```
0001                        HED  **  MONITOR/BASIC LINKAGE AREA **
0002  00100                 ORG 100B
0003                        SPC 10
0004*
0005*                   TIME-SHARE BASIC COMPILER
0006*
0007*                           KILE B. BAKER
0008*                           JOHN S. SHEMA
0009*
0010*                        DATA RECORDING CENTER
0011*
0012*                      MONTANA STATE UNIVERSITY
0013*
0014*                             16K SYSTEM
0015*
0016*
0017                        SKP
0018*
0019***   BASE PAGE LINKAGE AREA
0020*
0021  00002                 ORG 2B
0022  00002 124003          JMP 3B,I     ADDRESS IS SET BY PREPARE BASIC
0023  00060                 ORG 60B
0024  00000          A      EQU 0
0025  00001          B      EQU 1
0026*
0027***   THESE LOCATIONS ARE SET BY PREPARE BASIC
0028*
0029  00060          .CARD BSS 1
0030  00061 002147  ?PTAP  DEF PTAPE   LINK TO PHOTOREADER INPUT
0031  00062          .HSPR BSS 1        PHOTOREADER LINK
0032  00063 000000  USN   NOP          ACTIVATED USER NUMBER
0033  00064 000111  ASTK  DEF ACTIV    LINK TO ACTIVE STACK
0034*
0035***   EXECUTION FLAGS
0036*
0037  00065 000000  EXU1  NOP
0038  00066 000000  EXU2  NOP
0039  00067 000000  EXU3  NOP
0040  00070 000000  EXU4  NOP
0041*
0042***   USER STACK ADDRESSES
0043*
0044  00071          BSK1  BSS 1
0045  00072          BSK2  BSS 1
0046  00073          BSK3  BSS 1
0047  00074          BSK4  BSS 1
0048*
0049  00100                ORR
0050  00100 002012  START DEF FLUSH    START OF BASIC
0051  00101          ?OFF  BSS 1        LINK TO LOG-OFF SUBROUTINE
0052  00102          ?MESG BSS 1        LINK TO MESSAGE EXECUTION
0053  00103          MONIT BSS 1        PRIMARY ENTRY POINT TO MONITOR
0054  00104          SEXU  BSS 1        SET EXECITION FLAG LINK TO MONITOR
0055  00105          IMON  BSS 1         LINK TO TURN ON INT
0056  00106          IMOFF BSS 1         LINK TO TURN OFF INT.
0057  00107 006055  XECUT DEF XEC4.    EXECUTION RETURN
0058  00110 002163  I.STP DEF STOP     LINK TO STOP ROUTINE
0059*
0060***   ACTIVE STACK LOCATION
0061*
0062  00111          ACTIV EQU *
0063  00111          TAPE! BSS 1        TAPE INPUT LINK
0064  00112          WRITE BSS 1        TTY OUTPUT LINK
0065  00113          REED  BSS 1        TTY INPUT LINK
0066  00114          FWAM  BSS 1        FIRST WORD AVAIL MEM
0067  00115          LWAM  BSS 1        LAST WORD AVAIL MEM
0068  00116          .BUFA BSS 1        I/O BUFFER ADDRESS
0069  00117          SYMTA BSS 1        SYMBOL TABLE END
0070  00120          SBUFA BSS 1        SYNTAX BUFFER ADDRESS
0071  00121          PBUFF BSS 1        FIRST WORD OF USER'S PROGRAM
0072  00122          PBPTR BSS 1        LAST WORD+1 OF USER'S PROG
0073  00123          BLANK BSS 1
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0074  00124         .LNUM BSS 1        CURRENT LINE NUMBER
0075  00125         BADDR BSS 1        I/O BUFFER
0076  00126         CCNT  BSS 1        POINTERS
0077  00127 000000  TFLAG NOP          PHOTOREADER FLAG
0078  00130 000000  TTYFL NOP          TAPE FLAG
0079  00131         FCORE BSS 1        START OF FREE CORE
0080  00132         SYMTF BSS 1        START OF SYMBOL TABLE
0081  00133         SBPTR BSS 1        SYNTAX BUFFER POINTER
0082  00134         LSTAK BSS 1        LOW-CORE STACK ADDRESS
0083  00135         TSTPT BSS 1        TEMPORARY STACK POINTER
0084  00136         LSTPT BSS 1        LOW-CORE STACK POINTER
0085  00137         HSTPT BSS 1        HIGH-CORE STACK POINTER
0086  00140         PRADD BSS 1        PROGRAM EXECUTION
0087  00141         NXTST BSS 1        SEQUENCING INFORMATION
0088  00142         TYPE  BSS 1        CURRENT STATEMENT TYPE
0089  00143         DSTRT BSS 1        DATA
0090  00144         NXTDT BSS 1        STATEMENT
0091  00145         DCCNT BSS 1        POINTERS
0092  00146         RSYM  BSS 1
0093  00147         SIGN  BSS 1
0094  00150         EXP   BSS 1
0095  00151         XH    BSS 1        RANDOM
0096  00152         XL    BSS 1        VARIABLES
0097  00153         EOL   BSS 1        *
0098  00154         STK1  BSS 1        *  STORAGE
0099  00155         STK2  BSS 1        *
0100  00156         STK3  BSS 1        *  FOR
0101  00157         STK4  BSS 1        *
0102  00160         STK5  BSS 1        *  RETURN
0103  00161         STK6  BSS 1        *
0104  00162         STK7  BSS 1        *  ADDRESSES
0105  00163         STK8  BSS 1        *
0106  00164         STK9  BSS 1        *  IN USER
0107  00165         STK10 BSS 1        *
0108  00166         STK11 BSS 1        *  STACK
0109  00167         STK12 BSS 1        *
0110  00170         STK13 BSS 1        *  AREA
0111  00171         STK14 BSS 1        *
0112  00172         STK15 BSS 1
0113  00173         STK16 BSS 1        STORAGE FOR ERROR CCNT
0114  00174         STK17 BSS 1        STOREAGE FOR ERROR BUFAD
0115  00175         STK18 BSS 1        STORAGE FOR ERROR #
0116  00176         STK19 BSS 1        RETURN ADDR FOR ERROR
0117  00177         STK20 BSS 1
0118  00200         STK21 BSS 1
0119  00201         STK22 BSS 1
0120  00202         STK23 BSS 1
0121  00203         STK24 BSS 1
0122  00204         SBOXX BSS 1
0123*
0124  00205         TEMPS BSS 12       TEMPORARIES
0125  00217         MLBX1 EQU TEMPS+10
0126  00221         B1    BSS 2        *  TEMPS USED
0127  00223         B2    BSS 2        *  BY MATRIX AND
0128  00225         B3    BSS 2        *  LIB FUNCTIONS
0129  00227         A1    BSS 1
0130  00230         A2    BSS 1
0131  00231         C1    BSS 1
0132  00232         C2    BSS 1
0133  00233         FORM& BSS 1
0134  00234         MANT1 BSS 1
0135  00235         MANT2 BSS 1
0136  00236         EXPON BSS 1
0137  00237         DPFLG BSS 1
0138  00204         FFLAG EQU SBOXX
0139  00221         TT1   EQU B1
0140  00223         TT2   EQU B2
0141  00211         TT3   EQU TEMPS+4
0142  00212         TT4   EQU TEMPS+5
0143  00240 000205  MBUF  DEF TEMPS
0144  00205         MBOX1 EQU TEMPS
0145  00160         MBIN1 EQU STK5
0146  00157         MBIN2 EQU STK4
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0147  00155         MPTR  EQU STK2
0148  00156         MNPTR EQU STK3
0149  00216         COML  EQU TEMPS+9
0150  00217         MWDNO EQU TEMPS+10
0151                      HED  ** BASIC LINKAGE AND CONSTANTS **
0152  00241 000242  RDYA  DEF READY
0153  00242 051105  READY ASC 2,READ
      00243 040504
0154  00244 054415        OCT 54415
0155  00245 000456  LFEED DEF LF
0156  00246 000251  QMRKA DEF QMARK
0157  00247 003657  STOPA DEF STCMD
0158  00250 002140  CMNDA DEF CMNDS
0159  00251 037421  QMARK OCT 37421
0160*
0161  00252 005146  RUNA  DEF MFASE    PHASE 2: BUILD SYMBOL TABLE
0162  00253 006016  FASE3 DEF XEC      PHASE 3: PROGRAM EXECUTION
0163  00254 002032  PEXMA DEF PEXMK    RETURN TO MONITOR FROM SYNTAX
0164  00255 002021  RDYDA DEF RDYPT    RETURN TO MONITOR FROM PHASE 3
0165  00256 002113  DRQSA DEF DRQST    REQUEST DATA INPUT
0166  00257 004470  LISTA DEF LIST     LIST PROGRAM
0167  00260 004006  MATA  DEF MAT+1
0168  00261 011445  EMATA DEF EMAT
0169  00262 004121  TSRCH DEF TBSRH    SEARCH PRINT-NAME TABLE
0170  00263 004411  FNDPA DEF FNDPS
0171  00264 000642  CNSTA DEF CONST
0172  00265 000672  NUMCA DEF NUMCK
0173  00266 004247  INCHK DEF INTCK
0174  00267 001711  ENOTA DEF ENOUT
0175  00270 010014  NUMOA DEF NUMOT
0176  00271 004231  PGINT DEF PRGIN
0177  00272 004713  OUTIA DEF OUTIN
0178  00273 004753  OUTSA DEF OUTST
0179  00274 001753  OUTLA DEF OUTLN
0180  00275 001773  OUTCA DEF OUTCR
0181  00276 001662  GETCA DEF GETCR
0182  00277 001636  DIGCA DEF DIGCK
0183  00300 001651  LETCA DEF LETCK
0184  00301 007625  SSYMA DEF SSYMT
0185  00302 006075  FETCA DEF FETCH    EVALUATE A FORMULA
0186  00303 005552  FORMA DEF FORMX
0187  00304 011053  .LOGA DEF .LOG
0188  00305 011162  .EXPA DEF .EXP
0189  00306 007340  .FADA DEF .FAD
0190  00307 007346  .FSBA DEF .FSB
0191  00310 007417  .FMPA DEF .FMP
0192  00311 007466  .FDVA DEF .FDV
0193  00312 001471  ARINA DEF ARINV
0194  00313 001317  MPYA  DEF MPY
0195  00314 001524  FLUNA DEF .FLUN
0196  00315 001077  PACKA DEF .PACK
0197  00316 011417  FLT   DEF FLOAT
0198  00317 001432  IFIXA DEF IFIX
0199  00320 006425  PRNIA DEF PRNIN
0200  00321 004306  CHRSA DEF CHRST
0201  00322 004345  ACCST DEF ACTST
0202  00323 004335  DELST DEF DLSTM
0203  00324 006141  FDAT  DEF FDATA
0204  00325 012053  LCK2A DEF LCHK2
0205  00326 006054  XEC4A DEF XEC4
0206  00327 003250  FSC1A DEF FSC14
0207  00330 005557  FOR1A DEF FORM1
0208  00331 005622  FOR0A DEF FORM0
0209  00332 005627  FOR0B DEF FOR11
0210  00333 005636  FOR1B DEF FOR10
0211  00334 005724  FR12A ABS FOR12
0212  00335 014544  EOF   JSB ERROR
0213  00336 014544  NOEOF JSB ERROR
0214  00337 001573  E8M1A DEF E8-1
0215  00340 002345  ESYN3 DEF SYNE3-1
0216  00341 003332  FSCEF DEF FSCE4
0217  00342 006752  E6M1A DEF E6-1
0218  00343 007705  ERBS  DEF ERR-1
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0219  00344 000100  RECER DEF RCERR-ERR
0220  00345 002242  FOPBS DEF QUOTE-2
0221  00346 102766  STBAS DEF SYNTB-26,I
0222  00347 105737  XECBR DEF XECTB-26,I
0223  00350 106650  ARBAS DEF AROTB-6,I
0224  00351 011771  PDFBS DEF PDFT-1
0225  00352 003656  TBLAD DEF SYCMD
0226  00353 003712  STTYP DEF LET
0227  00354 003765  MATIO DEF READ
0228  00355 004023  MCBOP DEF AND
0229  00356 004041  PDFNS DEF SIN
0230  00357 004102  MATFN DEF ZER
0231  00360 003741  ANEXT DEF NEXT
0232  00361 003762  ADATA DEF DATA
0233  00362 004010  ATHEN DEF THEN
0234  00363 004013  ATO   DEF TO
0235  00364 004015  ASTEP DEF STEP
0236  00365 004020  ANOT  DEF NOT
0237  00366 004036  ATAB  DEF TAB
0238  00367 000217  MBXL  DEF MLBX1
0239  00370 000001  .1    DEC 1
0240  00371 000002  .2    DEC 2
0241  00372 000003  .3    DEC 3
0242  00373 000004  .4    DEC 4
0243  00374 000006  .6    DEC 6
0244  00375 000007  .7    DEC 7
0245  00376 000010  .8    DEC 8
0246  00377 000011  .9    DEC 9
0247  00400 000012  .10   DEC 10
0248  00401 000014  .12   DEC 12
0249  00402 000017  .15   DEC 15
0250  00403 000027  .23 DEC 23
0251  00404 000032  .26   DEC 26
0252  00405 000033  .27   DEC 27
0253  00406 000034  .28   DEC 28
0254  00407 000036  .30   DEC 30
0255  00410 000037  .31   DEC 31
0256  00411 000040  .32   DEC 32
0257  00412 000041  .33   DEC 33
0258  00413 000042  .34   DEC 34
0259  00414 000043  .35   DEC 35
0260  00415 000044  .36   DEC 36
0261  00416 000045  .37   DEC 37
0262  00417 000050  .40   DEC 40
0263  00420 000051  .41   DEC 41
0264  00421 000053  .43   DEC 43
0265  00422 000055  .45   DEC 45
0266  00423 000056  .46   DEC 46
0267  00424 000057  .47   DEC 47
0268  00425 000060  .48   DEC 48
0269  00426 000061  .49   DEC 49
0270  00427 000072  .58   DEC 58
0271  00430 000077  .63   DEC 63
0272  00431 000100  B100  OCT 100
0273  00432 000105  E     OCT 105
0274  00433 000106  F     OCT 106
0275  00434 000110  .72   DEC 72
0276  00435 000112  .74   DEC 74
0277  00436 000113  .75   DEC 75
0278  00437 000116  N     OCT 116
0279  00440 000122  R     OCT 122
0280  00441 000123  S     OCT 123
0281  00442 000133  B133  OCT 133
0282  00443 000177  B177  OCT 177
0283  00444 000200  B200  OCT 200
0284  00445 000377  MSK0  OCT 377
0285  00446 000400  B400  OCT 400
0286  00447 000776  B776  OCT 776
0287  00450 000777  MSK1  OCT 777
0288  00451 001000  B1000 OCT 1000
0289  00452 002000  B2000 OCT 2000
0290  00453 003000  B3000 OCT 3000
0291  00454 003002  SCCNT OCT 3002
```

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0292  00455 004000  B4000 OCT 4000
0293  00456 005000  LF    OCT 5000
0294  00457 014000  B1400 OCT 14000
0295  00460 021000  UNMNC OCT 21000
0296  00461 022000  B2200 OCT 22000
0297  00462 023000  B2300 OCT 23000
0298  00463 035000  DEFOP OCT 35000
0299  00464 036000  REMOP OCT 36000
0300  00465 052000  RDOP  OCT 52000
0301  00466 063146  TENTH OCT 63146
0302  00467 077000  OPMSK OCT 77000
0303  00470 077600  MSK4  OCT 77600
0304  00471 077777  INF   OCT 77777
0305  00472 100017  TYPFL OCT 100017
0306  00473 100037  TABCN OCT 100037
0307  00474 100777  OPDMK OCT 100777
0308  00475 140000  UNNRM OCT 140000
0309  00476 174000  HIMSK OCT 174000
0310  00477 177777  M1    DEC -1
0311  00500 177776  M2    DEC -2
0312  00501 177775  M3    DEC -3
0313  00502 177774  M4    DEC -4
0314  00503 177773  M5    DEC -5
0315  00504 177772  M6    DEC -6
0316  00505 177771  M7    DEC -7
0317  00506 177770  M8    DEC -8
0318  00507 177767  M9    DEC -9
0319  00510 177766  M10   DEC -10
0320  00511 177765  M11   DEC -11
0321  00512 177761  M15   DEC -15
0322  00513 177760  M16   DEC -16
0323  00514 177755  M19   DEC -19
0324  00515 177753  M21   DEC -21
0325  00516 177747  M25   DEC -25
0326  00517 177740  M32   DEC -32
0327  00520 177725  D53   OCT -53
0328  00521 177706  D72   OCT -72
0329  00522 177700  D100  OCT -100
0330  00523 177670  M72   DEC -72
0331  00524 177667  M73   DEC -73
0332  00525 177664  M76   DEC -76
0333  00526 177645  D133  OCT -133
0334  00527 177400  M256  DEC -256
0335  00530 177312  M310  DEC -310
0336  00531 176030  M1000 DEC -1000
0337  00532 154360  MAXSN DEC -10000
0338  00505         MSK3  EQU M7
0339  00533 043116  FN    ASC 1,FN
0340  00534 040000  HALF  OCT 40000
0341  00535 000000        NOP
0342  00534         HONE  EQU HALF
0343  00536 100000  MNEG  OCT 100000   MAXIMUM NEGATIVE FLOATING
0344  00537 000376        OCT 376      POINT NUMBER
0345  00536         FLGBT EQU MNEG
0346  00540 102756  MAXFX DEC -999999.5
      00541 002050
0347  00542 114631  MINFX DEC -0.099999959
      00543 116373
0348  00427         COLON EQU .58
0349  00206         TEMP EQU TEMPS+1
0350  00207         TEMP1 EQU TEMPS+2
0351  00210         TEMP2 EQU TEMPS+3
0352  00211         TEMP3 EQU TEMPS+4
0353  00212         TEMP4 EQU TEMPS+5
0354  00213         COUNT EQU TEMPS+6
0355  00211         STEMP EQU TEMPS+4
0356  00226         ARYAD EQU B3+1
0357  00172         LFLAG EQU STK15
0358  00177         DIGCT EQU STK20
0359  00200         DIVSR EQU STK21
0360  00201         LDZRO EQU STK22
0361  00202         MIND  EQU STK23
0362                HED  ** BASE PAGE SUBROUTINES **
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0363*
0364***   EMIT ERROR MESSAGE
0365*
0366  00544 000000  ERROR NOP
0367  00545 060544        LDA ERROR    SAVE ERROR RETURN
0368  00546 070176        STA STK19    STORE RETURN ADDRESS
0369  00547 060126        LDA CCNT     SAVE CHAR-OUT COUNT
0370  00550 070173        STA STK16    SAVE COUNT
0371  00551 060125        LDA BADDR    SAVE I/O BUFFER
0372  00552 070174        STA STK17    SAVE ADDRESS
0373*
0374  00553 002400        CLA          SET EXU FLAG TO I/O
0375  00554 114104        JSB SEXU,I   TO "IN I/O"
0376  00555 070130        STA TTYFL    TAPE FLAG TO ZERO
0377  00556 070126        STA CCNT     CHARS-OUT COUNT TO ZERO
0378  00557 114112        JSB WRITE,I  OUTPUT CR-LF
0379  00560 064414        LDB .35
0380  00561 044116        ADB .BUFA    COMPUTE BUFF ADR-1
0381  00562 074125        STB BADDR    STORE AS POINTER
0382*
0383  00563 060432        LDA E        LOAD ASCII "E"
0384  00564 015773        JSB OUTCR    PUT IT IN BUFFER
0385  00565 060440        LDA R        LOAD ASCII "R"
0386  00566 015773        JSB OUTCR    PUT IT IN BUFFER
0387  00567 015773        JSB OUTCR    PUT IT IN BUFFER
0388  00570 060123        LDA BLANK    LOAD BLANK
0389  00571 015773        JSB OUTCR    PUT IT IN BUFFER
0390*
0391  00572 064176        LDB STK19    LOAD RETURN ADDRESS
0392  00573 060343        LDA ERBS     ERROR ADDRESS IN (A)
0393  00574 002004        INA          MOVE TO NEXT ERROR
0394  00575 154000        CPB A,I      SAME AS ACTUAL ERROR
0395  00576 003005        CMA,INA,RSS  YES
0396  00577 024574        JMP *-3      NO
0397  00600 040343        ADA ERBS     COMPUTE ERROR
0398  00601 070175        STA STK18    SAVE NEG. ERROR NUMBER
0399  00602 003004        CMA,INA
0400  00603 114272        JSB OUTIA,I  PUT ERROR CODE IN BUFFER
0401  00604 060427        LDA COLON    LOAD COLON
0402  00605 015773        JSB OUTCR    PUT IT IN BUFFER
0403  00606 060124        LDA .LNUM    LOAD LINE NUMBER
0404  00607 114272        JSB OUTIA,I  PUT IT IN BUFFER
0405*
0406***   OUTPUT ERROR CODE ON TTY
0407*
0408  00610 060126        LDA CCNT
0409  00611 064415        LDB .36
0410  00612 044116        ADB .BUFA    INDEX TO BUFF START ADR
0411  00613 114112        JSB WRITE,I  OUTPUT ERR MESSAGE ON TTY
0412*
0413  00614 060175        LDA STK18    GET ERROR NUMBER
0414  00615 040344        ADA RECER    RECOVERABLE ERROR?
0415  00616 002021        SSA,RSS
0416  00617 124254        JMP PEXMA,I  RETURN TO SYNTAX MODE
0417  00620 002404        CLA,INA      SET EXECUTION
0418  00621 114104        JSB SEXU,I   FLAG TO IN EXU.
0419  00622 060173        LDA STK16    LOAD COUNT
0420  00623 064174        LDB STK17    LOAD ADDRESS
0421  00624 070126        STA CCNT     CCNT AND
0422  00625 074125        STB BADDR    BADDR
0423  00626 124176        JMP STK19,I  RETURN
0424*
0425**
0426***  MOVE WORDS TO HIGHER CORE **
0427**
0428  00627 000000  MVTOH NOP
0429  00630 064210        LDB TEMP2    FETCH SOURCE ADDRESS
0430  00631 054211  MVTO1 CPB TEMP3    ALL RELOCATION DONE?
0431  00632 124627        JMP MVTOH,I  YES,EXIT
0432  00633 003400        CCA          BACK UP
0433  00634 040212        ADA TEMP4    SOURCE AND
0434  00635 070212        STA TEMP4    DESTINATION
0435  00636 044477        ADB M1       ADDRESSES
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0436  00637 160001        LDA 1,I      MOVE
0437  00640 170212        STA TEMP4,I  WORD
0438  00641 024631        JMP MVTO1
0439**
0440***   INPUT A CONSTANT **
0441**
0442  00642 000000  CONST NOP
0443  00643 064642        LDB CONST
0444  00644 074161        STB STK6
0445  00645 015662        JSB GETCR
0446  00646 124161        JMP STK6,I
0447  00647 006400        CLB          SET SIGN
0448  00650 074147        STB SIGN     POSITIVE
0449  00651 006004        INB
0450  00652 050421        CPA .43      "+"?
0451  00653 024657        JMP CONS1    YES, IGNORE IT
0452  00654 050422        CPA .45      "-"?
0453  00655 007401        CCB,RSS      YES
0454  00656 024662        JMP CONS2    NO
0455  00657 074147  CONS1 STB SIGN     RECORD SIGN
0456  00660 015662        JSB GETCR    FETCH NEXT
0457  00661 024670        JMP SYE12-1  CHARACTER
0458  00662 014672  CONS2 JSB NUMCK    FETCH CONSTANT
0459  00663 024666        JMP CONS3    NONE FOUND
0460  00664 034161        ISZ STK6
0461  00665 124161        JMP STK6,I
0462  00666 054147  CONS3 CPB SIGN
0463  00667 003401        CCA,RSS
0464  00670 014544        JSB ERROR
0465  00671 124161  SYE12 JMP STK6,I
0466**
0467***   FETCH NUMBER AND CONVERT TO BINARY  **
0468**
0469  00672 000000  NUMCK NOP          CHARACTER IN (A), SIGN SET
0470  00673 064672        LDB NUMCK
0471  00674 074162        STB STK7
0472  00675 006400        CLB
0473  00676 074150        STB EXP      ZERO
0474  00677 074234        STB MANT1    ALL
0475  00700 074235        STB MANT2    COMPONENTS
0476  00701 074236        STB EXPON
0477  00702 074211        STB TEMP3    SET "NUMBER" FLAG FALSE
0478  00703 007400        CCB          SET "DECIMAL POINT"
0479  00704 074237        STB DPFLG    FLAG FALSE
0480  00705 050423  NUMC1 CPA .46      DECIMAL POINT?
0481  00706 034237        ISZ DPFLG    YES, SET FLAG TRUE
0482  00707 024713        JMP NUMC2    NO
0483  00710 002400        CLA          INITIALIZE POST-DECIMAL DIGIT
0484  00711 070236        STA EXPON    DIGIT COUNTER TO ZERO
0485  00712 024732        JMP NUMC3+1  FETCH A CHARACTER
0486  00713 015636  NUMC2 JSB DIGCK    DIGIT?
0487  00714 024765        JMP NUMC7    NO
0488  00715 034236        ISZ EXPON    COUNT DIGIT
0489  00716 001727        ALF,ALF      LEFT-JUSTIFY
0490  00717 001723        ALF,RAR      DIGIT AND
0491  00720 070212        STA TEMP4    SAVE IT
0492  00721 015230        JSB MBY10    MULTIPLY PREVIOUS NUMBER BY 10
0493  00722 064150        LDB EXP
0494  00723 006002        SZB          ZERO EXPONENT?
0495  00724 024736        JMP NUMC4    NO
0496  00725 060373        LDA .4       YES, SET
0497  00726 070150        STA EXP      EXPONENT TO 4
0498  00727 060212        LDA TEMP4    LOAD
0499  00730 006400        CLB          NUMBER
0500  00731 015174  NUMC3 JSB NORML    NORMALIZE THE NUMBER
0501  00732 034211        ISZ TEMP3    YES, SET "NUMBER" FLAG TRUE
0502  00733 015662        JSB GETCR    ANOTHER CHARACTER?
0503  00734 025034        JMP NUM12    NO
0504  00735 024705        JMP NUMC1    YES
0505  00736 044502  NUMC4 ADB M4       COMPUTE
0506  00737 007000        CMB          EXPONENT
0507  00740 060212        LDA TEMP4    BIAS AND
0508  00741 074212        STB TEMP4    SAVE IT
```

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0509  00742 006400        CLB
0510  00743 034212  NUMC5 ISZ TEMP4    DIGIT POSITIONED?
0511  00744 024762        JMP NUMC6    NO
0512  00745 000040        CLE          YES, ADD IN
0513  00746 044235        ADB MANT2    LOW PART
0514  00747 103101        CLO          OF NUMBER
0515  00750 002040        SEZ          OVERFLOW?
0516  00751 002004        INA          YES, BUMP (A)
0517  00752 040234        ADA MANT1    ADD IN HIGH PART OF NUMBER
0518  00753 102301        SOS          OVERFLOW?
0519  00754 024731        JMP NUMC3    NO
0520  00755 000065        CLE,ERA      YES, ROTATE
0521  00756 005500        ERB          DOWN AND
0522  00757 034150        ISZ EXP      BUMP
0523  00760 000000        NOP          EXPONENT
0524  00761 024731        JMP NUMC3
0525  00762 000065  NUMC6 CLE,ERA      SHIFT
0526  00763 005500        ERB          DIGIT
0527  00764 024743        JMP NUMC5    RIGHT
0528  00765 006400  NUMC7 CLB          DECIMAL POINT
0529  00766 074212        STB TEMP4    SET EXPONENT PART TO ZERO
0530  00767 054211        CPB TEMP3    OR DIGIT FOUND?
0531  00770 124162        JMP STK7,I
0532  00771 050432        CPA E        "E"?
0533  00772 002001        RSS          YES
0534  00773 025034        JMP NUM12    NO, NO EXPONENT PART
0535  00774 015662        JSB GETCR
0536  00775 014544  NUMER JSB ERROR
0537  00776 050421        CPA .43
0538  00777 025004        JMP NUMC8
0539  01000 050422        CPA .45      NO, "-"?
0540  01001 003401        CCA,RSS
0541  01002 025006        JMP NUMC9    YES
0542  01003 070212        STA TEMP4
0543  01004 015662  NUMC8 JSB GETCR
0544  01005 024775        JMP NUMER
0545  01006 015636  NUMC9 JSB DIGCK
0546  01007 024775        JMP NUMER
0547  01010 070211        STA TEMP3
0548  01011 015662        JSB GETCR
0549  01012 025030        JMP NUM10
0550  01013 015636        JSB DIGCK
0551  01014 025030        JMP NUM10
0552  01015 064211        LDB TEMP3
0553  01016 005020        BLS,BLS
0554  01017 044211        ADB TEMP3
0555  01020 005000        BLS
0556  01021 040001        ADA 1
0557  01022 070211        STA TEMP3
0558  01023 015662        JSB GETCR
0559  01024 025030        JMP NUM10
0560  01025 015636        JSB DIGCK
0561  01026 002001        RSS
0562  01027 024775        JMP NUMER
0563  01030 060211  NUM10 LDA TEMP3
0564  01031 034212        ISZ TEMP4
0565  01032 003004        CMA,INA      YES, COMPLEMENT IT
0566  01033 002001        RSS          NO
0567  01034 002400  NUM12 CLA          CLEAR IF NO EXPONENT PART
0568  01035 034237        ISZ DPFLG    DECIMAL POINT?
0569  01036 040236        ADA EXPON    YES, CORRECT EXPONENT
0570  01037 002003        SZA,RSS      ZERO EXPONENT?
0571  01040 025055        JMP NUM14    YES
0572  01041 002020        SSA          NO, NEGATIVE EXPONENT?
0573  01042 025051        JMP NUM13    NO
0574  01043 003004        CMA,INA      YES, SET
0575  01044 070236        STA EXPON COUNTER
0576  01045 015261        JSB DBY10    DIVIDE NUMBER BY 10
0577  01046 034236        ISZ EXPON    DONE?
0578  01047 025045        JMP *-2      NO
0579  01050 025055        JMP NUM14    YES
0580  01051 070236  NUM13 STA EXPON    SET COUNTER
0581  01052 015230        JSB MBY10    MULTIPLY BY 10
```

```
0582  01053 034236        ISZ EXPON    DONE?
0583  01054 025052        JMP *-2      NO
0584  01055 060234  NUM14 LDA MANT1    YES, LOAD
0585  01056 064235        LDB MANT2    NUMBER
0586  01057 034147        ISZ SIGN     POSITIVE?
0587  01060 025064        JMP NUM15     YES
0588  01061 003000        CMA          NO,
0589  01062 007007        CMB,INB,SZB,RSS    COMPLEMENT
0590  01063 002004        INA          IT
0591  01064 015077  NUM15 JSB .PACK    PACK NUMBER INTO (A) AND (B)
0592  01065 034133        ISZ SBPTR
0593  01066 170133        STA SBPTR,I  STORE
0594  01067 034133        ISZ SBPTR    NUMBER IN
0595  01070 174133        STB SBPTR,I  PROPER
0596  01071 034133        ISZ SBPTR    LOCATION
0597  01072 015701        JSB BCKSP    FETCH
0598  01073 015662        JSB GETCR    FIRST
0599  01074 060400        LDA .10      UNUSED CHARACTER
0600  01075 034162        ISZ STK7
0601  01076 124162        JMP STK7,I
0602**
0603***   NORMALIZE AND PACK FLOATING POINT NUMBER **
0604**
0605  01077 000000  .PACK NOP          MANTISSA IN (A) AND (B),
0606  01100 015174        JSB NORML    EXPONENT IN EXP, (E) CLEARED
0607  01101 002103        CLE,SZA,RSS  ZERO RESULT?
0608  01102 125077        JMP .PACK,I
0609  01103 044443        ADB B177     NO, ROUND
0610  01104 002021        SSA,RSS      POSITIVE NUMBER?
0611  01105 006004        INB          YES, FINISH ROUND
0612  01106 103101        CLO
0613  01107 002040        SEZ          OVERFLOW FROM (B)?
0614  01110 002104        CLE,INA      YES, BUMP (A)
0615  01111 102301        SOS          OVERFLOW? (A=100000, B=0)
0616  01112 001200        RAL
0617  01113 002031        SSA,SLA,RSS  TWO HIGH BITS 1'S? (A=140000))
0618  01114 025117        JMP PACK1    NO
0619  01115 002300        CCE          YES
0620  01116 001130        ARS,SLA,ALS  SET (A) =100000 AND SKIP
0621  01117 001300  PACK1 RAR          COUNTERPART TO *-5
0622  01120 071230        STA MBY10    SAVE (A)
0623  01121 060001        LDA 1        DELETE 8 LOW
0624  01122 010527        AND M256     ORDER BITS OF MANTISSA
0625  01123 070001        STA 1        SAVE LOWER MANTISSA
0626  01124 061077        LDA .PACK
0627  01125 070171        STA STK14
0628  01126 060150        LDA EXP      FETCH EXPONENT
0629  01127 002040        SEZ          DECREMENT EXPONENT?
0630  01130 040477        ADA M1       YES
0631  01131 102201        SOC          NO, PRIOR OVERFLOW?
0632  01132 002004        INA          YES, INCREMENT EXPONENT
0633  01133 040444        ADA B200     NO, EXPONENT
0634  01134 002020        SSA          UNDERFLOW?
0635  01135 025154        JMP PACK3    YES
0636  01136 040527        ADA M256     NO, EXPONENT
0637  01137 002021        SSA,RSS      OVERFLOW?
0638  01140 025160        JMP PACK4    YES
0639  01141 040444        ADA B200     NO, RESTORE EXPONENT,
0640  01142 001200        RAL          POSITION SIGN,
0641  01143 010445        AND MSK0     MASK TO 8 BITS, AND
0642  01144 044000        ADB 0        COMBINE WITH LOW MANTISSA
0643  01145 061230        LDA MBY10    RETRIEVE HIGH MANTISSA
0644  01146 050536        CPA MNEG
0645  01147 002001        RSS          NEGATIVE
0646  01150 124171        JMP STK14,I
0647  01151 054537        CPB MNEG+1   OVERFLOW?
0648  01152 025160        JMP PACK4    YES
0649  01153 124171        JMP STK14,I
0650  01154 014544  PACK3 JSB ERROR
0651  01155 002400  UNDER CLA          ZERO RESULT
0652  01156 006400        CLB          ON UNDERFLOW
0653  01157 124171        JMP STK14,I
0654  01160 014544  PACK4 JSB ERROR
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0655  01161 061230  OVRER LDA MBY10
0656  01162 015164        JSB OVFLW
0657  01163 124171        JMP STK14,I
0658**
0659***   LOAD INFINITY ON OVERFLOW **
0660**
0661  01164 000000  OVFLW NOP
0662  01165 064500        LDB M2
0663  01166 002020        SSA
0664  01167 064447        LDB B776
0665  01170 030471        IOR INF
0666  01171 002020        SSA
0667  01172 060536        LDA MNEG
0668  01173 125164        JMP OVFLW,I  INFINITY
0669**
0670***  NORMALIZE (A), (B), AND EXP **
0671**
0672  01174 000000  NORML NOP          SET
0673  01175 071230        STA MBY10    LEFT-SHIFT
0674  01176 002400        CLA          COUNTER
0675  01177 071317        STA MPY      TO ZERO
0676  01200 061230        LDA MBY10
0677  01201 002003        SZA,RSS      ON
0678  01202 006002        SZB          ZERO
0679  01203 025211        JMP NORM3        CLEAR
0680  01204 070150        STA EXP      EVERYTHING
0681  01205 070234        STA MANT1    STORE
0682  01206 074235  NORM1 STB MANT2    MANTISSA
0683  01207 125174        JMP NORML,I  AND RETURN
0684  01210 035317  NORM2 ISZ MPY      COUNT LEFT SHIFTS
0685  01211 004066  NORM3 CLE,ELB      ROTATE (A) AND
0686  01212 001600        ELA          (B) LEFT INTO (E)
0687  01213 002061        SEZ,SSA,RSS  TWO HIGHEST BITS 0?
0688  01214 025210        JMP NORM2    YES, + UNNORMALIZED
0689  01215 002060        SEZ,SSA      NO, TWO HIGHEST BITS 1?
0690  01216 025210        JMP NORM2    YES, -UNNORMALIZED
0691  01217 001500        ERA          SHIFT TO
0692  01220 005540        ERB,CLE      NORMALIZE MANTISSA
0693  01221 070234        STA MANT1    NO,
0694  01222 061317        LDA MPY      COMPUTE
0695  01223 003004        CMA,INA      CORRECTED
0696  01224 040150        ADA EXP      EXPONENT
0697  01225 070150        STA EXP      VALUE
0698  01226 060234        LDA MANT1
0699  01227 025206        JMP NORM1
0700**
0701*** MULTIPLY UNPACKED NUMBER BY 10 **
0702**
0703  01230 000000  MBY10 NOP
0704  01231 060234        LDA MANT1    RETURN ON
0705  01232 002003        SZA,RSS      ZERO
0706  01233 125230        JMP MBY10,I  MANTISSA
0707  01234 064150        LDB EXP      MULTIPLY
0708  01235 044372        ADB .3       BY
0709  01236 074150        STB EXP      8
0710  01237 064235        LDB MANT2    LOAD MANTISSA
0711  01240 000065        CLE,ERA      DIVIDE
0712  01241 005500        ERB          BY
0713  01242 000065        CLE,ERA      4
0714  01243 005540        ERB,CLE
0715  01244 044235        ADB MANT2    DOUBLE
0716  01245 002040        SEZ          ADD TO
0717  01246 002004        INA          PRODUCE
0718  01247 040234        ADA MANT1    1.25 * MANTISSA
0719  01250 002021        SSA,RSS      CORRECT
0720  01251 025256        JMP *+5
0721  01252 000065        CLE,ERA      ON
0722  01253 005500        ERB
0723  01254 034150        ISZ EXP      OVERFLOW
0724  01255 000000        NOP
0725  01256 070234        STA MANT1
0726  01257 074235        STB MANT2
0727  01260 125230        JMP MBY10,I
```

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0728**
0729*** DIVIDE UNPACKED NUMBER BY 10 **
0730**
0731  01261 000000  DBY10 NOP          MULTIPLY BY DOUBLE-LENGTH TENTH
0732  01262 060234        LDA MANT1    RETURN
0733  01263 002003        SZA,RSS      ON ZERO
0734  01264 125261        JMP DBY10,I  MANTISSA
0735  01265 064500        LDB M2       ADD EXPONENT OF
0736  01266 044150        ADB EXP      "TENTH" TO
0737  01267 074150        STB EXP      MANTISSA EXPONENT
0738  01270 060235        LDA MANT2    JUSTIFY
0739  01271 000065        CLE,ERA      LOWER MANTISSA
0740  01272 015317        JSB MPY      MULTIPLY BY
0741  01273 000466        DEF TENTH    63146 (ONE TENTH)
0742  01274 000066        CLE,ELA      SHIFT
0743  01275 005640        ELB,CLE      BACK
0744  01276 040001        ADA 1        ADD IN LOWER MANTISSA *
0745  01277 002040        SEZ          TENTH*(2)-16
0746  01300 006004        INB          AND ROUND
0747  01301 074235        STB MANT2    TO 16 BITS
0748  01302 060234        LDA MANT1    DO
0749  01303 015317        JSB MPY      SAME
0750  01304 000466        DEF TENTH    FOR
0751  01305 000040        CLE          HIGH
0752  01306 040001        ADA 1        MANTISSA
0753  01307 040235        ADA MANT2    (EFFECTIVELY) SUM
0754  01310 002040        SEZ          DOUBLE-LENGTH
0755  01311 006004        INB          PRODUCTS
0756  01312 074234        STB MANT1    EXCHANGE
0757  01313 070001        STA 1        (A) AND (B)
0758  01314 060234        LDA MANT1    REGISTERS
0759  01315 015174        JSB NORML    NORMALIZE RESULT
0760  01316 125261        JMP DBY10,I
0761**
0762***   MULTIPLY INTEGER IN (A)  **
0763**
0764  01317 000000  MPY   NOP          ADDRESS OF MULTIPLIER IN MPY,I
0765  01320 064500        LDB M2       SET -2 IN
0766  01321 075230        STB MBY10    SIGN TEMP
0767  01322 165317        LDB MPY,I    LOAD
0768  01323 164001        LDB 1,I      MULTIPLIER
0769  01324 002120        CLE,SSA      (A) NEGATIVE?
0770  01325 003204        CMA,CME,INA  YES COMPLEMENT (A) AND (E)
0771  01326 006020        SSB          (B) NEGATIVE?
0772  01327 007204        CMB,CME,INB  YES, COMPLEMENT (B) AND (E)
0773  01330 002040        SEZ          (E) = 0?
0774  01331 035230        ISZ MBY10    NO, SET SIGN OF RESULT NEGATIVE
0775  01332 075174        STB NORML    SAVE MULTIPLIER
0776  01333 064513        LDB M16      SET
0777  01334 074627        STB MVTOH    COUNTER
0778  01335 006400        CLB          ZERO PRODUCT
0779  01336 001600        ELA          BIAS (A) TO LEFT
0780  01337 001550  MPY1  ERA,CLE,SLA  SHIFT, TEST,
0781  01340 045174        ADB NORML    AND ADD UPON
0782  01341 005500        ERB          NON-ZERO BIT
0783  01342 034627        ISZ MVTOH    DONE?
0784  01343 025337        JMP MPY1     NO
0785  01344 001540        ERA,CLE      YES, ADJUST FINAL RESULT
0786  01345 035230        ISZ MBY10    NEGATIVE RESULT?
0787  01346 025352        JMP MPY2     NO
0788  01347 007000        CMB          YES
0789  01350 003007        CMA,INA,SZA,RSS COMPLEMENT
0790  01351 006004        INB          RESULT
0791  01352 103101  MPY2  CLO
0792  01353 035317        ISZ MPY
0793  01354 125317        JMP MPY,I
0794**
0795***   FIND AND STORE ONE-CHARACTER OPERATORS **
0796**
0797  01355 000000  SYMCK NOP          CHARACTER IN (A)
0798  01356 074213        STB COUNT    -(ENTRIES TO BE SEARCHED)
0799  01357 001727        ALF,ALF      POSITION
0800  01360 030411        IOR .32      CHARACTER
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0801  01361 165355        LDB SYMCK,I  STARTING TABLE ENTRY -2
0802  01362 035355        ISZ SYMCK    SET RETURN ADDRESS
0803  01363 044371  SYMC1 ADB .2       UPDATE TABLE POINTER
0804  01364 150001        CPA 1,I      MATCH?
0805  01365 025373        JMP SYMC2
0806  01366 034213        ISZ COUNT    NO, CONTINUE SEARCH?
0807  01367 025363        JMP SYMC1    YES
0808  01370 001727        ALF,ALF      NO, RESTORE
0809  01371 010443        AND B177     CHARACTER
0810  01372 125355        JMP SYMCK,I  AND EXIT
0811  01373 003400  SYMC2 CCA          GET
0812  01374 040001        ADA 1        INFORMATION
0813  01375 160000        LDA 0,I      WORD
0814  01376 010467        AND OPMSK    AND
0815  01377 170133        STA SBPTR,I  STORE IT
0816  01400 050457        CPA B1400
0817  01401 124327        JMP FSC1A,I
0818  01402 035355        ISZ SYMCK    RETURN VIA
0819  01403 125355        JMP SYMCK,I  (P+2)
0820**
0821*     ***********************************************
0822*     SUBROUTINE TO COMPUTE THE STORAGE REQUIRED BY AN
0823*     ARRAY WHOSE PACKED DIMENSIONS ARE IN A UPON ENTRY
0824*     ***********************************************
0825**
0826*     THE SUBROUTINE RETURNS IN A THE NUMBER OF LOCATIONS
0827*     REQUIRED FOR THE SPECIFIED DIMENSIONS
0828*     = 2*DIM1*DIM2
0829**
0830  01404 000000  MDIM  NOP
0831  01405 070001        STA 1        STORE PACKED DIMS. TEMPORARILY
0832  01406 010445        AND MSK0
0833  01407 071524        STA .FLUN
0834  01410 060001        LDA 1
0835  01411 001727        ALF,ALF
0836  01412 010445        AND MSK0     A = # OF ROWS
0837  01413 001000        ALS          DOUBLE FOR FLOATING POINT
0838  01414 015317        JSB MPY
0839  01415 001524        DEF .FLUN
0840  01416 002020        SSA          RESULT < 32768 ?
0841  01417 014544        JSB ERROR    NO, ERROR DIMENSIONS TOO LARGE
0842  01420 125404  MER9  JMP MDIM,I
0843**
0844*** ROUND A SUBSCRIPT TO AN INTEGER  **
0845**
0846  01421 000000  SBFIX NOP          SUBSCRIPT IN (A) AND (B)
0847  01422 015432        JSB IFIX     INTEGERIZE
0848  01423 124342        JMP E6M1A,I
0849  01424 002041        SEZ,RSS
0850  01425 044477        ADB M1
0851  01426 002003        SZA,RSS
0852  01427 006020        SSB
0853  01430 124342        JMP E6M1A,I
0854  01431 125421        JMP SBFIX,I
0855**
0856***   INTEGERIZE FLOATING POINT NUMBER  **
0857**
0858  01432 000000  IFIX  NOP          NUMBER IN (A) AND (B)
0859  01433 102101        STO
0860  01434 070172       STA STK15
0861  01435 015524        JSB .FLUN    UNPACK LOW WORD
0862  01436 002020        SSA
0863  01437 025462        JMP IFIX3    YES
0864  01440 040513        ADA M16
0865  01441 002020        SSA
0866  01442 103101        CLO
0867  01443 040506        ADA M8
0868  01444 002021        SSA,RSS
0869  01445 125432        JMP IFIX,I
0870  01446 040506        ADA M8
0871  01447 071524        STA .FLUN
0872  01450 060172        LDA STK15
0873  01451 025456        JMP IFIX2
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0874  01452 000071  IFIX1 CLE,SLA,ARS
0875  01453 002200        CME          TO A(0)
0876  01454 004035        SLB,ERB
0877  01455 102101        STO          OVERFLOW ON NON-INTEGER
0878  01456 035524  IFIX2 ISZ .FLUN
0879  01457 025452        JMP IFIX1    YES
0880  01460 035432        ISZ IFIX
0881  01461 125432        JMP IFIX,I   NO, (E) = 0 FOR INTEGER NUMBER
0882  01462 060172  IFIX3 LDA STK15
0883  01463 002120        CLE,SSA
0884  01464 003401        CCA,RSS
0885  01465 002401        CLA,RSS
0886  01466 007401        CCB,RSS
0887  01467 006400        CLB
0888  01470 025460        JMP IFIX2+2

0890**
0891***  TAKE ARITHMETIC INVERSE  **
0892**
0893  01471 000000  ARINV NOP          NUMBER IN (A) AND (B)
0894  01472 070157        STA STK4
0895  01473 060001        LDA 1
0896  01474 064157        LDB STK4
0897  01475 007100        CMB,CLE      COMPLEMENT HIGH PART
0898  01476 020527        XOR M256     COMPLEMENT LOW PART
0899  01477 040446        ADA B400     ADD IN 1
0900  01500 002041        SEZ,RSS      OVERFLOW?
0901  01501 025520        JMP ARIN2    NO
0902  01502 006004        INB          YES, INCREMENT HIGH MANTISSA
0903  01503 054536        CPB FLGBT    OVERFLOW?
0904  01504 025510        JMP ARIN1    YES
0905  01505 054475        CPB UNNRM    NO, NEGATIVE UNNORMALIZED?
0906  01506 002001        RSS          YES
0907  01507 025520        JMP ARIN2    NO
0908  01510 044475  ARIN1 ADB UNNRM    FIX HIGH MANTISSA
0909  01511 000033        SLA,RAR      POSITION EXPONENT
0910  01512 030470        IOR MSK4     FILL IN BITS IF NEGATIVE
0911  01513 006021        SSB,RSS      POSITIVE?
0912  01514 002005        INA,RSS      YES, BUMP EXPONENT
0913  01515 040477        ADA M1       NO, DECREMENT EXPONENT
0914  01516 001200        RAL          POSITION
0915  01517 010445        AND MSK0     EXPONENT
0916  01520 070157  ARIN2 STA STK4
0917  01521 060001        LDA 1
0918  01522 064157        LDB STK4
0919  01523 125471        JMP ARINV,I
0920**
0921***   UNPACK LOW WORD OF NUMBER  **
0922**
0923  01524 000000  .FLUN NOP          WORD IN (B)
0924  01525 060001        LDA 1        (A) = (B)
0925  01526 010445        AND MSK0     EXTRACT EXPONENT IN (A)
0926  01527 007000        CMB          SUBTRACT OFF
0927  01530 044000        ADB 0        EXPONENT FROM
0928  01531 007000        CMB          MANTISSA IN (B)
0929  01532 000033        SLA,RAR      NEGATIVE EXPONENT?
0930  01533 030470        IOR MSK4     YES, FILL IN LEADING BITS
0931  01534 125524        JMP .FLUN,I  NO
0932**
0933***   STACK (B) ON LOW CORE STACK **
0934**
0935  01535 000000  SLWST NOP
0936  01536 034136        ISZ LSTPT    ADVANCE 'LOW
0937  01537 060136        LDA LSTPT    STACK' POINTER
0938  01540 050137        CPA HSTPT    STACK OVERFLOW?
0939  01541 014544  E1    JSB ERROR    YES
0940  01542 174136        STB LSTPT,I  NO, STACK (B)
0941  01543 125535        JMP SLWST,I
0942**
0943***   BUMP HIGH STACK POINTER  **
0944**
0945  01544 000000  BHSTP NOP
0946  01545 007400        CCB          ADVANCE
```

```
0947  01546 044137        ADB HSTPT
0948  01547 074137        STB HSTPT    POINTER
0949  01550 054136        CPB LSTPT    OVERFLOW?
0950  01551 025541        JMP E1       YES
0951  01552 125544        JMP BHSTP,I  NO
0952**
0953***   FETCH TOP OF STACK  **
0954**
0955  01553 000000  STTOP NOP
0956  01554 015563        JSB OPCHK    VALIDATE
0957  01555 015604        JSB RSCHK    OPERAND
0958  01556 164137        LDB HSTPT,I  SAVE
0959  01557 160001        LDA 1,I      LOAD
0960  01560 006004        INB
0961  01561 164001        LDB 1,I      NUMBER
0962  01562 125553        JMP STTOP,I
0963**
0964***   VERIFY LEGITIMACY OF OPERAND  **
0965**
0966  01563 000000  OPCHK NOP
0967  01564 164137        LDB HSTPT,I  OPERAND ADDRESS TO (B)
0968  01565 160001        LDA 1,I      HIGH PART OF
0969  01566 050536        CPA MNEG     OPERAND 100000B?
0970  01567 006005        INB,RSS
0971  01570 025575        JMP OPCH1    NO
0972  01571 160001        LDA 1,I      OF OPERAND
0973  01572 050537        CPA MNEG+1   776B?
0974  01573 014544        JSB ERROR    YES
0975  01574 044477  E8    ADB M1
0976  01575 054135  OPCH1 CPB TSTPT    TEMPORARY OPERAND?
0977  01576 002001        RSS          YES
0978  01577 125563        JMP OPCHK,I  NO
0979  01600 060135        LDA TSTPT    UNSTACK
0980  01601 040500        ADA M2       THE TEMPORARY
0981  01602 070135        STA TSTPT    OPERAND
0982  01603 125563        JMP OPCHK,I  EXIT WITH ADDRESS IN (B)
0983**
0984***   ALLOT SPACE FOR INTERMEDIATE RESULT  **
0985**
0986  01604 000000  RSCHK NOP
0987  01605 060135        LDA TSTPT    ALLOT
0988  01606 040371        ADA .2
0989  01607 070135        STA TSTPT    SPACE
0990  01610 040477        ADA M1       OVERFLOW INTO
0991  01611 050134        CPA LSTAK    LOW-CORE STACK?
0992  01612 002001        RSS          YES
0993  01613 125604        JMP RSCHK,I  NO
0994  01614 060134        LDA LSTAK    SAVE
0995  01615 002004        INA          LOWER
0996  01616 070211        STA TEMP3    STACK BOUND
0997  01617 040377        ADA .9       UPDATE
0998  01620 070134        STA LSTAK    STACK BOTTOM
0999  01621 060136        LDA LSTPT    SET
1000  01622 002004        INA          SOURCE
1001  01623 070210        STA TEMP2    ADDRESS
1002  01624 040377        ADA .9       UPDATE
1003  01625 070136        STA LSTPT    STACK TOP
1004  01626 002004        INA          SET DESTINATION
1005  01627 070212        STA TEMP4    ADDRESS
1006  01630 003004        CMA,INA      OVERFLOW
1007  01631 040137        ADA HSTPT    INTO
1008  01632 002020        SSA          HIGH-CORE STACK?
1009  01633 025541        JMP E1       YES
1010  01634 014627        JSB MVTOH    NO, MOVE
1011  01635 125604        JMP RSCHK,I  LOW-CORE STACK
1012**
1013*** CHECK FOR DIGIT  **
1014**
1015  01636 000000  DIGCK NOP          CHARACTER IN (A)
1016  01637 064000        LDB 0
1017  01640 044521        ADB D72      ASCII 72B
1018  01641 006021        SSB,RSS      OR GREATER?
1019  01642 125636        JMP DIGCK,I  YES, RETURN WITH CHARACTER
```

