    1576#  1579   1625
SAVE     3073   3081   3091   3099   3177#
SAVLK    1577#  1581   1623
SBAR     826#   880
SCHAR    819#   825    877
SCONT    816#   878    881
SCOPOU   3415#  3430   3468   3612
SCOUNT   2263   2354#  2365   2368   2380   2383
SETCLK   2231#  3589
SETT     654#   740
SEX      846    856#
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Symbol													
SEXC	73	580#											
SFOUND	832#	835											
SGOT	834#	884											
SIGN	3765	3137	3153#	3170									
SIGNF	66#	2387	2401	2410	3126	3161	3204						
SIN	1604	1605	1612	1629#									
SMIN	2532	2599	2619#										
SMP	15#												
SMSP	2529	2617#											
SORTB	159	836#	841	842	851	856	858						
SORTC	160#	493	520	550	906	914	1285	2742	2764				
SORTCN	74#	299	321	309	578	1313	1039	1063	1069	1076	1201	1205	1216	2426
SORTJ	158#	220	505	603	644	671	679	758	781	821	831	1150	2774	3559
SPECIA	604	605	3055#										
SPLAT	1722	1751#											
SPNOR	176#	236	251	278	549	657							
SPTR	3505	3513	3514	3517	3518	3520	3544#	3547	3551				
SQCON1	3363	3404#											
SQEND	3371	3402#											
SRETLD	4224	4227#											
SRETN	254#	883											
SRETST	4399	4408#											
SRNLST	833	876#											
START	203#	261	266	752	1240	1320	1712	1812	4053				
STARTL	2031	2338#											
STARTV	79#	933	1318	1334	1434	1753							
STEMP	3493	3512	3591#										
STEMP2	3504	3515	3592#										
STOKOK	4410	4424#											
STOOBG	4412	4429#											
STORIT	2644	2648#											
SUBR	3676	3680	3691#										
SUBS	197#	927	962	974	985	2639	2750	3688					
SUBS2	195#	986	2638										
SWITCH	3739#	4330	4333	4335	4337	4350							
SWTMP	3740#	4363	4364	4381									
T	24#	1241	1423	1726									
T1	48#	636	639	641	1249	1252	1255	1257	1273	1279	1474	2267	2268	2283
	2289	2328	2330	2333	2338								
T12	1819#												
T2	89#	412	415	431	439	448	451	464	467	587	590	840	847	852
	853	854	855	1022	1023	1245	1246	1256	1517	1518	1525	1725	1729	1739
	1744	1749	2296	2298	2300	2302	2310						
T3	49#	1479	1481	1488	1872	1906	1988	2038	2130	2152	2154	2184	2286	2313
	2319	2326	2329	2363	2364	2533	2545	2574	2577	2592	2596	2671	2687	2688
	2693	2709	2710										
TABLE	2832	2850#											
TAG1	2982	3029#											
TASK	758#	790	798										
TASK4	796#	1030	1031	1438									
TCRLF	794#	1027											
TCRLF2	791#	1028											
TDUMP	1029	1753#	1786										

XABS	42	1181#											
XADC	347	853#											
XCT	38#	232	1368	1399	1414	1764							
XCTIN	32#	216	248	811	829	923	1535	1555	1714	1727	1735		
XDELET	97	1222#	1225	1281									
XDISP	345	3487#											
XENDLN	173	1422#	1436										
XFIND	171	1344#	1355	1369									
XGETLN	169	277#	331										
XGETOU	3993	4011#											
XI33	84	1633#	1640	1642	1651	1655							
XIN	2656	2666	2683	2725#									
XINPUT	2411	2432	2449#										
XINT	344	736#											
XLC	2179	3714#											
XLG	2792	3720#											
XLL	2111	3716#											
XLO	2137	3712#											
XLS	2650	3718#											
XOUTL	83	1637	1639	1641#	1663	3611	3612						
XPOPJ	147	1021#											
XPRNT	167	1461#	1473										
XPUSHA	149	411#	419										
XPUSHJ	144	429#	430	434									
XQ	3617#	3647	3658	3666	3667								
XR1	3625#	3983	3984	4005	4007	4045	4048	4339	4341	4343	4344	4347	4358	4366
	4367	4370	4375	4376	4389	4396	4452	4453	4456	4460	4462	4464		
XRAN	346	726#											
XRAR2	3336#	3342											
XRT	30#	376	377	443	449	462	466	971	972	1262	1278	1350	1353
XRT2	31#	567	568	577	843	844	850	1266	1272	1277			
XRTL6	175	357#	361										
XSGN	343	1177#											
XSORTC	161	565#	566	575	580	581	583						
XSPNOR	177	992#	996	998									
XSQ2	1881	1883	1886	1895	1916#	1948	1951	1955	1957				
XSQR	1916	2134	2140	2172	2174	2176	2178	2180	2205#				
XSQRT	353	3349#											
XT3	557	563#											
XTESTC	185	548#	552	554	559	561	562	563	564				
XTESTN	179	1004#	1008	1015	1016								
XYZ	1482#	1486											
Y	3646	3653	3657	3663	3687#								
ZERO	2879#	3174											