```
1020  01643 044400        ADB .10      NO, ASCII 60B
1021  01644 006020        SSB          OR GREATER?
1022  01645 125636        JMP DIGCK,I  NO
1023  01646 035636        ISZ DIGCK    YES, SET "SUCCESS" EXIT,
1024  01647 060001        LDA 1        LOAD DIGIT INTO (A),
1025  01650 125636        JMP DIGCK,I  AND RETURN
1026**
1027***  CHECK FOR LETTER  **
1028**
1029  01651 000000  LETCK NOP          CHARACTER IN (A)
1030  01652 064000        LDB 0
1031  01653 044526        ADB D133     ASCII 133B
1032  01654 006021        SSB,RSS      OR GREATER?
1033  01655 125651        JMP LETCK,I  YES, EXIT WITH CHARACTER IN (A)
1034  01656 044404        ADB .26      NO, ASCII 101B
1035  01657 006021        SSB,RSS
1036  01660 035651        ISZ LETCK    YES, SET "SUCCESS" EXIT,
1037  01661 125651        JMP LETCK,I  AND RETURN
1038**
1039***   GET A CHARACTER FROM INPUT BUFFER
1040**
1041  01662 000000  GETCR NOP
1042  01663 034126        ISZ CCNT     ANY CHARACTERS LEFT?
1043  01664 002001        RSS
1044  01665 125662        JMP GETCR,I  NO, END-OF-FILE EXIT
1045  01666 064125        LDB BADDR    LOAD BUFFER ADDRESS
1046  01667 034125        ISZ BADDR UPDATE FOR NEXT TIME
1047  01670 004065        CLE,ERB      SET CHARACTER FLAG
1048  01671 160001        LDA 1,I      LOAD CURRENT BUFFER WORD
1049  01672 002041        SEZ,RSS      FIRST CHARACTER?
1050  01673 001727        ALF,ALF      YES, POSITION IT
1051  01674 010443        AND B177     MASK EXTRANEOUS BITS
1052  01675 050123        CPA BLANK    BLANK?
1053  01676 025663        JMP GETCR+1  YES, FETCH NEXT CHARACTER
1054  01677 035662        ISZ GETCR    UPDATE RETURN ADDRESS
1055  01700 125662        JMP GETCR,I  AND EXIT
1056**
1057***   BACKSPACE OVER ONE CHARACTER **
1058**
1059  01701 000000  BCKSP NOP
1060  01702 003400        CCA          BACKSPACE
1061  01703 040126        ADA CCNT     OVER
1062  01704 070126        STA CCNT     LAST
1063  01705 003400        CCA          CHARACTER IN
1064  01706 040125        ADA BADDR    INPUT
1065  01707 070125        STA BADDR    BUFFER
1066  01710 125701        JMP BCKSP,I
1067**
1068***   PRINT A NUMBER  **
1069**
1070  01711 000000  ENOUT NOP
1071  01712 075701        STB BCKSP
1072  01713 065711        LDB ENOUT
1073  01714 074170        STB STK13
1074  01715 065701        LDB BCKSP
1075  01716 002300        CCE          SET SIGN FLAG TRUE
1076  01717 114270        JSB NUMOA,I  OUTPUT THE NUMBER
1077  01720 015753        JSB OUTLN    END-OF-LINE ACTION
1078  01721 060411        LDA .32      OUTPUT
1079  01722 015773        JSB OUTCR    A BLANK
1080  01723 064220        LDB MLBX1+1
1081  01724 044126        ADB CCNT
1082  01725 006002        SZB          FULL?
1083  01726 025721        JMP *-5      NO
1084  01727 124170        JMP STK13,I
1085**
1086***   SPACE FOR A COMMA  **
1087**
1088  01730 000000  EDELM NOP
1089  01731 065730        LDB EDELM    LOAD ADDRESS
1090  01732 074155        STB STK2
1091  01733 064126        LDB CCNT     NO, LOAD CHARACTER COUNT
1092  01734 006003  EDEL1 SZB,RSS      ZERO?
```

```
1093  01735 124155        JMP STK2,I
1094  01736 044512        ADB M15      NO, SUBTRACT ZONE WIDTH
1095  01737 006021        SSB,RSS      NEGATIVE RESULT?
1096  01740 025734        JMP EDEL1    NO
1097  01741 074157        STB STK4
1098  01742 060411        LDA .32      FETCH BLANK
1099  01743 015773        JSB OUTCR    OUTPUT
1100  01744 034157        ISZ STK4
1101  01745 025742        JMP *-3      BLANKS
1102  01746 064126        LDB CCNT     LINE
1103  01747 044525        ADB M76
1104  01750 006021        SSB,RSS      FULL?
1105  01751 015753        JSB OUTLN    YES
1106  01752 124155        JMP STK2,I
1107**
1108***   OUTPUT A COMPLETED LINE
1109**
1110  01753 000000  OUTLN NOP
1111  01754 061753        LDA OUTLN    LOAD RETURN ADDRESS
1112  01755 070157        STA STK4
1113  01756 060142        LDA TYPE     FETCH 'CHARACTERS PRINTED' COUNT
1114  01757 000010        SLA          CORRECT FOR START ON
1115  01760 002004        INA          ODD PRINT POSITION
1116  01761 040126        ADA CCNT     OUTPUT
1117  01762 064116        LDB .BUFA    A
1118  01763 114112        JSB WRITE,I  LINE
1119  01764 064220        LDB MLBX1+1
1120  01765 044126        ADB CCNT
1121  01766 074220        STB MLBX1+1
1122  01767 002400        CLA          RESET COUNT OF
1123  01770 070142        STA TYPE     CHARACTERS PRINTED
1124  01771 114320        JSB PRNIA,I  CLEAN UP
1125  01772 124157        JMP STK4,I
1126**
1127***   ADD A CHARACTER TO OUTPUT BUFFER  **
1128**
1129  01773 000000  OUTCR NOP          CHARACTER IN (A)
1130  01774 071432        STA IFIX     SAVE CHARACTER
1131  01775 034126        ISZ CCNT     COUNT IT
1132  01776 064126        LDB CCNT     FIRST CHARACTER
1133  01777 004010        SLB          OF BUFFER WORD?
1134  02000 034125        ISZ BADDR    YES, MOVE TO FRESH WORD
1135  02001 160125        LDA BADDR,I  LOAD BUFFER WORD
1136  02002 004010        SLB          SAVE
1137  02003 001727        ALF,ALF      OTHER
1138  02004 010527        AND M256     CHARACTER
1139  02005 031432        IOR IFIX     ADD NEW CHARACTER
1140  02006 004010        SLB          POSITION
1141  02007 001727        ALF,ALF      WORD AND
1142  02010 170125        STA BADDR,I  STORE IT
1143  02011 125773        JMP OUTCR,I
1144                      HED          BASIC INTERPRETER CONTROL
1145*
1146***   BASIC INTERPRETER CONTROL
1147*
1148*
1149  02012 060114  FLUSH LDA FWAM
1150  02013 070121        STA PBUFF    SET PROGRAM BUFFER ADR
1151  02014 070122        STA PBPTR    SET PROGRAM BUFFER POINTER
1152  02015 060411        LDA .32      INITIALIZE
1153  02016 070123        STA BLANK    DELETE CHARACTER FOR GETCR
1154  02017 002400        CLA          SET LINE NUMBER
1155  02020 070124        STA .LNUM      TO ZERO
1156*
1157  02021 002400  RDYPT CLA
1158  02022 114104        JSB SEXU,I   SET EXU FLAG TO ZERO
1159  02023 070167        STA STK12    SET DATA REQUEST TO ZERO
1160  02024 070127        STA TFLAG    CLEAR PHOTO-READER FLAG
1161  02025 070130        STA TTYFL    CLEAR TTY TAPE FLAG
1162  02026 114112        JSB WRITE,I  OUTPUT CR-LF
1163  02027 060504        LDA M6       OUTPUT
1164  02030 064241        LDB RDYA     "READY"
1165  02031 114112        JSB WRITE,I  ON TTY
```

```
1166*
1167***   CHECK IF INPUT IS FROM PHOTOREADER
1168*
1169  02032 060127  PEXMK LDA TFLAG    LOAD PHOTOREADER FLAG
1170  02033 002020        SSA          CHECK IF PTAPE MODE
1171  02034 026147        JMP PTAPE    YES- INPUT FROM PHOTO RDR
1172*
1173  02035 064245        LDB LFEED    LOAD LF ADDRESS
1174  02036 074146        STB RSYM     STAOR FOR EMIT LF
1175*
1176***   CHECK FOR TAPE MODE
1177*
1178  02037 060130  DATAI LDA TTYFL    LOAD TAPE FLAG
1179  02040 002003        SZA,RSS      IS IT SET?
1180  02041 026047        JMP KEYIN    NO- GET KEYBOARD INPUT
1181  02042 124103        JMP MONIT,I  YES: GO DIRECTLY TO MONITOR
1182  02043 114111  !TAPE JSB TAPE!,I  SET UP TAPE INPUT
1183  02044 002002        SZA
1184  02045 026060        JMP RPRCS    -TAPE: NOT FINISHED RETURN-
1185  02046 026021        JMP RDYPT    -TAPE: FINISHED RETURN-
1186*
1187  02047 060500  KEYIN LDA M2       SET TO OUTPUT 2 CHARS
1188  02050 064146        LDB RSYM     LOAD LF OR '? X-ON' ADR
1189  02051 114112        JSB WRITE,I  PRINT LF OR '? X-ON', NO CR
1190*
1191***   GET INPUT FROM TTY KEYBOARD
1192*
1193  02052 114106  GTRCD JSB IMOFF,I   KEYINT3
1194  02053 060434        LDA .72
1195  02054 064116        LDB .BUFA
1196  02055 114113        JSB REED,I   GET RECORD FROM TTY
1197  02056 050500        CPA M2
1198  02057 026107        JMP RBOUT    RUBOUT IN RECORD, INPUT AGAIN
1199  02060 003021  RPRCS CMA,SSA,RSS  SET A=-U-#CHARS AND
1200  02061 014544        JSB ERROR    CHECK FOR RECORD TOO LONG
1201  02062 070126  RTLE  STA CCNT     -1-# CHARS <0,SET CCNT
1202  02063 060116        LDA .BUFA    LOAD BUFFER ADDRESS
1203  02064 000066        CLE,ELA      SHIFT LEFT, LEAST BIT
1204  02065 070125        STA BADDR    USED AS ODD/EVEN FLAG
1205  02066 015662        JSB GETCR    FIRCH FIRST CHARACTER
1206  02067 026035        JMP DATAI-2  NULL RECORD- INPUT AGAIN
1207  02070 064167        LDB STK12
1208  02071 006003        SZB,RSS      DATA REQUEST?
1209  02072 026120        JMP CKRCD    NO- CHECK FOR COMMAND
1210  02073 050441        CPA S        ASCII S FIRST CHAR?
1211  02074 016163        JSB STOP     ASSUME STOP REQUESTED
1212  02075 002400        CLA          OUTPUT CR-LF
1213  02076 114112        JSB WRITE,I  ON TTY
1214  02077 015701        JSB BCKSP    BACKSPACE 1 CHAR
1215  02100 114105        JSB IMON,I
1216  02101 064167        LDB STK12
1217  02102 002400        CLA          CLEAR DATA REQUEST FLAG
1218  02103 070167        STA STK12
1219  02104 124001        JMP B,I      GO TO DATA REQUEST CALL POINT
1220*
1221  02105 056040        ASC 1,\
1222  02106 002105        DEF *-1
1223  02107 066106  RBOUT LDB *-1      OUTPUT '/' WITH
1224  02110 002404        CLA,INA      CARRIAGE RETURN
1225  02111 114112        JSB WRITE,I  AND LINE-FEED
1226  02112 026052        JMP KEYIN+3
1227*
1228**     THIS SECTION REQUESTS DATA INPUT
1229*
1230  02113 000000  DRQST NOP
1231  02114 066113        LDB DRQST    SAVE RETURN ADDRESS
1232  02115 074167        STB STK12    AND FLAG
1233  02116 064246        LDB QMRKA
1234  02117 026036        JMP DATAI-1  PRINT '?-X-ON' AND WAIT
1235*
1236**    THIS SECTION CHECKS RECORDS FOR SYS COMMANDS
1237*
1238  02120 064120  CKRCD LDB SBUFA
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1239  02121 074133        STB SBPTR
1240  02122 170133        STA SBPTR,I
1241  02123 015651        JSB LETCK
1242  02124 026205        JMP SYNTX
1243*
1244  02125 002400        CLA          OUTPUT CR-LF
1245  02126 070130        STA TTYFL    SET TTY TAPE FLAG
1246  02127 114112        JSB WRITE,I  ON TTY
1247  02130 060352        LDA TBLAD
1248  02131 064507        LDB M9       SET TO SEARCH TABLE OF 9 COMMANDS
1249  02132 114262        JSB TSRCH,I
1250  02133 014544        JSB ERROR
1251  02134         INVSC EQU *        INVALID CMND ERROR REFERENCE
1252  02134 001727        ALF,ALF
1253  02135 001100        ARS
1254  02136 040250        ADA CMNDA
1255  02137 124000        JMP A,I
1256*
1257***   THIS SECTION SETS UP AND EXECUTES THE SYSTEMS COMMANDS
1258*
1259  02140         CMNDS EQU *        COMMAND LIST REFERENCE
1260*
1261***   RUN COMMAND
1262*
1263  02140 114105  RUN   JSB IMON,I
1264  02141 124252        JMP RUNA,I
1265*
1266***   SCRATCH COMMAND
1267*
1268  02142 026012  SCRTH JMP FLUSH    DELETE CURRENT PROGRAM
1269*
1270***   LIST COMMAND
1271*
1272  02143 006400        CLB
1273*
1274***   PLIST COMMAND
1275*
1276  02144 074175  PLIST STB STK18    SET PUNCH FLAG
1277  02145 114105        JSB IMON,I
1278  02146 124257        JMP LISTA,I  GO TO LIST ENTRY POINT
1279*
1280***   PTAPE COMMAND
1281*
1282  02147 060127  PTAPE LDA TFLAG    LOAD PHOTO/CARD FLAG
1283  02150 001500        ERA          SET FLAG FOR CARD OR PHOTO
1284  02151 060434        LDA .72      ASK FOR 72 CHARS INPUT
1285  02152 064116        LDB .BUFA
1286  02153 002040        SEZ          MAKE CALL TO CORRECT DRIVER
1287  02154 114062        JSB .HSPR,I  GET INPUT FROM PHOTORDR
1288  02155 114060        JSB .CARD,I  GET INPUT FROM CARD READER
1289  02156 050501        CPA M3       END-OF-TAPE?
1290  02157 026021        JMP RDYPT    YES- GO TO ENTRY POINT
1291*
1292  02160 002003  PRERR SZA,RSS      NULL RECORD?
1293  02161 026147        JMP PTAPE    YES- READ AGAIN
1294  02162 026060        JMP RPRCS    GO PROCESS RECORD
1295*
1296***   STOP COMMAND
1297*
1298  02163 000000  STOP  NOP
1299  02164 114106        JSB IMOFF,I
1300  02165 002400        CLA          CLEAR EXECUTION
1301  02166 114104        JSB SEXU,I   FLAG
1302  02167 114112        JSB WRITE,I  OUTPUT A CR-LF
1303  02170 060373        LDA .4
1304  02171 064247        LDB STOPA    PRINT "STOP"
1305  02172 114112        JSB WRITE,I
1306  02173 026021        JMP RDYPT    GO TO READY POINT
1307*
1308***   TAPE COMMAND
1309*
1310  02174 006400  TAPE  CLB          CLEAR TTY FLAG
1311  02175 074127        STB TFLAG
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1312  02176 070130        STA TTYFL
1313  02177 114106        JSB IMOFF,I
1314  02200 026043        JMP !TAPE    SET UP TAPE INPUT
1315*
1316***   EXECUTE LOG-OFF COMMAND
1317*
1318  02201 124101        JMP ?OFF,I
1319*
1320***   MESG COMMAND
1321*
1322  02202 124102        JMP ?MESG,I
1323*
1324***   RENUMBER COMMAND
1325*
1326  02203 126204        JMP ?NBER,I  EXECUTE "RENUMBER" COMMAND
1327*
1328  02204 005037  ?NBER DEF RENUM    LINK TO RENUMBER EXECUTION
1329*
1330                      HED          CHECK SYNTAX AND TRANSLITERATE
1331*
1332*
1333***   CHECK SYNTAX OF STATEMENT ***
1334*
1335**
1336***   DETERMINE SEQUENCE NUMBER **
1337**
1338  02205 114266  SYNTX JSB INCHK,I  RECORD
1339  02206 000532        DEF MAXSN    SEQUENCE NUMBER
1340  02207 034133        ISZ SBPTR    SAVE SPACE FOR LENGTH WORD
1341  02210 074124        STB .LNUM    SAVE LINE NUMBER
1342  02211 064120        LDB SBUFA    SET
1343  02212 006004        INB          TEMP TO
1344  02213 074206        STB TEMP     (SBUFF)+1
1345**
1346***   DETERMINE STATEMENT TYPE **
1347**
1348  02214 050400        CPA .10      NULL STATEMENT?
1349  02215 124323        JMP DELST,I  YES, DELETE IT
1350  02216 170133        STA SBPTR,I  NO, RECORD NEXT CHARACTER
1351  02217 060353        LDA STTYP    PRINT-TABLE ADDRESS
1352  02220 064514        LDB M19      -(NUMBER OF ENTRIES)
1353  02221 114262        JSB TSRCH,I  FIND STATEMENT TYPE
1354  02222 014544        JSB ERROR    NOT FOUND
1355  02223 064507  SYNE1 LDB M9
1356  02224 076315        STB MSFLG    TO FALSE
1357  02225 064122        LDB PBPTR    SET S-STACK
1358  02226 054121        CPB PBUFF
1359  02227 002001        RSS
1360  02230 026234        JMP SYNT1
1361  02231 064114        LDB FWAM
1362  02232 074121        STB PBUFF
1363  02233 074122        STB PBPTR
1364  02234 074205  SYNT1 STB TEMPS
1365  02235 006400        CLB          SET DEFINE FLAG
1366  02236 076317        STB DFLAG    TO FALSE
1367  02237 076321        STB PFLAG    SET PARAMETER FLAG TO FALSE
1368  02240 001727        ALF,ALF      COMPUTE
1369  02241 001300        RAR          ADDRESS OF
1370  02242 040346        ADA STBAS    SYNTAX ROUTINE AND
1371  02243 124000        JMP 0,I      BRANCH TO IT
1372**
1373***   SINGLE CHARACTER AND/OR FORMULA OPERATORS **
1374**
1375  02244 001000  QUOTE OCT 1000     BITS 15-9 OF THE LABELLED WORD
1376  02245 021040        ASC 1,"
1377  02246 002000  COMMA OCT 2000     ARE THE BASIC CODE OPERATOR
1378  02247 026040        ASC 1,,
1379  02250 003000  SMCLN OCT 3000     NUMBERS. BITS 3-0 ARE THE
1380  02251 035440        ASC 1,;
1381  02252 004001  RPARN OCT 4001     OPERATOR'S HIERARCHICAL
1382  02253 024440        ASC 1,)
1383  02254 005001  RBRAC OCT 5001     PRECEDENCE FOR THOSE OPERATORS
1384  02255 056440        ASC 1,]
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1385  02256 006002  SCMMA OCT 6002     BELONGING TO FORMULAS. THE
1386  02257 026040        ASC 1,,
1387  02260 007002  ASSOP OCT 7002     UNLABELED WORD GIVES THE
1388  02261 036440        ASC 1,=
1389  02262 010007  PLUS  OCT 10007    ASCII REPRESENTATION OF THE
1390  02263 025440        ASC 1,+
1391  02264 011007  MINUS OCT 11007    SINGLE CHARACTER OPERATORS.
1392  02265 026440        ASC 1,-
1393  02266 012010  TIMES OCT 12010
1394  02267 025040        ASC 1,*
1395  02270 013010  DIV   OCT 13010
1396  02271 027440        ASC 1,/
1397  02272 014012  EXPS  OCT 14012
1398  02273 057040        ASC 1,^
1399  02274 015005  GTR   OCT 15005
1400  02275 037040        ASC 1,>
1401  02276 016005  LSS   OCT 16005
1402  02277 036040        ASC 1,<
1403  02300 017005  UNEQL OCT 17005
1404  02301 021440        ASC 1,#
1405  02302 020005  EQUAL OCT 20005
1406  02303 036440        ASC 1,=
1407  02304 021011  UNMIN OCT 21011
1408  02305 026440        ASC 1,-
1409  02306 022020  LBRAC OCT 22020
1410  02307 055440        ASC 1,[
1411  02310 023020  LPARN OCT 23020
1412  02311 024040        ASC 1,(
1413  02312 024011  UPLUS OCT 24011
1414  02313 025440        ASC 1,+
1415  02314 025003  OROP  OCT 25003
1416  02315 000000  MSFLG NOP
1417  02316 026004  ANDOP OCT 26004
1418  02317 000000  DFLAG NOP
1419  02320 027011  NOTOP OCT 27011
1420  02321 000000  PFLAG NOP
1421  02322 030005  GTREQ OCT 30005
1422  02323 000000  UFLAG NOP
1423  02324 031005  LSSEQ OCT 31005
1424*
1425**    LET STATEMENT SYNTAX  **
1426*
1427  02325 077461  LETS  STB SFLAG
1428  02326 060506        LDA M8       SET MULTIPLE STORE FLAG
1429  02327 072315        STA MSFLG    TO TRUE
1430  02330 017045        JSB FSC      FETCH FORMULA
1431  02331 057461        CPB SFLAG    STORE OCCUR?
1432  02332 014544        JSB ERROR    NO
1433  02333        SYNE2 EQU *
1434**
1435***   CHECK FOR END OF STATEMENT  **
1436**
1437  02333 050400  EOST  CPA .10      END-OF-STATEMENT?
1438  02334 124322        JMP ACCST,I  YES, ACCEPT STATEMENT
1439  02335 024336        JMP NOEOF    NO, ILLEGAL CHARACTER
1440*
1441***   DIM STATEMENT SYNTAX
1442*
1443  02336 036317  DIMS  ISZ DFLAG    SET DFLAG TO TRUE
1444  02337 017461        JSB ARRYS    CHECK AN ARRAY
1445  02340 124322        JMP ACCST,I  DONE
1446  02341 026337        JMP DIMS+1   WAS A COMMA, CONTINUE
1447*
1448***   COM STATEMENT SYNTAX
1449*
1450  02342 064122  COMS  LDB PBPTR    HAS A PROGRAM BUFFER
1451  02343 054114        CPB FWAM     BEEN MOVED?
1452  02344 002001        RSS          NO
1453  02345 014544        JSB ERROR    YES, ILLEGAL COM
1454  02346 074214  SYNE3 STB TEMPS+7  SET ARRAY POINTER
1455  02347 036317        ISZ DFLAG    SET DEFINE FLAG TO TRUE
1456  02350 003400  COMS1 CCA          SET COMMON FLAG
1457  02351 072321        STA PFLAG    TO TRUE
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1458  02352 017461        JSB ARRYS    CHECK AN ARRAY
1459  02353 002001        RSS          DONE
1460  02354 026350        JMP COMS1    MORE ARRAYS
1461  02355 064214        LDB TEMPS+7  FETCH UPDATED POINTER
1462  02356 074121        STB PBUFF    SET PROGRAM BUFFER ADDRESS
1463  02357 074122        STB PBPTR    SET PROGRAM BUFFER POINTER
1464  02360 124322        JMP ACCST,I  EXIT
1465*
1466***   DEF STATEMENT SYNTAX
1467*
1468  02361 017566  DEFS    JSB LTR
1469  02362 026372        JMP SYNE4    FIRST
1470  02363 060207        LDA TEMP1
1471  02364 001727        ALF,ALF      TWO CHARACTERS
1472  02365 030210        IOR TEMP2
1473  02366 050533        CPA FN       'FN'?
1474  02367 002001        RSS          YES
1475  02370 026372        JMP SYNE4    NO
1476  02371 017566        JSB LTR      LETTER FOLLOWS?
1477  02372 014544  SYNE4 JSB ERROR    NO
1478  02373 060207        LDA TEMP1    YES, RECORD
1479  02374 064427        LDB .58      FUNCTION
1480  02375 017601        JSB STROP    NAME
1481  02376 060210        LDA TEMP2    RETRIEVE NEXT CHARACTER
1482  02377 017612        JSB LPCK     LEFT PARENTHESIS?
1483  02400 030536        IOR FLGBT    YES, SET FORMAL
1484  02401 170133        STA SBPTR,I  PARAMETER BIT
1485  02402 017507        JSB VAROP    FETCH SIMPLE VARIABLE
1486  02403 000000        NOP          NONE FOUND
1487  02404 014544        JSB ERROR    SUBSCRIPTED VARIABLE FOUND
1488  02405 017622  SYNE5 JSB RPCK     RECORD A RIGHT PARENTHESIS
1489  02406 007400        CCB          ASSIGNMENT
1490  02407 015355        JSB SYMCK
1491  02410 002257        DEF ASSOP-1  OPERATOR?
1492  02411 014544  SYNE6 JSB ERROR    NO
1493  02412 060500        LDA M2       YES,
1494  02413 040133        ADA SBPTR    RETRIEVE
1495  02414 160000        LDA 0,I      PARAMETER
1496  02415 010450        AND MSK1     AND
1497  02416 072321        STA PFLAG    SAVE IT
1498  02417 017045        JSB FSC      FETCH DEFINING FORMULA
1499  02420 026333        JMP EOST     END-OF-STATEMENT TEST
1500*
1501***   REM STATEMENT SYNTAX
1502*
1503  02421 060400  REMS    LDA .10      DUMMY STRING TERMINATOR
1504  02422 114321        JSB CHRSA,I  FETCH CHARACTER STRING
1505  02423 124322        JMP ACCST,I
1506*
1507***   IF STATEMENT SYNTAX
1508*
1509  02424 017045  IFS     JSB FSC      GET DECISION FORMULA
1510  02425 170133        STA SBPTR,I  TABLE
1511  02426 060362        LDA ATHEN    SEARCH
1512  02427 007400        CCB          FOR
1513  02430 114262        JSB TSRCH,I  'THEN'
1514  02431 014544        JSB ERROR    NOT FOUND
1515  02432         SYNE7 EQU *
1516*
1517***   GOTO AND GOSUB STATEMENT SYNTAX
1518*
1519  02432 114271  GOTOS  JSB PGINT,I  FETCH AND RECORD
1520  02433 000532        DEF MAXSN    SEQUENCE NUMBER
1521  02434 026333        JMP EOST     END-OF-STATEMENT TEST
1522*
1523***   FOR STATEMENT SYNTAX
1524*
1525  02435 017507  FORS    JSB VAROP    FETCH SIMPLE VARIABLE
1526  02436 000000        NOP          NONE FOUND
1527  02437 014544  SYNE8 JSB ERROR    SUBSCRIPTED VARIABLE FOUND
1528  02440 007400        CCB
1529  02441 015355        JSB SYMCK    ASSIGNMENT
1530  02442 002257        DEF ASSOP-1  OPERATOR?
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1531  02443 026411        JMP SYNE6    NO
1532  02444 017045        JSB FSC      YES, FETCH INITIAL VALUE FORMULA
1533  02445 170133        STA SBPTR,I  LOOK
1534  02446 060363        LDA ATO      FOR
1535  02447 007400        CCB          THE
1536  02450 114262        JSB TSRCH,I  'TO'
1537  02451 014544        JSB ERROR    MISSING
1538  02452 017045  SYNE9 JSB FSC
1539  02453 050400        CPA .10      END-OF-STATEMENT?
1540  02454 124322        JMP ACCST,I  YES
1541  02455 007400        CCB          FOR
1542  02456 044133       ADB SBPTR
1543  02457 074133        STB SBPTR
1544  02460 170133        STA SBPTR,I  NO,
1545  02461 060364        LDA ASTEP    LOOK
1546  02462 007400        CCB
1547  02463 114262        JSB TSRCH,I  THE 'STEP'
1548  02464 014544        JSB ERROR    MISSING
1549  02465 017045  SYE10 JSB FSC
1550  02466 026333        JMP EOST     END-OF-STATEMENT TEST
1551*
1552***   NEXT STATEMENT SYNTAX
1553*
1554  02467 017507  NXTS  JSB VAROP    FETCH SIMPLE VARIABLE
1555  02470 000000        NOP          NONE FOUND
1556  02471 026437        JMP SYNE8    SUBSCRIPTED VARIABLE FOUND
1557  02472 026333        JMP EOST     END-OF-STATEMENT TEST
1558*
1559***   END, STOP, RESTORE, RETURN STATEMENT SYNTAX
1560*
1561  02473 034133  ENDS  ISZ SBPTR
1562  02474 015662        JSB GETCR    END-OF-STATEMENT?
1563  02475 124322        JMP ACCST,I  YES
1564  02476 024336        JMP NOEOF    NO
1565*
1566***   DATA STATEMENT SYNTAX
1567*
1568  02477 014642  DATAS JSB CONST    FETCH A CONSTANT
1569  02500 024670        JMP SYE12-1
1570  02501 017645        JSB NUMOP
1571  02502 007400        CCB          CHECK
1572  02503 015355        JSB SYMCK    FOR A
1573  02504 002245        DEF COMMA-1  COMMA
1574  02505 026333        JMP EOST     END-OF-STATEMENT TEST
1575  02506 026477        JMP DATAS    FETCH ANOTHER NUMBER
1576*
1577***   READ AND INPUT STATEMENT SYNTAX
1578*
1579  02507 017507  READS JSB VAROP    RECORD VARIABLE OPERAND
1580  02510 014544        JSB ERROR    MISSING
1581  02511 000000  SYE13 NOP
1582  02512 007400        CCB          CHECK
1583  02513 015355        JSB SYMCK    FOR A
1584  02514 002245        DEF COMMA-1  COMMA
1585  02515 002001        RSS
1586  02516 026507        JMP READS    IS, FETCH NEXT ITEM
1587  02517 006400        CLB          APPEND
1588  02520 174133        STB SBPTR,I  END-OF-FORMULA
1589  02521 034133        ISZ SBPTR    OPERATOR
1590  02522 026333        JMP EOST     END OF STATEMENT TEXT
1591*
1592***   PRINT STATEMENT SYNTAX
1593*
1594  02523 064500  PRIN1 LDB M2       NO,
1595  02524 015355        JSB SYMCK    COMMA OR
1596  02525 002245        DEF COMMA-1  SEMICOLON?
1597  02526 026534        JMP PRIN2    NO
1598  02527 003400  PRINS CCA          YES, ENABLE
1599  02530 170206        STA TEMP,I   FORMULA
1600  02531 034133        ISZ SBPTR
1601  02532 015662        JSB GETCR    END-OF-STATEMENT?
1602  02533 124322        JMP ACCST,I  YES
1603  02534 007400  PRIN2 CCB
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1604  02535 015355        JSB SYMCK    QUOTE?
1605  02536 002243        DEF QUOTE-1
1606  02537 026553        JMP PRIN3    NO
1607  02540 060413        LDA .34      YES, SET QUOTE AS TERMINATOR
1608  02541 114321        JSB CHRSA,I  CHARACTER AND FETCH STRING
1609  02542 014544        JSB ERROR    MISSING QUOTE
1610  02543 062244  SYE14  LDA QUOTE    RECORD
1611  02544 170133        STA SBPTR,I  QUOTE
1612  02545 034133        ISZ SBPTR
1613  02546 015662        JSB GETCR    END-OF-STATEMENT?
1614  02547 124322        JMP ACCST,I  YES
1615  02550 007400        CCB          ENABLE
1616  02551 174206        STB TEMP,I   FORMULA
1617  02552 026523        JMP PRIN1    NO
1618  02553 134206  PRIN3  ISZ TEMP,I   TAB OR FORMULA PERMITTED?
1619  02554 014544        JSB ERROR    NO
1620  02555 170133  SYE15  STA SBPTR,I  SEARCH
1621  02556 060366        LDA ATAB     FOR
1622  02557 007400        CCB          'TAB'
1623  02560 114262        JSB TSRCH,I
1624  02561 002401        CLA,RSS
1625  02562 060473        LDA TABCN    FOUND,
1626  02563 007400        CCB
1627  02564 044133        ADB SBPTR
1628  02565 074133        STB SBPTR
1629  02566 002003        SZA,RSS
1630  02567 026577        JMP PRIN4
1631  02570 130133        IOR SBPTR,I
1632  02571 170133        STA SBPTR,I  RECORD 'TAB'
1633  02572 017635        JSB GETPF    FETCH PARAMETER
1634  02573 006400        CLB
1635  02574 174133        STB SBPTR,I
1636  02575 034133        ISZ SBPTR
1637  02576 026601        JMP PRIN5
1638  02577 015701  PRIN4  JSB BCKSP    BACKSPACE OVER LAST CHARACTER
1639  02600 017045        JSB FSC      FETCH FORMULA
1640  02601 050400  PRIN5  CPA .10      END-OF-STATEMENT?
1641  02602 124322        JMP ACCST,I  YES
1642  02603 026523        JMP PRIN1    NO
1643*
1644***   MAT STATEMENT SYNTAX
1645*
1646  02604 017566  MATS   JSB LTR      FIRST
1647  02605 014544        JSB ERROR    TWO CHARACTERS
1648  02606 015651  SYE16  JSB LETCK    LETTERS?
1649  02607 026652        JMP MATS2    NO
1650  02610 034133        ISZ SBPTR    YES, MOVE TO FRESH S-BUFFER WORD
1651  02611 064207        LDB TEMP1    RETRIEVE FIRST LETTER AND
1652  02612 005727        BLF,BLF      PUT IT IN THE
1653  02613 030001        IOR 1        UPPER CHARACTER OF (A)
1654  02614 170133        STA SBPTR,I  SEARCH
1655  02615 060354        LDA MATIO    FOR
1656  02616 064500        LDB M2       'READ' OR
1657  02617 114262        JSB TSRCH,I  'PRINT'
1658  02620 014544        JSB ERROR    NOT FOUND
1659  02621 050465  SYE17  CPA RDOP
1660  02622 026640        JMP MATS1    YES
1661  02623 017475  MATS0  JSB ARRID    RECORD ARRAY
1662  02624 050400        CPA .10      END-OF-STATEMENT?
1663  02625 124322        JMP ACCST,I  YES
1664  02626 064500        LDB M2       NO,
1665  02627 015355        JSB SYMCK    COMMA OR
1666  02630 002245        DEF COMMA-1  SEMICOLON?
1667  02631 014544        JSB ERROR    NO
1668  02632 015662  SYE18  JSB GETCR    END-OF-STATEMENT?
1669  02633 026636        JMP *+3      YES
1670  02634 015701        JSB BCKSP    NO
1671  02635 026623        JMP MATS0
1672  02636 034133        ISZ SBPTR    INCLUDE
1673  02637 124322        JMP ACCST,I  PARAMETER
1674  02640 017475  MATS1  JSB ARRID    RECORD ARRAY
1675  02641 117017        JSB MAT&,I
1676  02642 000000        NOP          RECORD IT
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1677  02643 050400        CPA .10      END-OF-STATEMENT
1678  02644 124322        JMP ACCST,I  YES
1679  02645 007400        CCB          NO
1680  02646 015355        JSB SYMCK
1681  02647 002245        DEF COMMA-1  COMMA?
1682  02650 026631        JMP SYE18-1  NO
1683  02651 026640        JMP MATS1    YES
1684  02652 070210  MATS2  STA TEMP2
1685  02653 060133        LDA SBPTR    SAVE
1686  02654 070226        STA ARYAD    OPERAND ADDRESS
1687  02655 060207        LDA TEMP1    RETRIEVE FIRST LETTER
1688  02656 064423        LDB .46      RECORD AN
1689  02657 017601        JSB STROP    ARRAY
1690  02660 060210        LDA TEMP2    RETRIEVE CHARACTER
1691  02661 007400        CCB          ASSIGNMENT
1692  02662 015355        JSB SYMCK
1693  02663 002257        DEF ASSOP-1  OPERATOR?
1694  02664 026411        JMP SYNE6    NO
1695  02665 160226        LDA ARYAD,I  YES RETRIEVE
1696  02666 010450        AND MSK1     AND SAVE
1697  02667 170206        STA TEMP,I   PREVIOUS ARRAY IDENTIFIER
1698  02670 017566        JSB LTR      LETTER NEXT?
1699  02671 026740        JMP MATS4    NO
1700  02672 015651        JSB LETCK    YES, SECOND LETTER?
1701  02673 026754        JMP MATS5    NO
1702  02674 034133        ISZ SBPTR    YES,
1703  02675 064207        LDB TEMP1    CONCATENATE
1704  02676 005727        BLF,BLF      LETTERS
1705  02677 030001        IOR 1        AND
1706  02700 170133        STA SBPTR,I  SEARCH
1707  02701 060357        LDA MATFN    FOR
1708  02702 064503        LDB M5       ARRAY
1709  02703 114262        JSB TSRCH,I  FUNCTION
1710  02704 014544        JSB ERROR    NOT FOUND
1711  02705 001727  SYE19  ALF,ALF      FOUND
1712  02706 001723        ALF,RAR      POSITION IT,
1713  02707 040402        ADA .15      COMPLETE OPERAND,
1714  02710 007400        CCB          COMBINE
1715  02711 044133        ADB SBPTR    WITH
1716  02712 130001        IOR 1,I      OPERATOR,
1717  02713 030536        IOR FLGBT    ADD FLAG BIT,
1718  02714 170001        STA 1,I      AND STORE
1719  02715 010450        AND MSK1     'INV'
1720  02716 040527        ADA M256     OR
1721  02717 002021        SSA,RSS 'TRN'?
1722  02720 026726        JMP MATS3    YES
1723  02721 015662        JSB GETCR    NO, END-OF-STATEMENT?
1724  02722 124322        JMP ACCST,I  YES
1725  02723 117017        JSB MAT&,I
1726  02724 014544        JSB ERROR    NO
1727  02725 024336  SYE20  JMP NOEOF
1728  02726 015662  MATS3  JSB GETCR
1729  02727 024335        JMP EOF
1730  02730 017612        JSB LPCK     GET LEFT PARENTHESIS
1731  02731 017475        JSB ARRID    FETCH AND RECORD AN ARRAY
1732  02732 017622        JSB RPCK     RECORD A RIGHT PARENTHESIS
1733  02733 160226        LDA ARYAD,I  RETRIEVE
1734  02734 010450        AND MSK1     PREVIOUS ARRAY IDENTIFIER
1735  02735 150206        CPA TEMP,I   MATCH LEFT-HAND SIDE ARRAY?
1736  02736 014544        JSB ERROR    YES
1737  02737 124322  SYE21  JMP ACCST,I  NO
1738  02740 034133  MATS4  ISZ SBPTR
1739  02741 017612        JSB LPCK     FETCH LEFT PARENTHESIS
1740  02742 017045        JSB FSC      FETCH FORMULA
1741  02743 017622        JSB RPCK     FETCH RIGHT PARENTHESIS
1742  02744 007400        CCB          MULTIPLICATION
1743  02745 015355        JSB SYMCK    OPERATOR?
1744  02746 002265        DEF TIMES-1
1745  02747 014544        JSB ERROR    NO
1746  02750 017475  SYE22  JSB ARRID    YES, FETCH AND RECORD ARRAY
1747  02751 050400        CPA .10      END-OF-STATEMENT?
1748  02752 124322        JMP ACCST,I  YES
1749  02753 024336        JMP NOEOF    NO
```

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1750  02754 070210  MATS5 STA TEMP2
1751  02755 060133        LDA SBPTR    SAVE
1752  02756 070226        STA ARYAD    OPERAND ADDRESS
1753  02757 060207        LDA TEMP1    RETRIEVE
1754  02760 064423        LDB .46      AND RECORD
1755  02761 017601        JSB STROP    ARRAY
1756  02762 060210        LDA TEMP2    END-OF-
1757  02763 050400        CPA .10      STATEMENT?
1758  02764 124322        JMP ACCST,I  YES
1759  02765 064501        LDB M3       NO, MUST BE
1760  02766 015355        JSB SYMCK    A '+',
1761  02767 002261        DEF PLUS-1   '-',OR'*'
1762  02770 014544        JSB ERROR    ISN'T
1763  02771 006400  SYE23 CLB          IS, SET FOR FALSE
1764  02772 040376        ADA .8
1765  02773 052266        CPA TIMES    '*'?
1766  02774 027011        JMP MATS7    YES
1767  02775 076321  MATS6 STB PFLAG    NO, SET PFLAG
1768  02776 017475        JSB ARRID    GET SECOND ARRAY
1769  02777 050400        CPA .10      END-OF-STATEMENT?
1770  03000 002001        RSS          YES
1771  03001 024336        JMP NOEOF    NO
1772  03002 036321        ISZ PFLAG    WAS OPERATOR A '*'?
1773  03003 124322        JMP ACCST,I  NO
1774  03004 160226        LDA ARYAD,I  YES RETRIEVE
1775  03005 010450        AND MSK1     SECOND ARRAY
1776  03006 150206        CPA TEMP,I   MATCH LEFT-HAND SIDE ARRAY?
1777  03007 014544  SYE24 JSB ERROR    YES
1778  03010 124322        JMP ACCST,I  NO
1779  03011 160226  MATS7 LDA ARYAD,I  RETRIEVE
1780  03012 010450        AND MSK1     ARRAY
1781  03013 007400        CCB          SET FOR TRUE
1782  03014 150206        CPA TEMP,I   MATCH LEFT-HAND SIDE ARRAY?
1783  03015 027007        JMP SYE24    YES
1784  03016 026775        JMP MATS6    NO
1785  03017 013150  MAT&  DEF MATSB
1786**
1787***   JUMP TABLE FOR STATEMENT SYNTAX  **
1788**
1789  03020 002325  SYNTB DEF LETS     LET
1790  03021 002336        DEF DIMS     DIM
1791  03022 002342        DEF COMS     COM
1792  03023 002361        DEF DEFS     DEF
1793  03024 002421        DEF REMS     REM
1794  03025 002432        DEF GOTOS    GO TO
1795  03026 002424        DEF IFS      IF
1796  03027 002435        DEF FORS     FOR
1797  03030 002467        DEF NXTS     NEXT
1798  03031 002432        DEF GOTOS    GOSUB
1799  03032 002473        DEF ENDS     RETURN
1800  03033 002473        DEF ENDS     END
1801  03034 002473        DEF ENDS     STOP
1802*
1803*     THESE TWO STATEMENTS WILL FORCE AN ERROR
1804*     CALL AND WAIT
1805*
1806  03035 002473        DEF ENDS     ANALYZE WAIT AS END STATEMENT
1807  03036 002473        DEF ENDS ANALYZE CALL AS END STATEMENT
1808  03037 002477        DEF DATAS    DATA
1809  03040 002507        DEF READS    READ
1810  03041 002527        DEF PRINS    PRINT
1811  03042 002507        DEF READS    INPUT
1812  03043 002473        DEF ENDS     RESTORE
1813  03044 002604        DEF MATS     MAT

1815*
1816***   FORMULA SYNTAX CHECKER
1817*
1818  03045 000000  FSC   NOP
1819  03046 002400        CLA          SET LEFT PARENTHESIS
1820  03047 170205        STA TEMPS,I  COUNT TO ZERO
1821  03050 003400  FSC1  CCA          SET UNARY FLAG
1822  03051 072323        STA UFLAG    TO TRUE
```

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1823  03052 017507  FSC2  JSB VAROP    LOOK FOR VARIABLE OPERAND
1824  03053 027212        JMP FSC9     NOT FOUND
1825  03054 027160        JMP FSC6     SUBSCRIPTED VARIABLE FOUND
1826  03055 015651        JSB LETCK    FOLLOWED BY LETTER?
1827  03056 027160        JMP FSC6     NO
1828  03057 064500        LDB M2       YES, LOOK FOR
1829  03060 017253        JSB MCBCK    'AND' OR 'OR'
1830  03061 060207        LDA TEMP1    NOT FOUND, FETCH PREVIOUS
1831  03062 001727        ALF,ALF      CHARACTER AND LEFT-JUSTIFY IT
1832  03063 030210        IOR TEMP2    ADD LATEST CHARACTER
1833  03064 050533        CPA FN       'FN'?
1834  03065 027113        JMP FSC4     YES
1835  03066 170133        STA SBPTR,I  NO,
1836  03067 060356        LDA PDFNS    SEARCH FOR
1837  03070 064511        LDB M11      PREDEFINED
1838  03071 114262        JSB TSRCH,I  FUNCTION
1839  03072 027077        JMP FSC3     NOT FOUND
1840  03073 001727        ALF,ALF      ASSEMBLE
1841  03074 001723        ALF,RAR      OPERAND
1842  03075 030536        IOR FLGBT    ADD FLAG BIT
1843  03076 027121        JMP FSC5
1844  03077 036323  FSC3  ISZ UFLAG    'NOT' PERMITTED?
1845  03100 027203        JMP FSC8-1   NO
1846  03101 060365        LDA ANOT     YES,
1847  03102 007400        CCB          SEARCH FOR
1848  03103 114262        JSB TSRCH,I  'NOT'
1849  03104 027203        JMP FSC8-1   'NOT' NOT FOUND
1850  03105 007400        CCB          RETRIEVE
1851  03106 044133        ADB SBPTR    PREVIOUS WORD
1852  03107 160001        LDA 1,I      WORD
1853  03110 010467        AND OPMSK    SET TO
1854  03111 170001        STA 1,I      NULL OPERAND
1855  03112 027250        JMP FSC14
1856  03113 015662  FSC4  JSB GETCR    IDENTIFYING
1857  03114 026372        JMP SYNE4    FUNCTION
1858  03115 015651        JSB LETCK    LETTER?
1859  03116 026372        JMP SYNE4    NO
1860  03117 040522        ADA D100     YES,
1861  03120 001700        ALF          ASSEMBLE AND
1862  03121 040402  FSC5  ADA .15      SAVE
1863  03122 070207        STA TEMP1    FUNCTION IDENTIFIER
1864  03123 007400        CCB          RETRIEVE
1865  03124 044133        ADB SBPTR    PREVIOUS
1866  03125 160001        LDA 1,I      PROGRAM WORD
1867  03126 010467        AND OPMSK    EXTRACT OPERATOR,
1868  03127 030207        IOR TEMP1    APPEND OPERAND,
1869  03130 170001        STA 1,I      AND RECORD
1870  03131 015662        JSB GETCR    LEFT PARENTHESIS
1871  03132 014544  FSCE1 JSB ERROR    OR
1872  03133 017612        JSB LPCK     LEFT BRACKET?
1873  03134 017304        JSB FRCUR    YES, SAVE LOCAL VARIABLES OF FSC
1874  03135 017045        JSB FSC      FETCH ACTUAL PARAMETER
1875  03136 017261        JSB FPOP     RESTORE LOCAL VARIABLE OF FSC
1876  03137 017622        JSB RPCK     FETCH RIGHT PARENTHESIS
1877  03140 027223        JMP FSC10+1
1878  03141 064500  FSC7  LDB M2
1879  03142 015355        JSB SYMCK
1880  03143 002251        DEF RPARN-1
1881  03144 027204        JMP FSC8
1882  03145 060455        LDA B4000
1883  03146 170133        STA SBPTR,I
1884  03147 060420        LDA .41
1885  03150 007400        CCB
1886  03151 144205        ADB TEMPS,I
1887  03152 006020        SSB
1888  03153 027204        JMP FSC8
1889  03154 174205        STB TEMPS,I
1890  03155 034133        ISZ SBPTR
1891  03156 015662        JSB GETCR
1892  03157 060400        LDA .10
1893  03160 050400  FSC6  CPA .10      END OF FORMULA?
1894  03161 027204        JMP FSC8     YES
1895  03162 072323        STA UFLAG    NO, SET UNARY FLAG TO FALSE
```

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1896  03163 064503        LDB M5
1897  03164 017253        JSB MCBCK    BINARY OPERATOR
1898  03165 160133        LDA SBPTR,I  NOT FOUND,
1899  03166 001727        ALF,ALF      RESTORE
1900  03167 010443        AND B177     CHARACTER
1901  03170 066315        LDB MSFLG    SEARCH
1902  03171 015355        JSB SYMCK    FOR A
1903  03172 002261        DEF PLUS-1   BINARY OPERATOR
1904  03173 002001        RSS          NOT
1905  03174 027232        JMP FSC12
1906  03175 007400        CCB          ASSIGNMENT
1907  03176 015355        JSB SYMCK
1908  03177 002257        DEF ASSOP-1  OPERATOR?
1909  03200 027141        JMP FSC7     NO
1910  03201 073461        STA SFLAG    YES, SET
1911  03202 027050        JMP FSC1     'STORE OCCURRED' FLAG
1912  03203 060210        LDA TEMP2
1913  03204 164205  FSC8  LDB TEMPS,I  ALL LEFT PARENTHESES
1914  03205 006002        SZB          MATCHED?
1915  03206 014544  FSCE2 JSB ERROR    NO
1916  03207 174133        STB SBPTR,I  YES, RECORD AN
1917  03210 034133        ISZ SBPTR    END-OF-FORMULA AND
1918  03211 127045        JMP FSC,I    EXIT WITH CHARACTER IN (A)
1919  03212 050417  FSC9  CPA .40
1920  03213 027226        JMP FSC11
1921  03214 050442        CPA B133
1922  03215 027226        JMP FSC11
1923  03216 006400        CLB
1924  03217 074147        STB SIGN     POSITIVE
1925  03220 014672        JSB NUMCK    NUMBER?
1926  03221 027235        JMP FSC13
1927  03222 017645  FSC10 JSB NUMOP    YES, FIX UP PRECEDING OPERATOR
1928  03223 064507        LDB M9       UPDATE
1929  03224 076315        STB MSFLG    MULTIPLE STORE
1930  03225 027160        JMP FSC6     FLAG
1931  03226 034133  FSC11 ISZ SBPTR
1932  03227 060462        LDA B2300
1933  03230 170133        STA SBPTR,I
1934  03231 134205        ISZ TEMPS,I
1935  03232 064507  FSC12 LDB M9
1936  03233 076315        STB MSFLG
1937  03234 027050        JMP FSC1
1938  03235 036323  FSC13 ISZ UFLAG    UNARY OPERATORS PERMITTED?
1939  03236 014544  FSCE3 JSB ERROR    NO
1940  03237 064460        LDB UNMNC
1941  03240 050421        CPA .43      '+'?
1942  03241 027245        JMP *+4      YES
1943  03242 050422        CPA .45      NO, '-'?
1944  03243 027246        JMP *+3      YES
1945  03244 027236        JMP FSCE3    NO
1946  03245 044453        ADB B3000    STORE
1947  03246 034133        ISZ SBPTR    UNARY
1948  03247 174133        STB SBPTR,I  OPERATOR
1949  03250 064507  FSC14 LDB M9       UPDATE
1950  03251 076315        STB MSFLG    MULTIPLE STORE FLAG
1951  03252 027052        JMP FSC2     FLAG
1952*
1953***   CHECK FOR MULTICHARACTER BINARY OPERATOR
1954*
1955  03253 000000  MCBCK NOP
1956  03254 170133        STA SBPTR,I  SEARCH
1957  03255 060355        LDA MCBOP    FOR 'AND'
1958  03256 114262        JSB TSRCH,I  OR 'OR'
1959  03257 127253        JMP MCBCK,I  NOT FOUND
1960  03260 027232        JMP FSC12
1961**
1962***   RESTORE FSC LOCAL QUANTITIES  **
1963**
1964  03261 000000  FPOP  NOP
1965  03262 070207        STA TEMP1    SAVE CHARACTER
1966  03263 064205        LDB TEMPS
1967  03264 044503        ADB M5
1968  03265 074205        STB TEMPS    RESTORE S-STACK TOP
```

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1969  03266 006004        INB
1970  03267 160001        LDA 1,I
1971  03270 072315        STA MSFLG    RESTORE MULTIPLE STORE FLAG
1972  03271 006004        INB
1973  03272 160001        LDA 1,I
1974  03273 072323        STA UFLAG    RESTORE UNARY OPERATOR FLAG
1975  03274 006004        INB
1976  03275 160001        LDA 1,I
1977  03276 073045        STA FSC      RESTORE FSC RETURN ADDRESS
1978  03277 006004        INB
1979  03300 160001        LDA 1,I      RESTORE
1980  03301 073507        STA VAROP      VAROP RETURN ADDRESS
1981  03302 060207        LDA TEMP1    RETRIEVE CHARACTER
1982  03303 127261        JMP FPOP,I
1983**
1984***   SAVE LOCAL QUANTITIES OF FSC  **
1985**
1986  03304 000000  FRCUR NOP
1987  03305 064205        LDB TEMPS    FETCH CURRENT S-STACK POINTER
1988  03306 006004        INB          UPDATE IT
1989  03307 062315        LDA MSFLG    DUMP MULTIPLE STORE
1990  03310 170001        STA 1,I      FLAG ON S-STACK
1991  03311 006004        INB
1992  03312 062323        LDA UFLAG    STACK UNARY OPERATOR
1993  03313 170001        STA 1,I      FLAG
1994  03314 006004        INB
1995  03315 063045        LDA FSC      STACK FSC
1996  03316 170001        STA 1,I      RETURN ADDRESS
1997  03317 063507        LDA VAROP    STACK VAROP RETURN ADDRESS
1998  03320 017322        JSB SSOV     AND CHECK FOR S-STACK OVERFLOW
1999  03321 127304        JMP FRCUR,I
2000**
2001***   PUT ITEM ON S-STACK AND CHECK FOR OVERFLOW **
2002**
2003  03322 000000  SSOV  NOP          STORE QUANTITY
2004  03323 006004        INB          ADVANCE S-STACK POINTER
2005  03324 170001        STA 1,I      SAVE ITEM IN (A)
2006  03325 006004        INB          ADVANCE S-STACK POINTER
2007  03326 074205        STB TEMPS    AND RECORD IT
2008  03327 007004        CMB,INB      LAST WORD
2009  03330 044115        ADB LWAM
2010  03331 006020        SSB          EXCEEDED?
2011  03332 014544  FSCE4 JSB ERROR    YES
2012  03333 127322        JMP SSOV,I
2013**
2014***   CHECK FOR SUBSCRIPT PART  **
2015**
2016  03334 000000  SBSCK NOP          CHARACTER IN (A)
2017  03335 064500        LDB M2       LEFT BRACKET
2018  03336 015355        JSB SYMCK    OR
2019  03337 002305        DEF LBRAC-1  LEFT PARENTHESIS?
2020  03340 127334        JMP SBSCK,I  NO, RETURN VIA (P+1)
2021  03341 037334        ISZ SBSCK    YES, SET RETURN TO (P+2)
2022  03342 160226        LDA ARYAD,I  SET
2023  03343 010513        AND M16      ARRAY
2024  03344 002004        INA          TO
2025  03345 170226        STA ARYAD,I  SINGLE SUBSCRIPT
2026  03346 060461        LDA B2200
2027  03347 170133        STA SBPTR,I  RECORD IT
2028  03350 006400        CLB          DIM OR COM
2029  03351 056317        CPB DFLAG    STATEMENT?
2030  03352 027424        JMP SBSC3    NO
2031  03353 114271        JSB PGINT,I  FETCH INTEGER
2032  03354 000527        DEF M256     SUBSCRIPT BOUND
2033  03355 005727        BLF,BLF      SAVE
2034  03356 074207        STB TEMP1    BOUND
2035  03357 007400        CCB
2036  03360 015355        JSB SYMCK    NEXT CHARACTER
2037  03361 002255        DEF SCMMA-1  A COMMA?
2038  03362 027367        JMP SBSC1
2039  03363 134226        ISZ ARYAD,I  NOTE SECOND SUBSCRIPT
2040  03364 114271        JSB PGINT,I  FETCH SECOND
2041  03365 000527        DEF M256     INTEGER SUBSCRIPT BOUND
```

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2042  03366 002001        RSS
2043  03367 006404  SBSC1 CLB,INB
2044  03370 036321        ISZ PFLAG    COM STATEMENT?
2045  03371 027401        JMP SBSC2    NO
2046  03372 070210        STA TEMP2    SAVE CHARACTER
2047  03373 060001        LDA 1
2048  03374 030207        IOR TEMP1    RETRIEVE FIRST BOUND
2049  03375 015404        JSB MDIM     FIND STORAGE NEED
2050  03376 040214        ADA TEMPS+7  UPDATE COM
2051  03377 070214        STA TEMPS+7  STORAGE POINTER
2052  03400 060210        LDA TEMP2    RETRIEVE NEXT CHARACTER
2053  03401 064500  SBSC2 LDB M2       RIGHT PARENTHESIS
2054  03402 015355        JSB SYMCK    OR
2055  03403 002251        DEF RPARN-1  RIGHT BRACKET?
2056  03404 027206        JMP FSCE2    NO
2057  03405 060456        LDA LF
2058  03406 170133        STA SBPTR,I  RIGHT BRACKET
2059  03407 034133        ISZ SBPTR    ADJUST S-BUFFER POINTER
2060  03410 015662        JSB GETCR    FETCH FOLLOWING
2061  03411 060400        LDA .10      CHARACTER
2062  03412 066317        LDB DFLAG
2063  03413 006002        SZB
2064  03414 127334        JMP SBSCK,I  YES, EXIT
2065  03415 017261        JSB FPOP     RESTORE FSC LOCAL VARIABLES
2066  03416 064500        LDB M2       RESTORE
2067  03417 044205        ADB TEMPS    S-STACK
2068  03420 074205        STB TEMPS    POINTER
2069  03421 006004        INB          FETCH
2070  03422 164001        LDB 1,I      RETURN ADDRESS
2071  03423 124001        JMP 1,I      AND EXIT
2072  03424 063334  SBSC3 LDA SBSCK    SAVE
2073  03425 064205        LDB TEMPS    RETURN ADDRESS
2074  03426 017322        JSB SSOV     ON S-STACK
2075  03427 017304        JSB FRCUR    SAVE FSC LOCAL VARIABLES
2076  03430 064507        LDB M9       SET MULTIPLE STORE FLAG
2077  03431 076315        STB MSFLG    TO FALSE
2078  03432 060226        LDA ARYAD    SAVE
2079  03433 064205        LDB TEMPS    OPERAND
2080  03434 017322        JSB SSOV     ADDRESS
2081  03435 017045        JSB FSC      GET SUBSCRIPT FORMULA
2082  03436 007400        CCB          CANCEL
2083  03437 044133        ADB SBPTR    END-OF-FORMULA
2084  03440 074133        STB SBPTR    OPERATOR
2085  03441 064500        LDB M2       RESTORE
2086  03442 044205        ADB TEMPS    S-STACK
2087  03443 074205        STB TEMPS    POINTER
2088  03444 006004        INB          RESTORE
2089  03445 164001        LDB 1,I      OPERAND
2090  03446 074226        STB ARYAD    ADDRESS
2091  03447 007400        CCB          CANCEL OTHER
2092  03450 015355        JSB SYMCK
2093  03451 002255        DEF SCMMA-1
2094  03452 027401        JMP SBSC2
2095  03453 134226        ISZ ARYAD,I
2096  03454 017045        JSB FSC
2097  03455 007400        CCB
2098  03456 044133        ADB SBPTR
2099  03457 074133        STB SBPTR
2100  03460 027401        JMP SBSC2
2101**
2102***   CHECK SYNTAX OF ARRAY DEFINITIONS **
2103**
2104  03461 000000  ARRYS NOP
2105  03462 017475        JSB ARRID    FETCH ARRAY IDENTIFIER
2106  03463 017334        JSB SBSCK    RECORD A SUBSCRIPT
2107  03464 014544        JSB ERROR    MISSING SUBSCRIPT
2108  03465 050400  ARRE1 CPA .10      END-OF-STATEMENT?
2109  03466 127461        JMP ARRYS,I  YES, RETURN VIA (P+1)
2110  03467 007400        CCB          NO,
2111  03470 015355        JSB SYMCK    MUST BE
2112  03471 002245        DEF COMMA-1  A COMMA
2113  03472 024336        JMP NOEOF    ISN'T
2114  03473 037461        ISZ ARRYS    IS, RETURN
```

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2115  03474 127461        JMP ARRYS,I  VIA (P+2)
2116**
2117***   FETCH ARRAY IDENTIFIER  **
2118**
2119  03475 000000  ARRID NOP
2120  03476 017566        JSB LTR      FETCH LETTER
2121  03477 014544        JSB ERROR    NONE FOUND
2122  03500 060133  ARRE2 LDA SBPTR    SAVE
2123  03501 070226        STA ARYAD OPERAND ADDRESS
2124  03502 060207        LDA TEMP1    RECORD
2125  03503 064423        LDB .46      ARRAY
2126  03504 017601        JSB STROP    IDENTIFIER
2127  03505 060210        LDA TEMP2    RETRIEVE FOLLOWING CHARACTER
2128  03506 127475        JMP ARRID,I
2129**
2130***   CHECK FOR VARIABLE OPERAND  **
2131**
2132  03507 000000  VAROP NOP
2133  03510 017566        JSB LTR      LETTER?
2134  03511 127507        JMP VAROP,I  NO, EXIT VIA (P+1)
2135  03512 037507        ISZ VAROP
2136  03513 050417        CPA .40      LEFT PARENTHESIS?
2137  03514 027555        JMP VARO5    YES
2138  03515 050442        CPA B133     NO, LEFT BRACKET?
2139  03516 027555        JMP VARO5    YES
2140  03517 037507        ISZ VAROP    NO
2141  03520 015636        JSB DIGCK    DIGIT?
2142  03521 027531        JMP VARO1    NO
2143  03522 060207        LDA TEMP1    YES, RETRIEVE LETTER,
2144  03523 044425        ADB .48      AND RESTORE ASCII DIGIT
2145  03524 074207        STB TEMP1
2146  03525 017601        JSB STROP    RECORD VARIABLE
2147  03526 015662        JSB GETCR    FETCH FOLLOWING
2148  03527 060400        LDA .10      CHARACTER
2149  03530 027535        JMP VARO2
2150  03531 060207  VARO1 LDA TEMP1    RETRIEVE LETTER,
2151  03532 064424        LDB .47      SET 'NO DIGIT',
2152  03533 017601        JSB STROP    AND RECORD VARIABLE
2153  03534 060210        LDA TEMP2    RETRIEVE FOLLOWING CHARACTER
2154  03535 070210  VARO2 STA TEMP2    SAVE CHARACTER
2155  03536 006400        CLB          INSIDE A
2156  03537 056321        CPB PFLAG    DEF STATEMENT?
2157  03540 127507        JMP VAROP,I  NO, EXIT VIA (P+3)
2158  03541 007400        CCB
2159  03542 044133        ADB SBPTR    RETRIEVE
2160  03543 160001        LDA 1,I
2161  03544 010450        AND MSK1         OPERAND
2162  03545 052321        CPA PFLAG    MATCH PARAMETER?
2163  03546 027551        JMP VARO4    YES
2164  03547 060210  VARO3 LDA TEMP2    NO, RETRIEVE
2165  03550 127507        JMP VAROP,I  CHARACTER AND EXIT VIA (P+3)
2166  03551 160001  VARO4 LDA 1,I      SET OPERAND TO
2167  03552 030536        IOR FLGBT    ACTUAL PARAMETER
2168  03553 170001        STA 1,I      AND RECORD IT
2169  03554 027547        JMP VARO3
2170  03555 060133  VARO5 LDA SBPTR    SAVE
2171  03556 070226        STA ARYAD    OPERAND ADDRESS
2172  03557 060207        LDA TEMP1    RETRIEVE LETTER
2173  03560 064423        LDB .46      RECORD
2174  03561 017601        JSB STROP    ARRAY IDENTIFIER
2175  03562 060442        LDA B133     RETRIEVE LEFT BRACKET
2176  03563 017334        JSB SBSCK    FETCH SUBSCRIPT
2177  03564 000000        NOP
2178  03565 127507        JMP VAROP,I  EXIT VIA (P+2)
2179**
2180***   FETCH A LETTER  **
2181**
2182  03566 000000  LTR   NOP
2183  03567 015662        JSB GETCR
2184  03570 060400        LDA .10
2185  03571 015651        JSB LETCK    LETTER?
2186  03572 127566        JMP LTR,I    NO, EXIT VIA (P+1)
2187  03573 037566        ISZ LTR      YES,
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2188  03574 070207        STA TEMP1    SAVE IT
2189  03575 015662        JSB GETCR    NEXT CHARACTER
2190  03576 060400        LDA .10      TO (A)
2191  03577 070210        STA TEMP2    SAVE SECOND CHARACTER
2192  03600 127566        JMP LTR,I    EXIT VIA (P+2)
2193**
2194***   STORE AN OPERAND NAME  **
2195**
2196  03601 000000  STROP NOP          LETTER IN (A), NUMBER IN (B)
2197  03602 040522        ADA D100     NUMERICALLY ADJUST THE
2198  03603 044520        ADB D53      OPERAND NAME
2199  03604 001700        ALF          COMBINE THE
2200  03605 030001        IOR 1        TWO PARTS
2201  03606 130133        IOR SBPTR,I  COMPLETE OPERAND-OPERATOR PAIR
2202  03607 170133        STA SBPTR,I  AND STORE IT
2203  03610 034133        ISZ SBPTR    UPDATE S-BUFFER POINTER
2204  03611 127601        JMP STROP,I
2205**
2206***   CHECK FOR LEFT PARENTHESIS  **
2207**
2208  03612 000000  LPCK  NOP          CHARACTER IN (A)
2209  03613 064500        LDB M2       LEFT PARENTHESIS
2210  03614 015355        JSB SYMCK    OR
2211  03615 002305        DEF LBRAC-1  LEFT BRACKET?
2212  03616 027132        JMP FSCE1    NO
2213  03617 060462        LDA B2300
2214  03620 170133        STA SBPTR,I  PARENTHESIS
2215  03621 127612        JMP LPCK,I   EXIT
2216**
2217***   CHECK FOR RIGHT PARENTHESIS  **
2218**
2219  03622 000000  RPCK  NOP
2220  03623 064500        LDB M2       RIGHT PARENTHESIS
2221  03624 015355        JSB SYMCK    OR
2222  03625 002251        DEF RPARN-1 RIGHT BRACKET?
2223  03626 027206        JMP FSCE2    NO
2224  03627 060455        LDA B4000
2225  03630 170133        STA SBPTR,I  PARENTHESIS
2226  03631 034133        ISZ SBPTR    UPDATE SYNTAX BUFFER POINTER
2227  03632 015662        JSB GETCR    FETCH
2228  03633 060400        LDA .10      FOLLOWING CHARACTER
2229  03634 127622        JMP RPCK,I
2230**
2231***   FETCH PARENTHESIZED FORMULA  **
2232**
2233  03635 000000  GETPF NOP
2234  03636 015662        JSB GETCR
2235  03637 024335        JMP EOF
2236  03640 034133        ISZ SBPTR
2237  03641 017612        JSB LPCK     FETCH LEFT PARENTHESIS
2238  03642 017045        JSB FSC      FETCH FORMULA
2239  03643 017622        JSB RPCK     GET RIGHT PARENTHESIS
2240  03644 127635        JMP GETPF,I
2241**
2242***   FLAG OPERATOR WHICH PRECEDES NUMBER  **
2243**
2244  03645 000000  NUMOP NOP
2245  03646 070212        STA TEMP4
2246  03647 064501        LDB M3       FETCH
2247  03650 044133        ADB SBPTR    PRECEDING
2248  03651 160001        LDA 1,I      OPERATOR
2249  03652 030536        IOR FLGBT    ADD FLAG BIT
2250  03653 170001        STA 1,I      REPLACE OPERATOR
2251  03654 060212        LDA TEMP4
2252  03655 127645        JMP NUMOP,I
2253                      SKP
2254*
2255*     SYSTEM COMMAND TABLE
2256*
2257  03656 023004  SYCMD OCT 23004
2258  03657 051524  STCMD ASC 2,STOP   STOP COMMAND ENTRY
      03660 047520
2259*
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2260  03661 000003        OCT 00003
2261  03662 051125        ASC 2,RUN    RUN COMMAND
      03663 047040
2262*
2263  03664 002003        OCT 02003
2264  03665 051503        ASC 2,SCR    SCRATCH COMMAND ENTRY
      03666 051040
2265*
2266  03667 004005        OCT 04005
2267  03670 050125        ASC 3,PUNCH
      03671 047103
      03672 044040
2268*
2269  03673 003004        OCT 03004
2270  03674 046111        ASC 2,LIST   LIST COMMAND
      03675 051524
2271*
2272  03676 034004        OCT 34004
2273  03677 052101        ASC 2,TAPE   TAPE COMMAND
      03700 050105
2274*
2275  03701 041003        OCT 41003
2276  03702 041131        ASC 2,BYE    LOG-OFF COMMAND
      03703 042440
2277*
2278  03704 042004        OCT 42004
2279  03705 046505        ASC 2,MESG   MESSAGE COMMAND
      03706 051507
2280*
2281  03707 043003        OCT 43003
2282  03710 051105        ASC 2,REN    RENUMBER COMMAND
      03711 047040
2283**
2284***   PRINT NAME TABLE FOR OPERATORS **
2285**
2286  03712 032003  LET   OCT 32003    BITS 15-9 OF THE LABELLED WORD
2287  03713 046105        ASC 2,LET
      03714 052040
2288  03715 033003  DIM   OCT 33003    ARE THE BASIC CODE OPERATOR
2289  03716 042111        ASC 2,DIM
      03717 046440
2290  03720 034003  COM   OCT 34003    NUMBERS.  BITS 2-0 ARE THE
2291  03721 041517        ASC 2,COM
      03722 046440
2292  03723 035003  DEF   OCT 35003    LENGTH IN CHARACTERS OF THE
2293  03724 042105        ASC 2,DEF
      03725 043040
2294  03726 036003  REM   OCT 36003    SYMBOL. THE ASCII VERSION OF
2295  03727 051105        ASC 2,REM
      03730 046440
2296  03731 037004  GOTO  OCT 37004    THE SYMBOL FOLLOWS.
2297  03732 043517        ASC 2,GOTO
      03733 052117
2298  03734 040002  IF    OCT 40002
2299  03735 044506        ASC 1,IF
2300  03736 041003  FOR   OCT 41003
2301  03737 043117        ASC 2,FOR
      03740 051040
2302  03741 042004  NEXT  OCT 42004
2303  03742 047105        ASC 2,NEXT
      03743 054124
2304  03744 043005  GOSUB OCT 43005
2305  03745 043517        ASC 3,GOSUB
      03746 051525
      03747 041040
2306  03750 044006  RTRN  OCT 44006
2307  03751 051105        ASC 3,RETURN
      03752 052125
      03753 051116
2308  03754 045003  END   OCT 45003
2309  03755 042516        ASC 2,END
      03756 042040
2310  03757 046004  STP   OCT 46004
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2311  03760 051524        ASC 2,STOP
      03761 047520
2312  03762 051004  DATA  OCT 51004
2313  03763 042101        ASC 2,DATA
      03764 052101
2314  03765 052004  READ  OCT 52004
2315  03766 051105        ASC 2,READ
      03767 040504
2316  03770 053005  PRINT OCT 53005
2317  03771 050122        ASC 3,PRINT
      03772 044516
      03773 052040
2318  03774 054005  INPUT OCT 54005
2319  03775 044516        ASC 3,INPUT
      03776 050125
      03777 052040
2320  04000 055007  RSTOR OCT 55007
2321  04001 051105        ASC 4,RESTORE
      04002 051524
      04003 047522
      04004 042440
2322  04005 056003  MAT   OCT 56003
2323  04006 046501        ASC 2,MAT
      04007 052040
2324  04010 057004  THEN  OCT 57004
2325  04011 052110        ASC 2,THEN
      04012 042516
2326  04013 060002  TO    OCT 60002
2327  04014 052117        ASC 1,TO
2328  04015 061004  STEP  OCT 61004
2329  04016 051524        ASC 2,STEP
      04017 042520
2330  04020 027003  NOT   OCT 27003
2331  04021 047117        ASC 2,NOT
      04022 052040
2332  04023 026003  AND   OCT 26003
2333  04024 040516        ASC 2,AND
      04025 042040
2334  04026 025002  OR    OCT 25002
2335  04027 047522        ASC 1,OR
2336  04030 030002  GTE   OCT 30002
2337  04031 037075        ASC 1,>=
2338  04032 031002  LTE   OCT 31002
2339  04033 036075        ASC 1,<=
2340  04034 017002  AUNEQ OCT 17002
2341  04035 036076        ASC 1,<>
2342  04036 001003  TAB   OCT 1003
2343  04037 052101        ASC 2,TAB
      04040 041040
2344  04041 002003  SIN   OCT 2003     THIS SECTION HAS THE PRE-DEFINED
2345  04042 051511        ASC 2,SIN
      04043 047040
2346  04044 003003  COS   OCT 3003     FUNCTIONS. HERE BITS 13-9 ARE
2347  04045 041517        ASC 2,COS
      04046 051440
2348  04047 004003  TAN   OCT 4003     THE IDENTIFYING NUMBER OF THE
2349  04050 052101        ASC 2,TAN
      04051 047040
2350  04052 005003  ATN   OCT 5003     FUNCTION.
2351  04053 040524        ASC 2,ATN
      04054 047040
2352  04055 006003  EXPN  OCT 6003
2353  04056 042530        ASC 2,EXP
      04057 050040
2354  04060 007003  LOG   OCT 7003
2355  04061 046117        ASC 2,LOG
      04062 043440
2356  04063 010003  ABS   OCT 10003
2357  04064 040502        ASC 2,ABS
      04065 051440
2358  04066 011003  SQR   OCT 11003
2359  04067 051521        ASC 2,SQR
      04070 051040
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2360  04071 012003  INT   OCT 12003
2361  04072 044516        ASC 2,INT
      04073 052040
2362  04074 013003  RND   OCT 13003
2363  04075 051116        ASC 2,RND
      04076 042040
2364  04077 014003  SGN   OCT 14003
2365  04100 051507        ASC 2,SGN
      04101 047040
2366  04102 015003  ZER   OCT 15003    MATRIX FUNCTIONS
2367  04103 055105        ASC 2,ZER
      04104 051040
2368  04105 016003  CON   OCT 16003
2369  04106 041517        ASC 2,CON
      04107 047040
2370  04110 017003  IDN   OCT 17003
2371  04111 044504        ASC 2,IDN
      04112 047040
2372  04113 020003  INV   OCT 20003
2373  04114 044516        ASC 2,INV
      04115 053040
2374  04116 021003  TRN   OCT 21003
2375  04117 052122        ASC 2,TRN
      04120 047040
2376**
2377***   TABLE SEARCH FOR MULTICHARACTER SYMBOLS  **
2378**
2379  04121 000000  TBSRH NOP
2380  04122 072231        STA TABLE    STORE TABLE ADDRESS
2381  04123 074215        STB LNGTH    STORE -(NUMBER OF ENTRIES)
2382  04124 060125        LDA BADDR    SAVE
2383  04125 070211        STA TEMP3    INPUT
2384  04126 060126        LDA CCNT     BUFFER
2385  04127 070212        STA TEMP4    STATUS
2386  04130 060133        LDA SBPTR    INITIALIZE END-OF-SYMBOL
2387  04131 072247        STA SMEND    POINTER
2388  04132 002404        CLA,INA      COUNT FIRST CHARACTER OF
2389  04133 072454        STA SLENG    SYMBOL
2390  04134 160133        LDA SBPTR,I  FETCH PARTIAL SYMBOL
2391  04135 010443        AND B177     TWO
2392  04136 150133        CPA SBPTR,I  CHARACTERS?
2393  04137 002001        RSS          NO
2394  04140 026163        JMP TSR10    YES
2395  04141 001727        ALF,ALF      LEFT-JUSTIFY
2396  04142 030411        IOR .32      FIRST CHARACTER AND
2397  04143 170133        STA SBPTR,I  APPEND BLANK
2398  04144 015662  TSRC1 JSB GETCR    FETCH NEXT CHARACTER
2399  04145 026224        JMP TSRC9    END-OF-STATEMENT
2400  04146 066454        LDB SLENG    CHECK FOR
2401  04147 054375        CPB .7       IMPOSSIBLE LENGTH
2402  04150 026224        JMP TSRC9
2403  04151 004010        SLB          EVEN-NUMBERED CHARACTER?
2404  04152 026160        JMP TSRC2    YES
2405  04153 036247        ISZ SMEND    NO, FETCH FRESH WORD,
2406  04154 001727        ALF,ALF      LEFT-JUSTIFY CHARACTER,
2407  04155 030411        IOR .32      APPEND BLANK,
2408  04156 172247        STA SMEND,I  AND STORE
2409  04157 026163        JMP TSR10
2410  04160 040517  TSRC2 ADA M32      DELETE BLANK,
2411  04161 142247        ADA SMEND,I  FILL SECOND CHARACTER,
2412  04162 172247        STA SMEND,I  AND STORE
2413  04163 036454  TSR10 ISZ SLENG    COUNT IT
2414  04164 064215        LDB LNGTH    INITIALIZE TABLE LENGTH
2415  04165 074213        STB COUNT    COUNTER
2416  04166 062231        LDA TABLE
2417  04167 072411  TSRC3 STA TBLPT    SET TABLE POINTER
2418  04170 162411        LDA TBLPT,I  EXTRACT SYMBOL LENGTH
2419  04171 010375        AND .7       FROM TABLE AND COMPARE
2420  04172 052454        CPA SLENG    WITH CURRENT SYMBOL
2421  04173 026202        JMP TSRC5    EQUAL?
2422  04174 040372  TSRC4 ADA .3       DIFFERENT,
2423  04175 001100        ARS          UPDATE
2424  04176 042411        ADA TBLPT    TABLE POINTER
```

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2425  04177 034213        ISZ COUNT    MORE ENTRIES?
2426  04200 026167        JMP TSRC3    YES
2427  04201 026144        JMP TSRC1    NO
2428  04202 066411  TSRC5 LDB TBLPT    SET POINTER TO
2429  04203 076435        STB TSPTR    TABLE SYMBOL
2430  04204 064133        LDB SBPTR    SET (B) TO INPUT
2431  04205 026211        JMP TSRC7    SYMBOL POINTER
2432  04206 056247  TSRC6 CPB SMEND    ALL OF SYMBOL CONSIDERED?
2433  04207 026217        JMP TSRC8    YES, MATCH OCCURRED
2434  04210 006004        INB          NO, INCREMENT
2435  04211 036435  TSRC7 ISZ TSPTR    SYMBOL POINTERS
2436  04212 162435        LDA TSPTR,I  FETCH WORD FROM TABLE
2437  04213 150001        CPA 1,I      MATCH WITH INPUT SYMBOL?
2438  04214 026206        JMP TSRC6    YES
2439  04215 062454        LDA SLENG    NO, WRONG
2440  04216 026174        JMP TSRC4    SYMBOL
2441  04217 162411  TSRC8 LDA TBLPT,I  EXTRACT
2442  04220 010467        AND OPMSK    SYMBOL CODE
2443  04221 170133        STA SBPTR,I
2444  04222 036121        ISZ TBSRH    AND RETURN VIA
2445  04223 126121        JMP TBSRH,I  'SUCCESS' EXIT
2446  04224 060211  TSRC9 LDA TEMP3    RESTORE
2447  04225 070125        STA BADDR    INPUT
2448  04226 060212        LDA TEMP4    BUFFER
2449  04227 070126        STA CCNT     STATUS
2450  04230 126121        JMP TBSRH,I  'FAILURE' EXIT
2451**
2452***   FETCH AND RECORD PROGRAM INTEGER **
2453**
2454  04231 000000  PRGIN NOP
2455  04232 160133        LDA SBPTR,I  SET
2456  04233 030536        IOR FLGBT    'INTEGER
2457  04234 040372        ADA .3       FOLLOWS'
2458  04235 170133        STA SBPTR,I  OPERAND
2459  04236 162231        LDA PRGIN,I  GIVE ADDRESS
2460  04237 072244        STA PRGI1    TO INTCK
2461  04240 034133        ISZ SBPTR
2462  04241 015662        JSB GETCR
2463  04242 014544  SYE25 JSB ERROR
2464  04243 016247        JSB INTCK    FETCH
2465  04244 000000  PRGI1 NOP
2466  04245 036231        ISZ PRGIN
2467  04246 126231        JMP PRGIN,I
2468**
2469***   BUILD AN INTEGER  **
2470**
2471  04247 000000  INTCK NOP          CHARACTER IN (A)
2472  04250 006400        CLB          STORE
2473  04251 076454        STB INTGR    PARTIAL RESULT
2474  04252 015636  INTC1 JSB DIGCK    DIGIT?
2475  04253 026271        JMP INTC2    NO
2476  04254 103101        CLO
2477  04255 066454        LDB INTGR    MULTIPLY
2478  04256 044001        ADB 1        PARTIAL
2479  04257 044001        ADB 1        RESULT
2480  04260 046454        ADB INTGR    BY
2481  04261 044001        ADB 1        10
2482  04262 044000        ADB 0        ADD LATEST DIGIT
2483  04263 102201        SOC          OVERFLOW?
2484  04264 026242        JMP SYE25    YES
2485  04265 076454        STB INTGR    STORE PARTIAL RESULT
2486  04266 015662        JSB GETCR    NO, FETCH
2487  04267 060400        LDA .10      NEXT CHARACTER
2488  04270 026252        JMP INTC1
2489  04271 066454  INTC2 LDB INTGR    ZERO
2490  04272 006003        SZB,RSS      INTEGER?
2491  04273 026242        JMP SYE25    YES
2492  04274 174133        STB SBPTR,I  NO, RECORD IT
2493  04275 166247        LDB INTCK,I  INTEGER
2494  04276 164001        LDB 1,I      TOO
2495  04277 046454        ADB INTGR    LARGE?
2496  04300 006021        SSB,RSS
2497  04301 026242        JMP SYE25    YES
```

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2498  04302 066454        LDB INTGR    NO,
2499  04303 034133        ISZ SBPTR    RETURN WITH
2500  04304 036247        ISZ INTCK    INTEGER
2501  04305 126247        JMP INTCK,I  IN (B)
2502**
2503***   PROCESS CHARACTER STRING  **
2504**
2505  04306 000000  CHRST NOP
2506  04307 070210        STA TEMP2    RECORD TERMINATOR CHARACTER
2507  04310 060400        LDA .10      DUMMY
2508  04311 070123        STA BLANK    DELETE CHARACTER
2509  04312 015662  CHRS1 JSB GETCR
2510  04313 026331        JMP CHRS3    TO END-OF-STATEMENT EXIT
2511  04314 050210        CPA TEMP2    TERMINATOR CHARACTER?
2512  04315 026330        JMP CHRS2    YES
2513  04316 130133        IOR SBPTR,I  NO, FILL
2514  04317 170133        STA SBPTR,I  SECOND CHARACTER
2515  04320 015662        JSB GETCR
2516  04321 026331        JMP CHRS3    TO END-OF-STATEMENT EXIT
2517  04322 050210        CPA TEMP2    TERMINATOR CHARACTER?
2518  04323 026330        JMP CHRS2    YES
2519  04324 034133        ISZ SBPTR    NO, MOVE TO NEW WORD
2520  04325 001727        ALF,ALF      AND STORE
2521  04326 170133        STA SBPTR,I  FIRST CHARACTER
2522  04327 026312        JMP CHRS1
2523  04330 036306  CHRS2 ISZ CHRST    SET (P+2) EXIT
2524  04331 034133  CHRS3 ISZ SBPTR    MOVE TO NEXT BUFFER WORD
2525  04332 060411        LDA .32      RESTORE BLANK AS
2526  04333 070123        STA BLANK    DELETE CHARACTER
2527  04334 126306        JMP CHRST,I
2528**
2529***   DELETE STATEMENT  **
2530**
2531  04335 160120  DLSTM LDA SBUFA,I  LOAD SEQUENCE NUMBER
2532  04336 016411        JSB FNDPS    FIND STATEMENT TO BE DELETED
2533  04337 124254        JMP PEXMA,I
2534  04340 124254        JMP PEXMA,I
2535  04341 002400        CLA          ZERO WORD SKIP FOR DESTINATION
2536  04342 006004        INB          ADDRESS OF SOURCE WORD SKIP IN B
2537  04343 016435        JSB CLPRG    CLOSE UP PROGRAM
2538  04344 124254        JMP PEXMA,I
2539*
2540***   ACCEPT STATEMENT
2541*
2542  04345 060120  ACTST LDA SBUFA    COMPUTE
2543  04346 003004        CMA,INA      LENGTH
2544  04347 040133        ADA SBPTR    OF STATEMENT
2545  04350 170206        STA TEMP,I   AND RECORD IT
2546  04351 160120        LDA SBUFA,I  LOAD SEQUENCE NUMBER
2547  04352 016411        JSB FNDPS    SEARCH ON SEQUENCE NUMBER
2548  04353 026370        JMP ACCS1    APPEND STATEMENT TO PROGRAM
2549  04354 026405        JMP ACCS4    INSERT STATEMENT IN PROGRAM
2550  04355 006004        INB          REPLACE STATEMENT IN PROGRAM
2551  04356 160001        LDA 1,I      COMPARE LENGTHS OF
2552  04357 003004        CMA,INA      STATEMENT BEING REPLACED
2553  04360 140206        ADA TEMP,I   AND STATEMENT
2554  04361 002003        SZA,RSS      REPLACING IT
2555  04362 026372        JMP ACCS2    EQUAL
2556  04363 002021        SSA,RSS
2557  04364 026406        JMP ACCS4+1  SHORTER
2558  04365 160206        LDA TEMP,I   LONGER,
2559  04366 016435        JSB CLPRG    CLOSE UP PROGRAM
2560  04367 026372        JMP ACCS2
2561  04370 160206  ACCS1 LDA TEMP,I   LOAD PROGRAM SPACE REQUIREMENT
2562  04371 016454        JSB OVCHK    SUFFICIENT PROGRAM SPACE LEFT?
2563  04372 006400  ACCS2 CLB          YES, SET COUNTER TO ZERO
2564  04373 060120        LDA SBUFA    INITIALIZE
2565  04374 070210        STA TEMP2    SOURCE ADDRESS
2566  04375 160210  ACCS3 LDA TEMP2,I  TRANSFER WORD FROM
2567  04376 170211        STA TEMP3,I  S-BUFFER TO PROGRAM SPACE
2568  04377 034210        ISZ TEMP2    INCREMENT SOURCE AND
2569  04400 034211        ISZ TEMP3    DESTINATION ADDRESSES
2570  04401 006004        INB          BUMP COUNTER
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2571  04402 154206        CPB TEMP,I   ENTIRE STATEMENT MOVED?
2572  04403 124254        JMP PEXMA,I
2573  04404 026375        JMP ACCS3    NO
2574  04405 160206  ACCS4 LDA TEMP,I   LOAD PROGRAM SPACE REQUIREMENT
2575  04406 016454        JSB OVCHK    SUFFICIENT PROGRAM SPACE LEFT?
2576  04407 014627        JSB MVTOH    MAKE
2577  04410 026372        JMP ACCS2    ROOM
2578**
2579***   FIND SEQUENTIAL POSITION  **
2580**
2581  04411 000000  FNDPS NOP
2582  04412 070211        STA TEMP3    SAVE SEQUENCE NUMBER
2583  04413 064121        LDB PBUFF    STARTING ADDRESS
2584  04414 054122  FNDP1 CPB PBPTR    END OF PROGRAM?
2585  04415 026433        JMP FNDP4    YES, EXIT VIA (P+1)
2586  04416 160001        LDA 1,I      SUBTRACT PROGRAM
2587  04417 003004        CMA,INA      SEQUENCE NUMBER FROM
2588  04420 040211        ADA TEMP3    S-BUFFER SEQUENCE NUMBER
2589  04421 002003        SZA,RSS      EQUAL?
2590  04422 026431        JMP FNDP2    YES, SET EXIT TO (P+3)
2591  04423 002020        SSA          NO, P-SEQ NO > S-SEQ NO ?
2592  04424 026432        JMP FNDP3    YES, SET EXIT TO (P+2)
2593  04425 060001        LDA 1        POINT (A) TO
2594  04426 002004        INA          PROGRAM ADDRESS INCREMENT
2595  04427 144000        ADB 0,I      COMPUTE NEW ADDRESS
2596  04430 026414        JMP FNDP1
2597  04431 036411  FNDP2 ISZ FNDPS
2598  04432 036411  FNDP3 ISZ FNDPS
2599  04433 074211  FNDP4 STB TEMP3    SAVE STATEMENT ADDRESS
2600  04434 126411        JMP FNDPS,I
2601**
2602***   DELETE SPACE IN PROGRAM  **
2603**
2604  04435 000000  CLPRG NOP          REFERENCE LOCATION IN TEMP3
2605  04436 040211        ADA TEMP3    SKIP (A) LOCATIONS FROM TEMP3
2606  04437 070212        STA TEMP4    AND SAVE DESTINATION ADDRESS
2607  04440 164001        LDB 1,I      SKIP TO END OF STATEMENT BEING
2608  04441 044211        ADB TEMP3    DELETED, SOURCE ADDRESS IN (B)
2609  04442 054122  CLPR1 CPB PBPTR    ALL OF PROGRAM MOVED?
2610  04443 026451        JMP CLPR2    YES
2611  04444 160001        LDA 1,I      NO, MOVE WORD FROM SOURCE TO
2612  04445 170212        STA TEMP4,I  DESTINATION ADDRESS
2613  04446 034212        ISZ TEMP4    INCREMENT DESTINATION ADDRESS
2614  04447 006004        INB          INCREMENT SOURCE ADDRESS
2615  04450 026442        JMP CLPR1
2616  04451 060212  CLPR2 LDA TEMP4    SET END-OF-PROGRAM
2617  04452 070122        STA PBPTR    POINTER
2618  04453 126435        JMP CLPRG,I
2619**
2620***   CHECK FOR PROGRAM SPACE OVERFLOW  **
2621**
2622  04454 000000  OVCHK NOP          NEW WORD REQUIREMENT IN (A)
2623  04455 064122        LDB PBPTR    SET SOURCE ADDRESS
2624  04456 074210        STB TEMP2    FOR PROGRAM RELOCATION
2625  04457 044000        ADB 0        SET DESTINATION
2626  04460 074212        STB TEMP4    ADDRESS
2627  04461 007004        CMB,INB      SUBTRACT FROM ADDRESS
2628  04462 044115        ADB LWAM
2629  04463 006020        SSB          NON-NEGATIVE RESULT?
2630  04464 124341        JMP FSCEF,I  NO, PROGRAM SPACE OVERFLOW
2631  04465 064212        LDB TEMP4    YES, RELOCATE FREE
2632  04466 074122        STB PBPTR    PROGRAM SPACE POINTER
2633  04467 126454        JMP OVCHK,I

2635                      HED  ** LIST THE PROGRAM**
2636*
2637***   LIST THE PROGRAM
2638*
2639  04470 064121  LIST  LDB PBUFF    INITIALIZE TO FIRST
2640  04471 074205        STB TEMPS    STATEMENT OF PROGRAM
2641  04472 015662        JSB GETCR    SEQUENCE NUMBER GIVEN?
2642  04473 026505        JMP LIST0
2643  04474 064116        LDB .BUFA    SET FOR
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2644  04475 074133         STB SBPTR    SEQUENCE NUMBER
2645  04476 114266         JSB INCHK,I  YES,
2646  04477 000532         DEF MAXSN    FETCH IT
2647  04500 160116         LDA .BUFA,I  LOAD SEQUENCE NUMBER
2648  04501 016411         JSB FNDPS    FIND INITIAL STATEMENT
2649  04502 124255         JMP RDYDA,I
2650  04503 000000         NOP          SAVE
2651  04504 074205         STB TEMPS    ADDRESS
2652  04505 006400  LIST0   CLB
2653  04506 054175         CPB STK18    CHECK PUNCH LAG
2654  04507 026512         JMP LIST1    NO
2655  04510 060442         LDA B133     YES, EMIT
2656  04511 114112         JSB WRITE,I
2657  04512 064205  LIST1   LDB TEMPS    MORE
2658  04513 054122         CPB PBPTR    PROGRAM?
2659  04514 026701         JMP LIS13    NO
2660  04515 003400         CCA          INITIALIZE
2661  04516 040120         ADA SBUFA    OUTPUT BUFFER
2662  04517 070125         STA BADDR    POINTER
2663  04520 002400         CLA          INITIALIZE
2664  04521 070126         STA CCNT     CHARACTER COUNT
2665  04522 160205         LDA TEMPS,I  OUTPUT
2666  04523 016713         JSB OUTIN    SEQUENCE NUMBER
2667  04524 060123         LDA BLANK    OUTPUT
2668  04525 015773         JSB OUTCR    BLANK
2669  04526 034205         ISZ TEMPS    FETCH
2670  04527 160205         LDA TEMPS,I  STATEMENT LENGTH
2671  04530 003004         CMA,INA      SET
2672  04531 002004         INA          WORD
2673  04532 070160         STA STK5
2674  04533 034205  LIST3   ISZ TEMPS    MORE
2675  04534 034160         ISZ STK5
2676  04535 026542         JMP LIST4    YES
2677  04536 064120  LIST2   LDB SBUFA    OUTPUT
2678  04537 060126         LDA CCNT
2679  04540 114112         JSB WRITE,I
2680  04541 026512         JMP LIST1
2681  04542 160205  LIST4   LDA TEMPS,I
2682  04543 010467         AND OPMSK
2683  04544 002003         SZA,RSS      NULL OPERATOR?
2684  04545 026566         JMP LIST5    YES
2685  04546 070210         STA TEMP2    NO, SAVE OPERATOR
2686  04547 001727         ALF,ALF      SINGLE
2687  04550 001100         ARS
2688  04551 064000         LDB 0
2689  04552 040515         ADA M21      OPERATOR?
2690  04553 002021         SSA,RSS
2691  04554 026670         JMP LIS12    NO
2692  04555 005000         BLS
2693  04556 006004         INB
2694  04557 044345         ADB FOPBS
2695  04560 160001         LDA 1,I      SYMBOL
2696  04561 001727         ALF,ALF      ADJUST
2697  04562 010445         AND MSK0     CHARACTER
2698  04563 050413         CPA .34      QUOTE MARK?
2699  04564 026707         JMP LIS14
2700  04565 015773         JSB OUTCR    NO
2701  04566 160205  LIST5   LDA TEMPS,I
2702  04567 010474         AND OPDMK    SAVE
2703  04570 070211         STA TEMP3    OPERAND
2704  04571 010472         AND TYPFL    EXTRACT OPERAND TYPE
2705  04572 070172         STA LFLAG    SET LFLAG FALSE
2706  04573 002020         SSA          FLAG BIT SET?
2707  04574 026630         JMP LIST9    YES
2708  04575 002003         SZA,RSS      NO, NULL OPERAND?
2709  04576 026533         JMP LIST3    YES
2710  04577 050402         CPA .15      FUNCTION?
2711  04600 026623         JMP LIST8    YES
2712  04601 040503  LIST6   ADA M5
2713  04602 002020         SSA          LETTER-DIGIT COMBINATION?
2714  04603 026606         JMP LIST7    NO
2715  04604 003400         CCA          YES, SET
2716  04605 070172         STA LFLAG    LFLAG FALSE
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2717  04606 060211  LIST7 LDA TEMP3
2718  04607 001727        ALF,ALF      RESTORE AND
2719  04610 001700        ALF
2720  04611 010443        AND B177     OUTPUT
2721  04612 040431        ADA B100
2722  04613 015773        JSB OUTCR    LETTER
2723  04614 034172        ISZ LFLAG    DIGIT FOLLOWS?
2724  04615 026533        JMP LIST3    NO
2725  04616 060211        LDA TEMP3    YES
2726  04617 010402        AND .15      RESTORE
2727  04620 040421        ADA .43      DIGIT
2728  04621 015773        JSB OUTCR    OUTPUT DIGIT
2729  04622 026533        JMP LIST3
2730  04623 060433  LIST8 LDA F        OUTPUT
2731  04624 015773        JSB OUTCR    'F'
2732  04625 060437        LDA N        OUTPUT
2733  04626 015773        JSB OUTCR    'N'
2734  04627 026606        JMP LIST7
2735  04630 020536  LIST9 XOR FLGBT
2736  04631 002102        CLE,SZA      NUMBER?
2737  04632 026647        JMP LIS10    NO
2738  04633 034205        ISZ TEMPS    YES,
2739  04634 070147        STA SIGN     SET SIGN FLAG FALSE
2740  04635 160205        LDA TEMPS,I
2741  04636 034205        ISZ TEMPS    OUTPUT
2742  04637 164205        LDB TEMPS,I
2743  04640 034160        ISZ STK5
2744  04641 034160        ISZ STK5
2745  04642 002020        SSA          NEGATIVE NUMBER?
2746  04643 002300        CCE          YES, SET SIGN FLAG TRUE
2747  04644 114270        JSB NUMOA,I
2748  04645 000000        NOP
2749  04646 026533        JMP LIST3
2750  04647 050372  LIS10 CPA .3       INTEGER?
2751  04650 026663        JMP LIS11    YES
2752  04651 050402        CPA .15      NO, FUNCTION?
2753  04652 002001        RSS          YES
2754  04653 026601        JMP LIST6    NO, MUST BE A PARAMETER
2755  04654 060211        LDA TEMP3    COMPUTE
2756  04655 001722        ALF,RAL      PRINT
2757  04656 010467        AND OPMSK    TABLE
2758  04657 070210        STA TEMP2    CODE
2759  04660 064366        LDB ATAB
2760  04661 016777        JSB MCOUT    OUTPUT FUNCTION NAME
2761  04662 026533        JMP LIST3
2762  04663 034205  LIS11 ISZ TEMPS    OUTPUT
2763  04664 034160        ISZ STK5
2764  04665 160205        LDA TEMPS,I  INTEGER
2765  04666 016713        JSB OUTIN
2766  04667 026533        JMP LIST3    OPERAND
2767  04670 060123  LIS12 LDA BLANK    OUTPUT
2768  04671 015773        JSB OUTCR    BLANK
2769  04672 064353        LDB STTYP
2770  04673 016777        JSB MCOUT    OUTPUT
2771  04674 060464        LDA REMOP
2772  04675 050210        CPA TEMP2    A REM?
2773  04676 026756        JMP OUTS1    YES, OUTPUT REMARK
2774  04677 060123        LDA BLANK    NO, OUTPUT
2775  04700 026565        JMP LIST5-1
2776  04701 006400  LIS13 CLB          HIGH-SPEED
2777  04702 054175        CPB STK18    PUNCH?
2778  04703 124255        JMP RDYDA,I
2779  04704 060442        LDA B133     YES, EMIT
2780  04705 114112        JSB WRITE,I
2781  04706 124255        JMP RDYDA,I
2782  04707 015773  LIS14 JSB OUTCR
2783  04710 016753        JSB OUTST
2784  04711 060413        LDA .34
2785  04712 026565        JMP LIST5-1
2786  04713 000000  OUTIN NOP          INTEGER IN (A)
2787  04714 064502        LDB M4       SET
2788  04715 074177        STB DIGCT    DIGIT COUNTER
2789  04716 067032        LDB LDVSR    SET DIVISOR
```

```
2790  04717 074200        STB DIVSR    ADDRESS
2791  04720 006400        CLB          SET LEADING
2792  04721 074201        STB LDZRO    ZERO FLAG
2793  04722 164200  OUT11  LDB DIVSR,I  NEGATE
2794  04723 007004        CMB,INB      AND STORE
2795  04724 074202        STB MIND     DIVISOR
2796  04725 007400        CCB          SET QUOTIENT
2797  04726 006004        INB          TO ZERO
2798  04727 040202        ADA MIND     SUBTRACT DIVISOR FROM INTEGER
2799  04730 002021        SSA,RSS      NEGATIVE RESULT?
2800  04731 026726        JMP *-3      NO, INCREMENT QUOTIENT
2801  04732 140200        ADA DIVSR,I  YES, RECOVER REMAINDER
2802  04733 072777        STA MCOUT    AND SAVE IT
2803  04734 060001        LDA 1
2804  04735 002002        SZA
2805  04736 026741        JMP OUT12
2806  04737 050201        CPA LDZRO
2807  04740 026744        JMP OUT13
2808  04741 040425  OUT12  ADA .48      NO, COMPUTE ASCII FOR DIGIT
2809  04742 070201        STA LDZRO    SET 'ZEROES SIGNIFICANT'
2810  04743 015773        JSB OUTCR    OUTPUT DIGIT
2811  04744 062777  OUT13  LDA MCOUT    RETRIEVE REMAINDER
2812  04745 034200        ISZ DIVSR    SET FOR NEXT DIVISOR
2813  04746 034177        ISZ DIGCT    DIVISION NECESSARY?
2814  04747 026722        JMP OUT11    YES
2815  04750 040425        ADA .48      NO, COMPUTE ASCII FOR LAST
2816  04751 015773        JSB OUTCR    DIGIT AND OUT PUT IT
2817  04752 126713        JMP OUTIN,I
2818  04753 000000  OUTST  NOP          " ENTRY POINT
2819  04754 062753        LDA OUTST    SAVE OUTST
2820  04755 070162        STA STK7
2821  04756 160205  OUTS1  LDA TEMPS,I
2822  04757 010443        AND B177
2823  04760 002002        SZA
2824  04761 015773        JSB OUTCR
2825  04762 034205        ISZ TEMPS
2826  04763 034160        ISZ STK5
2827  04764 002001        RSS
2828  04765 026536        JMP LIST2
2829  04766 160205        LDA TEMPS,I
2830  04767 001727        ALF,ALF      YES, POSITION IT
2831  04770 010443        AND B177     EXTRACT CHARACTER
2832  04771 050371        CPA .2
2833  04772 124162        JMP STK7,I
2834  04773 050372        CPA .3
2835  04774 124162        JMP STK7,I
2836  04775 015773        JSB OUTCR    NO, OUTPUT CHARACTER
2837  04776 026756        JMP OUTS1
2838  04777 000000  MCOUT  NOP
2839  05000 160001  MCOU1  LDA 1,I      LOAD INFORMATION WORD
2840  05001 010467        AND OPMSK    COMPARE WITH
2841  05002 050210        CPA TEMP2    OPERATOR CODE
2842  05003 027012        JMP MCOU2    EQUAL
2843  05004 160001        LDA 1,I      UNEQUAL,
2844  05005 010375        AND .7       COMPUTE
2845  05006 040372        ADA .3       ENTRY
2846  05007 001100        ARS          LENGTH
2847  05010 044000        ADB 0        COMPUTE ADDRESS OF NEXT ENTRY
2848  05011 027000        JMP MCOU1
2849  05012 160001  MCOU2  LDA 1,I      COMPUTE
2850  05013 010375        AND .7       ENTRY
2851  05014 003004        CMA,INA      LENGTH
2852  05015 070163        STA STK8
2853  05016 006104        CLE,INB      SET FOR FIRST CHARACTER
2854  05017 074211        STB TEMP3    SAVE SYMBOL ADDRESS
2855  05020 160211  MCOU3  LDA TEMP3,I  LOAD WORD
2856  05021 002041        SEZ,RSS      FIRST CHARACTER?
2857  05022 001727        ALF,ALF      YES, POSITION IT
2858  05023 010443        AND B177     EXTRACT CHARACTER
2859  05024 015773        JSB OUTCR    OUTPUT IT
2860  05025 002240        SEZ,CME      SET FOR NEXT CHARACTER
2861  05026 034211        ISZ TEMP3    MOVE TO NEXT WORD OF SYMBOL
2862  05027 034163        ISZ STK8
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2863  05030 027020        JMP MCOU3    YES
2864  05031 126777        JMP MCOUT,I
2865  05032 005033  LDVSR DEF *+1
2866  05033 023420        DEC 10000
2867  05034 001750        DEC 1000
2868  05035 000144        DEC 100
2869  05036 000012        DEC 10
2870  03461         SFLAG EQU ARRYS
2871  04231         TABLE EQU PRGIN
2872  00215         LNGTH EQU TEMPS+8
2873  04247         SMEND EQU INTCK
2874  04454         SLENG EQU OVCHK
2875  04411         TBLPT EQU FNDPS
2876  04435         TSPTR EQU CLPRG
2877  04454         INTGR EQU OVCHK
2878                      HED *** EXECUTE "RENUMBER" SYSTEM COMMAND ***
2879*
2880***   EXECUTE "RENUMBER" SYSTEMS COMMAND
2881*
2882  05037         RENUM BSS 0        ENTRY POINT OF RENUMBER
2883*
2884  05037 063141        LDA !INS1    SET UP
2885  05040 073075        STA &IN1     FOR
2886  05041 063142        LDA !INS2    PASS 1
2887  05042 073123        STA &IN2     AND
2888  05043 063143        LDA !INS3    PASS 2
2889  05044 073126        STA &IN3
2890  05045 064400        LDB .10
2891  05046 074206        STB LNUM     SET LINE NUMBER TO 10
2892  05047 064121        LDB PBUFF    SET ADDR TO FIRST WORD
2893  05050 074212        STB ADDR     ADDRESS OF USER'S PROGRAM
2894  05051 027060        JMP FASTM    FETCH A STATEMENT
2895*
2896***   SET UP CALL FOR NEXT STATEMENT
2897*
2898  05052 064212  NXSTM LDB ADDR     PUT ADDRESS IN B-REG
2899  05053 044210        ADB LNGT1    UPDATE BY PROG STMT LENGTH
2900  05054 074212        STB ADDR     RESET VALUE OF PROGRAM ADDRESS
2901  05055 060206        LDA LNUM     * UPDATE
2902  05056 040400        ADA .10      * LINE
2903  05057 070206        STA LNUM     * NUMBER
2904*
2905*
2906***   FETCH A STATEMENT ( OUTER LOOP )
2907*
2908  05060 054122  FASTM CPB PBPTR    END OF PROGRAM?
2909  05061 027132        JMP PASS3    YES - GO TO PASS 3 PROCESSOR
2910  05062 160001        LDA B,I      LOAD LINE # AND STORE
2911  05063 070207        STA LNUM.    FOR REFERENCE IN OUTER LOOP
2912  05064 006004        INB          INDEX (B) TO LENGTH ADR
2913  05065 160001        LDA B,I      LOAD STORE LENGTH
2914  05066 070210        STA LNGT1    SAVE LENGTH
2915*
2916***   CHECK LINE NUMBER
2917*
2918  05067 060206        LDA LNUM     LOAD X10 LINE NUMBER
2919  05070 050207        CPA LNUM.    DOES IT MATCH?
2920  05071 027052        JMP NXSTM    YES - GO TO NEXT STATEMENT
2921  05072 170212        STA ADDR,I   SET NEW LINE # IN STATEMENT
2922*
2923***   CHECK IF REFERENCED BY OTHER STATEMENT (INNER LOOP)
2924*
2925  05073 064121        LDB PBUFF    LOAD PROGRAM START ADDRESS
2926  05074 054122  LOOP2 CPB PBPTR    DONE?
2927  05075 027052  &IN1  JMP NXSTM    YES - RETURN TO OUTER LOOP
2928  05076 006004        INB          INDEX TO STORE LENGTH
2929  05077 074211        STB LNGT2    SAVE FOR INDEXING
2930  05100 006004        INB          INDEX TO OPERATIONS ADDRESS
2931  05101 160001        LDA B,I      LOAD OPERATION TYPE
2932  05102 010467        AND OPMSK    MASK TO OPERATIONS FIELD
2933  05103 001727        ALF,ALF      POSITION OPERATION CODE
2934  05104 001300        RAR
2935  05105 050410        CPA N37      "GOTO" STATEMENT ?
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2936  05106 027117        JMP PRCS     YES - PROCESS IT
2937  05107 050411        CPA N40      "IF-THEN" STATEMENT ?
2938  05110 027117        JMP PRCS     YES - PROCESS IT
2939  05111 050414        CPA N43      "GOSUB" STATEMENT ?
2940  05112 027117        JMP PRCS     YES - PROCESS IT
2941*
2942***   DOES NOT REFERENCE OUTER INSTRUCTION
2943*
2944  05113 007400  EXIT  CCB          SET B = -1
2945  05114 044211        ADB LNGT2    SET NEXT STATEMENT START ADR
2946  05115 144211        ADB LNGT2,I  INDEX BY STATEMENT LENGTH
2947  05116 027074        JMP LOOP2    CHECK NEXT STATEMENT
2948*
2949***   PROCESS "GOTO" "GOSUB" "IF-THEN" STATEMENTS
2950*
2951  05117 064500  PRCS  LDB M2       SET B = -2
2952  05120 044211        ADB LNGT2    INDEX BY CURRENT "AT" ADDRESS
2953  05121 144211        ADB LNGT2,I  INDEX BY STATEMENT LENGTH
2954  05122 160001        LDA B,I      LOAD INSTRUCTION DESTINATION
2955  05123 050207  &IN2  CPA LNUM.    SAME AS CURRENT STATEMENT?
2956  05124 002001        RSS          YES - UPDATE DESTINATION
2957  05125 027113        JMP EXIT     NO - TRY NEXT STATEMENT
2958*
2959  05126 060206  &IN3  LDA LNUM     * SET
2960  05127 003004        CMA,INA      * NEW
2961  05130 170001        STA B,I      * DESTINATION
2962  05131 027113        JMP EXIT     * ADDRESS
2963  05132 063144  PASS3 LDA !INS4
2964  05133 073075        STA &IN1     SET UP
2965  05134 063145        LDA !INS5    FOR
2966  05135 073123        STA &IN2     PASS 3
2967  05136 002400        CLA
2968  05137 073126        STA &IN3
2969  05140 027073        JMP LOOP2-1
2970*
2971  05141 027052  !INS1 JMP NXSTM
2972  05142 050207  !INS2 CPA LNUM.
2973  05143 060206  !INS3 LDA LNUM
2974  05144 124255  !INS4 JMP RDYDA,I
2975  05145 002020  !INS5 SSA
2976  00206         LNUM  EQU TEMPS+1
2977  00207         LNUM. EQU TEMPS+2
2978  00210         LNGT1 EQU TEMPS+3
2979  00211         LNGT2 EQU TEMPS+4
2980  00212         ADDR  EQU TEMPS+5
2981  00425         N60   EQU .48
2982  00410         N37   EQU .31
2983  00411         N40   EQU .32
2984  00414         N43   EQU .35
2985                      HED  PRE-EXECUTION PROCESSING
2986*
2987*                  **********************
2988*                  PHASE 2 OF THE COMPILER
2989*                  **********************
2990*
2991*                  THIS PHASE HAS THE FOLLOWING 3 FUNCTIONS:
2992*                  1. SYMBOL TABLE CONSTRUCTION
2993*                  2. FOR LOOP CHECKING
2994*                  3. ARRAY STORAGE ALLOCATION
2995*
2996  05146 060122  MFASE LDA PBPTR
2997  05147 050121        CPA PBUFF
2998  05150 124255        JMP RDYDA,I
2999  05151 070131        STA FCORE
3000  05152 060114        LDA FWAM
3001  05153 070216        STA COML     INITIALIZE COMMON POINTER
3002  05154 060117        LDA SYMTA
3003  05155 070132        STA SYMTF    INITIALIZE SYMBOL TABLE POINTER
3004  05156 060121        LDA PBUFF
3005  05157 070155        STA MPTR     INITIALIZE PROGRAM POINTER
3006  05160 164155  MLOP1 LDB MPTR,I
3007  05161 074124        STB .LNUM    SET LINE NUMBER
3008  05162 064155        LDB MPTR
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3009  05163 034155        ISZ MPTR
3010  05164 144155        ADB MPTR,I   COMPUTE LOCATION OF NEXT
3011  05165 074156        STB MNPTR    STATEMENT AND STORE THIS
3012  05166 034155        ISZ MPTR
3013  05167 160155        LDA MPTR,I   FETCH THE FIRST WORD IN THE
3014  05170 001100  MLO10  ARS
3015  05171 001727        ALF,ALF      PART TO DETERMINE THE TYPE OF
3016  05172 010430        AND .63      STATEMENT AND STORE
3017  05173 070142        STA TYPE
3018  05174 050423        CPA .46
3019  05175 027205        JMP MLO12
3020  05176 050407        CPA .30      IS THIS A REM STATEMENT
3021  05177 074155        STB MPTR
3022  05200 050421        CPA .43      IS THIS A PRINT STMT
3023  05201 074155        STB MPTR
3024  05202 003400        CCA
3025  05203 070217        STA MWDNO
3026  05204 027221        JMP MLOP2+1
3027  05205 060155  MLO12  LDA MPTR
3028  05206 002004        INA
3029  05207 160000        LDA 0,I      FETCH THE SECOND WORD IN THE STMT
3030  05210 027170        JMP MLO10
3031  05211 010450  MLO13  AND MSK1
3032  05212 064155        LDB MPTR
3033  05213 002003        SZA,RSS
3034  05214 044371        ADB .2
3035  05215 050372        CPA .3
3036  05216 006004        INB
3037  05217 074155        STB MPTR
3038  05220 034155  MLOP2  ISZ MPTR     INCREMENT PROGRAM POINTER
3039  05221 060155        LDA MPTR
3040  05222 050156        CPA MNPTR    HAS THE CURRENT STATEMENT
3041  05223 027301        JMP MLOP5
3042  05224 160155        LDA MPTR,I
3043  05225 002020        SSA
3044  05226 027211        JMP MLO13
3045  05227 010450        AND MSK1
3046  05230 002003        SZA,RSS
3047  05231 027220        JMP MLOP2
3048  05232 070205        STA MBOX1
3049  05233 010402        AND .15
3050  05234 050402        CPA .15
3051  05235 027310        JMP MLOP6
3052  05236 040502        ADA M4
3053  05237 002020        SSA
3054  05240 027327        JMP MLOP7
3055  05241 060205        LDA MBOX1
3056  05242 114301        JSB SSYMA,I
3057  05243 006021        SSB,RSS
3058  05244 027253        JMP MLOP3
3059  05245 060536        LDA MNEG
3060  05246 064537        LDB MNEG+1
3061  05247 070206        STA MBOX1+1
3062  05250 074207        STB MBOX1+2
3063  05251 060501        LDA M3
3064  05252 017510        JSB ESYMT
3065  05253 064142  MLOP3  LDB TYPE
3066  05254 060205        LDA MBOX1
3067  05255 054413        CPB .34
3068  05256 027270        JMP MLOP4
3069  05257 054412        CPB .33
3070  05260 034217        ISZ MWDNO
3071  05261 027220        JMP MLOP2
3072  05262 034131        ISZ FCORE
3073  05263 064131        LDB FCORE
3074  05264 054132        CPB SYMTF
3075  05265 027520        JMP MER8-1
3076  05266 170131        STA FCORE,I
3077  05267 027220        JMP MLOP2
3078  05270 064131  MLOP4  LDB FCORE
3079  05271 054122        CPB PBPTR
3080  05272 014544        JSB ERROR    IF NOT END ISSUE DIAGNOSTIC
3081  05273 150131  MER3   CPA FCORE,I
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3082  05274 002001        RSS          AS THE LAST FOR VARIABLE IN THE
3083  05275 027272        JMP MER3-1   FOR TABLE. NO, ERROR
3084  05276 044477        ADB M1       YES, DELETE LAST ENTRY FROM
3085  05277 074131        STB FCORE
3086  05300 027220        JMP MLOP2    THE POINTER AND GO TO PROCESS
3087  05301 050122  MLOP5  CPA PBPTR
3088  05302 002001        RSS
3089  05303 027160        JMP MLOP1
3090  05304 060142        LDA TYPE
3091  05305 050416        CPA .37
3092  05306 027416        JMP M1LOP
3093  05307 014544        JSB ERROR
3094  05310 160155  MLOP6  LDA MPTR,I
3095  05311 010467        AND OPMSK
3096  05312 050463        CPA DEFOP
3097  05313 002001        RSS
3098  05314 027220        JMP MLOP2    NO GO TO PROCESS NEXT WORD
3099  05315 060205        LDA MBOX1    SEARCH SYMBOL TABLE FOR
3100  05316 114301        JSB SSYMA,I
3101  05317 006021        SSB,RSS
3102  05320 014544        JSB ERROR    FOUND. ERROR MULTIPLY DEFINED
3103  05321 060155  MER4  LDA MPTR
3104  05322 040372        ADA .3       ENTER THE FUNCTION INTO THE
3105  05323 070206        STA MBOX1+1  SYMBOL TABLE TOGETHER WITH
3106  05324 060500        LDA M2       ITS ENTRY POINT IN THE SOURCE
3107  05325 017510        JSB ESYMT    CODE
3108  05326 027220        JMP MLOP2    GO TO PROCESS THE NEXT WORD
3109  05327 070001  MLOP7  STA 1
3110  05330 060142        LDA TYPE
3111  05331 050405        CPA .27
3112  05332 027344        JMP MLOP8    GO TO MLOP8
3113  05333 050406        CPA .28
3114  05334 027344        JMP MLOP8
3115  05335 017531        JSB MSYMT    LOOK UP IN SYMBOL TABLE
3116  05336 027220        JMP MLOP2    FOUND, GO TO PROCESS NEXT WORD
3117  05337 002400        CLA
3118  05340 070206        STA MBOX1+1  ENTER THE VARIABLE INTO THE
3119  05341 070207        STA MBOX1+2  SYMBOL TABLE WITH ITS STORAGE
3120  05342 070210        STA MBOX1+3  ALLOCATION, FORMAL AND ACTUAL
3121  05343 027377        JMP MLOP0
3122  05344 034155  MLOP8  ISZ MPTR     PROCESS COM OR DIM STMT
3123  05345 034155        ISZ MPTR
3124  05346 160155        LDA MPTR,I   PICK UP FIRST DIMENSION
3125  05347 001727        ALF,ALF      SHIFT M. S. PART OF WORD
3126  05350 054501        CPB M3       IS THIS A SINGLE DIMENSION ARRAY
3127  05351 027356        JMP *+5      YES, JUMP
3128  05352 034155        ISZ MPTR     OF SECOND DIMENSION AND PACK
3129  05353 034155        ISZ MPTR     NO, INDEX POINTER TO THE LOC,
3130  05354 130155        IOR MPTR,I
3131  05355 002001        RSS
3132  05356 030370        IOR .1
3133  05357 070207        STA MBOX1+2  SET UP TO STORE PACKED
3134  05360 070210        STA MBOX1+3  DIMENSIONS IN FORMAL AND ACTUAL
3135  05361 002400        CLA          SLOTS AND UNDEFINED FLAG IN
3136  05362 070206        STA MBOX1+1  STORAGE ALLOCATION SLOT
3137  05363 017531        JSB MSYMT    SEARCH SYMBOL TABLE
3138  05364 027402        JMP MLOP9    NOT FOUND, JUMP
3139  05365 060142        LDA TYPE
3140  05366 050406        CPA .28
3141  05367 002001        RSS
3142  05370 027377        JMP MLOP0
3143  05371 060207        LDA MBOX1+2
3144  05372 015404        JSB MDIM
3145  05373 064216        LDB COML
3146  05374 074206        STB MBOX1+1
3147  05375 044000        ADB 0
3148  05376 074216        STB COML
3149  05377 060502  MLOP0  LDA M4
3150  05400 017510        JSB ESYMT
3151  05401 027220        JMP MLOP2
3152  05402 044371  MLOP9  ADB .2
3153  05403 160001        LDA 1,I
3154  05404 002002        SZA
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3155  05405 014544        JSB ERROR
3156  05406 060142  MER5  LDA TYPE
3157  05407 050406        CPA .28       COM STMT?
3158  05410 124340        JMP ESYN3,I   ERROR MISPLACED COM STMT
3159  05411 060207        LDA MBOX1+2
3160  05412 170001        STA 1,I       STORE THESE DIMENSIONS IN FORMAL
3161  05413 006004        INB           AND ACTUAL SLOTS IN SYMBOL TABLE
3162  05414 170001        STA 1,I       ENTRY
3163  05415 027220        JMP MLOP2     GO TO PROCESS NEXT WORD
3164                      SKP
3165  05416 060131  M1LOP LDA FCORE
3166  05417 050122        CPA PBPTR
3167  05420 002001        RSS           IS THE FOR TABLE EMPTY
3168  05421 014544        JSB ERROR     NO, ERROR
3169  05422 064132  MER6  LDB SYMTF     CHECK THROUGH THE SYMBOL TABLE
3170  05423 054117  M2LOP CPB SYMTA
3171  05424 027475        JMP M4LOP
3172  05425 160001        LDA 1,I
3173  05426 010402        AND .15
3174  05427 044371        ADB .2
3175  05430 050402        CPA .15
3176  05431 027423        JMP M2LOP
3177  05432 006004        INB
3178  05433 040502        ADA M4
3179  05434 002025        SSA,INA,RSS
3180  05435 027423        JMP M2LOP
3181  05436 002003        SZA,RSS
3182  05437 014544        JSB ERROR     NO. OF DIMENSIONS UNSPECIFIED
3183  05440 002004  MER10 INA
3184  05441 070206        STA MBOX1+1   SET FLAG FOR NO. OF DIMENSIONS
3185  05442 074205        STB MBOX1     SAVE SYMBOL TABLE LOCATOR
3186  05443 160001        LDA 1,I       PICK UP DIMENSIONS
3187  05444 002002        SZA           DEFINED ?
3188  05445 027454        JMP M3LOP
3189  05446 063507        LDA STDIM     NO, LOAD FIRST STANDARD DIMENSION
3190  05447 034206        ISZ MBOX1+1   SKIP IF SINGLE DIMENSION
3191  05450 040377        ADA .9
3192  05451 170001        STA 1,I       STORE IN FORMAL AND ACTUAL
3193  05452 044477        ADB M1
3194  05453 170001        STA 1,I
3195  05454 015404  M3LOP JSB MDIM
3196  05455 070206        STA MBOX1+1   SAVE
3197  05456 064205        LDB MBOX1
3198  05457 044500        ADB M2
3199  05460 160001        LDA 1,I       PICK UP STORAGE ASSIGNMENT
3200  05461 002002        SZA           SKIP IF UNDEFINED
3201  05462 027473        JMP MER7
3202  05463 060131        LDA FCORE
3203  05464 170001        STA 1,I       STORAGE ASSIGNMENT SLOT
3204  05465 040206        ADA MBOX1+1
3205  05466 070131        STA FCORE
3206  05467 003004        CMA,INA
3207  05470 040132        ADA SYMTF     CHECK THAT THE ARRAY STORAGE
3208  05471 002020        SSA           DOES NOT OVERLAP THE SYMBOL
3209  05472 014544        JSB ERROR     TABLE IF SO GO TO ERROR
3210  05473 044372  MER7  ADB .3
3211  05474 027423        JMP M2LOP
3212  05475 064122  M4LOP LDB PBPTR
3213  05476 054131        CPB FCORE
3214  05477 124253        JMP FASE3,I
3215  05500 060536        LDA MNEG
3216  05501 170001        STA 1,I
3217  05502 006004        INB
3218  05503 060537        LDA MNEG+1
3219  05504 170001        STA 1,I
3220  05505 006004        INB
3221  05506 027476        JMP M4LOP+1
3222  05507 005001  STDIM OCT 5001
3223*                     ****************************
3224*                     ENTER SYMBOL TABLE SUBROUTINE
3225*                     ****************************
3226*
3227*                     THE SUBROUTINE IS CALLED WITH THE NEGATIVE OF THE
```

```
3228*                  ENTRY LENGTH IN A . THE ENTRY IS IN TEMPORARY
3229*                  LOCATIONS AND IS TRANSFERRED TO THE SYMBOL TABLE
3230*                  BY THE SUBROUTINE
3231*
3232  05510 000000  ESYMT NOP
3233  05511 070160        STA MBIN1    SAVE NEGATIVE OF LENGTH OF ENTRY
3234  05512 040132        ADA SYMTF
3235  05513 070132        STA SYMTF    MOVE SYMBOL TABLE START LOCATOR
3236  05514 070157        STA MBIN2    UP BY THE LENGTH OF ENTRY
3237  05515 003004        CMA,INA      CHECK THAT THE SYMBOL TABLE AND
3238  05516 040131        ADA FCORE
3239  05517 002021        SSA,RSS
3240  05520 014544        JSB ERROR    OVERLAP ERROR
3241  05521 064240  MER8  LDB MBUF     POINTER TO REQD ENTRY
3242  05522 160001        LDA 1,I      TRANSFER ENTRY TO THE SYMBOL
3243  05523 170157        STA MBIN2,I  TABLE
3244  05524 006004        INB
3245  05525 034157        ISZ MBIN2
3246  05526 034160        ISZ MBIN1
3247  05527 027522        JMP MER8+1
3248  05530 127510        JMP ESYMT,I  RETURN
3249                      SKP
3250*     ******************************************
3251*     SUBROUTINE TO SEARCH SYMBOL TABLE FOR AN ARRAY
3252*     ******************************************
3253**
3254  05531 000000  MSYMT NOP          B GIVES ARRAY TYPE -3 = 1 DIM,
3255  05532 074160        STB MBIN1    -2 = 2DIM, -1 = UNDIMENSIONED
3256  05533 060205        LDA MBOX1    LOAD IDENTIFIER
3257  05534 114301        JSB SSYMA,I
3258  05535 006021        SSB,RSS
3259  05536 127531        JMP MSYMT,I  FOUND, RETURN
3260  05537 034160        ISZ MBIN1    IF ARRAY UNDIMENSIONED
3261  05540 002001        RSS
3262  05541 027550        JMP MSYM     JUMP TO NOT FOUND EXIT
3263  05542 034160        ISZ MBIN1    SET UP TO CHECK THAT ARRAY DOES
3264  05543 040371        ADA .2       NOT APPEAR IN THE TABLE WITH
3265  05544 040477        ADA M1       DIFFERENT DIMENSIONS. CHANGE
3266  05545 114301        JSB SSYMA,I
3267  05546 006021        SSB,RSS      SEARCH AGAIN
3268  05547 014544        JSB ERROR    FOUND, INCONSISTENT DIMENSIONS
3269  05550 037531  MSYM  ISZ MSYMT    NOT FOUND, INCREMENT RETURN
3270  05551 127531        JMP MSYMT,I  ADDRESS AND RETURN
3271                      HED  ** EXECUTE THE PROGRAM  **
3272*
3273*     PHASE 3 OF THE COMPILER - PROGRAM EXECUTION
3274*
3275  05552 000000  FORMX NOP          FORMULA BEGINS IN (TEMPS)
3276  05553 067552        LDB FORMX
3277  05554 074233        STB FORM&
3278  05555 006400        CLB          INITIALIZE OPERATOR
3279  05556 015535        JSB SLWST    STACK
3280  05557 160205  FORM1 LDA TEMPS,I  FETCH OPERAND
3281  05560 034205        ISZ TEMPS    SET FOR NEXT WORD OF FORMULA
3282  05561 010474        AND OPDMK    EXTRACT OPERAND
3283  05562 070213        STA TEMPS+6    AND SAVE IT
3284  05563 002003        SZA,RSS      NULL OPERAND?
3285  05564 027577        JMP FORM2    YES
3286  05565 015544        JSB BHSTP    SET STACK FOR OPERAND ADDRESS
3287  05566 002020        SSA          FLAG BIT SET?
3288  05567 027646        JMP FORM4    YES
3289  05570 114301        JSB SSYMA,I
3290  05571 006007        INB,SZB,RSS
3291  05572 124337        JMP E8M1A,I  NO
3292  05573 010402        AND .15      YES
3293  05574 050402        CPA .15      FUNCTION?
3294  05575 027661        JMP FORM6
3295  05576 174137        STB HSTPT,I  NO, STACK OPERAND ADDRESS
3296  05577 160205  FORM2 LDA TEMPS,I  FETCH
3297  05600 010467        AND OPMSK    OPERATOR
3298  05601 001727        ALF,ALF      POSITION IT
3299  05602 064000        LDB 0
3300  05603 044345        ADB FOPBS    NO, LOAD OPERATOR
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3301  05604 040506        ADA M8       NON-FORMULA
3302  05605 002020        SSA          OPERATOR?
3303  05606 006400        CLB          YES
3304  05607 040520        ADA D53      NO, NON-FORMULA
3305  05610 002021        SSA,RSS      OPERATOR?
3306  05611 006400        CLB          YES
3307  05612 002400        CLA          NO
3308  05613 160001        LDA 1,I      INFORMATION WORD
3309  05614 010450        AND MSK1     SAVE
3310  05615 070214        STA TEMPS+7
3311  05616 120001        XOR 1,I      SAVE
3312  05617 001100        ARS
3313  05620 070213        STA TEMPS+6  IDENTIFICATION
3314  05621 027627        JMP FOR11
3315  05622 170135  FORM0 STA TSTPT,I  STACK HIGH WORD
3316  05623 060135        LDA TSTPT    STACK OPERAND
3317  05624 170137        STA HSTPT,I  ADDRESS
3318  05625 002004        INA          STORE
3319  05626 174000        STB 0,I      LOW WORD
3320  05627 160136  FOR11 LDA LSTPT,I  DOES OPERATOR
3321  05630 010445        AND MSK0     ON TOP OF
3322  05631 003000        CMA          OPERATOR STACK
3323  05632 040214        ADA TEMPS+7  HAVE HIGHER
3324  05633 002020        SSA          PRECEDENCE?
3325  05634 027761        JMP FORM9    YES, EXECUTE IF
3326  05635 002001        RSS          NO
3327  05636 034136  FOR10 ISZ LSTPT
3328  05637 064214        LDB TEMPS+7  RETRIEVE PRECEDENCE
3329  05640 044512        ADB M15      NO, LEFT PARENTHESIS
3330  05641 006020        SSB          OR LEFT BRACKET?
3331  05642 044402        ADB .15      NO, RESTORE PRECEDENCE
3332  05643 044213        ADB TEMPS+6  COMBINE IDENTIFICATION
3333  05644 015535        JSB SLWST    WITH PRECEDENCE AND STACK
3334  05645 027557        JMP FORM1
3335  05646 050536  FORM4 CPA FLGBT
3336  05647 027655        JMP FORM5    YES
3337  05650 010402        AND .15      NO, PRE-DEFINED
3338  05651 050402        CPA .15      FUNCTION
3339  05652 027736        JMP FORM7    YES
3340  05653 064216        LDB TEMPS+9  NO, MUST BE A
3341  05654 027576        JMP FORM2-1  PARAMETER
3342  05655 064205  FORM5 LDB TEMPS    LOAD CONSTANT ADDRESS
3343  05656 034205        ISZ TEMPS    MOVE POINTER TO
3344  05657 034205        ISZ TEMPS    NEXT CODE WORD
3345  05660 027576        JMP FORM2-1
3346  05661 074213  FORM6 STB TEMPS+6
3347  05662 064135        LDB TSTPT
3348  05663 015535        JSB SLWST
3349  05664 164213        LDB TEMPS+6,I
3350  05665 015535        JSB SLWST
3351  05666 060233        LDA FORM&
3352  05667 170137        STA HSTPT,I  ADDRESS ON OPERHAND STACK
3353  05670 017552        JSB FORMX    EVALUATE PARAMETER
3354  05671 034205        ISZ TEMPS    UPDATE
3355  05672 034205        ISZ TEMPS    FORMULA POINTER
3356  05673 060205        LDA TEMPS
3357  05674 164136        LDB LSTPT,I
3358  05675 074205        STB TEMPS
3359  05676 170136        STA LSTPT,I
3360  05677 064216        LDB TEMPS+9
3361  05700 160137        LDA HSTPT,I
3362  05701 034136        ISZ LSTPT
3363  05702 034137        ISZ HSTPT
3364  05703 174136        STB LSTPT,I
3365  05704 070216        STA TEMPS+9
3366  05705 050135        CPA TSTPT
3367  05706 015604        JSB RSCHK
3368  05707 017552        JSB FORMX
3369  05710 160136        LDA LSTPT,I
3370  05711 070216        STA TEMPS+9
3371  05712 060136        LDA LSTPT
3372  05713 040501        ADA M3
3373  05714 070136        STA LSTPT
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3374  05715 002004        INA
3375  05716 164000        LDB 0,I
3376  05717 074135        STB TSTPT
3377  05720 002004        INA
3378  05721 164000        LDB 0,I
3379  05722 074205        STB TEMPS
3380  05723 015553        JSB STTOP
3381  05724 170135  FOR12  STA TSTPT,I  STORE HIGH WORD
3382  05725 060135        LDA TSTPT    STACK
3383  05726 002004        INA          STORE
3384  05727 174000        STB 0,I      LOW WORD
3385  05730 034137        ISZ HSTPT    UNSTACK
3386  05731 164137        LDB HSTPT,I  LOAD 'RESULT' ADDRESS
3387  05732 074233        STB FORM&
3388  05733 040477        ADA M1
3389  05734 170137        STA HSTPT,I
3390  05735 027577        JMP FORM2
3391  05736 060213  FORM7  LDA TEMPS+6
3392  05737 001727        ALF,ALF
3393  05740 001700        ALF
3394  05741 010410        AND .31
3395  05742 040351        ADA PDFBS
3396  05743 164000        LDB 0,I
3397  05744 015535        JSB SLWST
3398  05745 060233        LDA FORM&
3399  05746 170137        STA HSTPT,I
3400  05747 017552        JSB FORMX
3401  05750 034205        ISZ TEMPS
3402  05751 034205        ISZ TEMPS
3403  05752 164136        LDB LSTPT,I
3404  05753 003400        CCA
3405  05754 040136        ADA LSTPT
3406  05755 070136        STA LSTPT
3407  05756 077510        STB ESYMT
3408  05757 015553        JSB STTOP
3409  05760 127510        JMP ESYMT,I
3410  05761 160136  FORM9  LDA LSTPT,I  UNSTACK
3411  05762 007400        CCB          OPERATOR
3412  05763 044136        ADB LSTPT    INFORMATION
3413  05764 074136        STB LSTPT    WOSD
3414  05765 001727        ALF,ALF      COMPUTE
3415  05766 010443        AND B177     SUBROUTINE
3416  05767 040350        ADA ARBAS    ADDRESS
3417  05770 124000        JMP 0,I      EXECUTE
3418*
3419***   EXECUTION BRANCH TABLE
3420*
3421  05771 006216  XECTB DEF ELET     LET
3422  05772 006054        DEF XEC4     DIM
3423  05773 006054        DEF XEC4     COM
3424  05774 006054        DEF XEC4     DEF
3425  05775 006054        DEF XEC4     REM
3426  05776 006220        DEF EGOTO    GO TO
3427  05777 006224        DEF EIF      IF
3428  06000 006232        DEF EFOR     FOR
3429  06001 006325        DEF ENEXT    NEXT
3430  06002 006367        DEF EGOSB    GOSUB
3431  06003 006400        DEF ERTRN    RETURN
3432  06004 100255        DEF RDYDA,I
3433  06005 100255        DEF RDYDA,I
3434  06006 100255        DEF RDYDA,I
3435  06007 100255        DEF RDYDA,I
3436  06010 006054        DEF XEC4     DATA
3437  06011 006410        DEF EREAD    READ
3438  06012 006445        DEF EPRIN    PRINT
3439  06013 006632        DEF EINPT    INPUT
3440  06014 006651        DEF ERSTR    RESTORE
3441  06015 011445        DEF EMAT     MAT

3443***   EXECUTE THE PROGRAM
3444*
3445*
3446**
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3447***  INITIALIZE FOR OUTPUT  **
3448**
3449  06016 002400  XEC   CLA          SET COUNTER FOR
3450  06017 070142        STA TYPE       CHARACTERS OUTPUTTED
3451  06020 070151        STA XH       INITIALIZE
3452  06021 002004        INA          RANDOM
3453  06022 070152        STA XL       VARIABLE
3454**
3455***  INITIALIZE THE DATA POINTER **
3456**
3457  06023 003400        CCA
3458  06024 070145        STA DCCNT      -NO
3459  06025 070143        STA DSTRT        DATA-
3460  06026 064121        LDB PBUFF       CONDITION
3461  06027 074144        STB NXTDT
3462  06030 160361        LDA ADATA,I  SEARCH
3463  06031 016120        JSB STSRH        DATA STAREMENT
3464  06032 026035        JMP XEC2
3465  06033 074143        STB DSTRT    SAVE STATEMENT LOCATION
3466  06034 016107        JSB SETDP    SET DATA POINTER
3467**
3468***  INITIALIZE STACK POINTERS **
3469**
3470  06035 064132  XEC2  LDB SYMTF    INITIALIZE
3471  06036 074137        STB HSTPT      POINTERS TO
3472  06037 064131        LDB FCORE      -HIGH CORE- STACK,
3473  06040 074135        STB TSTPT        -TEMPORARY-
3474  06041 044403        ADB .23
3475  06042 074134        STB LSTAK
3476  06043 074136        STB LSTPT             STACK
3477  06044 007000        CMB
3478  06045 044137        ADB HSTPT
3479  06046 006020        SSB
3480  06047 025541        JMP E1
3481  06050 002404        CLA,INA      SET EXECUTION FLAG=1
3482  06051 114104        JSB SEXU,I
3483  06052 064121        LDB PBUFF BEGIN
3484  06053 026065        JMP XEC5         EXECUTION
3485**
3486*** FIND NEXT STATEMENT TO BE EXECUTED **
3487**
3488  06054 124103  XEC4  JMP MONIT,I
3489  06055 060141  XEC4. LDA NXTST    NEXT STATEMENT NUMBER
3490  06056 064140        LDB PRADD     PROSPECTIVE ADDRESS
3491  06057 150001        CPA 1,I       DESIRED STATEMENT?
3492  06060 026066        JMP XEC6      YES
3493  06061 064121        LDB PBUFF     NO, FIND
3494  06062 114263        JSB FNDPA,I
3495  06063 000000        NOP          NON-EXISTENT
3496  06064 014544        JSB ERROR      STATEMENT
3497  06065 160001  XEC5  LDA 1,I      SAVE NEW
3498  06066 070124  XEC6  STA .LNUM      SEQUENCE NUMBER
3499**
3500***  SET SUCCESSOR STATEMENT **
3501**
3502  06067 016162        JSB FLWST
3503  06070 010467        AND OPMSK    EXTRACT STATEMENT TYPE
3504  06071 001727        ALF,ALF      POSITION
3505  06072 001300        RAR            IT
3506  06073 040347        ADA XECBR    COMPUTE EXEXUTION ADDRESS
3507  06074 124000        JMP 0,I      BRANCH TO EXECUTION ADDRESS
3508**
3509*** EVALUATE FORMULA AND RETURN RESULT **
3510**
3511  06075 000000  FETCH NOP
3512  06076 066075        LDB FETCH
3513  06077 074156        STB STK3
3514  06100 114303        JSB FORMA,I  EVALUATE FORMULA
3515  06101 015563        JSB OPCHK
3516  06102 034137        ISZ HSTPT    UNSTACK RESULT ADDRESS
3517  06103 160001        LDA 1,I      LOAD (A) WITH HIGH MANTISSA
3518  06104 006004        INB          LOAD LOW PART
3519  06105 164001        LDB 1,I        OF RESULT INTO (B)
```

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3520  06106 124156        JMP STK3,I
3521**
3522*** SET POINTER TO START OF DATA STATEMENT **
3523**
3524  06107 000000  SETDP NOP          STATEMENT ADDRESS IN (B)
3525  06110 006004        INB          LOAD
3526  06111 160001        LDA 1,I        STATEMENT LENGTH
3527  06112 003004        CMA,INA      SET
3528  06113 002004        INA            DATA COUNTER
3529  06114 070145        STA DCCNT         TO 1-STATEMENT LENGTH
3530  06115 006004        INB          SET -NEXT DATA- POINTER ONE
3531  06116 074144        STB NXTDT      WORD ABOVE FIRST CONSTANT
3532  06117 126107        JMP SETDP,I
3533**
3534*** SEARCH FOR STATEMENT OF GIVEN TYPE **
3535**
3536  06120 000000  STSRH NOP          TYPE IN (A), ADDRESS IN (B)
3537  06121 010467        AND OPMSK    EXTRACT
3538  06122 070212        STA TEMP4      STATEMENT TYPE
3539  06123 060001  STSR1 LDA 1        EXTRACT
3540  06124 040371        ADA .2         PROGRAM
3541  06125 160000        LDA A,I
3542  06126 010467        AND OPMSK            TYPE
3543  06127 050212        CPA TEMP4    DESIRED TYPE?
3544  06130 026137        JMP STSR2    YES
3545  06131 060001        LDA 1        NO, FETCH
3546  06132 002004        INA            STATEMENT LENGTH
3547  06133 144000        ADB 0,I
3548  06134 054122        CPB PBPTR    PAST LAST STATEMENT?
3549  06135 126120        JMP STSRH,I  YES
3550  06136 026123        JMP STSR1    NO
3551  06137 036120  STSR2 ISZ STSRH
3552  06140 126120        JMP STSRH,I
3553**
3554*** FETCH A DATA ITEM **
3555**
3556  06141 000000  FDATA NOP
3557  06142 034145  FDAT1 ISZ DCCNT    MORE DATA?
3558  06143 026152        JMP FDAT2    YES
3559  06144 160361        LDA ADATA,I  NO, SEARCH
3560  06145 064144        LDB NXTDT      FOR NEXT
3561  06146 016120        JSB STSRH
3562  06147 014544        JSB ERROR    NONE FOUND
3563  06150 016107  E4    JSB SETDP    INITIALIZE THE
3564  06151 026142        JMP FDAT1      DATA POINTERS
3565  06152 034145  FDAT2 ISZ DCCNT    UPDATE
3566  06153 034145        ISZ DCCNT      POINTER
3567  06154 034144        ISZ NXTDT
3568  06155 160144        LDA NXTDT,I  LOAD
3569  06156 034144        ISZ NXTDT      DATA
3570  06157 164144        LDB NXTDT,I      ITEM
3571  06160 034144        ISZ NXTDT    UPDATE POINTER
3572  06161 126141        JMP FDATA,I
3573**
3574***  SET FOR FOLLOWING STATEMENT  **
3575**
3576  06162 000000  FLWST NOP          (B) HOLDS PRESENT ADDRESS
3577  06163 060001        LDA 1        COMPUTE
3578  06164 002004        INA            ADDRESS
3579  06165 160000        LDA 0,I
3580  06166 040001        ADA 1               NEXT
3581  06167 070140        STA PRADD             STATEMENT
3582  06170 160000        LDA 0,I      RECORD THE
3583  06171 070141        STA NXTST      SEQUENCE NUMBER
3584  06172 044371        ADB .2       FETCH
3585  06173 074205        STB TEMPS      FIRST WORD
3586  06174 160001        LDA 1,I          OF CURRENT
3587  06175 126162        JMP FLWST,I      STATEMENT
3588**
3589*** SEARCH STACK FOR GIVEN FOR-VARIABLE **
3590**
3591  06176 000000  FVSRH NOP
3592  06177 160205        LDA TEMPS,I  FETCH
```

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3593  06200 010450        AND MSK1       FOR-VARIABLE
3594  06201 070155        STA STK2
3595  06202 114301        JSB SSYMA,I
3596  06203 006004        INB            SYMBOL TABLE
3597  06204 060137        LDA HSTPT
3598  06205 070211        STA TEMP3      STACK TOP
3599  06206 050132  FVSR1 CPA SYMTF     STACK BOTTOM?
3600  06207 126176        JMP FVSRH,I    YES, EXIT VIA (P.1)
3601  06210 154000        CPB 0,I
3602  06211 026214        JMP FVSR2      YES
3603  06212 040374        ADA .6         NO, MOVE TO
3604  06213 026206        JMP FVSR1        NEXT STACK ENTRY
3605  06214 036176  FVSR2 ISZ FVSRH      EXIT
3606  06215 126176        JMP FVSRH,I    VIA (P.2)
3607*
3608***   EXECUTE LET
3609*
3610  06216 114303  ELET  JSB FORMA,I
3611  06217 026054        JMP XEC4
3612**
3613***   EXECUTE GOTO
3614**
3615  06220 006004  EGOTO INB            LOAD SEQUENCE
3616  06221 160001        LDA 1,I          NUMBER
3617  06222 070141        STA NXTST      RECORD FOR EXECUTION
3618  06223 026054        JMP XEC4       RETURN TO MONITOR
3619*
3620***   EXECUTE IF
3621*
3622  06224 114302  EIF   JSB FETCA,I    FETCH VALUE OF FORMULA
3623  06225 002003        SZA,RSS        RESULTANT TRUE?
3624  06226 026054        JMP XEC4       NO
3625  06227 034205        ISZ TEMPS      YES, BRANCH TO
3626  06230 064205        LDB TEMPS        FOLLOWING
3627  06231 026220        JMP EGOTO          SEQUENCE NUMBER
3628*
3629***   EXECUTE FOR
3630*
3631  06232 016176  EFOR  JSB FVSRH      FOR-VARIABLE ALREADY IN STACK?
3632  06233 026243        JMP EFOR1      NO
3633  06234 070210        STA TEMP2      YES, SAVE SOURCE ADDRESS
3634  06235 040374        ADA .6         SAVE
3635  06236 070212        STA TEMP4        DESTINATION ADDRESS
3636  06237 074207        STB TEMP1      SAVE FOR-VARIABLE ADDRESS
3637  06240 014627        JSB MVTOH      COMPRESS STACK
3638  06241 064207        LDB TEMP1      RESTORE FOR-VARIABLE ADDRESS
3639  06242 002401        CLA,RSS
3640  06243 060504  EFOR1 LDA M6             TOP OF
3641  06244 040137        ADA HSTPT          FOR-STACK
3642  06245 070137        STA HSTPT            POINTER
3643  06246 070207        STA TEMP1
3644  06247 003004        CMA,INA        STACK
3645  06250 040136        ADA LSTPT
3646  06251 002021        SSA,RSS          OVERFLOW?
3647  06252 025541        JMP E1         YES
3648  06253 174207        STB TEMP1,I    NO, RECORD FOR-VARIABLE ADDRESS
3649  06254 114303        JSB FORMA,I    INITIALIZE FOR-VARIABLE
3650  06255 034205        ISZ TEMPS
3651  06256 034207        ISZ TEMP1      SAVE
3652  06257 060207        LDA TEMP1        LIMIT
3653  06260 072353        STA ENEX2          ADDRESS
3654  06261 114302        JSB FETCA,I    FETCH
3655  06262 170207        STA TEMP1,I      AND
3656  06263 034207        ISZ TEMP1          STORE
3657  06264 174207        STB TEMP1,I          LIMIT
3658  06265 034207        ISZ TEMP1
3659  06266 064500        LDB M2         SET FOR STEP SIZE
3660  06267 076141        STB FDATA        SIGN CHECK
3661  06270 160205        LDA TEMPS,I
3662  06271 002002        SZA
3663  06272 026276        JMP EFOR2      FOUND
3664  06273 060534        LDA HONE       NOT FOUND,
3665  06274 064371        LDB .2           DEFAULT
```

```
3666  06275 002001        RSS              IS 1.0
3667  06276 114302  EFOR2 JSB FETCA,I
3668  06277 002020        SSA          STEP SIZE NEGATIVE?
3669  06300 036141        ISZ FDATA    YES
3670  06301 170207        STA TEMP1,I  SAVE
3671  06302 034207        ISZ TEMP1    SET POINTER
3672  06303 174207        STB TEMP1,I      SIZE
3673  06304 034207        ISZ TEMP1      STEP
3674  06305 060141        LDA NXTST      TO STATEMENT
3675  06306 170207        STA TEMP1,I       FOLLOWING THE FOR
3676  06307 160360  EFOR3 LDA ANEXT,I  FIND
3677  06310 064140        LDB PRADD      -NEXT-
3678  06311 016120        JSB STSRH         STATEMENT
3679  06312 000000        NOP
3680  06313 016162        JSB FLWST    FIND FOLLOWING STATEMENT
3681  06314 010450        AND MSK1     SAME
3682  06315 050155        CPA STK2
3683  06316 002001        RSS          YES
3684  06317 026307        JMP EFOR3    NO
3685  06320 164137        LDB HSTPT,I  LOAD
3686  06321 160001        LDA 1,I        VALUE
3687  06322 006004        INB              OF
3688  06323 164001        LDB 1,I            FOR-VARIABLE
3689  06324 026352        JMP ENEX2-1  CHECK ACCEPTABILITY
3690*
3691***   EXECUTE NEXT
3692*
3693  06325 016176  ENEXT JSB FVSRH    FIND CORRESPONDING STACK ENTRY
3694  06326 026054        JMP XEC4     NONE PRESENT
3695  06327 070137        STA HSTPT    RESET TOP OF STACK
3696  06330 076346        STB ENEX1
3697  06331 002004        INA          SAVE LIMIT
3698  06332 072353        STA ENEX2    ADDRESS
3699  06333 040371        ADA .2       SAVE STEP SIZE
3700  06334 070207        STA TEMP1      ADDRESS
3701  06335 064500        LDB M2       SET STEP SIZE
3702  06336 076141        STB FDATA    SIGN CHECK
3703  06337 160207        LDA TEMP1,I  LOAD
3704  06340 034207        ISZ TEMP1    STEP
3705  06341 164207        LDB TEMP1,I
3706  06342 034207        ISZ TEMP1
3707  06343 002020        SSA          CHECK
3708  06344 036141        ISZ FDATA    SIGN
3709  06345 017340        JSB .FAD     INCREMENT
3710  06346 000000  ENEX1 NOP          FOR-VARIABLE
3711  06347 172346        STA ENEX1,I
3712  06350 036346        ISZ ENEX1    SAVE
3713  06351 176346        STB ENEX1,I  VALUE
3714  06352 017346        JSB .FSB     COMPUTE FOR-VARIABLE-LIMIT
3715  06353 000000  ENEX2 NOP
3716  06354 036141        ISZ FDATA    POSITIVE STEP SIZE?
3717  06355 001600        ELA          YES, COMPLEMENT SIGN
3718  06356 002020        SSA          NO, NON-NEGATIVE RESULT?
3719  06357 026363        JMP ENEX3    NO
3720  06360 160207        LDA TEMP1,I  YES,GO TO FIRST
3721  06361 070141        STA NXTST
3722  06362 026054        JMP XEC4
3723  06363 060137  ENEX3 LDA HSTPT    FAILS,
3724  06364 040374        ADA .6       ERASE
3725  06365 070137        STA HSTPT    STACK
3726  06366 026054        JMP XEC4
3727*
3728***   EXECUTE GOSUB
3729*
3730  06367 006004  EGOSB INB          LOAD (A) WITH
3731  06370 160001        LDA 1,I        SEQUENCE NUMBER
3732  06371 064141        LDB NXTST    LOAD (B) WITH
3733  06372 070141        STA NXTST    RETURN SEQUENCE NUMBER
3734  06373 015535        JSB SLWST    STACK RETURN ON LOW-CORE STACK
3735  06374 040510        ADA M10      GOSUBS NESTED
3736  06375 050134        CPA LSTAK
3737  06376 014544        JSB ERROR    YES
3738  06377 026054  E2    JMP XEC4     NO
```

```
3739*
3740***   EXECUTE RETURN
3741*
3742  06400 064136  ERTRN LDB LSTPT    RETURN STACK
3743  06401 054134        CPB LSTAK    EMPTY?
3744  06402 014544        JSB ERROR    YES
3745  06403 160136  E3    LDA LSTPT,I  NO, LOAD RETURN ADDRESS
3746  06404 070141        STA NXTST    STORE FOR EXECUTION
3747  06405 044477        ADB M1       RESET
3748  06406 074136        STB LSTPT    STACK POINTER
3749  06407 026054        JMP XEC4     RETURN TO THE MONITOR
3750*
3751***   EXECUTE READ
3752*
3753  06410 054140  EREAD CPB PRADD    END-OF-STATEMENT?
3754  06411 026054        JMP XEC4     YES
3755  06412 114303        JSB FORMA,I  NO, EVALUATE NEXT ADDRESS
3756  06413 160137        LDA HSTPT,I  RECORD
3757  06414 070157        STA STK4
3758  06415 016141        JSB FDATA
3759  06416 170157        STA STK4,I
3760  06417 034157        ISZ STK4
3761  06420 174157        STB STK4,I
3762  06421 034137        ISZ HSTPT
3763  06422 064205        LDB TEMPS
3764  06423 006004        INB
3765  06424 026410        JMP EREAD
3766**
3767***   INITIALIZE FOR PRINT  **
3768**
3769  06425 000000  PRNIN NOP
3770  06426 002400        CLA
3771  06427 114104        JSB SEXU,I
3772  06430 003400        CCA          INITIALIZE
3773  06431 040116        ADA .BUFA    BUFFER
3774  06432 070125        STA BADDR    POINTER
3775  06433 060142        LDA TYPE     INITIALIZE
3776  06434 003004        CMA,INA      -CHARACTERS OUTPUTTED-
3777  06435 070126        STA CCNT     COUNTER
3778  06436 002011        SLA,RSS      START ON ODD CHARACTER POSITION?
3779  06437 126425        JMP PRNIN,I  NO
3780  06440 040477        ADA M1       YES, BIAS
3781  06441 070126        STA CCNT     COUNTER
3782  06442 002400        CLA          OUTPUT A
3783  06443 015773        JSB OUTCR    NULL CHARACTER
3784  06444 126425        JMP PRNIN,I
3785*
3786***   EXECUTE PRINT
3787*
3788  06445 016425  EPRIN JSB PRNIN    SET FOR PRINT
3789  06446 002400        CLA
3790  06447 026454        JMP EPRI1+1
3791  06450 002400  EPRI0 CLA
3792  06451 050153        CPA EOL
3793  06452 015730        JSB EDELM
3794  06453 003400  EPRI1 CCA
3795  06454 070153        STA EOL
3796  06455 160205        LDA TEMPS,I
3797  06456 010474        AND OPDMK
3798  06457 002002        SZA
3799  06460 026500        JMP EPRI3
3800  06461 034205  EPRI2 ISZ TEMPS
3801  06462 064205        LDB TEMPS
3802  06463 054140        CPB PRADD
3803  06464 026544        JMP EPRI7
3804  06465 160205        LDA TEMPS,I
3805  06466 010467        AND OPMSK
3806  06467 050452        CPA B2000
3807  06470 026450        JMP EPRI0
3808  06471 050453        CPA B3000    NO, SEMICOLON?
3809  06472 026453        JMP EPRI1
3810  06473 050451        CPA B1000    NO, QUOTE?
3811  06474 026515        JMP EPRI4    YES
```

```
3812  06475 003400        CCA
3813  06476 040205        ADA TEMPS
3814  06477 070205        STA TEMPS
3815  06500 003400  EPRI3     CCA
3816  06501 070153        STA EOL
3817  06502 002404        CLA,INA
3818  06503 114104        JSB SEXU,I
3819  06504 114302        JSB FETCA,I
3820  06505 071711        STA ENOUT
3821  06506 002400        CLA
3822  06507 114104        JSB SEXU,I
3823  06510 061711        LDA ENOUT
3824  06511 034153        ISZ EOL
3825  06512 026461        JMP EPRI2
3826  06513 015711        JSB ENOUT
3827  06514 026461        JMP EPRI2
3828  06515 002400  EPRI4 CLA
3829  06516 070153        STA EOL
3830  06517 070160        STA STK5
3831  06520 070157        STA STK4
3832  06521 160001  EPRI5 LDA 1,I
3833  06522 010445        AND MSK0
3834  06523 002003        SZA,RSS
3835  06524 026535        JMP EPRI6
3836  06525 034157        ISZ STK4
3837  06526 006004        INB          QUOTE
3838  06527 160001        LDA 1,I
3839  06530 010467        AND OPMSK
3840  06531 050451        CPA B1000
3841  06532 026535        JMP EPRI6
3842  06533 034157        ISZ STK4
3843  06534 026521        JMP EPRI5
3844  06535 064157  EPRI6 LDB STK4
3845  06536 044126        ADB CCNT     WILL LINE
3846  06537 044524        ADB M73
3847  06540 006021        SSB,RSS      CHARACTERS?
3848  06541 015753        JSB OUTLN    YES, GET FRESH LINE
3849  06542 114273        JSB OUTSA,I  OUTPUT STRING
3850  06543 026455        JMP EPRI1+2
3851  06544 034153  EPRI7 ISZ EOL
3852  06545 026562        JMP EPRI8
3853  06546 064142        LDB TYPE
3854  06547 007004        CMB,INB      CHARACTERS OUTPUTTED
3855  06550 060126        LDA CCNT     LOAD LINE LENGTH
3856  06551 003004        CMA,INA      SAVE NEW COUNT OF
3857  06552 070142        STA TYPE     CHARACTERS OUTPUTTED
3858  06553 040001        ADA 1        COMPUTE CHARACTERS NOT YET OUT
3859  06554 004010        SLB          CORRECT FOR START ON
3860  06555 040477        ADA M1       ODD PRINT POSITION
3861  06556 064116        LDB .BUFA    OUTPUT
3862  06557 002002        SZA
3863  06560 114112        JSB WRITE,I
3864  06561 002001        RSS
3865  06562 015753  EPRI8 JSB OUTLN
3866  06563 002404        CLA,INA      SET EXU FLAG
3867  06564 114104        JSB SEXU,I   TO EXECUTION MODE
3868  06565 026054        JMP XEC4
3869**
3870***   TAB TELEPRINTER  **
3871**
3872  06566 116616  ETAB  JSB IENTA,I
3873  06567 026610        JMP ETAB1
3874  06570 006400        CLB
3875  06571 074153        STB EOL
3876  06572 040523        ADA M72      EXCEED
3877  06573 002021        SSA,RSS      72?
3878  06574 026610        JMP ETAB1    YES
3879  06575 003004        CMA,INA      NO, COMPUTE
3880  06576 040523        ADA M72      BLANKS?
3881  06577 040126        ADA CCNT     REQUIRED
3882  06600 002021        SSA,RSS      ANY?
3883  06601 124334        JMP FR12A,I
3884  06602 070157        STA STK4
```

```
3885  06603 060411        LDA .32      OUTPUT
3886  06604 015773        JSB OUTCR    REQUIRED
3887  06605 034157        ISZ STK4
3888  06606 026603        JMP *-3      OF BLANKS
3889  06607 124334        JMP FR12A,I
3890  06610 002400  ETAB1 CLA
3891  06611 114104        JSB SEXU,I
3892  06612 015753        JSB OUTLN
3893  06613 002404        CLA,INA
3894  06614 114104        JSB SEXU,I
3895  06615 124334        JMP FR12A,I
3896  06616 011400  IENTA DEF .IENT
3897*
3898***   EXECUTE INPUT
3899*
3900  06617 002006  EINP1 INA,SZA
3901  06620 114256        JSB DRQSA,I
3902  06621 014642  EINP2 JSB CONST
3903  06622 026617        JMP EINP1
3904  06623 064205        LDB TEMPS
3905  06624 006004        INB
3906  06625 054140        CPB PRADD
3907  06626 026643        JMP EINP3
3908  06627 050400        CPA .10
3909  06630 026634        JMP *+4
3910  06631 026635        JMP *+4
3911  06632 002400  EINPT CLA
3912  06633 114104        JSB SEXU,I
3913  06634 114256        JSB DRQSA,I
3914  06635 114303        JSB FORMA,I
3915  06636 003400        CCA
3916  06637 140137        ADA HSTPT,I
3917  06640 034137        ISZ HSTPT
3918  06641 070133        STA SBPTR
3919  06642 026621        JMP EINP2
3920  06643 002400  EINP3 CLA
3921  06644 070142        STA TYPE
3922  06645 002404        CLA,INA
3923  06646 114104        JSB SEXU,I
3924  06647 026054        JMP XEC4
3925**
3926***   EXIT FORMULA ON EMPTY STACK  **
3927**
3928  06650 100233        DEF FORM&,I
3929**
3930***   EXECUTE RESTORE
3931**
3932  06651 064143  ERSTR LDB DSTRT    GET FIRST DATA STATEMENT ADDRESS
3933  06652 054477        CPB M1       IMPOSSIBLE ADDRESS?
3934  06653 026054        JMP XEC4     YES, DONE
3935  06654 016107        JSB SETDP    NO, SET DATA POINTER
3936  06655 026054        JMP XEC4     DONE
3937**
3938***   FORMULA OPERATOR JUMP TABLE  **
3939**
3940  06656 006715  AROTB DEF ESCMA    SUBSCRIPT SEPARATOR
3941  06657 006775        DEF ESTR     ASSIGNMENT OPERATOR
3942  06660 007021        DEF EFAD     '+'
3943  06661 007024        DEF EFSB     '-'
3944  06662 007027        DEF EFMP     '*'
3945  06663 007032        DEF EFDV     '/'
3946  06664 007035        DEF EPWR     '^'
3947  06665 007157        DEF EGTRT    '>'
3948  06666 007164        DEF ELST     '<'
3949  06667 007210        DEF ENEQL    '#'
3950  06670 007171        DEF EEQL     '='
3951  06671 007222        DEF EUMIN    UNARY '-'
3952  06672 007225        DEF ELBRC    '['
3953  06673 100330        DEF FOR1A,I  '('
3954  06674 100332        DEF FOR0B,I  UNARY '+'
3955  06675 007233        DEF EOR      OR
3956  06676 007241        DEF EAND     AND
3957  06677 007246        DEF ENOT     NOT
```

```
3958  06700 007176        DEF EGORE    '>='
3959  06701 007203        DEF ELORE    '<='
3960**
3961***   EXECUTE A BINARY OPERATOR  **
3962**
3963  06702 000000  BINOP NOP          SAVE
3964  06703 162702        LDA BINOP,I  SUBROUTINE
3965  06704 072712        STA BINO1    CALL
3966  06705 036702        ISZ BINOP    SET RETURN ADDRESS
3967  06706 015563        JSB OPCHK    SAVE ADDRESS OF
3968  06707 076713        STB BINO2    TOP OPERAND
3969  06710 034137        ISZ HSTPT    UNSTACK ADDRESS
3970  06711 015553        JSB STTOP    LOAD SECOND OPERAND
3971  06712 000000  BINO1 NOP          PERFORM OPERATION
3972  06713 000000  BINO2 NOP          ADDRESS OF SECOND OPERAND
3973  06714 126702        JMP BINOP,I
3974**
3975***   EXECUTE SUBSCROPT COMMA  **
3976**
3977  06715 016764  ESCMA JSB ESBS     INTEGERIZE COLUMN SUBSCRIPT
3978  06716 034136        ISZ LSTPT
3979  06717 016764        JSB ESBS     INTEGERIZE ROW SUBSCRIPT
3980  06720 164137        LDB HSTPT,I  FETCH
3981  06721 044371        ADB .2       SUBSCRIPT
3982  06722 160001        LDA 1,I      BOUNDS
3983  06723 010445        AND MSK0     SAVE
3984  06724 070157        STA STK4
3985  06725 160001        LDA 1,I      EXTRACT
3986  06726 001727        ALF,ALF      ROW
3987  06727 010445        AND MSK0     BOUND
3988  06730 003004        CMA,INA      ACTUAL
3989  06731 140136        ADA LSTPT,I  ROW SUBSCRIPT
3990  06732 002021        SSA,RSS      LEGAL?
3991  06733 026752        JMP E6-1     NO
3992  06734 060157        LDA STK4
3993  06735 050370        CPA .1       COLUMN MATRIX?
3994  06736 026742        JMP ESCM1    YES
3995  06737 015317        JSB MPY      NO, COMPUTE ADDRESS
3996  06740 100136        DEF LSTPT,I  DISPLACEMENT
3997  06741 002001        RSS          DUE TO ROWS
3998  06742 160136  ESCM1 LDA LSTPT,I
3999  06743 007400        CCB          UNSTACK
4000  06744 044136        ADB LSTPT    ROW
4001  06745 074136        STB LSTPT    SUBSCRIPT
4002  06746 064157        LDB STK4
4003  06747 007004        CMB,INB      COLUMN
4004  06750 144136        ADB LSTPT,I  SUBSCRIPT
4005  06751 006021        SSB,RSS      LEGAL?
4006  06752 014544        JSB ERROR    NO
4007  06753 140136  E6    ADA LSTPT,I  YES, ADD IN COLUMN DISPLACEMENT
4008  06754 001000        ALS          DOUBLE DISPLACEMENT
4009  06755 164137        LDB HSTPT,I  COMPUTE
4010  06756 140001        ADA 1,I      ACTUAL
4011  06757 170137        STA HSTPT,I  ADDRESS
4012  06760 064136        LDB LSTPT    UNSTACK
4013  06761 044477        ADB M1
4014  06762 074136        STB LSTPT    I
4015  06763 124330        JMP FOR1A,I
4016**
4017***   INTERGERIZE A SUBSCRIPT  **
4018**
4019  06764 000000  ESBS  NOP
4020  06765 015563        JSB OPCHK    VALIDATE SUBSCRIPT
4021  06766 160001        LDA 1,I      FETCH
4022  06767 006004        INB          SUBSCRIPT
4023  06770 164001        LDB 1,I
4024  06771 015421        JSB SBFIX    INTEGERIZE
4025  06772 174136        STB LSTPT,I
4026  06773 034137        ISZ HSTPT    POP OPERAND STACK
4027  06774 126764        JMP ESBS,I
4028**
4029***   EXECUTE STORE  **
4030**
```

```
4031  06775 064214  ESTR  LDB TEMPS+7  IS NEXT OPERATOR
4032  06776 006002        SZB          AN END-OF-FORMULA?
4033  06777 124333        JMP FOR1B,I  NO, DEFER STORE
4034  07000 054213        CPB TEMPS+6  YES, FIRST STORE OPERATOR USED?
4035  07001 027015        JMP ESTR2    YES
4036  07002 160137  ESTR1 LDA HSTPT,I  SET
4037  07003 070216        STA TEMPS+9  DESTINATION
4038  07004 060213        LDA TEMPS+6  SOURCE ADDRESS IN (A)
4039  07005 164000        LDB 0,I      TRANSFER HIGH
4040  07006 174216        STB TEMPS+9,I  PART OF SOURCE
4041  07007 034216        ISZ TEMPS+9  UPDATE
4042  07010 002004        INA          POINTERS
4043  07011 164000        LDB 0,I      TRANSFER LOW
4044  07012 174216        STB TEMPS+9,I   PART OF SOURCE
4045  07013 034137        ISZ HSTPT    POP STACK
4046  07014 124332        JMP FOR0B,I
4047  07015 015563  ESTR2 JSB OPCHK    SAVE ADDRESS
4048  07016 074213        STB TEMPS+6  OF QUANTITY
4049  07017 034137        ISZ HSTPT    YES, POP HIGH-CORE
4050  07020 027002        JMP ESTR1    STACK AND EXECUTE STORE
4051**
4052***   CALL ADD  **
4053**
4054  07021 016702  EFAD  JSB BINOP
4055  07022 017340        JSB .FAD
4056  07023 124331        JMP FOR0A,I
4057**
4058***   CALL SUBTRACT  **
4059**
4060  07024 016702  EFSB  JSB BINOP
4061  07025 017346        JSB .FSB
4062  07026 124331        JMP FOR0A,I
4063**
4064***   CALL MULTIPLY  **
4065**
4066  07027 016702  EFMP  JSB BINOP
4067  07030 017417        JSB .FMP
4068  07031 124331        JMP FOR0A,I
4069**
4070***   CALL DIVIDE  **
4071**
4072  07032 016702  EFDV  JSB BINOP
4073  07033 017466        JSB .FDV
4074  07034 124331        JMP FOR0A,I
4075**
4076***   EXECUTE ^ ***
4077**
4078  07035 164137  EPWR  LDB HSTPT,I  LOAD
4079  07036 160001        LDA 1,I
4080  07037 006004        INB          POWER
4081  07040 164001        LDB 1,I
4082  07041 015432        JSB IFIX
4083  07042 027045        JMP *+3
4084  07043 102301        SOS          INTEGER?
4085  07044 027060        JMP EPWR1    YES
4086  07045 016702        JSB BINOP    NO
4087  07046 027047        JMP RPWR
4088  07047 017137  RPWR  JSB PCHK     CHECK ARGUMENTS
4089  07050 002020        SSA          NEGATIVE BASE?
4090  07051 014544        JSB ERROR    YES
4091  07052         BASER EQU *
4092  07052 066712        LDB BINO1    NO, LOAD BASE
4093  07053 114304        JSB .LOGA,I  TAKE NATURAL LOG
4094  07054 017417        JSB .FMP     MULTIPLY
4095  07055 106713        DEF BINO2,I  BY POWER
4096  07056 114305        JSB .EXPA,I  EXPONENTIATE
4097  07057 124331        JMP FOR0A,I  RESULT
4098  07060 074221  EPWR1 STB TT1
4099  07061 006020        SSB
4100  07062 007004        CMB,INB
4101  07063 074223        STB TT2
4102  07064 016702        JSB BINOP
4103  07065 027066        JMP IPWR
```

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4104  07066 017137  IPWR  JSB PCHK     CHECK ARGUMENTS
4105  07067 066712        LDB BINO1    STORE
4106  07070 072712        STA BINO1
4107  07071 076713        STB BINO2    BASE
4108  07072 060534        LDA HONE     INITIALIZE
4109  07073 070211        STA TT3      RESULT
4110  07074 060371        LDA .2       TO
4111  07075 070212        STA TT4      1.0
4112  07076 064223  IPWR1 LDB TT2      DIVIDE POWER
4113  07077 004031        SLB,BRS      BY 2
4114  07100 027117        JMP IPWR3    WAS ODD
4115  07101 074223        STB TT2      WAS EVEN
4116  07102 006002  IPWR2 SZB          ZERO?
4117  07103 027130        JMP IPWR4    NO
4118  07104 060221        LDA TT1      YES
4119  07105 002020        SSA          POSITIVE POWER?
4120  07106 027112        JMP IPWR5    NO
4121  07107 060211        LDA TT3      YES, LOAD
4122  07110 064212        LDB TT4      RESULT
4123  07111 124331        JMP FOR0A,I
4124  07112 060534  IPWR5 LDA HONE     LOAD
4125  07113 064371        LDB .2       1.0
4126  07114 017466        JSB .FDV     DIVIDE BY
4127  07115 000211        DEF TT3      RESULT
4128  07116 124331        JMP FOR0A,I
4129  07117 074223  IPWR3 STB TT2      SAVE POWER
4130  07120 062712        LDA BINO1    LOAD
4131  07121 066713        LDB BINO2    BASE
4132  07122 017417        JSB .FMP     MULTIPLY BY
4133  07123 000211        DEF TT3      RESULT-SO-FAR
4134  07124 070211        STA TT3      SAVE PARTIAL
4135  07125 074212        STB TT4
4136  07126 064223        LDB TT2      LOAD POWER
4137  07127 027102        JMP IPWR2
4138  07130 062712  IPWR4 LDA BINO1    LOAD
4139  07131 066713        LDB BINO2    BASE
4140  07132 017417        JSB .FMP     SQUARE
4141  07133 006712        DEF BINO1    IT
4142  07134 072712        STA BINO1    SAVE
4143  07135 076713        STB BINO2    RESULT
4144  07136 027076        JMP IPWR1
4145**
4146***   INSURE VALID OPERATION  **
4147**
4148  07137 000000  PCHK  NOP
4149  07140 076712        STB BINO1    LOAD
4150  07141 166713        LDB BINO2,I  POWER
4151  07142 002002        SZA          BASE ZERO?
4152  07143 027154        JMP PCHK1    NO
4153  07144 006003        SZB,RSS      YES, POWER ZERO?
4154  07145 014544        JSB ERROR    YES
4155  07146         POWER EQU *
4156  07146 006021        SSB,RSS      NO, POWER POSITIVE?
4157  07147 027214        JMP FALSE    YES
4158  07150 014544        JSB ERROR    NO
4159  07151 060471  ZRTNG LDA INF      USE POSITIVE
4160  07152 064500        LDB M2       INFINITY
4161  07153 124331        JMP FOR0A,I
4162  07154 006003  PCHK1 SZB,RSS      POWER ZERO?
4163  07155 027217        JMP TRUE     YES, RETURN 1,0
4164  07156 127137        JMP PCHK,I   NO
4165**
4166**  EXECUTE  >   **
4167**
4168  07157 016702  EGTRT JSB BINOP    COMPUTE OPERAND
4169  07160 017346        JSB .FSB     DIFFERENCE
4170  07161 002020        SSA          NEGATIVE?
4171  07162 027214        JMP FALSE    YES
4172  07163 027212        JMP ENEQ1    NO
4173**
4174**  EXECUTE  <   **
4175**
4176  07164 016702  ELST  JSB BINOP    COMPUTE OPERAND
```

```
4177  07165 017346        JSB .FSB     DIFFERENCE
4178  07166 002020        SSA          NEGATIVE?
4179  07167 027217        JMP TRUE     YES
4180  07170 027214        JMP FALSE    NO
4181**
4182*** EXECUTE = **
4183**
4184  07171 016702  EEQL   JSB BINOP    COMPUTE OPERAND
4185  07172 017346        JSB .FSB       DIFFERENCE
4186  07173 002002  EEQL1 SZA          ZERO?
4187  07174 027214        JMP FALSE    NO
4188  07175 027217        JMP TRUE     YES
4189**
4190**    EXECUTE >= **
4191**
4192  07176 016702  EGORE JSB BINOP    COMPUTE OPERAND
4193  07177 017346        JSB .FSB     DIFFERENCE
4194  07200 002020        SSA          POSITIVE?
4195  07201 027214        JMP FALSE    NO
4196  07202 027217        JMP TRUE     YES
4197**
4198***   EXCUTE <= **
4199**
4200  07203 016702  ELORE JSB BINOP    COMPUTE OPERAND
4201  07204 017346        JSB .FSB     DIFFERENCE
4202  07205 002020        SSA          NEGATIVE?
4203  07206 027217        JMP TRUE     YES
4204  07207 027173        JMP EEQL1    NO
4205**
4206**  EXECUTE  #   **
4207**
4208  07210 016702  ENEQL JSB BINOP    COMPUTE OPERAND
4209  07211 017346        JSB .FSB       DIFFERENCE
4210  07212 002002  ENEQ1 SZA          NON-ZERO?
4211  07213 027217        JMP TRUE YES
4212**
4213***   SET LOGICAL VALUES **
4214**
4215  07214 002400  FALSE CLA          LOAD
4216  07215 006400        CLB          ZERO
4217  07216 124331        JMP FOR0A,I
4218  07217 060534  TRUE  LDA HONE     LOAD
4219  07220 064371        LDB .2       ONE
4220  07221 124331        JMP FOR0A,I
4221**
4222***   EXECUTE UNARY - **
4223**
4224  07222 015553  EUMIN JSB STTOP    LOAD NUMBER
4225  07223 015471        JSB ARINV    NEGATE NUMBER
4226  07224 124331        JMP FOR0A,I
4227**
4228***   EXECUTE LEFT BRACKET **
4229**
4230  07225 034136  ELBRC ISZ LSTPT    LOAD SUBSCRIPT COMMA
4231  07226 064454        LDB SCCNT    INFORMATION WORD
4232  07227 015535        JSB SLWST    STACK IT
4233  07230 015544        JSB BHSTP    STACK
4234  07231 015604        JSB RSCHK
4235  07232 027217        JMP TRUE     1
4236**
4237***   EXECUTE  OR **
4238**
4239  07233 016702  EOR   JSB BINOP    VALIDATE
4240  07234 027235        JMP ORS      OPERANDS
4241  07235 002002  ORS   SZA          SECOND OPERAND NON-ZERO?
4242  07236 027217        JMP TRUE     YES
4243  07237 162713  ORS1  LDA BINO2,I  NO, CHECK SECOND
4244  07240 027212        JMP ENEQ1    OPERAND
4245**
4246***   EXECUTE AND **
4247**
4248  07241 016702  EAND  JSB BINOP    VALIDATE
4249  07242 027243        JMP ANDS     OPERANDS
```

```
4250  07243 002003  ANDS  SZA,RSS      SECOND OPERAND ZERO?
4251  07244 027214        JMP FALSE    YES
4252  07245 027237        JMP ORS1     NO
4253**
4254*** EXECUTE NOT **
4255**
4256  07246 015553  ENOT  JSB STTOP    LOAD OPERAND
4257  07247 002002        SZA          ZERO?
4258  07250 027214        JMP FALSE    NO
4259  07251 027217        JMP TRUE     YES

4261**
4262** ADD TWO FLOATING POINT QUANTITIES **
4263**
4264  07252 000000  ADMUP NOP
4265  07253 063252        LDA ADMUP
4266  07254 070203        STA STK24
4267  07255 060157        LDA STK4
4268  07256 003004  ADMU1 CMA,INA      EXPONENT
4269  07257 040150        ADA EXP      DIFFERENCE
4270  07260 002021        SSA,RSS      ARG 1 LARGER?
4271  07261 027277        JMP ADMU2    YES
4272  07262 060227        LDA A1       NO,
4273  07263 064230        LDB A2       SWAP
4274  07264 070230        STA A2       ARGUMENTS
4275  07265 074227        STB A1
4276  07266 060231        LDA C1
4277  07267 064232        LDB C2
4278  07270 070232        STA C2
4279  07271 074231        STB C1
4280  07272 060150        LDA EXP
4281  07273 064157        LDB STK4
4282  07274 070157        STA STK4
4283  07275 074150        STB EXP
4284  07276 027256        JMP ADMU1
4285  07277 040516  ADMU2 ADA M25      SHIFT COUNT >=
4286  07300 064231        LDB C1
4287  07301 002021        SSA,RSS      25 ?
4288  07302 027331        JMP ADMU4    YES, IGNORE SMALLER ARGUMENT
4289  07303 003100        CMA,CLE      NO, COMPUTE
4290  07304 040516        ADA M25      SHIFT COUNT
4291  07305 070157        STA STK4
4292  07306 060230        LDA A2       LOAD SMALLER
4293  07307 064232        LDB C2       MANTISSA
4294  07310 034157  ADMU3 ISZ STK4
4295  07311 027334        JMP ADMU5    YES
4296  07312 044231        ADB C1       NO, ADD LOW MANTISSAS
4297  07313 103101        CLO
4298  07314 005326        RBR,ELB      SAVE (E) IN B(0)
4299  07315 000040        CLE
4300  07316 040227        ADA A1       ADD HIGH MANTISSAS
4301  07317 004010        SLB          OVERFLOW FROM LOWER MANTISSA?
4302  07320 002004        INA          YES, ADD IT IN
4303  07321 005566        ERB,CLE,ELB  ERASE B(0)
4304  07322 102301        SOS          OVERFLOW?
4305  07323 027332        JMP ADMU4+1  NO
4306  07324 001500        ERA          YES, SHIFT
4307  07325 005500        ERB          MANTISSA DOWN AND
4308  07326 034150        ISZ EXP      CORRECT EXPONENT
4309  07327 027332        JMP ADMU4+1
4310  07330 002001        RSS
4311  07331 060227  ADMU4 LDA A1       RETRIEVE HIGH MANTISSA
4312  07332 015077        JSB .PACK    NORMALIZE AND PACK
4313  07333 124203        JMP STK24,I
4314  07334 000071  ADMU5 CLE,SLA,ARS  ARITHMETIC
4315  07335 002200        CME          DOUBLE
4316  07336 005540        ERB,CLE      SHIFT
4317  07337 027310        JMP ADMU3
4318**
4319***   ADD TWO FLOATING POINT NUMBERS **
4320**
4321  07340 000000  .FAD  NOP
4322  07341 017367        JSB UNPAK    UNPACK THE ARGUMENTS
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4323  07342 063340        LDA .FAD
4324  07343 070161        STA STK6
4325  07344 017252        JSB ADMUP    ADD THEM UP
4326  07345 124161        JMP STK6,I
4327**
4328***   SUBTRACT TWO FLOATING POINT NUMBERS **
4329**
4330  07346 000000  .FSB  NOP
4331  07347 017367        JSB UNPAK    UNPACK THE ARGUMENTS
4332  07350 063346        LDA .FSB
4333  07351 070161        STA STK6
4334  07352 060230        LDA A2       TWO'S COMPLEMENT
4335  07353 003000        CMA          THE SECOND ARGUMENT
4336  07354 007006        CMB,INB,SZB  LOW PART ZERO?
4337  07355 027363        JMP .FSB1    NO
4338  07356 002025        SSA,INA,RSS  YES, ORIGINAL NUMBER NEGATIVE?
4339  07357 002021        SSA,RSS      YES, STILL NEGATIVE?
4340  07360 027363        JMP .FSB1    NO
4341  07361 001300        RAR          YES, SHIFT DOWN AND
4342  07362 034157        ISZ STK4
4343  07363 074232  .FSB1 STB C2       SAVE COMPLEMENTED
4344  07364 070230        STA A2       NUMBER
4345  07365 017252        JSB ADMUP    ADD ARGUMENTS
4346  07366 124161        JMP STK6,I
4347**
4348*** UNPACK ARGUMENTS FOR ARITHMETIC OPERATIONS **
4349**
4350  07367 000000  UNPAK NOP
4351  07370 070227        STA A1       SAVE HIGH PART OF ARG 1
4352  07371 002003        SZA,RSS      UNPACK
4353  07372 006404        CLB,INB      SECOND
4354  07373 015524        JSB .FLUN    WORD
4355  07374 074231        STB C1       SAVE LOW PART OF ARG 1
4356  07375 070150        STA EXP      SAVE EXPONENT OF ARG 1
4357  07376 063367        LDA UNPAK    COMPUTE ADDRESS OF
4358  07377 040500        ADA M2       CALLING ROUTINE
4359  07400 164000        LDB 0,I
4360  07401 134000        ISZ 0,I      SET CALLING ROUTINE-S RETURN
4361  07402 164001        LDB 1,I      LOAD
4362  07403 005275        RBL,CLE,SLB,ERB
4363  07404 027402        JMP *-2
4364  07405 160001        LDA 1,I      LOAD
4365  07406 006004        INB          ARG 2
4366  07407 164001        LDB 1,I
4367  07410 070230        STA A2       SAVE HIGH PART OF ARG 2
4368  07411 002003        SZA,RSS      UNPACK
4369  07412 006404        CLB,INB      SECOND
4370  07413 015524        JSB .FLUN
4371  07414 074232        STB C2       SAVE LOW PART OF ARG 2
4372  07415 070157        STA STK4
4373  07416 127367        JMP UNPAK,I
4374**
4375***   MULTIPLY TWO FLOATING POINT NUMBERS **
4376**
4377  07417 000000  .FMP  NOP          UNPACK THE
4378  07420 017367        JSB UNPAK    ARGUMENTS
4379  07421 040150        ADA EXP      ADD EXPONENTS
4380  07422 002004        INA          PLUS 1 FOR
4381  07423 070150        STA EXP      NORMALIZATION
4382  07424 005300        RBR          POSITION LOW PART OF ARG 2
4383  07425 060001        LDA 1        COMPUTE A
4384  07426 015317        JSB MPY      CROSS PRODUCT
4385  07427 000227        DEF A1
4386  07430 070232        STA C2       SAVE RESULT
4387  07431 063417        LDA .FMP
4388  07432 070161        STA STK6
4389  07433 060231        LDA C1       LOAD AND POSITION
4390  07434 001300        RAR          LOW PART OF ARG 1
4391  07435 074231        STB C1       SAVE REST OF PRIOR RESULT
4392  07436 015317        JSB MPY      COMPUTE SECOND
4393  07437 000230        DEF A2       CROSS PRODUCT
4394  07440 044231        ADB C1       ADD
4395  07441 000040        CLE          CROSS
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4396  07442 040232        ADA C2       PRODUCTS
4397  07443 002040        SEZ          CORRECT
4398  07444 006004        INB          FOR CARRY
4399  07445 074232        STB C2       SAVE RESULT
4400  07446 060227        LDA A1       COMPUTE
4401  07447 015317        JSB MPY      HIGH PART
4402  07450 000230        DEF A2       OF PRODUCT
4403  07451 000065        CLE,ERA      POSITION LOW PART
4404  07452 040232        ADA C2       ADD IN CROSS TERMS
4405  07453 000066        CLE,ELA      REPOSITION
4406  07454 002041        SEZ,RSS      CARRY FROM LOW PART?
4407  07455 027461        JMP *+4
4408  07456 102201        SOC          YES, POSITIVE CARRY?
4409  07457 006005        INB,RSS      YES
4410  07460 044477        ADB M1       NO
4411  07461 070227        STA A1       EXCHANGE
4412  07462 060001        LDA 1
4413  07463 064227        LDB A1       REGISTERS
4414  07464 015077        JSB .PACK    NORMALIZE AND PACK
4415  07465 124161        JMP STK6,I
4416**
4417***   PERFORM FLOATING DIVIDE **
4418**
4419  07466 000000  .FDV  NOP
4420  07467 017367        JSB UNPAK    UNPACK ARGUMENTS
4421  07470 067466        LDB .FDV
4422  07471 074161        STB STK6
4423  07472 064230        LDB A2       DIVISOR
4424  07473 006003        SZB,RSS      ZERO?
4425  07474 027553        JMP .FDV2    YES
4426  07475 064227        LDB A1       NO,DIVIDEND
4427  07476 006003        SZB,RSS      ZERO?
4428  07477 027550        JMP .FDV1    YES
4429  07500 003004        CMA,INA      NO, COMPUTE
4430  07501 002004        INA          EXPONENT
4431  07502 040150        ADA EXP      DIFFERENCE
4432  07503 070150        STA EXP      PLUS 1
4433  07504 060231        LDA C1       LOAD DIVIDEND
4434  07505 004071        CLE,SLB,BRS   ARITHMETIC
4435  07506 002200        CME          RIGHT SHIFT
4436  07507 001500        ERA          TWICE TO
4437  07510 004071        CLE,SLB,BRS  PREVENT
4438  07511 002200        CME          DIVISION
4439  07512 001500        ERA          OVERFLOW
4440  07513 017557        JSB IDIV     DIVIDE
4441  07514 070157        STA STK4
4442  07515 005100        BRS          DIVIDE REMAINDER BY 2 TO
4443  07516 002400        CLA          PREVENT DIVISION OVERFLOW
4444  07517 017557        JSB IDIV     DIVIDE REMAINDER AND
4445  07520 070162        STA STK7
4446  07521 064232        LDB C2
4447  07522 002500        CLA,CLE      SCALE TO
4448  07523 005521        ERB,BRS      PREVENT
4449  07524 005100        BRS          OVERFLOW
4450  07525 017557        JSB IDIV     COMPUTE B2/A2 = Q
4451  07526 003004        CMA,INA      COMPUTE
4452  07527 015317        JSB MPY      -HIGH QUOTIENT*Q
4453  07530 000157        DEF STK4
4454  07531 005066        BLS,CLE,ELB  SHIFT SIGN TO (E)
4455  07532 060162        LDA STK7
4456  07533 002020        SSA          NEGATIVE?
4457  07534 003401        CCA,RSS      YES, SET (A)=-1 (EXTEND
4458  07535 002400        CLA          NO, SET (A)=0   SIGN)
4459  07536 003040        CMA,SEZ      IF (E)=1 SUBTRACT
4460  07537 002004        INA          1 AS EXTENSION
4461  07540 003100        CMA,CLE      OF PRODUCT
4462  07541 044162        ADB STK7
4463  07542 002040        SEZ          CARRY
4464  07543 002004        INA          INTO (A)
4465  07544 004066        CLE,ELB      POSITION
4466  07545 001600        ELA          REGISTERS
4467  07546 040157        ADA STK4
4468  07547 002001        RSS
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4469  07550 002400  .FDV1 CLA          SET MANTISSA TO ZERO
4470  07551 015077        JSB .PACK    NORMALIZE AND PACK
4471  07552 124161        JMP STK6,I
4472  07553 014544  .FDV2 JSB ERROR    DIVIDE-BY-ZERO
4473  07554 060227  DBYZR LDA A1
4474  07555 015164        JSB OVFLW    RETURN INFINITY
4475  07556 124161        JMP STK6,I
4476**
4477***   INTEGER DIVIDE **
4478**
4479  07557 000000  IDIV  NOP          DIVIDEND IN (B) AND (A)
4480  07560 074227        STB A1       SAVE HIGH DIVIDEND
4481  07561 064230        LDB A2
4482  07562 006120        CLE,SSB      SET (B) TO ABS(B)
4483  07563 007204        CMB,CME,INB  AND (E) TO SIGN(B)
4484  07564 077340        STB .FAD     SAVE POSITION DIVISOR
4485  07565 007004        CMB,INB      SAVE
4486  07566 077346        STB .FSB     NEGATIVE DIVISOR
4487  07567 064513        LDB M16      SET
4488  07570 074231        STB C1       COUNTER
4489  07571 064500        LDB M2       SET
4490  07572 074147        STB SIGN
4491  07573 077417        STB .FMP     SIGNS
4492  07574 064227        LDB A1       RETRIEVE HIGH DIVIDEND
4493  07575 006021        SSB,RSS      POSITIVE?
4494  07576 027604        JMP IDIV1    YES
4495  07577 037417        ISZ .FMP     NO, SET REMAINDER SIGN
4496  07600 007200        CMB,CME      NEGATIVE AND COMPLEMENT
4497  07601 002002        SZA          THE DIVISOR
4498  07602 003005        CMA,INA,RSS  AND (E)
4499  07603 006004        INB
4500  07604 002040  IDIV1 SEZ          QUOTIENT POSITIVE?
4501  07605 034147        ISZ SIGN     NO
4502  07606 000066  IDIV2 CLE,ELA      SHIFT
4503  07607 005600        ELB          DIVIDEND
4504  07610 047346        ADB .FSB     SUBTRACT DIVISOR
4505  07611 006021        SSB,RSS      OK?
4506  07612 002005        INA,RSS      YES
4507  07613 047340        ADB .FAD     NO, RESTORE DIVIDEND
4508  07614 034231        ISZ C1       DONE?
4509  07615 027606        JMP IDIV2    NO
4510  07616 003004        CMA,INA      YES, NEGATE QUOTIENT
4511  07617 034147        ISZ SIGN     RESULT TO BE POSITIVE?
4512  07620 003004        CMA,INA      YES
4513  07621 037417        ISZ .FMP NO,REMAINDER POSITIVE?
4514  07622 127557        JMP IDIV,I   YES
4515  07623 007004        CMB,INB      NO
4516  07624 127557        JMP IDIV,I
4517                      SKP
4518*                    ******************************
4519*                    SYMBOL TABLE SEARCH SUBROUTINE
4520*                    ******************************
4521*
4522  07625 000000  SSYMT NOP
4523  07626 070211        STA STEMP    STORE IDENTIFIER
4524  07627 010402        AND .15      ISOLATE IDENTIFIER TYPE
4525  07630 040502        ADA M4
4526  07631 002024        SSA,INA
4527  07632 027636        JMP *+4      JUMP IF ARRAY TYPE
4528  07633 060211        LDA STEMP    RESTORE A
4529  07634 070001        STA 1        STORE IN B
4530  07635 027650        JMP SYMT1+3
4531  07636 002020        SSA          SKIP IF UNDIMENSIONED
4532  07637 027645        JMP SYMT1
4533  07640 060211        LDA STEMP    RESTORE A
4534  07641 010505        AND MSK3     177771B SET TYPE TO 1
4535  07642 070001        STA 1
4536  07643 006004        INB          SET TYPE IN 3 TO 2
4537  07644 027650        JMP *+4
4538  07645 007400  SYMT1 CCB          SET DIMENSIONED FLAG TO B
4539  07646 060372        LDA .3
4540  07647 030211        IOR STEMP    SET TYPE TO UNDEFINED
4541  07650 070212        STA STEMP+1  STORE A
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4542  07651 074213        STB STEMP+2  STORE B
4543  07652 064132        LDB SYMTF    START OF SYMBOL TABLE
4544  07653 027674        JMP SYMT4
4545  07654 160001  SYMT2 LDA 1,I      PICK UP 1ST WORD OF ENTRY
4546  07655 050211        CPA STEMP    COMPARE WITH IDENTIFIER
4547  07656 127625        JMP SSYMT,I  MATCH? RETURN
4548  07657 050212        CPA STEMP+1  COMPARE WITH DIFFERENT DIM.
4549  07660 027701        JMP SYMT3
4550  07661 050213        CPA STEMP+2  COMPARE WITH DIFFERENT DIM.
4551  07662 027701        JMP SYMT3
4552  07663 160001        LDA 1,I
4553  07664 010402        AND .15
4554  07665 050402        CPA .15
4555  07666 027673        JMP *+5
4556  07667 040502        ADA M4
4557  07670 002020        SSA
4558  07671 006004        INB
4559  07672 006004          INB
4560  07673 044371        ADB .2
4561  07674 054117  SYMT4 CPB SYMTA
4562  07675 007401        CCB,RSS
4563  07676 027654        JMP SYMT2
4564  07677 060211        LDA STEMP
4565  07700 127625        JMP SSYMT,I
4566  07701 060211  SYMT3 LDA STEMP    RESTORE A
4567  07702 034213        ISZ STEMP+2  DIMENSIONED IDENTIFIER?
4568  07703 002001        RSS          NO, SKIP
4569  07704 170001        STA 1,I      YES CHANGE 1ST WORD OF ENTRY TO
4570  07705 127625        JMP SSYMT,I  APPROPRIATE DIMENSION TYPE
4571                      SKP
4572**
4573***   ERROR TABLE **
4574**
4575  07706 000336  ERR   DEF EOF+1    PREMATURE STATEMENT END
4576  07707 002062        DEF RTLE     INPUT EXCEEDS 71 CHARACTERS
4577  07710 002134        DEF INVSC    SYSTEM COMMAND NOT RECOGNIZED
4578  07711 002223        DEF SYNE1    NO STATEMENT TYPE FOUND
4579  07712 000776        DEF NUMER+1
4580  07713 002606        DEF SYE16    NO LETTER WHERE EXPECTED
4581  07714 002333        DEF SYNE2    LET STATEMENT HAS NO STORE
4582  07715 002346        DEF SYNE3    ILLIGAL COM STATEMENT
4583  07716 002373        DEF SYNE4+1  NO FUNCTION IDENTIFIER (OR BAD)
4584  07717 002405        DEF SYNE5    MISSING PARAMETER
4585  07720 002412        DEF SYNE6+1  MISSING ASSIGNMENT OPERATOR
4586  07721 002432        DEF SYNE7    MISSING 'THEN'
4587  07722 002440        DEF SYNE8+1  MISSING OR IMPROPER FOR-VARIABLE
4588  07723 002452        DEF SYNE9    MISSING 'TO'
4589  07724 002465        DEF SYE10    BAD 'STEP' PART IN FOR STATEMENT
4590  07725 177777        DEC -1
4591  07726 177777        DEC -1
4592  07727 000671        DEF SYE12    NO CONSTAND WHERE EXPECTED
4593  07730 002511        DEF SYE13    NO VARIABLE WHERE EXPECTED
4594  07731 002543        DEF SYE14    NO CLOSING QUOTE FOR STRING
4595  07732 002555        DEF SYE15    PRINT JUXTAPOSES FORMULAS
4596  07733 002621        DEF SYE17    IMPROPER WORD IN MAT STATEMENT
4597  07734 002632        DEF SYE18    NO COMMA WHERE EXPECTED
4598  07735 002705        DEF SYE19    IMPROPER ARRAY FUNCTION
4599  07736 002725        DEF SYE20    NO SUBSCRIPT WHERE EXPECTED
4600  07737 002737        DEF SYE21    ARRAY INVERSION INTO SELF
4601  07740 002750        DEF SYE22    MISSING MULTIPLICATION OPERATOR
4602  07741 002771        DEF SYE23    IMPROPER ARRAY OPERATOR
4603  07742 003010        DEF SYE24+1  ARRAY MULTIPLICATION INTO SELF
4604  07743 003133        DEF FSCE1+1  MISSING LEFT PARENTHESIS
4605  07744 003207        DEF FSCE2+1  MISSING RIGHT PARENTHESIS
4606  07745 003237        DEF FSCE3+1  UNRECOGNIZED OPERAND
4607  07746 003465        DEF ARRE1    MISSING SUBSCRIPT
4608  07747 003500        DEF ARRE2    MISSING ARRAY IDENTIFIER
4609  07750 004243        DEF SYE25+1  MISSING OR BAD INTEGER
4610  07751 000337        DEF NOEOF+1  CHARACTERS AFTER STATEMENT END
4611  07752 003333        DEF FSCE4+1
4612  07753 002160        DEF PRERR    PHOTO READER NOT READY
4613  07754 005321        DEF MER4     FUNCTION MULTIPLY DEFINED
4614  07755 005422        DEF MER6     UNMATCHED FOR STATEMENT
```

```
4615  07756 005273        DEF MER3     UNMATCHED NEXT
4616  07757 005521        DEF MER8     OUT OF STORAGE-SYMBOL TABLE
4617  07760 005550        DEF MSYM     INCONSISTENT DIMENSIONS
4618  07761 005310        DEF MLOP6
4619  07762 005406        DEF MER5     ARRAY DOUBLE DIMENSIONED
4620  07763 005440        DEF MER10    NO OF DIMENSIONS UNSPECIFIED
4621  07764 001420        DEF MER9     ARRAY TOO LARGE
4622  07765 005473        DEF MER7     OUT OF STORAGE-ARRAY ALLOCATION
4623  07766 006753        DEF E6       SUBSCRIPT TOO LARGE
4624  07767 001574        DEF E8       UNDEFINED OPERAND ACCESSED
4625  07770 007052        DEF BASER NEGATIVE BASE POWERED TO REAL
4626  07771 007146        DEF POWER    ZERO TO ZERO POWER
4627  07772 006065        DEF XEC5     MISSING STATEMENT
4628  07773 006377        DEF E2       GOSUBS NESTED 10 DEEP
4629  07774 006403        DEF E3       RETURN FINDS NO ADDRES
4630  07775 006150        DEF E4       OUT OF DATA
4631  07776 001542        DEF E1+1     OUT OF STORAGE - EXECUTION
4632  07777 011760        DEF E7       RE-DIMENSIONED ARRAY TOO LARGE
4633  10000 012044        DEF LERR+1
4634  10001 012106        DEF LCHK5    MATRIX UNASSIGNED
4635  10002 012712        DEF LDUM1    NEARLY SINGULAR MATRIX
4636  10003 010401        DEF TRGER    ARGUMENT TOO LARGE
4637  10004 010752        DEF SQRER    SQRT HAS NEGATIVE ARGUMENT
4638  10005 011060        DEF LOGER    LOG OF NEGATIVE ARGUMENT
4639  10006         RCERR EQU *        ** RECOVERABLE ERRORS FOLLOW **
4640  10006 001161        DEF OVRER    OVERFLOW
4641  10007 001155        DEF UNDER    UNDERFLOW
4642  10010 011132        DEF LNZR     LOG OF ZERO
4643  10011 011266        DEF EXPER    EXPONTIAL OVERFLOW
4644  10012 007554        DEF DBYZR    DIVIDE BY ZERO
4645  10013 007151        DEF ZRTNG    ZERO TO NEGATIVE POWER
4646**
4647***   OUTPUT A NUMBER **
4648**
4649  10014 000000  NUMOT NOP          NUMBER (A) AND (B)
4650  10015 070236        STA EXPON    SAVE NUMBER
4651  10016 062014        LDA NUMOT
4652  10017 070164        STA STK9
4653  10020 060236        LDA EXPON
4654  10021 002041        SEZ,RSS      SIGN?
4655  10022 026034        JMP NS2      NO
4656  10023 002021        SSA,RSS      YES,NEGATIVE NUMBER?
4657  10024 026031        JMP NS1      NO
4658  10025 015471        JSB ARINV    YES, INVERT IT
4659  10026 070236        STA EXPON
4660  10027 060422        LDA .45
4661  10030 002001        RSS
4662  10031 060411  NS1   LDA .32      STORE
4663  10032 070147        STA SIGN     SIGN
4664  10033 060236        LDA EXPON
4665  10034 074163  NS2   STB STK8
4666  10035 015432        JSB IFIX     INTEGERIZE
4667  10036 000000        NOP
4668  10037 160164        LDA STK9,I
4669  10040 072060        STA NUMO1
4670  10041 072116        STA NUMO3
4671  10042 034164        ISZ STK9
4672  10043 102201        SOC          WAS IT AN INTEGER?
4673  10044 026067        JMP NUMO2    NO
4674  10045 002400        CLA
4675  10046 074222        STB B1+1
4676  10047 044531        ADB M1000
4677  10050 006021        SSB,RSS
4678  10051 040372        ADA .3
4679  10052 040374        ADA .6
4680  10053 040126        ADA CCNT
4681  10054 003004        CMA,INA
4682  10055 070220        STA MLBX1+1
4683  10056 040435        ADA .74
4684  10057 002020        SSA
4685  10060 000000  NUMO1 NOP          NO
4686  10061 060147        LDA SIGN
4687  10062 002002        SZA          SIGN?
```

```
4688  10063 015773        JSB OUTCR    YES, OUTPUT IT
4689  10064 060222        LDA B1+1
4690  10065 114272        JSB OUTIA,I  THE INTEGER
4691  10066 124164        JMP STK9,I
4692  10067 003400  NUMO2 CCA          SET 'FIXED'
4693  10070 070204        STA FFLAG    FLAG FALSE
4694  10071 060236        LDA EXPON    LOAD
4695*
4696***   THESE TWO INSTRUCTIONS CHECK FOR AN NUMERIC UNDERFLOW.
4697***   IF MANTISSA IS ZERO, GIVE AN ERROR 50 MESSAGE.
4698***   OTHERWISE, CONTINUE TO OUTPUT NUMBER
4699*
4700  10072 002003        SZA,RSS      ZERO MANTISSA?
4701  10073 025573        JMP E8-1     YES - ERROR (UNDERFLOW)
4702*
4703  10074 064163        LDB STK8
4704  10075 114306        JSB .FADA,I  IS NUMBER
4705  10076 000540        DEF MAXFX    LESS THAN
4706  10077 002021        SSA,RSS      999999.5?
4707  10100 026110        JMP NUMO5    NO
4708  10101 060236        LDA EXPON    YES, IS
4709  10102 064163        LDB STK8
4710  10103 114306        JSB .FADA,I  LESS
4711  10104 000542        DEF MINFX    THAN
4712  10105 064401        LDB .12      SAVE
4713  10106 002021        SSA,RSS
4714  10107 034204        ISZ FFLAG
4715  10110 064402  NUMO5 LDB .15      WIDTH
4716  10111 044126        ADB CCNT     SAVE
4717  10112 007004        CMB,INB      END-OF-FIELD
4718  10113 074220        STB MLBX1+1
4719  10114 044436        ADB .75      ROOM
4720  10115 006020        SSB          ENOUGH?
4721  10116 000000  NUMO3 NOP          NO
4722**
4723***   OUTPUT A FLOATING POINT NUMBER **
4724**
4725  10117 060236        LDA EXPON
4726  10120 070234        STA MANT1
4727  10121 064163        LDB STK8
4728  10122 015524        JSB .FLUN
4729  10123 074235        STB MANT2    NUMBER
4730  10124 070150        STA EXP
4731  10125 060147        LDA SIGN
4732  10126 002002        SZA          SIGN
4733  10127 015773        JSB OUTCR    YES, OUTPUT IT
4734  10130 002400        CLA          INITIALIZE COUNTER
4735  10131 070236        STA EXPON    FOR DECIMAL EXPONENT
4736  10132 050150        CPA EXP      EXPONENT ZERO?
4737  10133 026156        JMP EOUT4    YES
4738  10134 015230  EOUT2 JSB MBY10    NO,
4739  10135 060150        LDA EXP      MULTIPLY
4740  10136 003004        CMA,INA      NUMBER BY 10
4741  10137 002020        SSA          UNTIL
4742  10140 026143        JMP *+3
4743  10141 034236        ISZ EXPON    GREATER
4744  10142 026134        JMP EOUT2    THAN 1
4745  10143 015261        JSB DBY10    DIVIDE BY 10
4746  10144 060236        LDA EXPON
4747  10145 064150  EOUT3 LDB EXP      DIVIDE
4748  10146 007004        CMB,INB      NUMBER
4749  10147 006021        SSB,RSS      BY 10
4750  10150 026156        JMP EOUT4    UNTIL
4751  10151 070236        STA EXPON    IT IS
4752  10152 015261        JSB DBY10    LESS
4753  10153 003400        CCA          THAN
4754  10154 040236        ADA EXPON    1
4755  10155 026145        JMP EOUT3
4756  10156 003000  EOUT4 CMA          SET EXPONENT
4757  10157 070236        STA EXPON    TO TRUE VALUE-1
4758  10160 064505        LDB M7       SET DIGIT
4759  10161 074165        STB STK10
4760  10162 007400        CCB          SET DECIMAL
```

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4761  10163 074157        STB STK4
4762  10164 054204        CPB FFLAG    FIXED POINT?
4763  10165 026174        JMP EOUT6    NO
4764  10166 003000        CMA          YES, SET
4765  10167 070157        STA STK4
4766  10170 050370        CPA .1       .1?
4767  10171 026200        JMP EOUT5    YES
4768  10172 002021        SSA,RSS      LEADING DECIMAL POINT?
4769  10173 026206        JMP EOUT7+2  YES
4770  10174 016325  EOUT6 JSB GETDG    OUTPUT
4771  10175 040425        ADA .48      A
4772  10176 015773        JSB OUTCR    DIGIT
4773  10177 026210        JMP EOUT8
4774  10200 060423  EOUT5 LDA .46      OUTPUT
4775  10201 015773        JSB OUTCR    DECIMAL POINT
4776  10202 060425        LDA .48      OUTPUT
4777  10203 026207        JMP EOUT8-1  LEADING ZERO
4778  10204 034157  EOUT7 ISZ STK4
4779  10205 026174        JMP EOUT6    NO
4780  10206 060423        LDA .46      YES,
4781  10207 015773        JSB OUTCR    OUTPUT IT
4782  10210 034165  EOUT8 ISZ STK10
4783  10211 026204        JMP EOUT7    YES
4784  10212 060126        LDA CCNT     NO,
4785  10213 072060        STA NUMO1    SAVE
4786  10214 060125        LDA BADDR    OUTPUT
4787  10215 072116        STA NUMO3    POINTERS
4788  10216 016325        JSB GETDG    NEXT DIGIT
4789  10217 040503        ADA M5       FIVE OR
4790  10220 002020        SSA          GREATER?
4791  10221 026264        JMP EOUT1    NO
4792  10222 003400        CCA          SET DECIMAL
4793  10223 070166  ERND1 STA STK11
4794  10224 016351        JSB RETCR    RETRIEVE CHARACTER
4795  10225 050423        CPA .46      DECIMAL POINT?
4796  10226 026222        JMP ERND1-1  YES, FLAG IT
4797  10227 015636        JSB DIGCK    NO, DIGIT?
4798  10230 026243        JMP ERND2    NO
4799  10231 050377        CPA .9       YES,9?
4800  10232 026235        JMP *+3
4801  10233 040426        ADA .49      NO, BUMP
4802  10234 026257        JMP ERND3    DIGIT 1
4803  10235 060425        LDA .48      OVERLAY
4804  10236 015773        JSB OUTCR    A ZERO
4805  10237 016351        JSB RETCR    BACKSPACE
4806  10240 003400        CCA          DECREMENT
4807  10241 040166        ADA STK11
4808  10242 026223        JMP ERND1    COUNTER
4809  10243 015773  ERND2 JSB OUTCR    RESTORE CHARACTER
4810  10244 034236        ISZ EXPON    CORRECT
4811  10245 000000        NOP          EXPONENT
4812  10246 060426        LDA .49      OVERLAY A1
4813  10247 064204        LDB FFLAG
4814  10250 006002        SZB
4815  10251 026257        JMP ERND3    NO
4816  10252 015773        JSB OUTCR    A ZERO
4817  10253 060425        LDA .48      OVERLAY
4818  10254 034166        ISZ STK11
4819  10255 026252        JMP *-3      NO
4820  10256 060423        LDA .46      YES
4821  10257 015773  ERND3 JSB OUTCR
4822  10260 062060        LDA NUMO1    RESTORE
4823  10261 070126        STA CCNT     OUTPUT
4824  10262 062116        LDA NUMO3    POINTERS
4825  10263 070125        STA BADDR
4826  10264 034204  EOUT1 ISZ FFLAG    NO, FIXED POINT?
4827  10265 026314        JMP EOUT9    YES
4828  10266 060432        LDA E        NO,
4829  10267 015773        JSB OUTCR    OUTPUT 'E'
4830  10270 060422        LDA .45      LOAD '-'
4831  10271 064236        LDB EXPON    POSITIVE
4832  10272 006020        SSB          EXPONENT?
4833  10273 007005        CMB,INB,RSS  NO
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4834  10274 060421        LDA .43      YES, LOAD '+'
4835  10275 074236        STB EXPON
4836  10276 015773        JSB OUTCR    OUTPUT SIGN
4837  10277 064236        LDB EXPON
4838  10300 060425        LDA .48      COMPUTE
4839  10301 044510        ADB M10
4840  10302 006020        SSB          EXPONENT
4841  10303 026306        JMP *+3
4842  10304 002004        INA          DIGIT
4843  10305 026301        JMP *-4
4844  10306 044427        ADB .58      COMPUTE
4845  10307 074236        STB EXPON    SECOND DIGIT
4846  10310 015773        JSB OUTCR    OUTPUT
4847  10311 060236        LDA EXPON
4848  10312 015773        JSB OUTCR    EXPONENT
4849  10313 124164        JMP STK9,I
4850  10314 016351  EOUT9 JSB RETCR    RETRIEVE CHARACTER
4851  10315 050425        CPA .48      ZERO?
4852  10316 026321        JMP EOU10    YES
4853  10317 015773        JSB OUTCR    NO, RESTORE CHARACTER
4854  10320 124164        JMP STK9,I
4855  10321 060411  EOU10 LDA .32      OVERLAY
4856  10322 015773        JSB OUTCR    A BLANK
4857  10323 016351        JSB RETCR
4858  10324 026314        JMP EOUT9
4859**
4860***   GET DIGIT TO OUTPUT **
4861**
4862  10325 000000  GETDG NOP
4863  10326 015230        JSB MBY10    MULTIPLY BY 10
4864  10327 064150        LDB EXP      GET EXPONENT IN (B)
4865  10330 007004        CMB,INB      AS NEGATIVE
4866  10331 010476        AND HIMSK    KEEP 5 HIGH BITS OF (A)
4867  10332 001200        RAL          NORMALIZE TO BIT 15
4868  10333 006024        SSB,INB      ROTATE INTEGER
4869  10334 026332        JMP *-2      INTO (A)
4870  10335 010445        AND MSK0
4871  10336 070162        STA STK7
4872  10337 064150        LDB EXP      ROTATE
4873  10340 007004        CMB,INB
4874  10341 001300        RAR          BACK
4875  10342 006024        SSB,INB
4876  10343 026341        JMP *-2
4877  10344 020234        XOR MANT1    REMOVE
4878  10345 064235        LDB MANT2    DIGIT
4879  10346 015174        JSB NORML    NORMALIZE REMAINDER
4880  10347 060162        LDA STK7
4881  10350 126325        JMP GETDG,I
4882*
4883*** RETRIEVE CHARACTER FROM OUTPUT BUFFER **
4884*
4885  10351 000000  RETCR NOP
4886  10352 064126        LDB CCNT     DECREMENT
4887  10353 044477        ADB M1         CHARACTER
4888  10354 074126        STB CCNT         COUNT
4889  10355 160125        LDA BADDR,I  POSITION
4890  10356 006011        SLB,RSS        AND
4891  10357 001727        ALF,ALF          EXTRACT
4892  10360 010445        AND MSK0
4893  10361 004010        SLB          FIRST CHARACTER OF WORD?
4894  10362 126351        JMP RETCR,I  NO
4895  10363 064125        LDB BADDR    YES, DECREMENT
4896  10364 044477        ADB M1         BUFFER
4897  10365 074125        STB BADDR        POINTER
4898  10366 126351        JMP RETCR,I
4899                      HED          LIBRARY ROUTINES
4900*                  ******************************
4901*                  SUBROUTINE TO CALCULATE TAN(X)
4902*                  ******************************
4903*
4904  10367 114310  ETAN  JSB .FMPA,I
4905  10370 010456        DEF FOPI     4/PI
4906  10371 072462        STA XTEMP
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4907  10372 076463        STB XTEMP+1
4908  10373 114306        JSB .FADA,I
4909  10374 010460        DEF K1
4910  10375 017427        JSB .PWR2
4911  10376 177776        DEC -2
4912  10377 017400        JSB .IENT
4913  10400 014544        JSB ERROR
4914  10401 017417  TRGER  JSB FLOAT
4915  10402 015471        JSB ARINV
4916  10403 017427        JSB .PWR2
4917  10404 000002        DEC 2
4918  10405 114306        JSB .FADA,I
4919  10406 010462        DEF XTEMP
4920  10407 072462        STA XTEMP
4921  10410 076463        STB XTEMP+1  X=X-4*ENTIER((X+1)/4)
4922  10411 114307        JSB .FSBA,I
4923  10412 010460        DEF K1
4924  10413 070204        STA SBOXX
4925  10414 002020        SSA          X<1?
4926  10415 026450        JMP ELSE1    YES
4927  10416 062470        LDA K2       NO
4928  10417 066471        LDB K2+1
4929  10420 114307        JSB .FSBA,I
4930  10421 010462        DEF XTEMP
4931  10422 072464  BOTH1  STA YTEMP
4932  10423 076465        STB YTEMP+1  Y= 2-X
4933  10424 114310        JSB .FMPA,I
4934  10425 010464        DEF YTEMP
4935  10426 114310        JSB .FMPA,I
4936  10427 010470        DEF K2
4937  10430 114307        JSB .FSBA,I
4938  10431 010460        DEF K1
4939  10432 017305        JSB .CHEB
4940  10433 010472        DEF COEFF
4941  10434 114310        JSB .FMPA,I
4942  10435 010464        DEF YTEMP
4943  10436 072464        STA YTEMP
4944  10437 076465        STB YTEMP+1  Y=Y*CHEBY(2*Y**2-1)
4945  10440 060204        LDA SBOXX
4946  10441 002020        SSA          X<1?
4947  10442 026453        JMP ELSE2    YES
4948  10443 062460        LDA K1
4949  10444 066461        LDB K1+1
4950  10445 114311        JSB .FDVA,I
4951  10446 010464        DEF YTEMP
4952  10447 124334        JMP FR12A,I
4953  10450 062462  ELSE1  LDA XTEMP
4954  10451 066463        LDB XTEMP+1
4955  10452 026422        JMP BOTH1    Y=X
4956  10453 062464  ELSE2  LDA YTEMP
4957  10454 066465        LDB YTEMP+1
4958  10455 124334        JMP FR12A,I
4959  10456 050574  FOPI   DEC 1.273239545    4/PI
      10457 141002
4960  10460 040000  K1     DEC 1.
      10461 000002
4961  10462         XTEMP  BSS 2
4962  10464         YTEMP  BSS 2
4963  10466         UTEMP  BSS 2
4964  10470 040000  K2     DEC 2.
      10471 000004
4965  10472 076061  COEFF  DEC 1.4458E-8
      10473 075315
4966  10474 066034        DEC 2.013766E-7
      10475 176725
4967  10476 057035        DEC 2.804816E-6
      10477 030335
4968  10500 050755        DEC 3.906637E-5
      10501 114745
4969  10502 043523        DEC 5.4417038E-4
      10503 052355
4970  10504 076112        DEC 7.586101578E-3
      10505 065763
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4971  10506 066520        DEC .10675392857
      10507 163773
4972  10510 070512        DEC 1.7701474227
      10511 014002
4973  10512 000000        OCT 0
4974                      SKP
4975*                   ******************************
4976*                   SUBROUTINE TO CALCULATE ATN(X)
4977*                   ******************************
4978*
4979  10513 072462  EATN  STA XTEMP
4980  10514 076463        STB XTEMP+1
4981  10515 060001        LDA 1
4982  10516 010445        AND MSK0
4983  10517 070204        STA SBOXX
4984  10520 002002        SZA
4985  10521 000010        SLA          ABS (X) > 1 ?
4986  10522 026557        JMP ELS1     NO
4987  10523 062460        LDA K1
4988  10524 066461        LDB K1+1
4989  10525 114311        JSB .FDVA,I
4990  10526 010462        DEF XTEMP    U=1/X
4991  10527 072466  BTH1  STA UTEMP
4992  10530 076467        STB UTEMP+1
4993  10531 114310        JSB .FMPA,I
4994  10532 010466        DEF UTEMP
4995  10533 114310        JSB .FMPA,I
4996  10534 010470        DEF K2
4997  10535 114307        JSB .FSBA,I
4998  10536 010460        DEF K1
4999  10537 017305        JSB .CHEB
5000  10540 010576        DEF COEF
5001  10541 114310        JSB .FMPA,I
5002  10542 010466        DEF UTEMP
5003  10543 072464        STA YTEMP
5004  10544 076465        STB YTEMP+1  Y=U*CHEBY(2*U**2-1)
5005  10545 060204        LDA SBOXX
5006  10546 002002        SZA
5007  10547 000010        SLA          ABS(X)>1 ?
5008  10550 026562        JMP ELS2     NO
5009  10551 062462        LDA XTEMP
5010  10552 002020        SSA          X<O ?
5011  10553 026565        JMP ELS3     YES
5012  10554 062572        LDA PIBY2
5013  10555 066573        LDB PIBY2+1
5014  10556 026567        JMP ELS3+2
5015  10557 062462  ELS1  LDA XTEMP
5016  10560 066463        LDB XTEMP+1
5017  10561 026527        JMP BTH1     U=X
5018  10562 062464  ELS2  LDA YTEMP
5019  10563 066465        LDB YTEMP+1
5020  10564 124334        JMP FR12A,I
5021  10565 062574  ELS3  LDA MP2
5022  10566 066575        LDB MP2+1
5023  10567 114307        JSB .FSBA,I
5024  10570 010464        DEF YTEMP
5025  10571 124334        JMP FR12A,I
5026  10572 062207  PIBY2 DEC 1.5707963268   PI/2
      10573 166402
5027  10574 115570  MP2   DEC -1.5707963268   -PI/2
      10575 011402
5028  10576 106671  COEF  DEC -1.33034E-8
      10577 102315
5029  10600 056335        DEC 8.64888E-8
      10601 156323
5030  10602 131601        DEC -56.99186E-8
      10603 137731
5031  10604 040033        DEC 3.821037E-6
      10605 035737
5032  10606 111013        DEC -2.6215196E-5
      10607 123343
5033  10610 060542        DEC 1.8574297E-4
      10611 000351
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5034  10612 122573        DEC -1.381195004E-3
      10613 062757
5035  10614 055471        DEC .01113584206
      10615 107365
5036  10616 111620        DEC -.1058929245
      10617 147373
5037  10620 070320        DEC 1.762747174
      10621 155002
5038  10622 000000        OCT 0
5039                      SKP
5040*                  ****************************
5041*                  SUBROUTINE TO CALCULATE SIN(X)
5042*                  ****************************
5043*
5044  10623 114306  ECOS JSB .FADA,I
5045  10624 010572        DEF PIBY2
5046  10625 114310  ESIN  JSB .FMPA,I
5047  10626 010675        DEF TOPI
5048  10627 072462        STA XTEMP
5049  10630 076463        STB XTEMP+1  X=2*X/PI
5050  10631 114306        JSB .FADA,I
5051  10632 010460        DEF K1
5052  10633 017427        JSB .PWR2
5053  10634 177776        DEC -2
5054  10635 017400        JSB .IENT
5055  10636 026400        JMP TRGER-1  ERROR IF EXPONENT >= 15
5056  10637 017417        JSB FLOAT
5057  10640 114310        JSB .FMPA,I
5058  10641 010677        DEF MM4
5059  10642 114306        JSB .FADA,I
5060  10643 010462        DEF XTEMP
5061  10644 072462        STA XTEMP
5062  10645 076463        STB XTEMP+1  X=X-4*ENTIER((X+1)/4)
5063  10646 114307        JSB .FSBA,I
5064  10647 010460        DEF K1
5065  10650 002020        SSA          X<1 ?
5066  10651 026660        JMP PAST     YES
5067  10652 062470        LDA K2
5068  10653 066471        LDB K2+1
5069  10654 114307        JSB .FSBA,I
5070  10655 010462        DEF XTEMP
5071  10656 072462        STA XTEMP
5072  10657 076463        STB XTEMP+1  X=2-X
5073  10660 062462  PAST  LDA XTEMP
5074  10661 066463        LDB XTEMP+1
5075  10662 114310        JSB .FMPA,I
5076  10663 010462        DEF XTEMP
5077  10664 017427        JSB .PWR2
5078  10665 000001        DEC 1
5079  10666 114307        JSB .FSBA,I
5080  10667 010460        DEF K1
5081  10670 017305        JSB .CHEB
5082  10671 010701        DEF COEF1
5083  10672 114310        JSB .FMPA,I
5084  10673 010462        DEF XTEMP
5085  10674 124334        JMP FR12A,I
5086  10675 050574  TOPI  DEC .636619772    2/PI
      10676 141000
5087  10677 100000  MM4   DEC -4.
      10700 000004
5088  10701 047605  COEF1 DEC 1.18496E-6
      10702 072733
5089  10703 134143        DEC -1.365875E-4
      10704 104751
5090  10705 045261        DEC 9.118016E-3
      10706 157365
5091  10707 133371        DEC -.2852615692
      10710 014777
5092  10711 050656        DEC 2.5525579248
      10712 107004
5093  10713 000000        OCT 0
5094                      SPC 10
5095*                  ****************************
```

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5096*                  SUBROUTINE TO COMPUTE ABS (X)
5097*                  ****************************
5098  10714 002020  EABS  SSA
5099  10715 015471        JSB ARINV    YES, NEGATE IT
5100  10716 124334        JMP FR12A,I
5101                      SKP
5102*                  ****************************
5103*                  SUBROUTINE TO COMPUTE RND(X)
5104*                  ****************************
5105*
5106*
5107  10717 002400  ERND  CLA
5108  10720 070150        STA EXP      INITIALIZE EXPONENT
5109  10721 060151        LDA XH       COMPUTE
5110  10722 001000        ALS          HIGH
5111  10723 040151        ADA XH       PART
5112  10724 064152        LDB XL       2*XH
5113  10725 004065        CLE,ERB      + XH +
5114  10726 040001        ADA 1        XL*2^15
5115  10727 064152        LDB XL
5116  10730 005275        RBL,CLE,SLB,ERB    ADD XL[15] TO
5117  10731 002004        INA          (A) (FROM 2*XL$
5118  10732 004066        CLE,ELB      2*XL
5119  10733 044152        ADB XL       + XL
5120  10734 001675        ELA,CLE,SLA,ERA   ADD OVERFLOW
5121  10735 002104        CLE,INA      TO (A)
5122  10736 044536        ADB FLGBT    ADD IN TRAILING BIT OF XL*2^15
5123  10737 002040        SEZ          ADD OVERFLOW
5124  10740 002004        INA          TO (A)
5125  10741 001665        ELA,CLE,ERA  ERASE A[15]
5126  10742 070151        STA XH       STORE
5127  10743 074152        STB XL       INTEGER
5128  10744 015077        JSB .PACK    NORMALIZE AND PACK
5129  10745 124334        JMP FR12A,I
5130                      SKP
5131*                  ****************************
5132*                  SUBROUTINE TO CALCULATE SQR(X)
5133*                  ****************************
5134*
5135  10746 002003  ESQR  SZA,RSS
5136  10747 124334        JMP FR12A,I
5137  10750 002020        SSA          X<O ?
5138  10751 014544        JSB ERROR    YES ERROR
5139  10752 072462  SQRER STA XTEMP
5140  10753 015524        JSB .FLUN
5141  10754 000031        SLA,ARS
5142  10755 027015        JMP ODD
5143  10756 040477        ADA M1
5144  10757 073013        STA SBOX     SBOX=EXPO(X)/2-1
5145  10760 076463        STB XTEMP+1
5146  10761 062462        LDA XTEMP
5147  10762 114310        JSB .FMPA,I
5148  10763 011030        DEF SA2
5149  10764 114306        JSB .FADA,I
5150  10765 011034        DEF SB2      Y=SB2+SA*X
5151  10766 072464  BTH2  STA YTEMP
5152  10767 076465        STB YTEMP+1
5153*
5154  10770 062462        LDA XTEMP
5155  10771 066463        LDB XTEMP+1
5156  10772 114311        JSB .FDVA,I
5157  10773 010464        DEF YTEMP
5158  10774 114306        JSB .FADA,I
5159  10775 010464        DEF YTEMP
5160  10776 017427        JSB .PWR2
5161  10777 177777        DEC -1
5162  11000 072464        STA YTEMP
5163  11001 076465        STB YTEMP+1  Y=(Y+X/Y)/2
5164  11002 062462        LDA XTEMP
5165  11003 066463        LDB XTEMP+1
5166  11004 114311        JSB .FDVA,I
5167  11005 010464        DEF YTEMP
5168  11006 114306        JSB .FADA,I
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5169  11007 010464        DEF YTEMP
5170  11010 072464        STA YTEMP
5171  11011 076465        STB YTEMP+1
5172  11012 017427        JSB .PWR2
5173  11013 000000  SBOX   OCT 0
5174  11014 124334        JMP FR12A,I
5175  11015 073013  ODD    STA SBOX
5176  11016 044445        ADB MSK0
5177  11017 076463        STB XTEMP+1
5178  11020 062462        LDA XTEMP
5179  11021 114310        JSB .FMPA,I
5180  11022 011026        DEF SA1
5181  11023 114306        JSB .FADA,I
5182  11024 011032        DEF SB1
5183  11025 026766        JMP BTH2     Y=SB1+SA1*X
5184  11026 070000  SA1    DEC .875
      11027 000000
5185  11030 045000  SA2    DEC .578125
      11031 000000
5186  11032 043524  SB1    DEC .27863
      11033 046377
5187  11034 066000  SB2    DEC .421875
      11035 000377
5188                        SPC 10

5190*                    ******************************
5191*                    SUBROUTINE TO CALCULATE INT(X)
5192*                    ******************************
5193  11036 074204  EINT   STB SBOXX
5194  11037 064410        LDB .31
5195  11040 074150        STB EXP
5196  11041 064204        LDB SBOXX
5197  11042 015432        JSB IFIX
5198  11043 027046        JMP EINT1
5199  11044 015077        JSB .PACK
5200  11045 124334        JMP FR12A,I
5201  11046 060172  EINT1  LDA STK15
5202  11047 064204        LDB SBOXX
5203  11050 124334        JMP FR12A,I
5204                        SKP
5205*                    ******************************
5206*                    SUBROUTINE TO CALCULATE LOG(X)
5207*                    ******************************
5208*
5209  11051 017053  ELOG   JSB .LOG
5210  11052 124334        JMP FR12A,I
5211  11053 000000  .LOG   NOP
5212  11054 002003        SZA,RSS      NON-ZERO ARGUMENT?
5213  11055 027131        JMP .LOG1    NO
5214  11056 002020        SSA          YES, POSITIVE ARGUMENT?
5215  11057 014544        JSB ERROR    NO
5216  11060 072462  LOGER STA XTEMP
5217  11061 015524        JSB .FLUN
5218  11062 076463        STB XTEMP+1
5219  11063 017417        JSB FLOAT
5220  11064 072464        STA YTEMP
5221  11065 076465        STB YTEMP+1  Y=EXPO(X)
5222  11066 062462        LDA XTEMP
5223  11067 066463        LDB XTEMP+1
5224  11070 114306        JSB .FADA,I
5225  11071 011135        DEF R22
5226  11072 072466        STA UTEMP
5227  11073 076467        STB UTEMP+1  U=X+SQR(0.5)
5228  11074 062462        LDA XTEMP
5229  11075 066463        LDB XTEMP+1
5230  11076 114307        JSB .FSBA,I
5231  11077 011135        DEF R22
5232  11100 114311        JSB .FDVA,I
5233  11101 010466        DEF UTEMP
5234  11102 072466        STA UTEMP
5235  11103 076467        STB UTEMP+1  U=(X-SQR(0.5))/O
5236  11104 114310        JSB .FMPA,I
5237  11105 010466        DEF UTEMP
```

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5238  11106 114307        JSB .FSBA,I
5239  11107 011145        DEF CCC
5240  11110 072462        STA XTEMP
5241  11111 076463        STB XTEMP+1
5242  11112 063143        LDA MB
5243  11113 067144        LDB MB+1
5244  11114 114311        JSB .FDVA,I
5245  11115 010462        DEF XTEMP
5246  11116 114306        JSB .FADA,I
5247  11117 011141        DEF AAA
5248  11120 114310        JSB .FMPA,I
5249  11121 010466        DEF UTEMP
5250  11122 114307        JSB .FSBA,I
5251  11123 000534        DEF HALF
5252  11124 114306        JSB .FADA,I
5253  11125 010464        DEF YTEMP
5254  11126 114310        JSB .FMPA,I
5255  11127 011137        DEF LE2
5256  11130 127053        JMP .LOG,I   ANS=LOG(2)*(EXPO(X)-0.5+U*
5257  11131 014544  .LOG1 JSB ERROR    LOG OF ZERO
5258  11132 060536  LNZR  LDA MNEG     RETURN
5259  11133 064447        LDB B776     NEGATIVE
5260  11134 127053        JMP .LOG,I   INFINITY
5261  11135 055202  R22   DEC .707106781   SQR(0.5)
      11136 075000
5262  11137 054271  LE2   DEC .6931471806   LOG BASE E OF 2
      11140 006000
5263  11141 051260  AAA   DEC 1.2920070987
      11142 037402
5264  11143 125606  MB    DEC -2.6398577035
      11144 044404
5265  11145 065010  CCC   DEC 1.6567626301
      11146 063002
5266                      SPC 10
5267*                  ****************************
5268*                  SUBROUTINE TO COMPUTE SGN(X)
5269*                  ****************************
5270*
5271  11147 006400  ESGN  CLB
5272  11150 002003        SZA,RSS      ZERO?
5273  11151 124334        JMP FR12A,I
5274  11152 002021        SSA,RSS      NO, POSITIVE?
5275  11153 064371        LDB .2       YES, SET EXPONENT
5276  11154 060536        LDA FLGBT    LOAD MANTISSA
5277  11155 006002        SZB          POSITIVE?
5278  11156 001300        RAR          YES, CORRECT MANTISSA
5279  11157 124334        JMP FR12A,I
5280                      SKP
5281*                  ****************************
5282*                  SUBROUTINE TO CALCULATE EXP(X)
5283*                  ****************************
5284*
5285  11160 017162  EEXP  JSB .EXP
5286  11161 124334        JMP FR12A,I
5287  11162 000000  .EXP  NOP
5288  11163 114310        JSB .FMPA,I
5289  11164 011303        DEF L2E
5290  11165 072462        STA XTEMP
5291  11166 076463        STB XTEMP+1    X=Z*LOG2(E)
5292  11167 017400        JSB .IENT
5293  11170 027262        JMP .EXP1
5294  11171 073255        STA INTE     INTE = ENTIER(X)
5295  11172 017417        JSB FLOAT
5296  11173 072464        STA YTEMP
5297  11174 076465        STB YTEMP+1  Y=ENTIER(X)
5298  11175 063255        LDA INTE
5299  11176 043271        ADA M124
5300  11177 002021        SSA,RSS      INTE >=124 ?
5301  11200 027265        JMP EXPER-1  YES,ERROR
5302  11201 043272        ADA .244     INTE <-120 ?
5303  11202 002020        SSA
5304  11203 027257        JMP ZERE     YES,ANS=0
5305  11204 062462        LDA XTEMP
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```
5306  11205 066463        LDB XTEMP+1
5307  11206 114307        JSB .FSBA,I
5308  11207 010464        DEF YTEMP
5309  11210 072462        STA XTEMP
5310  11211 076463        STB XTEMP+1  X=X-ENTIER(X)
5311  11212 114310        JSB .FMPA,I
5312  11213 010462        DEF XTEMP
5313  11214 072466        STA UTEMP
5314  11215 076467        STB UTEMP+1  U=X**2
5315  11216 114306        JSB .FADA,I
5316  11217 011273        DEF AAAA
5317  11220 072464        STA YTEMP
5318  11221 076465        STB YTEMP+1  Y=X**2+AAAA
5319  11222 063275        LDA BBBB
5320  11223 067276        LDB BBBB+1
5321  11224 114311        JSB .FDVA,I
5322  11225 010464        DEF YTEMP
5323  11226 072464        STA YTEMP
5324  11227 076465        STB YTEMP+1  Y=BBBB/Y
5325  11230 063277        LDA CCCC
5326  11231 067300        LDB CCCC+1
5327  11232 114310        JSB .FMPA,I
5328  11233 010466        DEF UTEMP
5329  11234 114306        JSB .FADA,I
5330  11235 011301        DEF DDDD
5331  11236 114307        JSB .FSBA,I
5332  11237 010462        DEF XTEMP
5333  11240 114307        JSB .FSBA,I
5334  11241 010464        DEF YTEMP
5335  11242 072464        STA YTEMP
5336  11243 076465        STB YTEMP+1  Y=X+DDDD+CCCC*X**2-Y
5337  11244 062462        LDA XTEMP
5338  11245 066463        LDB XTEMP+1
5339  11246 114311        JSB .FDVA,I
5340  11247 010464        DEF YTEMP
5341  11250 114306        JSB .FADA,I
5342  11251 000534        DEF HALF
5343  11252 037255        ISZ INTE
5344  11253 000000        NOP
5345  11254 017427        JSB .PWR2
5346  11255 000000  INTE  OCT 0
5347  11256 127162        JMP .EXP,I   AND=(0.5+X/Y)*2**INTE
5348  11257 002400  ZERE  CLA
5349  11260 006400        CLB
5350  11261 127162        JMP .EXP,I
5351  11262 063366  .EXP1 LDA X2TMP
5352  11263 002020        SSA
5353  11264 027257        JMP ZERE
5354  11265 014544        JSB ERROR
5355  11266 060471  EXPER LDA INF
5356  11267 064500        LDB M2
5357  11270 127162        JMP .EXP,I
5358  11271 177604  M124  DEC -124
5359  11272 000364  .244  DEC 244
5360  11273 053552  AAAA  DEC 87.417497202
      11274 160416
5361  11275 046477  BBBB  DEC 617.9722695
      11276 016424
5362  11277 043372  CCCC  DEC .03465735903
      11300 070371
5363  11301 047643  DDDD  DEC 9.9545957821
      11302 001410
5364  11303 056125  L2E   DEC 1.4426950409
      11304 017002
5365                      SKP
5366*                  ******************************
5367*                  SUBROUTINE TO COMPUTE CHEBY(X)
5368*                  ******************************
5369*
5370  11305 000000  .CHEB NOP
5371  11306 073400        STA .IENT
5372  11307 063305        LDA .CHEB
5373  11310 070146        STA RSYM
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5374  11311 063400        LDA .IENT
5375  11312 114310        JSB .FMPA,I
5376  11313 010470        DEF K2
5377  11314 073366        STA X2TMP
5378  11315 077367        STB X2TMP+1  X2 =X+2
5379  11316 164146        LDB RSYM,I
5380  11317 077374        STB CTMP     C POINTS TO COEFFICIENT TABLE
5381  11320 160001        LDA 1,I
5382  11321 006004        INB
5383  11322 164001        LDB 1,I      GET FIRST COEFF
5384  11323 073376        STA DTMP
5385  11324 077377        STB DTMP+1   D=C(N)
5386  11325 002400        CLA
5387  11326 073372        STA BTMP
5388  11327 073373        STA BTMP+1   B=0
5389  11330 037374  LOPC  ISZ CTMP
5390  11331 037374        ISZ CTMP     N=N-1
5391  11332 163374        LDA CTMP,I
5392  11333 002003        SZA,RSS      C(N)=0 ?
5393  11334 027356        JMP COUT     ZERO FLAGS END OF TABLE
5394  11335 063372        LDA BTMP     NO
5395  11336 067373        LDB BTMP+1
5396  11337 073370        STA ATMP
5397  11340 077371        STB ATMP+1   A=B
5398  11341 063376        LDA DTMP
5399  11342 067377        LDB DTMP+1
5400  11343 073372        STA BTMP
5401  11344 077373        STB BTMP+1   B=D
5402  11345 114310        JSB .FMPA,I
5403  11346 011366        DEF X2TMP
5404  11347 114307        JSB .FSBA,I
5405  11350 011370        DEF ATMP
5406  11351 114306        JSB .FADA,I
5407  11352 111374        DEF CTMP,I
5408  11353 073376        STA DTMP
5409  11354 077377        STB DTMP+1   D=C(N) -A+B*X2
5410  11355 027330        JMP LOPC
5411  11356 063376  COUT  LDA DTMP
5412  11357 067377        LDB DTMP+1
5413  11360 114307        JSB .FSBA,I
5414  11361 011370        DEF ATMP
5415  11362 114310        JSB .FMPA,I
5416  11363 000534        DEF HALF
5417  11364 034146        ISZ RSYM
5418  11365 124146        JMP RSYM,I
5419*
5420***   CONSTANTS FOR .CHEB
5421*
5422  11366         X2TMP BSS 2
5423  11370         ATMP  BSS 2
5424  11372         BTMP  BSS 2
5425  11374         CTMP  BSS 2
5426  11376         DTMP  BSS 2
5427                      SKP
5428*                  ****************************************
5429*                  SUBROUTINE TO COMPUTE THE ENTIER OF A NUMBER
5430*                  WHOSE EXPONENT IS LESS THAN 15
5431*                  ****************************************
5432*
5433  11400 000000  .IENT NOP
5434  11401 073366        STA X2TMP    STORE HIGH PART
5435  11402 060001        LDA 1        MOVE LOW PART TO A
5436  11403 010445        AND MSK0     ISOLATE EXPONENT
5437  11404 000033        SLA,RAR
5438  11405 027411        JMP *+4      IF NEGATIVE OK
5439  11406 040512        ADA M15
5440  11407 002021        SSA,RSS      EXPO(X) > 14
5441  11410 127400        JMP .IENT,I  YES, ERROR RETURN
5442  11411 037400        ISZ .IENT    NO BUMP RETURN POINT
5443  11412 063366        LDA X2TMP    RESTORE HIGH PART
5444  11413 015432        JSB IFIX     CALL ENTIER
5445  11414 000000        NOP
5446  11415 060001        LDA 1
```

```
5447  11416 127400        JMP .IENT,I
5448                      SPC 5
5449*                  ****************************
5450*                  SUBROUTINE TO FLOAT AN INTEGER
5451*                  ****************************
5452*
5453  11417 000000  FLOAT NOP
5454  11420 067417        LDB FLOAT
5455  11421 074154        STB STK1
5456  11422 064402        LDB .15
5457  11423 074150        STB EXP
5458  11424 006400        CLB
5459  11425 015077        JSB .PACK
5460  11426 124154        JMP STK1,I
5461                      SKP
5462*                  ************************************
5463*                  SUBROUTINE TO MULTIPLY BY A POWER OF TWO
5464*                  ************************************
5465*
5466  11427 000000  .PWR2 NOP
5467  11430 002003        SZA,RSS      X=0 ?
5468  11431 027443        JMP .RET     YES, ANS=0
5469  11432 073366        STA X2TMP
5470  11433 015524        JSB .FLUN
5471  11434 077367        STB X2TMP+1
5472  11435 143427        ADA .PWR2,I
5473  11436 001200        RAL
5474  11437 010445        AND MSK0
5475  11440 070001        STA 1
5476  11441 047367        ADB X2TMP+1
5477  11442 063366        LDA X2TMP
5478  11443 037427  .RET   ISZ .PWR2
5479  11444 127427        JMP .PWR2,I
5480                      HED ***  MATRIX ROUTINES  ***
5481*                  ****************************
5482*                  MATRIX STMT EXECUTION CONTROL
5483*                  ****************************
5484*
5485  11445 160205  EMAT  LDA TEMPS,I  LOAD FIRST WORD OF STMT
5486  11446 034205        ISZ TEMPS
5487  11447 010450        AND MSK1     ISOLATE OPERAND PART
5488  11450 002002        SZA
5489  11451 027602        JMP EMAT7
5490  11452 160205        LDA TEMPS,I  LOAD NEXT WORD OF STMT
5491  11453 010467        AND OPMSK
5492  11454 070217        STA MLBX1
5493  11455 050465        CPA RDOP
5494  11456 002001        RSS
5495  11457 114320        JSB PRNIA,I
5496*
5497  11460 160205  EMAT1 LDA TEMPS,I
5498  11461 010450        AND MSK1
5499  11462 002003        SZA,RSS
5500  11463 027550        JMP EMAT4+4
5501  11464 114301        JSB SSYMA,I
5502  11465 006007        INB,SZB,RSS
5503  11466 124337        JMP E8M1A,I
5504  11467 034205        ISZ TEMPS
5505  11470 160001        LDA 1,I
5506  11471 070221        STA B1
5507  11472 060217        LDA MLBX1
5508  11473 050465        CPA RDOP
5509  11474 027553        JMP EMAT5
5510  11475 044371        ADB .2
5511  11476 160001        LDA 1,I
5512  11477 070222        STA B1+1
5513  11500 010445        AND MSK0
5514  11501 003004        CMA,INA
5515  11502 070223        STA B2
5516  11503 070224        STA B2+1
5517  11504 160001        LDA 1,I
5518  11505 001727        ALF,ALF
5519  11506 010445        AND MSK0
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5520  11507 003004        CMA,INA
5521  11510 070225        STA B3
5522  11511 114325        JSB LCK2A,I
5523  11512 002400        CLA
5524  11513 070226        STA B3+1
5525  11514 060205        LDA TEMPS
5526  11515 050140        CPA PRADD
5527  11516 027527        JMP EMAT3
5528  11517 160205        LDA TEMPS,I
5529  11520 010467        AND OPMSK
5530  11521 050453        CPA B3000
5531  11522 034226        ISZ B3+1
5532  11523 027527        JMP EMAT3
5533  11524 006400  EMAT2 CLB
5534  11525 054226        CPB B3+1
5535  11526 015730        JSB EDELM
5536  11527 160221  EMAT3 LDA B1,I
5537  11530 034221        ISZ B1
5538  11531 164221        LDB B1,I
5539  11532 034221        ISZ B1
5540  11533 015711        JSB ENOUT
5541  11534 034223        ISZ B2
5542  11535 027524        JMP EMAT2
5543  11536 015753        JSB OUTLN
5544  11537 015753        JSB OUTLN
5545  11540 060224        LDA B2+1
5546  11541 070223        STA B2
5547  11542 034225        ISZ B3
5548  11543 027527        JMP EMAT3
5549  11544 064205  EMAT4 LDB TEMPS
5550  11545 054140        CPB PRADD
5551  11546 002001        RSS
5552  11547 027460        JMP EMAT1
5553  11550 002404        CLA,INA
5554  11551 114104        JSB SEXU,I
5555  11552 124326        JMP XEC4A,I
5556*
5557  11553 074223  EMAT5 STB B2
5558  11554 160205        LDA TEMPS,I
5559  11555 010467        AND OPMSK
5560  11556 064205        LDB TEMPS
5561  11557 054140        CPB PRADD
5562  11560 002400        CLA
5563  11561 050461        CPA B2200
5564  11562 017724        JSB REDIM
5565  11563 060223        LDA B2
5566  11564 040371        ADA .2
5567  11565 160000        LDA 0,I
5568  11566 015404        JSB MDIM
5569  11567 001100        ARS
5570  11570 003004        CMA,INA
5571  11571 070225        STA B3
5572  11572 114324  EMAT6 JSB FDAT,I
5573  11573 170221        STA B1,I
5574  11574 034221        ISZ B1
5575  11575 174221        STB B1,I
5576  11576 034221        ISZ B1
5577  11577 034225        ISZ B3
5578  11600 027572        JMP EMAT6
5579  11601 027544        JMP EMAT4
5580*
5581  11602 114301  EMAT7 JSB SSYMA,I
5582  11603 006004        INB
5583  11604 160001        LDA 1,I
5584  11605 070225        STA B3
5585  11606 074223        STB B2
5586  11607 044371        ADB .2
5587  11610 160001        LDA 1,I
5588  11611 070226        STA B3+1
5589  11612 002404        CLA,INA
5590  11613 070154        STA STK1
5591  11614 160205  EMAT0 LDA TEMPS,I
5592  11615 034205        ISZ TEMPS
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5593  11616 002020        SSA
5594  11617 027703        JMP EMA11
5595  11620 010450  EMAT8 AND MSK1
5596  11621 002003        SZA,RSS
5597  11622 027673        JMP EMA10
5598  11623 114301        JSB SSYMA,I
5599  11624 006004        INB
5600  11625 160001        LDA 1,I
5601  11626 070221        STA B1
5602  11627 044371        ADB .2
5603  11630 160001        LDA 1,I
5604  11631 070222        STA B1+1
5605  11632 064205        LDB TEMPS
5606  11633 054140        CPB PRADD
5607  11634 027654        JMP EMAT9
5608  11635 160205        LDA TEMPS,I
5609  11636 001100        ARS
5610  11637 001727        ALF,ALF
5611  11640 010430        AND .63
5612  11641 040504        ADA M6
5613  11642 070154        STA STK1
5614  11643 160205        LDA TEMPS,I
5615  11644 010450        AND MSK1
5616  11645 114301        JSB SSYMA,I
5617  11646 006004        INB
5618  11647 160001        LDA 1,I
5619  11650 070223        STA B2
5620  11651 044371        ADB .2
5621  11652 160001        LDA 1,I
5622  11653 070224        STA B2+1
5623  11654 060154  EMAT9 LDA STK1
5624  11655 043660        ADA LMAP
5625  11656 114000        JSB 0,I
5626  11657 124326        JMP XEC4A,I
5627  11660 111660  LMAP  DEF LBASE-1,I
5628  11661 012131  LBASE DEF REPLC
5629  11662 012111        DEF ADD
5630  11663 012124        DEF SUB
5631  11664 012337        DEF MULT
5632  11665 012176        DEF SZER
5633  11666 012153        DEF LCON
5634  11667 012204        DEF LIDN
5635  11670 012447        DEF LINV
5636  11671 012274        DEF TRAN
5637  11672 012145        DEF SMULT
5638  11673 060400  EMA10 LDA .10
5639  11674 070154        STA STK1
5640  11675 114302        JSB FETCA,I
5641  11676 070217        STA MLBX1
5642  11677 074220        STB MLBX1+1
5643  11700 034205        ISZ TEMPS
5644  11701 034205        ISZ TEMPS
5645  11702 027614        JMP EMAT0
5646  11703 001727  EMA11 ALF,ALF
5647  11704 001700        ALF
5648  11705 010410        AND .31
5649  11706 040506        ADA M8
5650  11707 070154        STA STK1
5651  11710 040506        ADA M8
5652  11711 002020        SSA
5653  11712 027717        JMP EMA12
5654  11713 160205        LDA TEMPS,I
5655  11714 034205        ISZ TEMPS
5656  11715 034205        ISZ TEMPS
5657  11716 027620        JMP EMAT8
5658  11717 064205  EMA12 LDB TEMPS
5659  11720 054140        CPB PRADD
5660  11721 027654        JMP EMAT9
5661  11722 017724        JSB REDIM
5662  11723 027654        JMP EMAT9
5663                      SKP
5664*                  ******************************
5665*                  SUBROUTINE TO REDIMENSION ARRAY
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5666*                  ******************************
5667*
5668  11724 000000  REDIM NOP
5669  11725 017761        JSB MCKS
5670  11726 005727        BLF,BLF
5671  11727 074226        STB B3+1
5672  11730 006404        CLB,INB
5673  11731 034205        ISZ TEMPS    INDEX POINTER
5674  11732 160205        LDA TEMPS,I
5675  11733 010467        AND OPMSK    CHECK OPERAND PART
5676  11734 050456        CPA LF
5677  11735 027740        JMP REDI1
5678  11736 017761        JSB MCKS
5679  11737 034205        ISZ TEMPS
5680  11740 034205  REDI1 ISZ TEMPS
5681  11741 044226        ADB B3+1
5682  11742 074226        STB B3+1
5683  11743 060223        LDA B2
5684  11744 040371        ADA .2
5685  11745 174000        STB 0,I
5686  11746 040477        ADA M1
5687  11747 160000        LDA 0,I
5688  11750 015404        JSB MDIM     COMPUTE SIZE OF ASSIGNED STORAGE
5689  11751 070220        STA MLBX1+1
5690  11752 060226        LDA B3+1
5691  11753 015404        JSB MDIM     COMPUTE STORAGE REQUIRED
5692  11754 003004        CMA,INA      COMPLEMENT
5693  11755 040220        ADA MLBX1+1
5694  11756 002020        SSA          OK IF POSITIVE
5695  11757 014544        JSB ERROR
5696  11760 127724  E7    JMP REDIM,I
5697                      SKP
5698*                  ****************************************
5699*                  SUBROUTINE TO EVALUATE & CHECK A SUBSCRIPT
5700*                  ****************************************
5701  11761 000000  MCKS  NOP
5702  11762 114302        JSB FETCA,I  CALL FOR EVALUATION
5703  11763 015421        JSB SBFIX    CONVERT TO INTEGER (ROUNDED)
5704  11764 006004        INB
5705  11765 060001        LDA 1
5706  11766 040527        ADA M256
5707  11767 002021        SSA,RSS
5708  11770 124342        JMP E6M1A,I
5709  11771 127761        JMP MCKS,I   RETURN
5710**
5711***   PREDEFINED FUNCTION JUMP TABLE **
5712**
5713  11772 006566  PDFT  DEF ETAB
5714  11773 010625        DEF ESIN
5715  11774 010623        DEF ECOS
5716  11775 010367        DEF ETAN
5717  11776 010513        DEF EATN
5718  11777 011160        DEF EEXP
5719  12000 011051        DEF ELOG
5720  12001 010714        DEF EABS
5721  12002 010746        DEF ESQR
5722  12003 011036        DEF EINT
5723  12004 010717        DEF ERND
5724  12005 011147        DEF ESGN
5725                      SKP
5726***   MATRIX ROUTINES EXECUTION
5727*
5728*
5729***   SUBROUTINE GENERAL
5730*
5731  12006 000000  GENER NOP          SUBROUTINE GENERAL
5732  12007 060224        LDA B2+1     LOAD DIM FOR MATRIX 2
5733  12010 064222        LDB B1+1     LOAD DIM FOR MATRIX 1
5734  12011 016040        JSB COMPR    CHECK ROW AND COL DIM
5735  12012 060222  GEN2  LDA B1+1
5736  12013 064226        LDB B3+1     LOAD DIM FOR MATRIX 3
5737  12014 016040        JSB COMPR    CHECKS ROW AND COL DIM
5738  12015 015317        JSB MPY
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5739  12016 013123        DEF T3
5740  12017 003004        CMA,INA
5741  12020 073142        STA LPIV
5742  12021 160221  LOOP  LDA B1,I
5743  12022 034221        ISZ B1
5744  12023 164221        LDB B1,I
5745  12024 034221        ISZ B1
5746  12025 000000  MOD1  NOP
5747  12026 000000        NOP
5748  12027 170225        STA B3,I
5749  12030 034225        ISZ B3
5750  12031 174225        STB B3,I
5751  12032 034225        ISZ B3
5752  12033 000000  MOD2  NOP           NEXT FOUR INSTR ARE MOD
5753  12034 000000        NOP
5754  12035 037142        ISZ LPIV
5755  12036 026021        JMP LOOP      COMPUTE NEXT ELEMENT
5756  12037 126006        JMP GENER,I
5757*
5758***   SUBROUTINE COMPARE
5759*
5760  12040 000000  COMPR NOP
5761  12041 050001        CPA 1
5762  12042 002001        RSS
5763  12043 014544  LERR  JSB ERROR     PRINT ERROR DIAGNOSTIC
5764  12044 001727        ALF,ALF
5765  12045 010445        AND MSK0
5766  12046 073123        STA T3
5767  12047 060001        LDA 1
5768  12050 010445        AND MSK0
5769  12051 073124        STA T4
5770  12052 126040        JMP COMPR,I
5771*
5772***   SUBROUTINE LCHK
5773*
5774  12053 000000  LCHK2 NOP
5775  12054 062053        LDA LCHK2
5776  12055 072057        STA LCHK1
5777  12056 026063        JMP *+5
5778  12057 000000  LCHK1 NOP
5779  12060 064223        LDB B2
5780  12061 060224        LDA B2+1
5781  12062 016067        JSB LCHK4     TEST EACH TERM OF B1
5782  12063 064221        LDB B1
5783  12064 060222        LDA B1+1
5784  12065 016067        JSB LCHK4
5785  12066 126057        JMP LCHK1,I
5786  12067 000000  LCHK4 NOP           SUBROUTINE TO TEST TERMS
5787  12070 077126        STB T6        SAVE
5788  12071 015404        JSB MDIM      COMPUTE SIZE OF MATRIX
5789  12072 001100        ARS
5790  12073 003004        CMA,INA
5791  12074 073127        STA T7        COUNTER FOR ELEMENTS
5792  12075 163126  LCHK6 LDA T6,I
5793  12076 037126        ISZ T6
5794  12077 167126        LDB T6,I
5795  12100 037126        ISZ T6
5796  12101 050536        CPA MNEG      COMPARE WITH PRESET QTY.
5797  12102 026104        JMP *+2
5798  12103 026106        JMP LCHK5
5799  12104 054537        CPB MNEG+1
5800  12105 014544        JSB ERROR     ERROR 'MAT UNASSIGNED'
5801  12106 037127  LCHK5 ISZ T7
5802  12107 026075        JMP LCHK6
5803  12110 126067        JMP LCHK4,I   RETURN
5804                      SKP
5805*
5806***   SUBROUTINE MATRIX ADD
5807*
5808  12111 000000  ADD   NOP
5809  12112 063143        LDA LPLUS     OCTAL INSTR FOR FAD T18
5810  12113 072025  ADD1  STA MOD1
5811  12114 063144        LDA LPLUS+1   ADDRESS OF T18
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5812  12115 072026        STA MOD1+1   MODIFY ROUTINE GENERAL
5813  12116 063147        LDA INCB2
5814  12117 072033        STA MOD2     MODIFY ROUTINE GENERAL
5815  12120 072034        STA MOD2+1   MODIFY ROUTINE GENERAL
5816  12121 016057        JSB LCHK1
5817  12122 016006        JSB GENER    ROUTINE GENERAL
5818  12123 126111        JMP ADD,I    EXIT TO MAIN PROGRAM
5819*
5820***   SUBROUTINE MATRIX SUBTRACT
5821*
5822  12124 000000  SUB   NOP
5823  12125 062124        LDA SUB
5824  12126 072111        STA ADD
5825  12127 063145        LDA LMIN     OCTAL INSTR FOR FSB T18
5826  12130 026113        JMP ADD1

5828*
5829***   SUBROUTINE MATRIX REPLACE
5830*
5831  12131 000000  REPLC NOP
5832  12132 062131        LDA REPLC
5833  12133 072006        STA GENER
5834  12134 002400        CLA
5835  12135 006400        CLB
5836  12136 072025  REPL1 STA MOD1
5837  12137 076026        STB MOD1+1
5838  12140 002400        CLA
5839  12141 072033        STA MOD2
5840  12142 072034        STA MOD2+1
5841  12143 016053        JSB LCHK2
5842  12144 026012        JMP GEN2
5843                      SKP
5844*
5845***   SUBROUTINE MATRIX SCALAR MULTIPLY
5846*
5847  12145 000000  SMULT NOP
5848  12146 062145        LDA SMULT
5849  12147 072006        STA GENER
5850  12150 063146        LDA LTIME
5851  12151 064367        LDB MBXL
5852  12152 026136        JMP REPL1
5853*
5854***   SUBROUTINE MATRIX CON
5855*
5856  12153 000000  LCON  NOP
5857  12154 060534        LDA HONE
5858  12155 064371        LDB .2
5859  12156 070217  LCON1 STA MLBX1
5860  12157 074220        STB MLBX1+1
5861  12160 060226        LDA B3+1
5862  12161 015404        JSB MDIM
5863  12162 001100        ARS
5864  12163 003004        CMA,INA
5865  12164 073142        STA LPIV
5866  12165 060217        LDA MLBX1
5867  12166 064220        LDB MLBX1+1
5868  12167 170225  LCON2 STA B3,I
5869  12170 034225        ISZ B3
5870  12171 174225        STB B3,I
5871  12172 034225        ISZ B3
5872  12173 037142        ISZ LPIV
5873  12174 026167        JMP LCON2
5874  12175 126153        JMP LCON,I
5875*
5876***   SUBROUTINE MATRIX ZERO
5877*
5878  12176 000000  SZER  NOP
5879  12177 062176        LDA SZER
5880  12200 072153        STA LCON
5881  12201 002400        CLA
5882  12202 006400        CLB
5883  12203 026156        JMP LCON1
5884*
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5885***   SUBROUTINE MATRIX IDN
5886*
5887  12204 000000  LIDN  NOP
5888  12205 060225        LDA B3
5889  12206 073131        STA T9
5890  12207 016176        JSB SZER
5891  12210 060226        LDA B3+1
5892  12211 001727        ALF,ALF
5893  12212 050226        CPA B3+1
5894  12213 001010        ALS,SLA
5895  12214 026043        JMP LERR
5896  12215 010450        AND MSK1
5897  12216 070217        STA MLBX1
5898  12217 001100        ARS
5899  12220 003004        CMA,INA
5900  12221 070220        STA MLBX1+1
5901  12222 067131        LDB T9
5902  12223 074225        STB B3
5903  12224 060534  LIDN1 LDA HONE
5904  12225 170001        STA 1,I
5905  12226 006004        INB
5906  12227 060371        LDA .2
5907  12230 170001        STA 1,I
5908  12231 006004        INB
5909  12232 044217        ADB MLBX1
5910  12233 034220        ISZ MLBX1+1
5911  12234 026224        JMP LIDN1
5912  12235 126204        JMP LIDN,I
5913*
5914***   SUBROUTINES DLD AND DST
5915*
5916  12236 000000  .DLD  NOP
5917  12237 016256        JSB GETAD    GET ADDRESS
5918  12240 112236        DEF .DLD,I
5919  12241 036236        ISZ .DLD     BUMP RETURN ADDRESS
5920  12242 162272        LDA ADRES,I  LOAD HIGH PART.
5921  12243 036272        ISZ ADRES
5922  12244 166272        LDB ADRES,I  LOAD LOW PART.
5923  12245 126236        JMP .DLD,I
5924  12246 000000  .DST  NOP
5925  12247 016256        JSB GETAD    GET ADDRESS.
5926  12250 112246        DEF .DST,I
5927  12251 036246        ISZ .DST     BUMP RETURN ADDRESS.
5928  12252 172272        STA ADRES,I  STORE HIGH PART.
5929  12253 036272        ISZ ADRES
5930  12254 176272        STB ADRES,I  STORE LOW PART.
5931  12255 126246        JMP .DST,I
5932  12256 000000  GETAD NOP          COMPUTES EFFECTIVE ADDRESS.
5933  12257 072273        STA TINY     SAVE A REGISTER.
5934  12260 162256        LDA GETAD,I  GET POINTER TO ADDRESS.
5935  12261 072272  GET   STA ADRES    STORE IN ADRES.
5936  12262 062273        LDA TINY     RESTORE A REGISTER.
5937  12263 162272        LDA ADRES,I
5938  12264 001275        RAL,CLE,SLA,ERA  TEST FOR INDIRECT
5939  12265 026261        JMP GET      IT IS INDIRECT.
5940  12266 072272        STA ADRES    EFFECTIVE ADDRESS.
5941  12267 062273        LDA TINY
5942  12270 036256        ISZ GETAD    RETURN
5943  12271 126256        JMP GETAD,I
5944  12272         ADRES BSS 1
5945  12273         TINY  BSS 1
5946*
5947***   SUBROUTINE TRANSPOSE
5948*
5949  12274 000000  TRAN  NOP
5950  12275 016053        JSB LCHK2    TEST B1 FOR UNASSIGNED TERMS
5951  12276 060226        LDA B3+1     PARAMETERS OF B3
5952  12277 001727        ALF,ALF      INTERCHANGE ROW AND COLUMN
5953  12300 064222        LDB B1+1     PARAMETERS OF B1
5954  12301 016040        JSB COMPR    SUBROUTINE COMPARE
5955  12302 015317        JSB MPY
5956  12303 013123        DEF T3
5957  12304 073142        STA LPIV     PRODUCT OF ROW*COL
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5958  12305 063124        LDA T4
5959  12306 003004        CMA,INA
5960  12307 073125        STA T5
5961  12310 002400  TRAN1 CLA
5962  12311 073126        STA T6       SET T6=0
5963  12312 067126  LNEXT LDB T6
5964  12313 005000        BLS
5965  12314 044221        ADB B1
5966  12315 160001        LDA 1,I
5967  12316 006004        INB
5968  12317 164001        LDB 1,I
5969  12320 170225        STA B3,I
5970  12321 034225        ISZ B3
5971  12322 174225        STB B3,I
5972  12323 034225        ISZ B3
5973  12324 063126        LDA T6       SET T6=T6+T4
5974  12325 043124        ADA T4       T6 POINTS TO NEXT TERM IN
5975  12326 073126        STA T6       A COLUMN TO BE TRANSPOSED
5976  12327 053142        CPA LPIV     TEST FOR LAST IN COL
5977  12330 026332        JMP *+2
5978  12331 026312        JMP LNEXT
5979  12332 034221        ISZ B1
5980  12333 034221        ISZ B1
5981  12334 037125        ISZ T5
5982  12335 026310        JMP TRAN1    TRANSPOSE NEXT COL
5983  12336 126274        JMP TRAN,I   EXIT TO MAIN PROGRAM
5984*
5985***   SUBROUTINE MATRIX MULTIPLY
5986*
5987  12337 000000  MULT  NOP
5988  12340 016057        JSB LCHK1    TEST B1,B2 FOR UNASSIGNED TERMS
5989  12341 060226        LDA B3+1     PARAMETERS OF B3
5990  12342 010445        AND MSK0
5991  12343 073126        STA T6
5992  12344 060224        LDA B2+1
5993  12345 010445        AND MSK0
5994  12346 053126        CPA T6
5995  12347 002001        RSS
5996  12350 026043        JMP LERR
5997  12351 060226        LDA B3+1     PARAMETERS OF B3
5998  12352 010527        AND M256
5999  12353 070001        STA 1        STORE ROW IN MSP OF B
6000  12354 060224        LDA B2+1     PARAMETERS OF B2
6001  12355 001727        ALF,ALF
6002  12356 010445        AND MSK0
6003  12357 040001        ADA 1        COMBINE A AND B
6004  12360 064222        LDB B1+1     PARAMETERS OF B1
6005  12361 016040        JSB COMPR    COMPARE ROW AND COL
6006  12362 060223        LDA B2       MULT
6007  12363 073125        STA T5
6008  12364 063123        LDA T3
6009  12365 003004        CMA,INA
6010  12366 073131        STA T9
6011  12367 063126  MULT4 LDA T6
6012  12370 003004        CMA,INA
6013  12371 073132        STA T10
6014  12372 063125        LDA T5
6015  12373 070223        STA B2       RESTORE BASE ADDRESS B2
6016  12374 002400  MULT3 CLA
6017  12375 073133        STA T11      COUNTER FOR B2. INCR BY
6018  12376 073134        STA T12      COUNTER FOR B1. INCR BY 2
6019  12377 006400        CLB
6020  12400 016246        JSB .DST     CLEAR TO ZERO
6021  12401 100225        DEF B3,I
6022  12402 064221  MULT2 LDB B1       COMPUTE PROD OF ONE TERM
6023  12403 047134        ADB T12      IN ROW BY ONE TERM IN COL
6024  12404 077140        STB T18
6025  12405 064223        LDB B2
6026  12406 047133        ADB T11
6027  12407 016236        JSB .DLD
6028  12410 100001        DEF 1,I
6029  12411 114310        JSB .FMPA,I
6030  12412 113140        DEF T18,I
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6031  12413 114306        JSB .FADA,I  COMPUTES RUNNING SUM
6032  12414 100225        DEF B3,I
6033  12415 016246        JSB .DST
6034  12416 100225        DEF B3,I
6035  12417 037134        ISZ T12      SELECT NEXT TERM IN ROW
6036  12420 037134        ISZ T12
6037  12421 063126        LDA T6       SELECT NEXT TERM IN COL
6038  12422 001000        ALS
6039  12423 043133        ADA T11
6040  12424 073133        STA T11
6041  12425 063124        LDA T4
6042  12426 001000        ALS
6043  12427 053134        CPA T12
6044  12430 026432        JMP *+2
6045  12431 026402        JMP MULT2    MULT AND ADD IN NEXT TERM
6046  12432 034225        ISZ B3       INCR RECEIVING MAT
6047  12433 034225        ISZ B3
6048  12434 034223        ISZ B2       BASE ADDRESS OF NEXT COL
6049  12435 034223        ISZ B2
6050  12436 037132        ISZ T10
6051  12437 026374        JMP MULT3    COMPUTE SAME ROW*NEXT COL
6052  12440 063124        LDA T4
6053  12441 001000        ALS
6054  12442 040221        ADA B1
6055  12443 070221        STA B1       ADDRESS OF NEXT ROW
6056  12444 037131        ISZ T9       COUNTER FOR ROW IN B1
6057  12445 026367        JMP MULT4    MULT ROW BY ALL COLUMNS
6058  12446 126337        JMP MULT,I   EXIT TO MAIN PROGRAM
6059                      SKP
6060*
6061***   SUBROUTINE MATRIX INVERT
6062*
6063  12447 000000  LINV  NOP          SUBROUTINE MATRIX INVERT
6064  12450 016053        JSB LCHK2    TEST B1 FOR UNASSIGNED TERMS
6065  12451 060222        LDA B1+1     DIMENSIONS OF MATRIX B1
6066  12452 064226        LDB B3+1     DIMENSIONS OF MATRIX B3
6067  12453 016040        JSB COMPR    CHECK DIMENSIONS
6068  12454 060225        LDA B3
6069  12455 073135        STA T13
6070  12456 060222        LDA B1+1
6071  12457 015404        JSB MDIM
6072  12460 003004        CMA,INA
6073  12461 001100        ARS
6074  12462 073122        STA T2
6075  12463 001000        ALS
6076  12464 064136        LDB LSTPT
6077  12465 006004        INB
6078  12466 074223        STB B2
6079  12467 074225        STB B3
6080  12470 007004        CMB,INB
6081  12471 044137        ADB HSTPT
6082  12472 040001        ADA 1
6083  12473 002020        SSA          SKIP IF SUFFICIENT CORE
6084  12474 025541        JMP E1       PRINT 'OUT OF CORE'
6085  12475 016131        JSB REPLC    COPY B1 INTO B3 (B2)
6086  12476 063135        LDA T13
6087  12477 070225        STA B3       RESTORE ADDRESS
6088  12500 016204        JSB LIDN     SET B3 TO IDENTITY MATRIX
6089  12501 063135        LDA T13
6090  12502 070225        STA B3       LSTPT+1
6091  12503 002400        CLA
6092  12504 073134        STA T12      T12,T13 IS STORE
6093  12505 073135        STA T13      FOR GREATEST VALUE
6094  12506 060223        LDA B2       COPY B2 INTO B1 AS
6095  12507 070221        STA B1       B2 NEEDED LATER
6096  12510 160221  LIN11 LDA B1,I
6097  12511 034221        ISZ B1
6098  12512 164221        LDB B1,I
6099  12513 034221        ISZ B1
6100  12514 002020        SSA          GET ABSOLUTE VALUE
6101  12515 015471        JSB ARINV    IF NUMBER IS NEGATIVE
6102  12516 073140        STA T18      SAVE NUMBER
6103  12517 077141        STB T19
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6104  12520 114307        JSB .FSBA,I  SUBTRACT EXISTING MAX.
6105  12521 013134        DEF T12      VALUE
6106  12522 002020        SSA          SKIP AND SWAP IF POSITIVE
6107  12523 026530        JMP LIN10
6108  12524 063140        LDA T18      SWAP
6109  12525 067141        LDB T19
6110  12526 073134        STA T12
6111  12527 077135        STB T13
6112  12530 037122  LIN10  ISZ T2
6113  12531 026510        JMP LIN11
6114  12532 063134        LDA T12      COMPUTE RELATIVE TOLERANCE
6115  12533 067135        LDB T13      TOL=ABSOLUTE TOL * MAX VALUE
6116  12534 114310        JSB .FMPA,I
6117  12535 013136        DEF T16      ABSOLUTE TOLERANCE
6118  12536 070217        STA MLBX1
6119  12537 074220        STB MLBX1+1
6120  12540 002400        CLA
6121  12541 073142        STA LPIV
6122  12542 037124        ISZ T4       REQUIRE CONSTANT (ROW+1)
6123  12543 037142  LINV1  ISZ LPIV     SELECT NEXT PIVOT
6124  12544 063142        LDA LPIV     TEST IF HAVE PROCESSED
6125  12545 053124        CPA T4       LAST PIVOT
6126  12546 126447        JMP LINV,I   NORMAL EXIT TO MAIN PROG
6127  12547 063142        LDA LPIV     COMPUTE ADDRESS OF PIVOT
6128  12550 067142        LDB LPIV     COLUMN USING ROUTINE LWHR
6129  12551 073122        STA T2       ROW COUNTER
6130  12552 017075        JSB LWHR     ON RETURN, ADDRESS IN A
6131  12553 073121        STA T1
6132  12554 002400        CLA
6133  12555 073134        STA T12      T12,T13 IS STORE
6134  12556 073135        STA T13      FOR GREATEST VALUE
6135  12557 016236  LINV2  JSB .DLD     LOAD FP NUMBER
6136  12560 113121        DEF T1,I
6137  12561 002020        SSA          OBTAIN ABSOLUTE VALUE
6138  12562 015471        JSB ARINV    IF NUMBER IS NEGATIVE
6139  12563 073140        STA T18      STORE VALUE OF FP NUMBER
6140  12564 077141        STB T19
6141  12565 114307        JSB .FSBA,I  SUBTR EXISTING LARGEST VALUE
6142  12566 013134        DEF T12
6143  12567 002020        SSA          SKIP AND SWAP IF POSITIVE
6144  12570 026577        JMP LINV7    T12 STILL CONTAINS MAX VALUE
6145  12571 063140        LDA T18      STORE NEW MAX VALUE
6146  12572 067141        LDB T19
6147  12573 073134        STA T12
6148  12574 077135        STB T13
6149  12575 063122        LDA T2       SET T5 TO POSITION IN
6150  12576 073125        STA T5       COLUMN OF MAX VALUE
6151  12577 037122  LINV7  ISZ T2
6152  12600 063122        LDA T2       TEST FOR LAST TERM IN COL
6153  12601 053124        CPA T4
6154  12602 026610        JMP LINV8    SWAP ROWS
6155  12603 063123        LDA T3       COMPUTE
6156  12604 001000        ALS          NEXT ADDRESS
6157  12605 043121        ADA T1       IN PIVOT
6158  12606 073121        STA T1       COLUMN
6159  12607 026557        JMP LINV2    SELECT NEXT TERM
6160  12610 063142  LINV8  LDA LPIV     COMPUTE ADDRESS
6161  12611 006404        CLB,INB
6162  12612 017075        JSB LWHR
6163  12613 073121        STA T1       ADDRESS OF PIVOTAL ROW
6164  12614 063125        LDA T5
6165  12615 006404        CLB,INB
6166  12616 017075        JSB LWHR
6167  12617 073122        STA T2       ADDR OF ROW TO BE SWAPPED
6168  12620 063142        LDA LPIV
6169  12621 006404        CLB,INB
6170  12622 017107        JSB LWHR2    PIVOTAL ROW IN I-MATRIX
6171  12623 073131        STA T9
6172  12624 073132        STA T10      KEEP COPY
6173  12625 063125        LDA T5
6174  12626 006404        CLB,INB
6175  12627 017107        JSB LWHR2    BE SWAPPED IN I-MATRIX
6176  12630 073133        STA T11
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6177  12631 063123        LDA T3
6178  12632 003004        CMA,INA
6179  12633 073134        STA T12      COUNTER FOR TERMS IN A ROW
6180  12634 016236  LINV3 JSB .DLD     SWAP ONE ELEMENT OF ROW
6181  12635 113121        DEF T1,I
6182  12636 073140        STA T18
6183  12637 077141        STB T19
6184  12640 016236        JSB .DLD
6185  12641 113122        DEF T2,I
6186  12642 173121        STA T1,I
6187  12643 037121        ISZ T1
6188  12644 177121        STB T1,I
6189  12645 037121        ISZ T1
6190  12646 063140        LDA T18
6191  12647 067141        LDB T19
6192  12650 173122        STA T2,I
6193  12651 037122        ISZ T2
6194  12652 177122        STB T2,I
6195  12653 037122        ISZ T2
6196  12654 016236        JSB .DLD     SWAP ONE ELEMENT IN A ROW
6197  12655 113131        DEF T9,I     OF I-MATRIX
6198  12656 073140        STA T18
6199  12657 077141        STB T19
6200  12660 016236        JSB .DLD
6201  12661 113133        DEF T11,I
6202  12662 173131        STA T9,I
6203  12663 037131        ISZ T9
6204  12664 177131        STB T9,I
6205  12665 037131        ISZ T9
6206  12666 063140        LDA T18
6207  12667 067141        LDB T19
6208  12670 173133        STA T11,I
6209  12671 037133        ISZ T11
6210  12672 177133        STB T11,I
6211  12673 037133        ISZ T11
6212  12674 037134        ISZ T12      INCREMENT COUNTER
6213  12675 026634        JMP LINV3    SWAP NEXT ELEMENT
6214  12676 063142        LDA LPIV     COMPUTE
6215  12677 067142        LDB LPIV     ADDRESS OF
6216  12700 017075        JSB LWHR     PIVOT
6217  12701 073121        STA T1       ELEMENT
6218  12702 016236        JSB .DLD     PIVOT VALUE
6219  12703 113121        DEF T1,I
6220  12704 002020        SSA          OBTAIN ABSOLUTE VALUE
6221  12705 015471        JSB ARINV    IF NUMBER IS NEGATIVE
6222  12706 114307        JSB .FSBA,I  SUBTRACT TOLERANCE AND
6223  12707 000217        DEF MLBX1
6224  12710 002020        SSA          COMPARE TO ZERO
6225  12711 014544        JSB ERROR    PRINT-NEARLY SING MATRIX'
6226  12712 063121  LDUM1 LDA T1       ADDRESS OF PIOT ELEMENT
6227  12713 073122        STA T2
6228  12714 060534        LDA HONE
6229  12715 064371        LDB .2
6230  12716 114311        JSB .FDVA,I
6231  12717 113121        DEF T1,I
6232  12720 073140        STA T18      INVERSE OF PIVOT
6233  12721 077141        STB T19
6234  12722 063142        LDA LPIV
6235  12723 073133        STA T11      COUNTER FOR ROW
6236  12724 037133  LINV6 ISZ T11      INCREMENT COUNTER
6237  12725 063133        LDA T11
6238  12726 053124        CPA T4       TEST FOR END OF ROW
6239  12727 026741        JMP LIN12
6240  12730 037122        ISZ T2       ADDRESS OF NEXT ELEMENT
6241  12731 037122        ISZ T2
6242  12732 016236        JSB .DLD
6243  12733 113122        DEF T2,I
6244  12734 114310        JSB .FMPA,I
6245  12735 013140        DEF T18
6246  12736 016246        JSB .DST
6247  12737 113122        DEF T2,I
6248  12740 026724        JMP LINV6
6249  12741 063132  LIN12 LDA T10
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6250  12742 073125        STA T5       IN I-MATRIX
6251  12743 063123        LDA T3
6252  12744 003004        CMA,INA
6253  12745 073133        STA T11      ROW COUNTER
6254  12746 016236  LIN13  JSB .DLD
6255  12747 113125        DEF T5,I
6256  12750 002003        SZA,RSS      SKIP MULTIPLICATION IF ZERO
6257  12751 006002        SZB
6258  12752 026754        JMP *+2      NOT ZERO
6259  12753 026760        JMP LIN14    ZERO
6260  12754 114310        JSB .FMPA,I
6261  12755 013140        DEF T18
6262  12756 016246        JSB .DST
6263  12757 113125        DEF T5,I
6264  12760 037125  LIN14  ISZ T5       NEXT ELEMENT IN I-MATRIX
6265  12761 037125        ISZ T5
6266  12762 037133        ISZ T11      INCREMENT COUNTER
6267  12763 026746        JMP LIN13    NO
6268  12764 002400        CLA
6269  12765 070221        STA B1
6270  12766 034221  LINV4  ISZ B1
6271  12767 060221        LDA B1
6272  12770 053124        CPA T4       TEST FOR LAST ROW
6273  12771 026543        JMP LINV1    SELECT NEXT PIVOT
6274  12772 053142        CPA LPIV     TEST TO SKIP PIVOTAL ROW
6275  12773 026766        JMP LINV4    SKIP PIVOTAL ROW
6276  12774 060221        LDA B1
6277  12775 006404        CLB,INB
6278  12776 017107        JSB LWHR2    ADDRESSOF ROW TO BE TRANSFORMED
6279  12777 073133        STA T11      IN I-MATRIX
6280  13000 060221        LDA B1
6281  13001 067142        LDB LPIV
6282  13002 017075        JSB LWHR
6283  13003 073131        STA T9       SAVE ADDRESS
6284  13004 016236        JSB .DLD
6285  13005 100000        DEF 0,I
6286  13006 073127        STA T7       VALUE OF MULTIPLIER
6287  13007 077130        STB T8
6288  13010 063142        LDA LPIV
6289  13011 073135        STA T13      COUNTER
6290  13012 063121        LDA T1
6291  13013 073122        STA T2
6292  13014 037135  LINV5  ISZ T13
6293  13015 063135        LDA T13
6294  13016 053124        CPA T4       TEST FOR LAST TERM IN ROW
6295  13017 027041        JMP LIN15
6296  13020 037131        ISZ T9       T9 IS ADDRESS OF
6297  13021 037131        ISZ T9       ELEMENT TO BE CHANGED
6298  13022 037122        ISZ T2       T2 IS ADDR OF CORRESPONDING
6299  13023 037122        ISZ T2       ELEMENT IN PIVOTAL ROW
6300  13024 063127        LDA T7
6301  13025 067130        LDB T8
6302  13026 114310        JSB .FMPA,I
6303  13027 113122        DEF T2,I
6304  13030 073140        STA T18      MULTIPLIER*VALUE IN
6305  13031 077141        STB T19      PIVOT ROW
6306  13032 016236        JSB .DLD
6307  13033 113131        DEF T9,I
6308  13034 114307        JSB .FSBA,I
6309  13035 013140        DEF T18
6310  13036 016246        JSB .DST     TRANSFORMED ELEMENT
6311  13037 113131        DEF T9,I
6312  13040 027014        JMP LINV5    SELECT NEXT TERM
6313  13041 063132  LIN15  LDA T10      ADDRESS OF
6314  13042 073125        STA T5       PIVOTAL ROW
6315  13043 063123        LDA T3
6316  13044 003004        CMA,INA
6317  13045 073135        STA T13      COUNTER
6318  13046 163125  LIN18  LDA T5,I
6319  13047 037125        ISZ T5
6320  13050 167125        LDB T5,I
6321  13051 037125        ISZ T5
6322  13052 002003        SZA,RSS      SKIP IF ZERO
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6323  13053 006002        SZB
6324  13054 027056        JMP *+2      NOT ZERO
6325  13055 027070        JMP LIN17    ZERO
6326  13056 114310        JSB .FMPA,I  MULTIPLY BY
6327  13057 013127        DEF T7       MULTIPLIER
6328  13060 073140        STA T18
6329  13061 077141        STB T19
6330  13062 016236        JSB .DLD
6331  13063 113133        DEF T11,I
6332  13064 114307        JSB .FSBA,I
6333  13065 013140        DEF T18
6334  13066 016246        JSB .DST
6335  13067 113133        DEF T11,I
6336  13070 037133  LIN17  ISZ T11
6337  13071 037133        ISZ T11
6338  13072 037135        ISZ T13
6339  13073 027046        JMP LIN18    SELECT NEXT TERM
6340  13074 026766        JMP LINV4    ELIMINATE NEXT ROW
6341                      SKP
6342*
6343***   SUBROUTINE LWHR
6344*
6345  13075 000000  LWHR  NOP
6346  13076 077127        STB T7
6347  13077 040477        ADA M1
6348  13100 015317        JSB MPY
6349  13101 013123        DEF T3
6350  13102 043127        ADA T7
6351  13103 040477        ADA M1
6352  13104 001000        ALS
6353  13105 040223        ADA B2
6354  13106 127075        JMP LWHR,I
6355  13107 000000  LWHR2 NOP
6356  13110 077127        STB T7
6357  13111 040477        ADA M1
6358  13112 015317        JSB MPY      ADDR=LWHR3+2((A-1)*T3+B-1)
6359  13113 013123        DEF T3
6360  13114 043127        ADA T7
6361  13115 040477        ADA M1
6362  13116 001000        ALS
6363  13117 040225        ADA B3
6364  13120 127107        JMP LWHR2,I
6365*
6366***   CONSTANTS
6367*
6368  13121         T1    BSS 1        TEMPORARY CONSTANTS
6369  13122         T2    BSS 1
6370  13123         T3    BSS 1
6371  13124         T4    BSS 1
6372  13125         T5    BSS 1
6373  13126         T6    BSS 1
6374  13127         T7    BSS 1
6375  13130         T8    BSS 1
6376  13131         T9    BSS 1
6377  13132         T10   BSS 1
6378  13133         T11   BSS 1
6379  13134         T12   BSS 1
6380  13135         T13   BSS 1
6381  13136 041433  T16   DEC +1E-6    ABSOLUTE TOLERANCE
      13137 157733
6382  13140         T18   BSS 1
6383  13141         T19   BSS 1
6384  13142         LPIV  BSS 1
6385  13143 114306  LPLUS JSB .FADA,I  GENERATES CODE
6386  13144 100223        DEF B2,I
6387  13145 114307  LMIN  JSB .FSBA,I  GENERATES CODE
6388  13146 114310  LTIME JSB .FMPA,I  GENERATES CODE
6389  13147 034223  INCB2 ISZ B2       GENERATES CODE
6390**
6391***   FETCH MAT STATEMENT SUBSCRIPT    **
6392**
6393  13150 000000  MATSB NOP
6394  13151 064500        LDB M2       LEFT PARENTHESIS
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6395  13152 015355        JSB SYMCK    OR
6396  13153 002305        DEF LBRAC-1  LEFT BRACKET?
6397  13154 127150        JMP MATSB,I  NO
6398  13155 037150        ISZ MATSB    YES, SET RETURN ADDRESS
6399  13156 060461        LDA B2200
6400  13157 170133        STA SBPTR,I  BRACKET
6401  13160 117201        JSB FSC&,I
6402  13161 007400        CCB
6403  13162 015355        JSB SYMCK    COMMA?
6404  13163 002245        DEF COMMA-1
6405  13164 002001        RSS          NO
6406  13165 117201        JSB FSC&,I
6407  13166 064500        LDB M2       RIGHT PARENTHESIS
6408  13167 015355        JSB SYMCK    OR
6409  13170 002251        DEF RPARN-1  RIGHT BRACKET
6410  13171 127200        JMP FSCA&,I
6411  13172 060456        LDA LF
6412  13173 170133        STA SBPTR,I  BRACKET
6413  13174 034133        ISZ SBPTR
6414  13175 015662        JSB GETCR    END-OF-STATEMENT?
6415  13176 124322        JMP ACCST,I  YES
6416  13177 127150        JMP MATSB,I
6417  13200 003206  FSCA& DEF FSCE2
6418  13201 003045  FSC&  DEF FSC
6419  13202        FINIS EQU *
6420                      END
!INS1   005141   01/2971 -- 01/2884
!INS2   005142   01/2972 -- 01/2886
!INS3   005143   01/2973 -- 01/2888
!INS4   005144   01/2974 -- 01/2963
!INS5   005145   01/2975 -- 01/2965
!TAPE   002043   01/1182 -- 01/1314
&IN1    005075   01/2927 -- 01/2885 01/2964
&IN2    005123   01/2955 -- 01/2887 01/2966
&IN3    005126   01/2959 -- 01/2889 01/2968
.1      000370   01/0239 -- 01/3132 01/3993 01/4766
.10     000400   01/0247 -- 01/0599 01/1020 01/1348 01/1437 01/1503 01/1539 01/1640 01/1662 01/1677
01/1747 01/1757 01/1769 01/1892 01/1893 01/2061 01/2108 01/2148 01/2184 01/2190 01/2228 01/2487 01/2507
01/2890 01/2902 01/3908 01/5638
.12     000401   01/0248 -- 01/4712
.15     000402   01/0249 -- 01/1713 01/1862 01/2710 01/2726 01/2752 01/3049 01/3050 01/3173 01/3175
01/3292 01/3293 01/3331 01/3337 01/3338 01/4524 01/4553 01/4554 01/4715 01/5456
.2      000371   01/0240 -- 01/0803 01/0988 01/2832 01/3034 01/3152 01/3174 01/3264 01/3540 01/3584
01/3665 01/3699 01/3981 01/4110 01/4125 01/4219 01/4560 01/5275 01/5510 01/5566 01/5586 01/5602 01/5620
01/5684 01/5858 01/5906 01/6229
.23     000403   01/0250 -- 01/3474
.244    011272   01/5359 -- 01/5302
.26     000404   01/0251 -- 01/1034
.27     000405   01/0252 -- 01/3111
.28     000406   01/0253 -- 01/3113 01/3140 01/3157
.3      000372   01/0241 -- 01/0708 01/2422 01/2457 01/2750 01/2834 01/2845 01/3035 01/3104 01/3210
01/4539 01/4678
.30     000407   01/0254 -- 01/3020
.31     000410   01/0255 -- 01/2982 01/3394 01/5194 01/5648
.32     000411   01/0256 -- 01/0800 01/1078 01/1098 01/1152 01/2396 01/2407 01/2525 01/2983 01/3885
01/4662 01/4855
.33     000412   01/0257 -- 01/3069
.34     000413   01/0258 -- 01/1607 01/2698 01/2784 01/3067
.35     000414   01/0259 -- 01/0379 01/2984
.36     000415   01/0260 -- 01/0409
.37     000416   01/0261 -- 01/3091
.4      000373   01/0242 -- 01/0496 01/1303
.40     000417   01/0262 -- 01/1919 01/2136
.41     000420   01/0263 -- 01/1884
.43     000421   01/0264 -- 01/0450 01/0537 01/1941 01/2727 01/3022 01/4834
.45     000422   01/0265 -- 01/0452 01/0539 01/1943 01/4660 01/4830
.46     000423   01/0266 -- 01/0480 01/1688 01/1754 01/2125 01/2173 01/3018 01/4774 01/4780 01/4795
01/4820
.47     000424   01/0267 -- 01/2151
.48     000425   01/0268 -- 01/2144 01/2808 01/2815 01/2981 01/4771 01/4776 01/4803 01/4817 01/4838
01/4851
.49     000426   01/0269 -- 01/4801 01/4812
.58     000427   01/0270 -- 01/0348 01/1479 01/4844
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.6      000374   01/0243 -- 01/3603 01/3634 01/3724 01/4679
.63     000430   01/0271 -- 01/3016 01/5611
.7      000375   01/0244 -- 01/2401 01/2419 01/2844 01/2850
.72     000434   01/0275 -- 01/1194 01/1284
.74     000435   01/0276 -- 01/4683
.75     000436   01/0277 -- 01/4719
.8      000376   01/0245 -- 01/1764
.9      000377   01/0246 -- 01/0997 01/1002 01/3191 01/4799
.BUFA   000116   01/0068 -- 01/0380 01/0410 01/1117 01/1195 01/1202 01/1285 01/2643 01/2647 01/3773
01/3861
.CARD   000060   01/0029 -- 01/1288
.CHEB   011305   01/5370 -- 01/4939 01/4999 01/5081 01/5372
.DLD    012236   01/5916 -- 01/5918 01/5919 01/5923 01/6027 01/6135 01/6180 01/6184 01/6196 01/6200
01/6218 01/6242 01/6254 01/6284 01/6306 01/6330
.DST    012246   01/5924 -- 01/5926 01/5927 01/5931 01/6020 01/6033 01/6246 01/6262 01/6310 01/6334
.EXP    011162   01/5287 -- 01/0188 01/5285 01/5347 01/5350 01/5357
.EXP1   011262   01/5351 -- 01/5293
.EXPA   000305   01/0188 -- 01/4096
.FAD    007340   01/4321 -- 01/0189 01/3709 01/4055 01/4323 01/4484 01/4507
.FADA   000306   01/0189 -- 01/4704 01/4710 01/4908 01/4918 01/5044 01/5050 01/5059 01/5149 01/5158
01/5168 01/5181 01/5224 01/5246 01/5252 01/5315 01/5329 01/5341 01/5406 01/6031 01/6385
.FDV    007466   01/4419 -- 01/0192 01/4073 01/4126 01/4421
.FDV1   007550   01/4469 -- 01/4428
.FDV2   007553   01/4472 -- 01/4425
.FDVA   000311   01/0192 -- 01/4950 01/4989 01/5156 01/5166 01/5232 01/5244 01/5321 01/5339 01/6230
.FLUN   001524   01/0923 -- 01/0195 01/0833 01/0839 01/0861 01/0871 01/0878 01/0931 01/4354 01/4370
01/4728 01/5140 01/5217 01/5470
.FMP    007417   01/4377 -- 01/0191 01/4067 01/4094 01/4132 01/4140 01/4387 01/4491 01/4495 01/4513
.FMPA   000310   01/0191 -- 01/4904 01/4933 01/4935 01/4941 01/4993 01/4995 01/5001 01/5046 01/5057
01/5075 01/5083 01/5147 01/5179 01/5236 01/5248 01/5254 01/5288 01/5311 01/5327 01/5375 01/5402 01/5415
01/6029 01/6116 01/6244 01/6260 01/6302 01/6326 01/6388
.FSB    007346   01/4330 -- 01/0190 01/3714 01/4061 01/4169 01/4177 01/4185 01/4193 01/4201 01/4209
01/4332 01/4486 01/4504
.FSB1   007363   01/4343 -- 01/4337 01/4340
.FSBA   000307   01/0190 -- 01/4922 01/4929 01/4937 01/4997 01/5023 01/5063 01/5069 01/5079 01/5230
01/5238 01/5250 01/5307 01/5331 01/5333 01/5404 01/5413 01/6104 01/6141 01/6222 01/6308 01/6332 01/6387
.HSPR   000062   01/0031 -- 01/1287
.IENT   011400   01/5433 -- 01/3896 01/4912 01/5054 01/5292 01/5371 01/5374 01/5441 01/5442 01/5447
.LNUM   000124   01/0074 -- 01/0403 01/1155 01/1341 01/3007 01/3498
.LOG    011053   01/5211 -- 01/0187 01/5209 01/5256 01/5260
.LOG1   011131   01/5257 -- 01/5213
.LOGA   000304   01/0187 -- 01/4093
.PACK   001077   01/0605 -- 01/0196 01/0591 01/0608 01/0626 01/4312 01/4414 01/4470 01/5128 01/5199
01/5459
.PWR2   011427   01/5466 -- 01/4910 01/4916 01/5052 01/5077 01/5160 01/5172 01/5345 01/5472 01/5478
01/5479
.RET    011443   01/5478 -- 01/5468
?MESG   000102   01/0052 -- 01/1322
?NBER   002204   01/1328 -- 01/1326
?OFF    000101   01/0051 -- 01/1318
?PTAP   000061   01/0030 -- unreferenced
A       000000   01/0024 -- 01/0394 01/1255 01/3541
A1      000227   01/0129 -- 01/4272 01/4275 01/4300 01/4311 01/4351 01/4385 01/4400 01/4411 01/4413
01/4426 01/4473 01/4480 01/4492
A2      000230   01/0130 -- 01/4273 01/4274 01/4292 01/4334 01/4344 01/4367 01/4393 01/4402 01/4423
01/4481
AAA     011141   01/5263 -- 01/5247
AAAA    011273   01/5360 -- 01/5316
ABS     004063   01/2356 -- unreferenced
ACCS1   004370   01/2561 -- 01/2548
ACCS2   004372   01/2563 -- 01/2555 01/2560 01/2577
ACCS3   004375   01/2566 -- 01/2573
ACCS4   004405   01/2574 -- 01/2549 01/2557
ACCST   000322   01/0201 -- 01/1438 01/1445 01/1464 01/1505 01/1540 01/1563 01/1602 01/1614 01/1641
01/1663 01/1673 01/1678 01/1724 01/1737 01/1748 01/1758 01/1773 01/1778 01/6415
ACTIV   000111   01/0062 -- 01/0033
ACTST   004345   01/2542 -- 01/0201
ADATA   000361   01/0232 -- 01/3462 01/3559
ADD     012111   01/5808 -- 01/5629 01/5818 01/5824
ADD1    012113   01/5810 -- 01/5826
ADDR    000212   01/2980 -- 01/2893 01/2898 01/2900 01/2921
ADMU1   007256   01/4268 -- 01/4284
ADMU2   007277   01/4285 -- 01/4271
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ADMU3   007310   01/4294 -- 01/4317
ADMU4   007331   01/4311 -- 01/4288 01/4305 01/4309
ADMU5   007334   01/4314 -- 01/4295
ADMUP   007252   01/4264 -- 01/4265 01/4325 01/4345
ADRES   012272   01/5944 -- 01/5920 01/5921 01/5922 01/5928 01/5929 01/5930 01/5935 01/5937 01/5940
AND     004023   01/2332 -- 01/0228
ANDOP   002316   01/1417 -- unreferenced
ANDS    007243   01/4250 -- 01/4249
ANEXT   000360   01/0231 -- 01/3676
ANOT    000365   01/0236 -- 01/1846
ARBAS   000350   01/0223 -- 01/3416
ARIN1   001510   01/0908 -- 01/0904
ARIN2   001520   01/0916 -- 01/0901 01/0907
ARINA   000312   01/0193 -- unreferenced
ARINV   001471   01/0893 -- 01/0193 01/0919 01/4225 01/4658 01/4915 01/5099 01/6101 01/6138 01/6221
AROTB   006656   01/3940 -- 01/0223
ARRE1   003465   01/2108 -- 01/4607
ARRE2   003500   01/2122 -- 01/4608
ARRID   003475   01/2119 -- 01/1661 01/1674 01/1731 01/1746 01/1768 01/2105 01/2128
ARRYS   003461   01/2104 -- 01/1444 01/1458 01/2109 01/2114 01/2115 01/2870
ARYAD   000226   01/0356 -- 01/1686 01/1695 01/1733 01/1752 01/1774 01/1779 01/2022 01/2025 01/2039
01/2078 01/2090 01/2095 01/2123 01/2171
ASSOP   002260   01/1387 -- 01/1491 01/1530 01/1693 01/1908
ASTEP   000364   01/0235 -- 01/1545
ASTK    000064   01/0033 -- unreferenced
ATAB    000366   01/0237 -- 01/1621 01/2759
ATHEN   000362   01/0233 -- 01/1511
ATMP    011370   01/5423 -- 01/5396 01/5397 01/5405 01/5414
ATN     004052   01/2350 -- unreferenced
ATO     000363   01/0234 -- 01/1534
AUNEQ   004034   01/2340 -- unreferenced
B       000001   01/0025 -- 01/1219 01/2910 01/2913 01/2931 01/2954 01/2961
B1      000221   01/0126 -- 01/0139 01/4675 01/4689 01/5506 01/5512 01/5536 01/5537 01/5538 01/5539
01/5573 01/5574 01/5575 01/5576 01/5601 01/5604 01/5733 01/5735 01/5742 01/5743 01/5744 01/5745 01/5782
01/5783 01/5953 01/5965 01/5979 01/5980 01/6004 01/6022 01/6054 01/6055 01/6065 01/6070 01/6095 01/6096
01/6097 01/6098 01/6099 01/6269 01/6270 01/6271 01/6276 01/6280
B100    000431   01/0272 -- 01/2721
B1000   000451   01/0288 -- 01/3810 01/3840
B133    000442   01/0281 -- 01/1921 01/2138 01/2175 01/2655 01/2779
B1400   000457   01/0294 -- 01/0816
B177    000443   01/0282 -- 01/0609 01/0809 01/1051 01/1900 01/2391 01/2720 01/2822 01/2831 01/2858
01/3415
B2      000223   01/0127 -- 01/0140 01/5515 01/5516 01/5541 01/5545 01/5546 01/5557 01/5565 01/5585
01/5619 01/5622 01/5683 01/5732 01/5779 01/5780 01/5992 01/6000 01/6006 01/6015 01/6025 01/6048 01/6049
01/6078 01/6094 01/6353 01/6386 01/6389
B200    000444   01/0283 -- 01/0633 01/0639
B2000   000452   01/0289 -- 01/3806
B2200   000461   01/0296 -- 01/2026 01/5563 01/6399
B2300   000462   01/0297 -- 01/1932 01/2213
B3      000225   01/0128 -- 01/0356 01/5521 01/5524 01/5531 01/5534 01/5547 01/5571 01/5577 01/5584
01/5588 01/5671 01/5681 01/5682 01/5690 01/5736 01/5748 01/5749 01/5750 01/5751 01/5861 01/5868 01/5869
01/5870 01/5871 01/5888 01/5891 01/5893 01/5902 01/5951 01/5969 01/5970 01/5971 01/5972 01/5989 01/5997
01/6021 01/6032 01/6034 01/6046 01/6047 01/6066 01/6068 01/6079 01/6087 01/6090 01/6363
B3000   000453   01/0290 -- 01/1946 01/3808 01/5530
B400    000446   01/0285 -- 01/0899
B4000   000455   01/0292 -- 01/1882 01/2224
B776    000447   01/0286 -- 01/0664 01/5259
BADDR   000125   01/0075 -- 01/0371 01/0381 01/0422 01/1045 01/1046 01/1064 01/1065 01/1134 01/1135
01/1142 01/1204 01/2382 01/2447 01/2662 01/3774 01/4786 01/4825 01/4889 01/4895 01/4897
BASER   007052   01/4091 -- 01/4625
BBBB    011275   01/5361 -- 01/5319 01/5320
BCKSP   001701   01/1059 -- 01/0597 01/1066 01/1071 01/1074 01/1214 01/1638 01/1670
BHSTP   001544   01/0945 -- 01/0951 01/3286 01/4233
BINO1   006712   01/3971 -- 01/3965 01/4092 01/4105 01/4106 01/4130 01/4138 01/4141 01/4142 01/4149
BINO2   006713   01/3972 -- 01/3968 01/4095 01/4107 01/4131 01/4139 01/4143 01/4150 01/4243
BINOP   006702   01/3963 -- 01/3964 01/3966 01/3973 01/4054 01/4060 01/4066 01/4072 01/4086 01/4102
01/4168 01/4176 01/4184 01/4192 01/4200 01/4208 01/4239 01/4248
BLANK   000123   01/0073 -- 01/0388 01/1052 01/1153 01/2508 01/2526 01/2667 01/2767 01/2774
BOTH1   010422   01/4931 -- 01/4955
BSK1    000071   01/0044 -- unreferenced
BSK2    000072   01/0045 -- unreferenced
BSK3    000073   01/0046 -- unreferenced
BSK4    000074   01/0047 -- unreferenced
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BTH1    010527   01/4991 -- 01/5017
BTH2    010766   01/5151 -- 01/5183
BTMP    011372   01/5424 -- 01/5387 01/5388 01/5394 01/5395 01/5400 01/5401
C1      000231   01/0131 -- 01/4276 01/4279 01/4286 01/4296 01/4355 01/4389 01/4391 01/4394 01/4433
01/4488 01/4508
C2      000232   01/0132 -- 01/4277 01/4278 01/4293 01/4343 01/4371 01/4386 01/4396 01/4399 01/4404
01/4446
CCC     011145   01/5265 -- 01/5239
CCCC    011277   01/5362 -- 01/5325 01/5326
CCNT    000126   01/0076 -- 01/0369 01/0377 01/0408 01/0421 01/1042 01/1061 01/1062 01/1081 01/1091
01/1102 01/1116 01/1120 01/1131 01/1132 01/1201 01/2384 01/2449 01/2664 01/2678 01/3777 01/3781 01/3845
01/3855 01/3881 01/4680 01/4716 01/4784 01/4823 01/4886 01/4888
CHRS1   004312   01/2509 -- 01/2522
CHRS2   004330   01/2523 -- 01/2512 01/2518
CHRS3   004331   01/2524 -- 01/2510 01/2516
CHRSA   000321   01/0200 -- 01/1504 01/1608
CHRST   004306   01/2505 -- 01/0200 01/2523 01/2527
CKRCD   002120   01/1238 -- 01/1209
CLPR1   004442   01/2609 -- 01/2615
CLPR2   004451   01/2616 -- 01/2610
CLPRG   004435   01/2604 -- 01/2537 01/2559 01/2618 01/2876
CMNDA   000250   01/0158 -- 01/1254
CMNDS   002140   01/1259 -- 01/0158
CNSTA   000264   01/0171 -- unreferenced
COEF    010576   01/5028 -- 01/5000
COEF1   010701   01/5088 -- 01/5082
COEFF   010472   01/4965 -- 01/4940
COLON   000427   01/0348 -- 01/0401
COM     003720   01/2290 -- unreferenced
COML    000216   01/0149 -- 01/3001 01/3145 01/3148
COMMA   002246   01/1377 -- 01/1573 01/1584 01/1596 01/1666 01/1681 01/2112 01/6404
COMPR   012040   01/5760 -- 01/5734 01/5737 01/5770 01/5954 01/6005 01/6067
COMS    002342   01/1450 -- 01/1791
COMS1   002350   01/1456 -- 01/1460
CON     004105   01/2368 -- unreferenced
CONS1   000657   01/0455 -- 01/0451
CONS2   000662   01/0458 -- 01/0454
CONS3   000666   01/0462 -- 01/0459
CONST   000642   01/0442 -- 01/0171 01/0443 01/1568 01/3902
COS     004044   01/2346 -- unreferenced
COUNT   000213   01/0354 -- 01/0798 01/0806 01/2415 01/2425
COUT    011356   01/5411 -- 01/5393
CTMP    011374   01/5425 -- 01/5380 01/5389 01/5390 01/5391 01/5407
D100    000522   01/0329 -- 01/1860 01/2197
D133    000526   01/0333 -- 01/1031
D53     000520   01/0327 -- 01/2198 01/3304
D72     000521   01/0328 -- 01/1017
DATA    003762   01/2312 -- 01/0232
DATAI   002037   01/1178 -- 01/1206 01/1234
DATAS   002477   01/1568 -- 01/1575 01/1808
DBY10   001261   01/0731 -- 01/0576 01/0734 01/0760 01/4745 01/4752
DBYZR   007554   01/4473 -- 01/4644
DCCNT   000145   01/0091 -- 01/3458 01/3529 01/3557 01/3565 01/3566
DDDD    011301   01/5363 -- 01/5330
DEF     003723   01/2292 -- unreferenced
DEFOP   000463   01/0298 -- 01/3096
DEFS    002361   01/1468 -- 01/1792
DELST   000323   01/0202 -- 01/1349
DFLAG   002317   01/1418 -- 01/1366 01/1443 01/1455 01/2029 01/2062
DIGCA   000277   01/0182 -- unreferenced
DIGCK   001636   01/1015 -- 01/0182 01/0486 01/0545 01/0550 01/0560 01/1019 01/1022 01/1023 01/1025
01/2141 01/2474 01/4797
DIGCT   000177   01/0358 -- 01/2788 01/2813
DIM     003715   01/2288 -- unreferenced
DIMS    002336   01/1443 -- 01/1446 01/1790
DIV     002270   01/1395 -- unreferenced
DIVSR   000200   01/0359 -- 01/2790 01/2793 01/2801 01/2812
DLSTM   004335   01/2531 -- 01/0202
DPFLG   000237   01/0137 -- 01/0479 01/0481 01/0568
DRQSA   000256   01/0165 -- 01/3901 01/3913
DRQST   002113   01/1230 -- 01/0165 01/1231
DSTRT   000143   01/0089 -- 01/3459 01/3465 01/3932
DTMP    011376   01/5426 -- 01/5384 01/5385 01/5398 01/5399 01/5408 01/5409 01/5411 01/5412
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E       000432   01/0273 -- 01/0383 01/0532 01/4828
E1      001541   01/0939 -- 01/0950 01/1009 01/3480 01/3647 01/4631 01/6084
E2      006377   01/3738 -- 01/4628
E3      006403   01/3745 -- 01/4629
E4      006150   01/3563 -- 01/4630
E6      006753   01/4007 -- 01/0217 01/3991 01/4623
E6M1A   000342   01/0217 -- 01/0848 01/0853 01/5708
E7      011760   01/5696 -- 01/4632
E8      001574   01/0975 -- 01/0214 01/4624 01/4701
E8M1A   000337   01/0214 -- 01/3291 01/5503
EABS    010714   01/5098 -- 01/5720
EAND    007241   01/4248 -- 01/3956
EATN    010513   01/4979 -- 01/5717
ECOS    010623   01/5044 -- 01/5715
EDEL1   001734   01/1092 -- 01/1096
EDELM   001730   01/1088 -- 01/1089 01/3793 01/5535
EEQL    007171   01/4184 -- 01/3950
EEQL1   007173   01/4186 -- 01/4204
EEXP    011160   01/5285 -- 01/5718
EFAD    007021   01/4054 -- 01/3942
EFDV    007032   01/4072 -- 01/3945
EFMP    007027   01/4066 -- 01/3944
EFOR    006232   01/3631 -- 01/3428
EFOR1   006243   01/3640 -- 01/3632
EFOR2   006276   01/3667 -- 01/3663
EFOR3   006307   01/3676 -- 01/3684
EFSB    007024   01/4060 -- 01/3943
EGORE   007176   01/4192 -- 01/3958
EGOSB   006367   01/3730 -- 01/3430
EGOTO   006220   01/3615 -- 01/3426 01/3627
EGTRT   007157   01/4168 -- 01/3947
EIF     006224   01/3622 -- 01/3427
EINP1   006617   01/3900 -- 01/3903
EINP2   006621   01/3902 -- 01/3919
EINP3   006643   01/3920 -- 01/3907
EINPT   006632   01/3911 -- 01/3439
EINT    011036   01/5193 -- 01/5722
EINT1   011046   01/5201 -- 01/5198
ELBRC   007225   01/4230 -- 01/3952
ELET    006216   01/3610 -- 01/3421
ELOG    011051   01/5209 -- 01/5719
ELORE   007203   01/4200 -- 01/3959
ELS1    010557   01/5015 -- 01/4986
ELS2    010562   01/5018 -- 01/5008
ELS3    010565   01/5021 -- 01/5011 01/5014
ELSE1   010450   01/4953 -- 01/4926
ELSE2   010453   01/4956 -- 01/4947
ELST    007164   01/4176 -- 01/3948
EMA10   011673   01/5638 -- 01/5597
EMA11   011703   01/5646 -- 01/5594
EMA12   011717   01/5658 -- 01/5653
EMAT    011445   01/5485 -- 01/0168 01/3441
EMAT0   011614   01/5591 -- 01/5645
EMAT1   011460   01/5497 -- 01/5552
EMAT2   011524   01/5533 -- 01/5542
EMAT3   011527   01/5536 -- 01/5527 01/5532 01/5548
EMAT4   011544   01/5549 -- 01/5500 01/5579
EMAT5   011553   01/5557 -- 01/5509
EMAT6   011572   01/5572 -- 01/5578
EMAT7   011602   01/5581 -- 01/5489
EMAT8   011620   01/5595 -- 01/5657
EMAT9   011654   01/5623 -- 01/5607 01/5660 01/5662
EMATA   000261   01/0168 -- unreferenced
END     003754   01/2308 -- unreferenced
ENDS    002473   01/1561 -- 01/1799 01/1800 01/1801 01/1806 01/1807 01/1812
ENEQ1   007212   01/4210 -- 01/4172 01/4244
ENEQL   007210   01/4208 -- 01/3949
ENEX1   006346   01/3710 -- 01/3696 01/3711 01/3712 01/3713
ENEX2   006353   01/3715 -- 01/3653 01/3689 01/3698
ENEX3   006363   01/3723 -- 01/3719
ENEXT   006325   01/3693 -- 01/3429
ENOT    007246   01/4256 -- 01/3957
ENOTA   000267   01/0174 -- unreferenced
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ENOUT   001711   01/1070 -- 01/0174 01/1072 01/3820 01/3823 01/3826 01/5540
EOF     000335   01/0212 -- 01/1729 01/2235 01/4575
EOL     000153   01/0097 -- 01/3792 01/3795 01/3816 01/3824 01/3829 01/3851 01/3875
EOR     007233   01/4239 -- 01/3955
EOST    002333   01/1437 -- 01/1499 01/1521 01/1550 01/1557 01/1574 01/1590
EOU10   010321   01/4855 -- 01/4852
EOUT1   010264   01/4826 -- 01/4791
EOUT2   010134   01/4738 -- 01/4744
EOUT3   010145   01/4747 -- 01/4755
EOUT4   010156   01/4756 -- 01/4737 01/4750
EOUT5   010200   01/4774 -- 01/4767
EOUT6   010174   01/4770 -- 01/4763 01/4779
EOUT7   010204   01/4778 -- 01/4769 01/4783
EOUT8   010210   01/4782 -- 01/4773 01/4777
EOUT9   010314   01/4850 -- 01/4827 01/4858
EPRI0   006450   01/3791 -- 01/3807
EPRI1   006453   01/3794 -- 01/3790 01/3809 01/3850
EPRI2   006461   01/3800 -- 01/3825 01/3827
EPRI3   006500   01/3815 -- 01/3799
EPRI4   006515   01/3828 -- 01/3811
EPRI5   006521   01/3832 -- 01/3843
EPRI6   006535   01/3844 -- 01/3835 01/3841
EPRI7   006544   01/3851 -- 01/3803
EPRI8   006562   01/3865 -- 01/3852
EPRIN   006445   01/3788 -- 01/3438
EPWR    007035   01/4078 -- 01/3946
EPWR1   007060   01/4098 -- 01/4085
EQUAL   002302   01/1405 -- unreferenced
ERBS    000343   01/0218 -- 01/0392 01/0397
EREAD   006410   01/3753 -- 01/3437 01/3765
ERND    010717   01/5107 -- 01/5723
ERND1   010223   01/4793 -- 01/4796 01/4808
ERND2   010243   01/4809 -- 01/4798
ERND3   010257   01/4821 -- 01/4802 01/4815
ERR     007706   01/4575 -- 01/0218 01/0219
ERROR   000544   01/0366 -- 01/0212 01/0213 01/0367 01/0464 01/0536 01/0650 01/0654 01/0841 01/0939
01/0974 01/1200 01/1250 01/1354 01/1432 01/1453 01/1477 01/1487 01/1492 01/1514 01/1527 01/1537 01/1548
01/1580 01/1609 01/1619 01/1647 01/1658 01/1667 01/1710 01/1726 01/1736 01/1745 01/1762 01/1777 01/1871
01/1915 01/1939 01/2011 01/2107 01/2121 01/2463 01/3080 01/3093 01/3102 01/3155 01/3168 01/3182 01/3209
01/3240 01/3268 01/3496 01/3562 01/3737 01/3744 01/4006 01/4090 01/4154 01/4158 01/4472 01/4913 01/5138
01/5215 01/5257 01/5354 01/5695 01/5763 01/5800 01/6225
ERSTR   006651   01/3932 -- 01/3440
ERTRN   006400   01/3742 -- 01/3431
ESBS    006764   01/4019 -- 01/3977 01/3979 01/4027
ESCM1   006742   01/3998 -- 01/3994
ESCMA   006715   01/3977 -- 01/3940
ESGN    011147   01/5271 -- 01/5724
ESIN    010625   01/5046 -- 01/5714
ESQR    010746   01/5135 -- 01/5721
ESTR    006775   01/4031 -- 01/3941
ESTR1   007002   01/4036 -- 01/4050
ESTR2   007015   01/4047 -- 01/4035
ESYMT   005510   01/3232 -- 01/3064 01/3107 01/3150 01/3248 01/3407 01/3409
ESYN3   000340   01/0215 -- 01/3158
ETAB    006566   01/3872 -- 01/5713
ETAB1   006610   01/3890 -- 01/3873 01/3878
ETAN    010367   01/4904 -- 01/5716
EUMIN   007222   01/4224 -- 01/3951
EXIT    005113   01/2944 -- 01/2957 01/2962
EXP     000150   01/0094 -- 01/0473 01/0493 01/0497 01/0522 01/0628 01/0680 01/0696 01/0697 01/0707
01/0709 01/0723 01/0736 01/0737 01/4269 01/4280 01/4283 01/4308 01/4356 01/4379 01/4381 01/4431 01/4432
01/4730 01/4736 01/4739 01/4747 01/4864 01/4872 01/5108 01/5195 01/5457
EXPER   011266   01/5355 -- 01/4643 01/5301
EXPN    004055   01/2352 -- unreferenced
EXPON   000236   01/0136 -- 01/0476 01/0484 01/0488 01/0569 01/0575 01/0577 01/0580 01/0582 01/4650
01/4653 01/4659 01/4664 01/4694 01/4708 01/4725 01/4735 01/4743 01/4746 01/4751 01/4754 01/4757 01/4810
01/4831 01/4835 01/4837 01/4845 01/4847
EXPS    002272   01/1397 -- unreferenced
EXU1    000065   01/0037 -- unreferenced
EXU2    000066   01/0038 -- unreferenced
EXU3    000067   01/0039 -- unreferenced
EXU4    000070   01/0040 -- unreferenced
F       000433   01/0274 -- 01/2730
```

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FALSE   007214   01/4215 -- 01/4157 01/4171 01/4180 01/4187 01/4195 01/4251 01/4258
FASE3   000253   01/0162 -- 01/3214
FASTM   005060   01/2908 -- 01/2894
FCORE   000131   01/0079 -- 01/2999 01/3072 01/3073 01/3076 01/3078 01/3081 01/3085 01/3165 01/3202
01/3205 01/3213 01/3238 01/3472
FDAT    000324   01/0203 -- 01/5572
FDAT1   006142   01/3557 -- 01/3564
FDAT2   006152   01/3565 -- 01/3558
FDATA   006141   01/3556 -- 01/0203 01/3572 01/3660 01/3669 01/3702 01/3708 01/3716 01/3758
FETCA   000302   01/0185 -- 01/3622 01/3654 01/3667 01/3819 01/5640 01/5702
FETCH   006075   01/3511 -- 01/0185 01/3512
FFLAG   000204   01/0138 -- 01/4693 01/4714 01/4762 01/4813 01/4826
FINIS   013202   01/6419 -- unreferenced
FLGBT   000536   01/0345 -- 01/0903 01/1483 01/1717 01/1842 01/2167 01/2249 01/2456 01/2735 01/3335
01/5122 01/5276
FLOAT   011417   01/5453 -- 01/0197 01/4914 01/5056 01/5219 01/5295 01/5454
FLT     000316   01/0197 -- unreferenced
FLUNA   000314   01/0195 -- unreferenced
FLUSH   002012   01/1149 -- 01/0050 01/1268
FLWST   006162   01/3576 -- 01/3502 01/3587 01/3680
FN      000533   01/0339 -- 01/1473 01/1833
FNDP1   004414   01/2584 -- 01/2596
FNDP2   004431   01/2597 -- 01/2590
FNDP3   004432   01/2598 -- 01/2592
FNDP4   004433   01/2599 -- 01/2585
FNDPA   000263   01/0170 -- 01/3494
FNDPS   004411   01/2581 -- 01/0170 01/2532 01/2547 01/2597 01/2598 01/2600 01/2648 01/2875
FOPBS   000345   01/0220 -- 01/2694 01/3300
FOPI    010456   01/4959 -- 01/4905
FOR     003736   01/2300 -- unreferenced
FOR0A   000331   01/0208 -- 01/4056 01/4062 01/4068 01/4074 01/4097 01/4123 01/4128 01/4161 01/4217
01/4220 01/4226
FOR0B   000332   01/0209 -- 01/3954 01/4046
FOR10   005636   01/3327 -- 01/0210
FOR11   005627   01/3320 -- 01/0209 01/3314
FOR12   005724   01/3381 -- 01/0211
FOR1A   000330   01/0207 -- 01/3953 01/4015
FOR1B   000333   01/0210 -- 01/4033
FORM&   000233   01/0133 -- 01/3277 01/3351 01/3387 01/3398 01/3928
FORM0   005622   01/3315 -- 01/0208
FORM1   005557   01/3280 -- 01/0207 01/3334
FORM2   005577   01/3296 -- 01/3285 01/3341 01/3345 01/3390
FORM4   005646   01/3335 -- 01/3288
FORM5   005655   01/3342 -- 01/3336
FORM6   005661   01/3346 -- 01/3294
FORM7   005736   01/3391 -- 01/3339
FORM9   005761   01/3410 -- 01/3325
FORMA   000303   01/0186 -- 01/3514 01/3610 01/3649 01/3755 01/3914
FORMX   005552   01/3275 -- 01/0186 01/3276 01/3353 01/3368 01/3400
FORS    002435   01/1525 -- 01/1796
FPOP    003261   01/1964 -- 01/1875 01/1982 01/2065
FR12A   000334   01/0211 -- 01/3883 01/3889 01/3895 01/4952 01/4958 01/5020 01/5025 01/5085 01/5100
01/5129 01/5136 01/5174 01/5200 01/5203 01/5210 01/5273 01/5279 01/5286
FRCUR   003304   01/1986 -- 01/1873 01/1999 01/2075
FSC     003045   01/1818 -- 01/1430 01/1498 01/1509 01/1532 01/1538 01/1549 01/1639 01/1740 01/1874
01/1918 01/1977 01/1995 01/2081 01/2096 01/2238 01/6418
FSC&    013201   01/6418 -- 01/6401 01/6406
FSC1    003050   01/1821 -- 01/1911 01/1937
FSC10   003222   01/1927 -- 01/1877
FSC11   003226   01/1931 -- 01/1920 01/1922
FSC12   003232   01/1935 -- 01/1905 01/1960
FSC13   003235   01/1938 -- 01/1926
FSC14   003250   01/1949 -- 01/0206 01/1855
FSC1A   000327   01/0206 -- 01/0817
FSC2    003052   01/1823 -- 01/1951
FSC3    003077   01/1844 -- 01/1839
FSC4    003113   01/1856 -- 01/1834
FSC5    003121   01/1862 -- 01/1843
FSC6    003160   01/1893 -- 01/1825 01/1827 01/1930
FSC7    003141   01/1878 -- 01/1909
FSC8    003204   01/1913 -- 01/1845 01/1849 01/1881 01/1888 01/1894
FSC9    003212   01/1919 -- 01/1824
FSCA&   013200   01/6417 -- 01/6410
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FSCE1   003132   01/1871 -- 01/2212 01/4604
FSCE2   003206   01/1915 -- 01/2056 01/2223 01/4605 01/6417
FSCE3   003236   01/1939 -- 01/1945 01/4606
FSCE4   003332   01/2011 -- 01/0216 01/4611
FSCEF   000341   01/0216 -- 01/2630
FVSR1   006206   01/3599 -- 01/3604
FVSR2   006214   01/3605 -- 01/3602
FVSRH   006176   01/3591 -- 01/3600 01/3605 01/3606 01/3631 01/3693
FWAM    000114   01/0066 -- 01/1149 01/1361 01/1451 01/3000
GEN2    012012   01/5735 -- 01/5842
GENER   012006   01/5731 -- 01/5756 01/5817 01/5833 01/5849
GET     012261   01/5935 -- 01/5939
GETAD   012256   01/5932 -- 01/5917 01/5925 01/5934 01/5942 01/5943
GETCA   000276   01/0181 -- unreferenced
GETCR   001662   01/1041 -- 01/0181 01/0445 01/0456 01/0502 01/0535 01/0543 01/0548 01/0558 01/0598
01/1044 01/1053 01/1054 01/1055 01/1205 01/1562 01/1601 01/1613 01/1668 01/1723 01/1728 01/1856 01/1870
01/1891 01/2060 01/2147 01/2183 01/2189 01/2227 01/2234 01/2398 01/2462 01/2486 01/2509 01/2515 01/2641
01/6414
GETDG   010325   01/4862 -- 01/4770 01/4788 01/4881
GETPF   003635   01/2233 -- 01/1633 01/2240
GOSUB   003744   01/2304 -- unreferenced
GOTO    003731   01/2296 -- unreferenced
GOTOS   002432   01/1519 -- 01/1794 01/1798
GTE     004030   01/2336 -- unreferenced
GTR     002274   01/1399 -- unreferenced
GTRCD   002052   01/1193 -- unreferenced
GTREQ   002322   01/1421 -- unreferenced
HALF    000534   01/0340 -- 01/0342 01/5251 01/5342 01/5416
HIMSK   000476   01/0309 -- 01/4866
HONE    000534   01/0342 -- 01/3664 01/4108 01/4124 01/4218 01/5857 01/5903 01/6228
HSTPT   000137   01/0085 -- 01/0938 01/0947 01/0948 01/0958 01/0967 01/1007 01/3295 01/3317 01/3352
01/3361 01/3363 01/3385 01/3386 01/3389 01/3399 01/3471 01/3478 01/3516 01/3597 01/3641 01/3642 01/3685
01/3695 01/3723 01/3725 01/3756 01/3762 01/3916 01/3917 01/3969 01/3980 01/4009 01/4011 01/4026 01/4036
01/4045 01/4049 01/4078 01/6081
I.STP   000110   01/0058 -- unreferenced
IDIV    007557   01/4479 -- 01/4440 01/4444 01/4450 01/4514 01/4516
IDIV1   007604   01/4500 -- 01/4494
IDIV2   007606   01/4502 -- 01/4509
IDN     004110   01/2370 -- unreferenced
IENTA   006616   01/3896 -- 01/3872
IF      003734   01/2298 -- unreferenced
IFIX    001432   01/0858 -- 01/0198 01/0847 01/0869 01/0880 01/0881 01/1130 01/1139 01/4082 01/4666
01/5197 01/5444
IFIX1   001452   01/0874 -- 01/0879
IFIX2   001456   01/0878 -- 01/0873 01/0888
IFIX3   001462   01/0882 -- 01/0863
IFIXA   000317   01/0198 -- unreferenced
IFS     002424   01/1509 -- 01/1795
IMOFF   000106   01/0056 -- 01/1193 01/1299 01/1313
IMON    000105   01/0055 -- 01/1215 01/1263 01/1277
INCB2   013147   01/6389 -- 01/5813
INCHK   000266   01/0173 -- 01/1338 01/2645
INF     000471   01/0304 -- 01/0665 01/4159 01/5355
INPUT   003774   01/2318 -- unreferenced
INT     004071   01/2360 -- unreferenced
INTC1   004252   01/2474 -- 01/2488
INTC2   004271   01/2489 -- 01/2475
INTCK   004247   01/2471 -- 01/0173 01/2464 01/2493 01/2500 01/2501 01/2873
INTE    011255   01/5346 -- 01/5294 01/5298 01/5343
INTGR   004454   01/2877 -- 01/2473 01/2477 01/2480 01/2485 01/2489 01/2495 01/2498
INV     004113   01/2372 -- unreferenced
INVSC   002134   01/1251 -- 01/4577
IPWR    007066   01/4104 -- 01/4103
IPWR1   007076   01/4112 -- 01/4144
IPWR2   007102   01/4116 -- 01/4137
IPWR3   007117   01/4129 -- 01/4114
IPWR4   007130   01/4138 -- 01/4117
IPWR5   007112   01/4124 -- 01/4120
K1      010460   01/4960 -- 01/4909 01/4923 01/4938 01/4948 01/4949 01/4987 01/4988 01/4998 01/5051
01/5064 01/5080
K2      010470   01/4964 -- 01/4927 01/4928 01/4936 01/4996 01/5067 01/5068 01/5376
KEYIN   002047   01/1187 -- 01/1180 01/1226
L2E     011303   01/5364 -- 01/5289
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LBASE   011661   01/5628 -- 01/5627
LBRAC   002306   01/1409 -- 01/2019 01/2211 01/6396
LCHK1   012057   01/5778 -- 01/5776 01/5785 01/5816 01/5988
LCHK2   012053   01/5774 -- 01/0204 01/5775 01/5841 01/5950 01/6064
LCHK4   012067   01/5786 -- 01/5781 01/5784 01/5803
LCHK5   012106   01/5801 -- 01/4634 01/5798
LCHK6   012075   01/5792 -- 01/5802
LCK2A   000325   01/0204 -- 01/5522
LCON    012153   01/5856 -- 01/5633 01/5874 01/5880
LCON1   012156   01/5859 -- 01/5883
LCON2   012167   01/5868 -- 01/5873
LDUM1   012712   01/6226 -- 01/4635
LDVSR   005032   01/2865 -- 01/2789
LDZRO   000201   01/0360 -- 01/2792 01/2806 01/2809
LE2     011137   01/5262 -- 01/5255
LERR    012043   01/5763 -- 01/4633 01/5895 01/5996
LET     003712   01/2286 -- 01/0226
LETCA   000300   01/0183 -- unreferenced
LETCK   001651   01/1029 -- 01/0183 01/1033 01/1036 01/1037 01/1241 01/1648 01/1700 01/1826 01/1858
01/2185
LETS    002325   01/1427 -- 01/1789
LF      000456   01/0293 -- 01/0155 01/2057 01/5676 01/6411
LFEED   000245   01/0155 -- 01/1173
LFLAG   000172   01/0357 -- 01/2705 01/2716 01/2723
LIDN    012204   01/5887 -- 01/5634 01/5912 01/6088
LIDN1   012224   01/5903 -- 01/5911
LIN10   012530   01/6112 -- 01/6107
LIN11   012510   01/6096 -- 01/6113
LIN12   012741   01/6249 -- 01/6239
LIN13   012746   01/6254 -- 01/6267
LIN14   012760   01/6264 -- 01/6259
LIN15   013041   01/6313 -- 01/6295
LIN17   013070   01/6336 -- 01/6325
LIN18   013046   01/6318 -- 01/6339
LINV    012447   01/6063 -- 01/5635 01/6126
LINV1   012543   01/6123 -- 01/6273
LINV2   012557   01/6135 -- 01/6159
LINV3   012634   01/6180 -- 01/6213
LINV4   012766   01/6270 -- 01/6275 01/6340
LINV5   013014   01/6292 -- 01/6312
LINV6   012724   01/6236 -- 01/6248
LINV7   012577   01/6151 -- 01/6144
LINV8   012610   01/6160 -- 01/6154
LIS10   004647   01/2750 -- 01/2737
LIS11   004663   01/2762 -- 01/2751
LIS12   004670   01/2767 -- 01/2691
LIS13   004701   01/2776 -- 01/2659
LIS14   004707   01/2782 -- 01/2699
LIST    004470   01/2639 -- 01/0166
LIST0   004505   01/2652 -- 01/2642
LIST1   004512   01/2657 -- 01/2654 01/2680
LIST2   004536   01/2677 -- 01/2828
LIST3   004533   01/2674 -- 01/2709 01/2724 01/2729 01/2749 01/2761 01/2766
LIST4   004542   01/2681 -- 01/2676
LIST5   004566   01/2701 -- 01/2684 01/2775 01/2785
LIST6   004601   01/2712 -- 01/2754
LIST7   004606   01/2717 -- 01/2714 01/2734
LIST8   004623   01/2730 -- 01/2711
LIST9   004630   01/2735 -- 01/2707
LISTA   000257   01/0166 -- 01/1278
LMAP    011660   01/5627 -- 01/5624
LMIN    013145   01/6387 -- 01/5825
LNEXT   012312   01/5963 -- 01/5978
LNGT1   000210   01/2978 -- 01/2899 01/2914
LNGT2   000211   01/2979 -- 01/2929 01/2945 01/2946 01/2952 01/2953
LNGTH   000215   01/2872 -- 01/2381 01/2414
LNUM    000206   01/2976 -- 01/2891 01/2901 01/2903 01/2918 01/2959 01/2973
LNUM.   000207   01/2977 -- 01/2911 01/2919 01/2955 01/2972
LNZR    011132   01/5258 -- 01/4642
LOG     004060   01/2354 -- unreferenced
LOGER   011060   01/5216 -- 01/4638
LOOP    012021   01/5742 -- 01/5755
LOOP2   005074   01/2926 -- 01/2947 01/2969
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LOPC    011330   01/5389 -- 01/5410
LPARN   002310   01/1411 -- unreferenced
LPCK    003612   01/2208 -- 01/1482 01/1730 01/1739 01/1872 01/2215 01/2237
LPIV    013142   01/6384 -- 01/5741 01/5754 01/5865 01/5872 01/5957 01/5976 01/6121 01/6123 01/6124
01/6127 01/6128 01/6160 01/6168 01/6214 01/6215 01/6234 01/6274 01/6281 01/6288
LPLUS   013143   01/6385 -- 01/5809 01/5811
LSS     002276   01/1401 -- unreferenced
LSSEQ   002324   01/1423 -- unreferenced
LSTAK   000134   01/0082 -- 01/0991 01/0994 01/0998 01/3475 01/3736 01/3743
LSTPT   000136   01/0084 -- 01/0936 01/0937 01/0940 01/0949 01/0999 01/1003 01/3320 01/3327 01/3357
01/3359 01/3362 01/3364 01/3369 01/3371 01/3373 01/3403 01/3405 01/3406 01/3410 01/3412 01/3413 01/3476
01/3645 01/3742 01/3745 01/3748 01/3978 01/3989 01/3996 01/3998 01/4000 01/4001 01/4004 01/4007 01/4012
01/4014 01/4025 01/4230 01/6076
LTE     004032   01/2338 -- unreferenced
LTIME   013146   01/6388 -- 01/5850
LTR     003566   01/2182 -- 01/1468 01/1476 01/1646 01/1698 01/2120 01/2133 01/2186 01/2187 01/2192
LWAM    000115   01/0067 -- 01/2009 01/2628
LWHR    013075   01/6345 -- 01/6130 01/6162 01/6166 01/6216 01/6282 01/6354
LWHR2   013107   01/6355 -- 01/6170 01/6175 01/6278 01/6364
M1      000477   01/0310 -- 01/0435 01/0630 01/0850 01/0913 01/0975 01/0990 01/3084 01/3193 01/3265
01/3388 01/3747 01/3780 01/3860 01/3933 01/4013 01/4410 01/4887 01/4896 01/5143 01/5686 01/6347 01/6351
01/6357 01/6361
M10     000510   01/0319 -- 01/3735 01/4839
M1000   000531   01/0336 -- 01/4676
M11     000511   01/0320 -- 01/1837
M124    011271   01/5358 -- 01/5299
M15     000512   01/0321 -- 01/1094 01/3329 01/5439
M16     000513   01/0322 -- 01/0776 01/0864 01/2023 01/4487
M19     000514   01/0323 -- 01/1352
M1LOP   005416   01/3165 -- 01/3092
M2      000500   01/0311 -- 01/0662 01/0735 01/0765 01/0980 01/1187 01/1197 01/1493 01/1594 01/1656
01/1664 01/1828 01/1878 01/2017 01/2053 01/2066 01/2085 01/2209 01/2220 01/2951 01/3106 01/3198 01/3659
01/3701 01/4160 01/4358 01/4489 01/5356 01/6394 01/6407
M21     000515   01/0324 -- 01/2689
M25     000516   01/0325 -- 01/4285 01/4290
M256    000527   01/0334 -- 01/0624 01/0636 01/0898 01/1138 01/1720 01/2032 01/2041 01/5706 01/5998
M2LOP   005423   01/3170 -- 01/3176 01/3180 01/3211
M3      000501   01/0312 -- 01/1289 01/1759 01/2246 01/3063 01/3126 01/3372
M310    000530   01/0335 -- unreferenced
M32     000517   01/0326 -- 01/2410
M3LOP   005454   01/3195 -- 01/3188
M4      000502   01/0313 -- 01/0505 01/2787 01/3052 01/3149 01/3178 01/4525 01/4556
M4LOP   005475   01/3212 -- 01/3171 01/3221
M5      000503   01/0314 -- 01/1708 01/1896 01/1967 01/2712 01/4789
M6      000504   01/0315 -- 01/1163 01/3640 01/5612
M7      000505   01/0316 -- 01/0338 01/4758
M72     000523   01/0330 -- 01/3876 01/3880
M73     000524   01/0331 -- 01/3846
M76     000525   01/0332 -- 01/1103
M8      000506   01/0317 -- 01/0867 01/0870 01/1428 01/3301 01/5649 01/5651
M9      000507   01/0318 -- 01/1248 01/1355 01/1928 01/1935 01/1949 01/2076
MANT1   000234   01/0134 -- 01/0474 01/0517 01/0584 01/0681 01/0693 01/0698 01/0704 01/0718 01/0725
01/0732 01/0748 01/0756 01/0758 01/4726 01/4877
MANT2   000235   01/0135 -- 01/0475 01/0513 01/0585 01/0682 01/0710 01/0715 01/0726 01/0738 01/0747
01/0753 01/4729 01/4878
MAT     004005   01/2322 -- 01/0167
MAT&    003017   01/1785 -- 01/1675 01/1725
MATA    000260   01/0167 -- unreferenced
MATFN   000357   01/0230 -- 01/1707
MATIO   000354   01/0227 -- 01/1655
MATS    002604   01/1646 -- 01/1813
MATS0   002623   01/1661 -- 01/1671
MATS1   002640   01/1674 -- 01/1660 01/1683
MATS2   002652   01/1684 -- 01/1649
MATS3   002726   01/1728 -- 01/1722
MATS4   002740   01/1738 -- 01/1699
MATS5   002754   01/1750 -- 01/1701
MATS6   002775   01/1767 -- 01/1784
MATS7   003011   01/1779 -- 01/1766
MATSB   013150   01/6393 -- 01/1785 01/6397 01/6398 01/6416
MAXFX   000540   01/0346 -- 01/4705
MAXSN   000532   01/0337 -- 01/1339 01/1520 01/2646
MB      011143   01/5264 -- 01/5242 01/5243
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MBIN1   000160   01/0145 -- 01/3233 01/3246 01/3255 01/3260 01/3263
MBIN2   000157   01/0146 -- 01/3236 01/3243 01/3245
MBOX1   000205   01/0144 -- 01/3048 01/3055 01/3061 01/3062 01/3066 01/3099 01/3105 01/3118 01/3119
01/3120 01/3133 01/3134 01/3136 01/3143 01/3146 01/3159 01/3184 01/3185 01/3190 01/3196 01/3197 01/3204
01/3256
MBUF    000240   01/0143 -- 01/3241
MBXL    000367   01/0238 -- 01/5851
MBY10   001230   01/0703 -- 01/0492 01/0581 01/0622 01/0643 01/0655 01/0673 01/0676 01/0706 01/0727
01/0766 01/0774 01/0786 01/4738 01/4863
MCBCK   003253   01/1955 -- 01/1829 01/1897 01/1959
MCBOP   000355   01/0228 -- 01/1957
MCKS    011761   01/5701 -- 01/5669 01/5678 01/5709
MCOU1   005000   01/2839 -- 01/2848
MCOU2   005012   01/2849 -- 01/2842
MCOU3   005020   01/2855 -- 01/2863
MCOUT   004777   01/2838 -- 01/2760 01/2770 01/2802 01/2811 01/2864
MDIM    001404   01/0830 -- 01/0842 01/2049 01/3144 01/3195 01/5568 01/5688 01/5691 01/5788 01/5862
01/6071
MER10   005440   01/3183 -- 01/4620
MER3    005273   01/3081 -- 01/3083 01/4615
MER4    005321   01/3103 -- 01/4613
MER5    005406   01/3156 -- 01/4619
MER6    005422   01/3169 -- 01/4614
MER7    005473   01/3210 -- 01/3201 01/4622
MER8    005521   01/3241 -- 01/3075 01/3247 01/4616
MER9    001420   01/0842 -- 01/4621
MFASE   005146   01/2996 -- 01/0161
MIND    000202   01/0361 -- 01/2795 01/2798
MINFX   000542   01/0347 -- 01/4711
MINUS   002264   01/1391 -- unreferenced
MLBX1   000217   01/0125 -- 01/0238 01/1080 01/1119 01/1121 01/4682 01/4718 01/5492 01/5507 01/5641
01/5642 01/5689 01/5693 01/5859 01/5860 01/5866 01/5867 01/5897 01/5900 01/5909 01/5910 01/6118 01/6119
01/6223
MLO10   005170   01/3014 -- 01/3030
MLO12   005205   01/3027 -- 01/3019
MLO13   005211   01/3031 -- 01/3044
MLOP0   005377   01/3149 -- 01/3121 01/3142
MLOP1   005160   01/3006 -- 01/3089
MLOP2   005220   01/3038 -- 01/3026 01/3047 01/3071 01/3077 01/3086 01/3098 01/3108 01/3116 01/3151
01/3163
MLOP3   005253   01/3065 -- 01/3058
MLOP4   005270   01/3078 -- 01/3068
MLOP5   005301   01/3087 -- 01/3041
MLOP6   005310   01/3094 -- 01/3051 01/4618
MLOP7   005327   01/3109 -- 01/3054
MLOP8   005344   01/3122 -- 01/3112 01/3114
MLOP9   005402   01/3152 -- 01/3138
MM4     010677   01/5087 -- 01/5058
MNEG    000536   01/0343 -- 01/0345 01/0644 01/0647 01/0667 01/0969 01/0973 01/3059 01/3060 01/3215
01/3218 01/5258 01/5796 01/5799
MNPTR   000156   01/0148 -- 01/3011 01/3040
MOD1    012025   01/5746 -- 01/5810 01/5812 01/5836 01/5837
MOD2    012033   01/5752 -- 01/5814 01/5815 01/5839 01/5840
MONIT   000103   01/0053 -- 01/1181 01/3488
MP2     010574   01/5027 -- 01/5021 01/5022
MPTR    000155   01/0147 -- 01/3005 01/3006 01/3008 01/3009 01/3010 01/3012 01/3013 01/3021 01/3023
01/3027 01/3032 01/3037 01/3038 01/3039 01/3042 01/3094 01/3103 01/3122 01/3123 01/3124 01/3128 01/3129
01/3130
MPY     001317   01/0764 -- 01/0194 01/0675 01/0684 01/0694 01/0740 01/0749 01/0767 01/0792 01/0793
01/0838 01/3995 01/4384 01/4392 01/4401 01/4452 01/5738 01/5955 01/6348 01/6358
MPY1    001337   01/0780 -- 01/0784
MPY2    001352   01/0791 -- 01/0787
MPYA    000313   01/0194 -- unreferenced
MSFLG   002315   01/1416 -- 01/1356 01/1429 01/1901 01/1929 01/1936 01/1950 01/1971 01/1989 01/2077
MSK0    000445   01/0284 -- 01/0641 01/0832 01/0836 01/0915 01/0925 01/2697 01/3321 01/3833 01/3983
01/3987 01/4870 01/4892 01/4982 01/5176 01/5436 01/5474 01/5513 01/5519 01/5765 01/5768 01/5990 01/5993
01/6002
MSK1    000450   01/0287 -- 01/1496 01/1696 01/1719 01/1734 01/1775 01/1780 01/2161 01/3031 01/3045
01/3309 01/3593 01/3681 01/5487 01/5498 01/5595 01/5615 01/5896
MSK3    000505   01/0338 -- 01/4534
MSK4    000470   01/0303 -- 01/0910 01/0930
MSYM    005550   01/3269 -- 01/3262 01/4617
MSYMT   005531   01/3254 -- 01/3115 01/3137 01/3259 01/3269 01/3270
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MULT    012337   01/5987 -- 01/5631 01/6058
MULT2   012402   01/6022 -- 01/6045
MULT3   012374   01/6016 -- 01/6051
MULT4   012367   01/6011 -- 01/6057
MVTO1   000631   01/0430 -- 01/0438
MVTOH   000627   01/0428 -- 01/0431 01/0777 01/0783 01/1010 01/2576 01/3637
MWDNO   000217   01/0150 -- 01/3025 01/3070
N       000437   01/0278 -- 01/2732
N37     000410   01/2982 -- 01/2935
N40     000411   01/2983 -- 01/2937
N43     000414   01/2984 -- 01/2939
N60     000425   01/2981 -- unreferenced
NEXT    003741   01/2302 -- 01/0231
NOEOF   000336   01/0213 -- 01/1439 01/1564 01/1727 01/1749 01/1771 01/2113 01/4610
NORM1   001206   01/0682 -- 01/0699
NORM2   001210   01/0684 -- 01/0688 01/0690
NORM3   001211   01/0685 -- 01/0679
NORML   001174   01/0672 -- 01/0500 01/0606 01/0683 01/0759 01/0775 01/0781 01/4879
NOT     004020   01/2330 -- 01/0236
NOTOP   002320   01/1419 -- unreferenced
NS1     010031   01/4662 -- 01/4657
NS2     010034   01/4665 -- 01/4655
NUM10   001030   01/0563 -- 01/0549 01/0551 01/0559
NUM12   001034   01/0567 -- 01/0503 01/0534
NUM13   001051   01/0580 -- 01/0573
NUM14   001055   01/0584 -- 01/0571 01/0579
NUM15   001064   01/0591 -- 01/0587
NUMC1   000705   01/0480 -- 01/0504
NUMC2   000713   01/0486 -- 01/0482
NUMC3   000731   01/0500 -- 01/0485 01/0519 01/0524
NUMC4   000736   01/0505 -- 01/0495
NUMC5   000743   01/0510 -- 01/0527
NUMC6   000762   01/0525 -- 01/0511
NUMC7   000765   01/0528 -- 01/0487
NUMC8   001004   01/0543 -- 01/0538
NUMC9   001006   01/0545 -- 01/0541
NUMCA   000265   01/0172 -- unreferenced
NUMCK   000672   01/0469 -- 01/0172 01/0458 01/0470 01/1925
NUMER   000775   01/0536 -- 01/0544 01/0546 01/0562 01/4579
NUMO1   010060   01/4685 -- 01/4669 01/4785 01/4822
NUMO2   010067   01/4692 -- 01/4673
NUMO3   010116   01/4721 -- 01/4670 01/4787 01/4824
NUMO5   010110   01/4715 -- 01/4707
NUMOA   000270   01/0175 -- 01/1076 01/2747
NUMOP   003645   01/2244 -- 01/1570 01/1927 01/2252
NUMOT   010014   01/4649 -- 01/0175 01/4651
NXSTM   005052   01/2898 -- 01/2920 01/2927 01/2971
NXTDT   000144   01/0090 -- 01/3461 01/3531 01/3560 01/3567 01/3568 01/3569 01/3570 01/3571
NXTS    002467   01/1554 -- 01/1797
NXTST   000141   01/0087 -- 01/3489 01/3583 01/3617 01/3674 01/3721 01/3732 01/3733 01/3746
ODD     011015   01/5175 -- 01/5142
OPCH1   001575   01/0976 -- 01/0971
OPCHK   001563   01/0966 -- 01/0956 01/0978 01/0982 01/3515 01/3967 01/4020 01/4047
OPDMK   000474   01/0307 -- 01/2702 01/3282 01/3797
OPMSK   000467   01/0302 -- 01/0814 01/1853 01/1867 01/2442 01/2682 01/2757 01/2840 01/2932 01/3095
01/3297 01/3503 01/3537 01/3542 01/3805 01/3839 01/5491 01/5529 01/5559 01/5675
OR      004026   01/2334 -- unreferenced
OROP    002314   01/1415 -- unreferenced
ORS     007235   01/4241 -- 01/4240
ORS1    007237   01/4243 -- 01/4252
OUT11   004722   01/2793 -- 01/2814
OUT12   004741   01/2808 -- 01/2805
OUT13   004744   01/2811 -- 01/2807
OUTCA   000275   01/0180 -- unreferenced
OUTCR   001773   01/1129 -- 01/0180 01/0384 01/0386 01/0387 01/0389 01/0402 01/1079 01/1099 01/1143
01/2668 01/2700 01/2722 01/2728 01/2731 01/2733 01/2768 01/2782 01/2810 01/2816 01/2824 01/2836 01/2859
01/3783 01/3886 01/4688 01/4733 01/4772 01/4775 01/4781 01/4804 01/4809 01/4816 01/4821 01/4829 01/4836
01/4846 01/4848 01/4853 01/4856
OUTIA   000272   01/0177 -- 01/0400 01/0404 01/4690
OUTIN   004713   01/2786 -- 01/0177 01/2666 01/2765 01/2817
OUTLA   000274   01/0179 -- unreferenced
OUTLN   001753   01/1110 -- 01/0179 01/1077 01/1105 01/1111 01/3848 01/3865 01/3892 01/5543 01/5544
OUTS1   004756   01/2821 -- 01/2773 01/2837
```

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OUTSA   000273   01/0178 -- 01/3849
OUTST   004753   01/2818 -- 01/0178 01/2783 01/2819
OVCHK   004454   01/2622 -- 01/2562 01/2575 01/2633 01/2874 01/2877
OVFLW   001164   01/0661 -- 01/0656 01/0668 01/4474
OVRER   001161   01/0655 -- 01/4640
PACK1   001117   01/0621 -- 01/0618
PACK3   001154   01/0650 -- 01/0635
PACK4   001160   01/0654 -- 01/0638 01/0648
PACKA   000315   01/0196 -- unreferenced
PASS3   005132   01/2963 -- 01/2909
PAST    010660   01/5073 -- 01/5066
PBPTR   000122   01/0072 -- 01/1151 01/1357 01/1363 01/1450 01/1463 01/2584 01/2609 01/2617 01/2623
01/2632 01/2658 01/2908 01/2926 01/2996 01/3079 01/3087 01/3166 01/3212 01/3548
PBUFF   000121   01/0071 -- 01/1150 01/1358 01/1362 01/1462 01/2583 01/2639 01/2892 01/2925 01/2997
01/3004 01/3460 01/3483 01/3493
PCHK    007137   01/4148 -- 01/4088 01/4104 01/4164
PCHK1   007154   01/4162 -- 01/4152
PDFBS   000351   01/0224 -- 01/3395
PDFNS   000356   01/0229 -- 01/1836
PDFT    011772   01/5713 -- 01/0224
PEXMA   000254   01/0163 -- 01/0416 01/2533 01/2534 01/2538 01/2572
PEXMK   002032   01/1169 -- 01/0163
PFLAG   002321   01/1420 -- 01/1367 01/1457 01/1497 01/1767 01/1772 01/2044 01/2156 01/2162
PGINT   000271   01/0176 -- 01/1519 01/2031 01/2040
PIBY2   010572   01/5026 -- 01/5012 01/5013 01/5045
PLIST   002144   01/1276 -- unreferenced
PLUS    002262   01/1389 -- 01/1761 01/1903
POWER   007146   01/4155 -- 01/4626
PRADD   000140   01/0086 -- 01/3490 01/3581 01/3677 01/3753 01/3802 01/3906 01/5526 01/5550 01/5561
01/5606 01/5659
PRCS    005117   01/2951 -- 01/2936 01/2938 01/2940
PRERR   002160   01/1292 -- 01/4612
PRGI1   004244   01/2465 -- 01/2460
PRGIN   004231   01/2454 -- 01/0176 01/2459 01/2466 01/2467 01/2871
PRIN1   002523   01/1594 -- 01/1617 01/1642
PRIN2   002534   01/1603 -- 01/1597
PRIN3   002553   01/1618 -- 01/1606
PRIN4   002577   01/1638 -- 01/1630
PRIN5   002601   01/1640 -- 01/1637
PRINS   002527   01/1598 -- 01/1810
PRINT   003770   01/2316 -- unreferenced
PRNIA   000320   01/0199 -- 01/1124 01/5495
PRNIN   006425   01/3769 -- 01/0199 01/3779 01/3784 01/3788
PTAPE   002147   01/1282 -- 01/0030 01/1171 01/1293
QMARK   000251   01/0159 -- 01/0156
QMRKA   000246   01/0156 -- 01/1233
QUOTE   002244   01/1375 -- 01/0220 01/1605 01/1610
R       000440   01/0279 -- 01/0385
R22     011135   01/5261 -- 01/5225 01/5231
RBOUT   002107   01/1223 -- 01/1198
RBRAC   002254   01/1383 -- unreferenced
RCERR   010006   01/4639 -- 01/0219
RDOP    000465   01/0300 -- 01/1659 01/5493 01/5508
RDYA    000241   01/0152 -- 01/1164
RDYDA   000255   01/0164 -- 01/2649 01/2778 01/2781 01/2974 01/2998 01/3432 01/3433 01/3434 01/3435
RDYPT   002021   01/1157 -- 01/0164 01/1185 01/1290 01/1306
READ    003765   01/2314 -- 01/0227
READS   002507   01/1579 -- 01/1586 01/1809 01/1811
READY   000242   01/0153 -- 01/0152
RECER   000344   01/0219 -- 01/0414
REDI1   011740   01/5680 -- 01/5677
REDIM   011724   01/5668 -- 01/5564 01/5661 01/5696
REED    000113   01/0065 -- 01/1196
REM     003726   01/2294 -- unreferenced
REMOP   000464   01/0299 -- 01/2771
REMS    002421   01/1503 -- 01/1793
RENUM   005037   01/2882 -- 01/1328
REPL1   012136   01/5836 -- 01/5852
REPLC   012131   01/5831 -- 01/5628 01/5832 01/6085
RETCR   010351   01/4885 -- 01/4794 01/4805 01/4850 01/4857 01/4894 01/4898
RND     004074   01/2362 -- unreferenced
RPARN   002252   01/1381 -- 01/1880 01/2055 01/2222 01/6409
RPCK    003622   01/2219 -- 01/1488 01/1732 01/1741 01/1876 01/2229 01/2239
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RPRCS   002060   01/1199 -- 01/1184 01/1294
RPWR    007047   01/4088 -- 01/4087
RSCHK   001604   01/0986 -- 01/0957 01/0993 01/1011 01/3367 01/4234
RSTOR   004000   01/2320 -- unreferenced
RSYM    000146   01/0092 -- 01/1174 01/1188 01/5373 01/5379 01/5417 01/5418
RTLE    002062   01/1201 -- 01/4576
RTRN    003750   01/2306 -- unreferenced
RUN     002140   01/1263 -- unreferenced
RUNA    000252   01/0161 -- 01/1264
S       000441   01/0280 -- 01/1210
SA1     011026   01/5184 -- 01/5180
SA2     011030   01/5185 -- 01/5148
SB1     011032   01/5186 -- 01/5182
SB2     011034   01/5187 -- 01/5150
SBFIX   001421   01/0846 -- 01/0854 01/4024 01/5703
SBOX    011013   01/5173 -- 01/5144 01/5175
SBOXX   000204   01/0122 -- 01/0138 01/4924 01/4945 01/4983 01/5005 01/5193 01/5196 01/5202
SBPTR   000133   01/0081 -- 01/0592 01/0593 01/0594 01/0595 01/0596 01/0815 01/1239 01/1240 01/1340
01/1350 01/1484 01/1494 01/1510 01/1533 01/1542 01/1543 01/1544 01/1561 01/1588 01/1589 01/1600 01/1611
01/1612 01/1620 01/1627 01/1628 01/1631 01/1632 01/1635 01/1636 01/1650 01/1654 01/1672 01/1685 01/1702
01/1706 01/1715 01/1738 01/1751 01/1835 01/1851 01/1865 01/1883 01/1890 01/1898 01/1916 01/1917 01/1931
01/1933 01/1947 01/1948 01/1956 01/2027 01/2058 01/2059 01/2083 01/2084 01/2098 01/2099 01/2122 01/2159
01/2170 01/2201 01/2202 01/2203 01/2214 01/2225 01/2226 01/2236 01/2247 01/2386 01/2390 01/2392 01/2397
01/2430 01/2443 01/2455 01/2458 01/2461 01/2492 01/2499 01/2513 01/2514 01/2519 01/2521 01/2524 01/2544
01/2644 01/3918 01/6400 01/6412 01/6413
SBSC1   003367   01/2043 -- 01/2038
SBSC2   003401   01/2053 -- 01/2045 01/2094 01/2100
SBSC3   003424   01/2072 -- 01/2030
SBSCK   003334   01/2016 -- 01/2020 01/2021 01/2064 01/2072 01/2106 01/2176
SBUFA   000120   01/0070 -- 01/1238 01/1342 01/2531 01/2542 01/2546 01/2564 01/2661 01/2677
SCCNT   000454   01/0291 -- 01/4231
SCMMA   002256   01/1385 -- 01/2037 01/2093
SCRTH   002142   01/1268 -- unreferenced
SETDP   006107   01/3524 -- 01/3466 01/3532 01/3563 01/3935
SEXU    000104   01/0054 -- 01/0375 01/0418 01/1158 01/1301 01/3482 01/3771 01/3818 01/3822 01/3867
01/3891 01/3894 01/3912 01/3923 01/5554
SFLAG   003461   01/2870 -- 01/1427 01/1431 01/1910
SGN     004077   01/2364 -- unreferenced
SIGN    000147   01/0093 -- 01/0448 01/0455 01/0462 01/0586 01/1924 01/2739 01/4490 01/4501 01/4511
01/4663 01/4686 01/4731
SIN     004041   01/2344 -- 01/0229
SLENG   004454   01/2874 -- 01/2389 01/2400 01/2413 01/2420 01/2439
SLWST   001535   01/0935 -- 01/0941 01/3279 01/3333 01/3348 01/3350 01/3397 01/3734 01/4232
SMCLN   002250   01/1379 -- unreferenced
SMEND   004247   01/2873 -- 01/2387 01/2405 01/2408 01/2411 01/2412 01/2432
SMULT   012145   01/5847 -- 01/5637 01/5848
SQR     004066   01/2358 -- unreferenced
SQRER   010752   01/5139 -- 01/4637
SSOV    003322   01/2003 -- 01/1998 01/2012 01/2074 01/2080
SSYMA   000301   01/0184 -- 01/3056 01/3100 01/3257 01/3266 01/3289 01/3595 01/5501 01/5581 01/5598
01/5616
SSYMT   007625   01/4522 -- 01/0184 01/4547 01/4565 01/4570
START   000100   01/0050 -- unreferenced
STBAS   000346   01/0221 -- 01/1370
STCMD   003657   01/2258 -- 01/0157
STDIM   005507   01/3222 -- 01/3189
STEMP   000211   01/0355 -- 01/4523 01/4528 01/4533 01/4540 01/4541 01/4542 01/4546 01/4548 01/4550
01/4564 01/4566 01/4567
STEP    004015   01/2328 -- 01/0235
STK1    000154   01/0098 -- 01/5455 01/5460 01/5590 01/5613 01/5623 01/5639 01/5650
STK10   000165   01/0107 -- 01/4759 01/4782
STK11   000166   01/0108 -- 01/4793 01/4807 01/4818
STK12   000167   01/0109 -- 01/1159 01/1207 01/1216 01/1218 01/1232
STK13   000170   01/0110 -- 01/1073 01/1084
STK14   000171   01/0111 -- 01/0627 01/0646 01/0649 01/0653 01/0657
STK15   000172   01/0112 -- 01/0357 01/0860 01/0872 01/0882 01/5201
STK16   000173   01/0113 -- 01/0370 01/0419
STK17   000174   01/0114 -- 01/0372 01/0420
STK18   000175   01/0115 -- 01/0398 01/0413 01/1276 01/2653 01/2777
STK19   000176   01/0116 -- 01/0368 01/0391 01/0423
STK2    000155   01/0099 -- 01/0147 01/1090 01/1093 01/1106 01/3594 01/3682
STK20   000177   01/0117 -- 01/0358
STK21   000200   01/0118 -- 01/0359
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STK22   000201   01/0119 -- 01/0360
STK23   000202   01/0120 -- 01/0361
STK24   000203   01/0121 -- 01/4266 01/4313
STK3    000156   01/0100 -- 01/0148 01/3513 01/3520
STK4    000157   01/0101 -- 01/0146 01/0894 01/0896 01/0916 01/0918 01/1097 01/1100 01/1112 01/1125
01/3757 01/3759 01/3760 01/3761 01/3831 01/3836 01/3842 01/3844 01/3884 01/3887 01/3984 01/3992 01/4002
01/4267 01/4281 01/4282 01/4291 01/4294 01/4342 01/4372 01/4441 01/4453 01/4467 01/4761 01/4765 01/4778
STK5    000160   01/0102 -- 01/0145 01/2673 01/2675 01/2743 01/2744 01/2763 01/2826 01/3830
STK6    000161   01/0103 -- 01/0444 01/0446 01/0460 01/0461 01/0465 01/4324 01/4326 01/4333 01/4346
01/4388 01/4415 01/4422 01/4471 01/4475
STK7    000162   01/0104 -- 01/0471 01/0531 01/0600 01/0601 01/2820 01/2833 01/2835 01/4445 01/4455
01/4462 01/4871 01/4880
STK8    000163   01/0105 -- 01/2852 01/2862 01/4665 01/4703 01/4709 01/4727
STK9    000164   01/0106 -- 01/4652 01/4668 01/4671 01/4691 01/4849 01/4854
STOP    002163   01/1298 -- 01/0058 01/1211
STOPA   000247   01/0157 -- 01/1304
STP     003757   01/2310 -- unreferenced
STROP   003601   01/2196 -- 01/1480 01/1689 01/1755 01/2126 01/2146 01/2152 01/2174 01/2204
STSR1   006123   01/3539 -- 01/3550
STSR2   006137   01/3551 -- 01/3544
STSRH   006120   01/3536 -- 01/3463 01/3549 01/3551 01/3552 01/3561 01/3678
STTOP   001553   01/0955 -- 01/0962 01/3380 01/3408 01/3970 01/4224 01/4256
STTYP   000353   01/0226 -- 01/1351 01/2769
SUB     012124   01/5822 -- 01/5630 01/5823
SYCMD   003656   01/2257 -- 01/0225
SYE10   002465   01/1549 -- 01/4589
SYE12   000671   01/0465 -- 01/0457 01/1569 01/4592
SYE13   002511   01/1581 -- 01/4593
SYE14   002543   01/1610 -- 01/4594
SYE15   002555   01/1620 -- 01/4595
SYE16   002606   01/1648 -- 01/4580
SYE17   002621   01/1659 -- 01/4596
SYE18   002632   01/1668 -- 01/1682 01/4597
SYE19   002705   01/1711 -- 01/4598
SYE20   002725   01/1727 -- 01/4599
SYE21   002737   01/1737 -- 01/4600
SYE22   002750   01/1746 -- 01/4601
SYE23   002771   01/1763 -- 01/4602
SYE24   003007   01/1777 -- 01/1783 01/4603
SYE25   004242   01/2463 -- 01/2484 01/2491 01/2497 01/4609
SYMC1   001363   01/0803 -- 01/0807
SYMC2   001373   01/0811 -- 01/0805
SYMCK   001355   01/0797 -- 01/0801 01/0802 01/0810 01/0818 01/0819 01/1490 01/1529 01/1572 01/1583
01/1595 01/1604 01/1665 01/1680 01/1692 01/1743 01/1760 01/1879 01/1902 01/1907 01/2018 01/2036 01/2054
01/2092 01/2111 01/2210 01/2221 01/6395 01/6403 01/6408
SYMT1   007645   01/4538 -- 01/4530 01/4532
SYMT2   007654   01/4545 -- 01/4563
SYMT3   007701   01/4566 -- 01/4549 01/4551
SYMT4   007674   01/4561 -- 01/4544
SYMTA   000117   01/0069 -- 01/3002 01/3170 01/4561
SYMTF   000132   01/0080 -- 01/3003 01/3074 01/3169 01/3207 01/3234 01/3235 01/3470 01/3599 01/4543
SYNE1   002223   01/1355 -- 01/4578
SYNE2   002333   01/1433 -- 01/4581
SYNE3   002346   01/1454 -- 01/0215 01/4582
SYNE4   002372   01/1477 -- 01/1469 01/1475 01/1857 01/1859 01/4583
SYNE5   002405   01/1488 -- 01/4584
SYNE6   002411   01/1492 -- 01/1531 01/1694 01/4585
SYNE7   002432   01/1515 -- 01/4586
SYNE8   002437   01/1527 -- 01/1556 01/4587
SYNE9   002452   01/1538 -- 01/4588
SYNT1   002234   01/1364 -- 01/1360
SYNTB   003020   01/1789 -- 01/0221
SYNTX   002205   01/1338 -- 01/1242
SZER    012176   01/5878 -- 01/5632 01/5879 01/5890
T1      013121   01/6368 -- 01/6131 01/6136 01/6157 01/6158 01/6163 01/6181 01/6186 01/6187 01/6188
01/6189 01/6217 01/6219 01/6226 01/6231 01/6290
T10     013132   01/6377 -- 01/6013 01/6050 01/6172 01/6249 01/6313
T11     013133   01/6378 -- 01/6017 01/6026 01/6039 01/6040 01/6176 01/6201 01/6208 01/6209 01/6210
01/6211 01/6235 01/6236 01/6237 01/6253 01/6266 01/6279 01/6331 01/6335 01/6336 01/6337
T12     013134   01/6379 -- 01/6018 01/6023 01/6035 01/6036 01/6043 01/6092 01/6105 01/6110 01/6114
01/6133 01/6142 01/6147 01/6179 01/6212
T13     013135   01/6380 -- 01/6069 01/6086 01/6089 01/6093 01/6111 01/6115 01/6134 01/6148 01/6289
01/6292 01/6293 01/6317 01/6338
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T16     013136   01/6381 -- 01/6117
T18     013140   01/6382 -- 01/6024 01/6030 01/6102 01/6108 01/6139 01/6145 01/6182 01/6190 01/6198
01/6206 01/6232 01/6245 01/6261 01/6304 01/6309 01/6328 01/6333
T19     013141   01/6383 -- 01/6103 01/6109 01/6140 01/6146 01/6183 01/6191 01/6199 01/6207 01/6233
01/6305 01/6329
T2      013122   01/6369 -- 01/6074 01/6112 01/6129 01/6149 01/6151 01/6152 01/6167 01/6185 01/6192
01/6193 01/6194 01/6195 01/6227 01/6240 01/6241 01/6243 01/6247 01/6291 01/6298 01/6299 01/6303
T3      013123   01/6370 -- 01/5739 01/5766 01/5956 01/6008 01/6155 01/6177 01/6251 01/6315 01/6349
01/6359
T4      013124   01/6371 -- 01/5769 01/5958 01/5974 01/6041 01/6052 01/6122 01/6125 01/6153 01/6238
01/6272 01/6294
T5      013125   01/6372 -- 01/5960 01/5981 01/6007 01/6014 01/6150 01/6164 01/6173 01/6250 01/6255
01/6263 01/6264 01/6265 01/6314 01/6318 01/6319 01/6320 01/6321
T6      013126   01/6373 -- 01/5787 01/5792 01/5793 01/5794 01/5795 01/5962 01/5963 01/5973 01/5975
01/5991 01/5994 01/6011 01/6037
T7      013127   01/6374 -- 01/5791 01/5801 01/6286 01/6300 01/6327 01/6346 01/6350 01/6356 01/6360
T8      013130   01/6375 -- 01/6287 01/6301
T9      013131   01/6376 -- 01/5889 01/5901 01/6010 01/6056 01/6171 01/6197 01/6202 01/6203 01/6204
01/6205 01/6283 01/6296 01/6297 01/6307 01/6311
TAB     004036   01/2342 -- 01/0237
TABCN   000473   01/0306 -- 01/1625
TABLE   004231   01/2871 -- 01/2380 01/2416
TAN     004047   01/2348 -- unreferenced
TAPE    002174   01/1310 -- unreferenced
TAPE!   000111   01/0063 -- 01/1182
TBLAD   000352   01/0225 -- 01/1247
TBLPT   004411   01/2875 -- 01/2417 01/2418 01/2424 01/2428 01/2441
TBSRH   004121   01/2379 -- 01/0169 01/2444 01/2445 01/2450
TEMP    000206   01/0349 -- 01/1344 01/1599 01/1616 01/1618 01/1697 01/1735 01/1776 01/1782 01/2545
01/2553 01/2558 01/2561 01/2571 01/2574
TEMP1   000207   01/0350 -- 01/1470 01/1478 01/1651 01/1687 01/1703 01/1753 01/1830 01/1863 01/1868
01/1965 01/1981 01/2034 01/2048 01/2124 01/2143 01/2145 01/2150 01/2172 01/2188 01/3636 01/3638 01/3643
01/3648 01/3651 01/3652 01/3655 01/3656 01/3657 01/3658 01/3670 01/3671 01/3672 01/3673 01/3675 01/3700
01/3703 01/3704 01/3705 01/3706 01/3720
TEMP2   000210   01/0351 -- 01/0429 01/1001 01/1472 01/1481 01/1684 01/1690 01/1750 01/1756 01/1832
01/1912 01/2046 01/2052 01/2127 01/2153 01/2154 01/2164 01/2191 01/2506 01/2511 01/2517 01/2565 01/2566
01/2568 01/2624 01/2685 01/2758 01/2772 01/2841 01/3633
TEMP3   000211   01/0352 -- 01/0430 01/0477 01/0501 01/0530 01/0547 01/0552 01/0554 01/0557 01/0563
01/0996 01/2383 01/2446 01/2567 01/2569 01/2582 01/2588 01/2599 01/2605 01/2608 01/2703 01/2717 01/2725
01/2755 01/2854 01/2855 01/2861 01/3598
TEMP4   000212   01/0353 -- 01/0433 01/0434 01/0437 01/0491 01/0498 01/0507 01/0508 01/0510 01/0529
01/0542 01/0564 01/1005 01/2245 01/2251 01/2385 01/2448 01/2606 01/2612 01/2613 01/2616 01/2626 01/2631
01/3538 01/3543 01/3635
TEMPS   000205   01/0124 -- 01/0125 01/0141 01/0142 01/0143 01/0144 01/0149 01/0150 01/0349 01/0350
01/0351 01/0352 01/0353 01/0354 01/0355 01/1364 01/1454 01/1461 01/1820 01/1886 01/1889 01/1913 01/1934
01/1966 01/1968 01/1987 01/2007 01/2050 01/2051 01/2067 01/2068 01/2073 01/2079 01/2086 01/2087 01/2640
01/2651 01/2657 01/2665 01/2669 01/2670 01/2674 01/2681 01/2701 01/2738 01/2740 01/2741 01/2742 01/2762
01/2764 01/2821 01/2825 01/2829 01/2872 01/2976 01/2977 01/2978 01/2979 01/2980 01/3280 01/3281 01/3283
01/3296 01/3310 01/3313 01/3323 01/3328 01/3332 01/3340 01/3342 01/3343 01/3344 01/3346 01/3349 01/3354
01/3355 01/3356 01/3358 01/3360 01/3365 01/3370 01/3379 01/3391 01/3401 01/3402 01/3585 01/3592 01/3625
01/3626 01/3650 01/3661 01/3763 01/3796 01/3800 01/3801 01/3804 01/3813 01/3814 01/3904 01/4031 01/4034
01/4037 01/4038 01/4040 01/4041 01/4044 01/4048 01/5485 01/5486 01/5490 01/5497 01/5504 01/5525 01/5528
01/5549 01/5558 01/5560 01/5591 01/5592 01/5605 01/5608 01/5614 01/5643 01/5644 01/5654 01/5655 01/5656
01/5658 01/5673 01/5674 01/5679 01/5680
TENTH   000466   01/0301 -- 01/0741 01/0750
TFLAG   000127   01/0077 -- 01/1160 01/1169 01/1282 01/1311
THEN    004010   01/2324 -- 01/0233
TIMES   002266   01/1393 -- 01/1744 01/1765
TINY    012273   01/5945 -- 01/5933 01/5936 01/5941
TO      004013   01/2326 -- 01/0234
TOPI    010675   01/5086 -- 01/5047
TRAN    012274   01/5949 -- 01/5636 01/5983
TRAN1   012310   01/5961 -- 01/5982
TRGER   010401   01/4914 -- 01/4636 01/5055
TRN     004116   01/2374 -- unreferenced
TRUE    007217   01/4218 -- 01/4163 01/4179 01/4188 01/4196 01/4203 01/4211 01/4235 01/4242 01/4259
TSPTR   004435   01/2876 -- 01/2429 01/2435 01/2436
TSR10   004163   01/2413 -- 01/2394 01/2409
TSRC1   004144   01/2398 -- 01/2427
TSRC2   004160   01/2410 -- 01/2404
TSRC3   004167   01/2417 -- 01/2426
TSRC4   004174   01/2422 -- 01/2440
TSRC5   004202   01/2428 -- 01/2421
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TSRC6   004206   01/2432 -- 01/2438
TSRC7   004211   01/2435 -- 01/2431
TSRC8   004217   01/2441 -- 01/2433
TSRC9   004224   01/2446 -- 01/2399 01/2402
TSRCH   000262   01/0169 -- 01/1249 01/1353 01/1513 01/1536 01/1547 01/1623 01/1657 01/1709 01/1838
01/1848 01/1958
TSTPT   000135   01/0083 -- 01/0976 01/0979 01/0981 01/0987 01/0989 01/3315 01/3316 01/3347 01/3366
01/3376 01/3381 01/3382 01/3473
TT1     000221   01/0139 -- 01/4098 01/4118
TT2     000223   01/0140 -- 01/4101 01/4112 01/4115 01/4129 01/4136
TT3     000211   01/0141 -- 01/4109 01/4121 01/4127 01/4133 01/4134
TT4     000212   01/0142 -- 01/4111 01/4122 01/4135
TTYFL   000130   01/0078 -- 01/0376 01/1161 01/1178 01/1245 01/1312
TYPE    000142   01/0088 -- 01/1113 01/1123 01/3017 01/3065 01/3090 01/3110 01/3139 01/3156 01/3450
01/3775 01/3853 01/3857 01/3921
TYPFL   000472   01/0305 -- 01/2704
UFLAG   002323   01/1422 -- 01/1822 01/1844 01/1895 01/1938 01/1974 01/1992
UNDER   001155   01/0651 -- 01/4641
UNEQL   002300   01/1403 -- unreferenced
UNMIN   002304   01/1407 -- unreferenced
UNMNC   000460   01/0295 -- 01/1940
UNNRM   000475   01/0308 -- 01/0905 01/0908
UNPAK   007367   01/4350 -- 01/4322 01/4331 01/4357 01/4373 01/4378 01/4420
UPLUS   002312   01/1413 -- unreferenced
USN     000063   01/0032 -- unreferenced
UTEMP   010466   01/4963 -- 01/4991 01/4992 01/4994 01/5002 01/5226 01/5227 01/5233 01/5234 01/5235
01/5237 01/5249 01/5313 01/5314 01/5328
VARO1   003531   01/2150 -- 01/2142
VARO2   003535   01/2154 -- 01/2149
VARO3   003547   01/2164 -- 01/2169
VARO4   003551   01/2166 -- 01/2163
VARO5   003555   01/2170 -- 01/2137 01/2139
VAROP   003507   01/2132 -- 01/1485 01/1525 01/1554 01/1579 01/1823 01/1980 01/1997 01/2134 01/2135
01/2140 01/2157 01/2165 01/2178
WRITE   000112   01/0064 -- 01/0378 01/0411 01/1118 01/1162 01/1165 01/1189 01/1213 01/1225 01/1246
01/1302 01/1305 01/2656 01/2679 01/2780 01/3863
X2TMP   011366   01/5422 -- 01/5351 01/5377 01/5378 01/5403 01/5434 01/5443 01/5469 01/5471 01/5476
01/5477
XEC     006016   01/3449 -- 01/0162
XEC2    006035   01/3470 -- 01/3464
XEC4    006054   01/3488 -- 01/0205 01/3422 01/3423 01/3424 01/3425 01/3436 01/3611 01/3618 01/3624
01/3694 01/3722 01/3726 01/3738 01/3749 01/3754 01/3868 01/3924 01/3934 01/3936
XEC4.   006055   01/3489 -- 01/0057
XEC4A   000326   01/0205 -- 01/5555 01/5626
XEC5    006065   01/3497 -- 01/3484 01/4627
XEC6    006066   01/3498 -- 01/3492
XECBR   000347   01/0222 -- 01/3506
XECTB   005771   01/3421 -- 01/0222
XECUT   000107   01/0057 -- unreferenced
XH      000151   01/0095 -- 01/3451 01/5109 01/5111 01/5126
XL      000152   01/0096 -- 01/3453 01/5112 01/5115 01/5119 01/5127
XTEMP   010462   01/4961 -- 01/4906 01/4907 01/4919 01/4920 01/4921 01/4930 01/4953 01/4954 01/4979
01/4980 01/4990 01/5009 01/5015 01/5016 01/5048 01/5049 01/5060 01/5061 01/5062 01/5070 01/5071 01/5072
01/5073 01/5074 01/5076 01/5084 01/5139 01/5145 01/5146 01/5154 01/5155 01/5164 01/5165 01/5177 01/5178
01/5216 01/5218 01/5222 01/5223 01/5228 01/5229 01/5240 01/5241 01/5245 01/5290 01/5291 01/5305 01/5306
01/5309 01/5310 01/5312 01/5332 01/5337 01/5338
YTEMP   010464   01/4962 -- 01/4931 01/4932 01/4934 01/4942 01/4943 01/4944 01/4951 01/4956 01/4957
01/5003 01/5004 01/5018 01/5019 01/5024 01/5151 01/5152 01/5157 01/5159 01/5162 01/5163 01/5167 01/5169
01/5170 01/5171 01/5220 01/5221 01/5253 01/5296 01/5297 01/5308 01/5317 01/5318 01/5322 01/5323 01/5324
01/5334 01/5335 01/5336 01/5340
ZER     004102   01/2366 -- 01/0230
ZERE    011257   01/5348 -- 01/5304 01/5353
ZRTNG   007151   01/4159 -- 01/4645
1048 symbols 87 unreferenced
6420 lines assembled, 5581 words generated
0 errors, 0 warnings
```